1. **Discussion Items:**
   a. Graduate Council Elections – Chair and Vice Chair Election
   b. Approval of Change in Graduate Council Standard Operating Procedures

2. **New Course Requests:**
   a. BMEN 622 Bioelectromagnetism
   b. BMEN 641 Numerical Methods in Biomedical Engineering
   c. EDCI 701 Elementary Science Instructional Strategies and STEM Learning
   d. EDCI 702 Elementary Mathematics Instructional Strategies and STEM
   e. FSTC 644 Disease Mechanisms of Foodborne Pathogens
   f. GEOP 631 Seismic Data Processing
   g. ICPE 601 Environmental Issues of Energy Systems
   h. ICPE 602 Reservoir Characterization and Modeling
   i. ICPE 603 Bioenergy
   j. ICPE 604 Energy Systems Engineering I
   k. ICPE 605 Energy Systems Engineering II
   l. ICPE 606 Introduction to Optimization
   m. ICPE 607 Energy Finance and Economics
   n. ICPE 608 Beyond Science and Technology: The Role of Policy in the Future of Energy in the U.S.
   o. ICPE 609 Introduction to U.S. Energy Law and Policy
   p. ICPE 610 The Global Energy Future
   q. ICPE 611 Economics of Energy
   r. ICPE 612 Entrepreneurship in Energy
   s. ICPE 613 Natural and Shale Gas Monetization: Technologies, Fundamentals, Economics, and Applications
   t. ICPE 614 CO2 Sequestration
   u. ICPE 615 Smart Grid Fundamentals
   v. ICPE 616 Multi-Functional Materials for Energy Conversion
   w. ICPE 617 Gas Separations for Energy: Fundamentals, Applications, and New Directions
   x. ICPE 618 Carbon Capture, Utilization and Storage, CCUS
   y. ICPE 619 Nanomaterials Engineering and Energy Storage
   z. ICPE 620 Thermoelectric Materials and Devices
   aa. ICPE 621 Thermoelectrics: Fundamentals of Electronic and Thermal Transport
   bb. ICPE 622 Energy Efficiency in Buildings
   cc. ICPE 623 Water-Energy-Food Nexus: Towards Sustainable Resource Allocation
   dd. ICPE 624 Energy-Water Nexus
   ee. ICPE 625 Integrated Risk Management for Exploration and Production Projects
   ff. ICPE 626 Safety in Energy Systems
   gg. ICPE 627 Interfacial Phenomena of Energy Systems
   hh. ICPE 628 Multi-physics Geomechanics for Energy Application (CO2, fracking, nuclear waste)
   ii. MEEN 645 Engineering Applications of Solid Mechanics
   jj. MSEN 636 Damage Mechanics and Failure in Composite Materials
   kk. NRSC 621 Functional Neuroanatomy
ll. PLAN 624  Digital Communication in Landscape Architecture and Urban Planning
nn. PLAN 667  Site Planning
oo. PSAA 657  Terrorism in Today’s World
pp. PSAA 660  Domestic Terrorism: The Internal Threat to America
qq. PSAA 667  Principles of International Law
rr. RDNG 610  Elementary Literacy Instruction for Facilitating STEM Learning
ss. RPTS 654  Amazon Field School
tt. SCSC 640  Intellectual Property in the Plant Sciences
uu. VIBS 621  Functional Neuroanatomy
vv. VTMI 604  Amazon Field School *(tabled at September 2014 meeting)*

3. **Course Change Requests:**
   a. PHYS 614  Introduction to Methods of Mathematical Physics
   b. PHYS 650  Kinetics of Electronic Processes
   c. WFSC 654  Amazon Field School

4. **Curriculum Change Request**
   a. Certificate in Engineering Therapeutics Manufacturing
   b. Certificate in Quality Engineering for Regulated Medical Technologies

5. **Special Consideration Items:**
   a. Administrative Change Proposal for the Master of Science in Engineering Systems Management
   b. Elimination of the Master of Science Degree in Health Physics
   c. Executive Master of Science in Energy Degree Program
   d. Five Year Joint Degree Program for Bachelor of Science in Agricultural Economics and Master of Public Service Administration
   e. Certificate in Energy
   f. Certificate in Transportation Planning
   g. Proposal for Course Prefix Changes to CHLS Courses
Discussion Items
Graduate Council (GC) Standard Operating Procedures (SOP)

Purpose: The Graduate Council shall review all curricular requests pertaining to the graduate and professional academic programs, shall be responsible for the quality and development of the graduate instruction and programs and shall advise the Associate Provost for Graduate Studies on all graduate program matters.

The Graduate Council shall communicate in writing, through its secretary, its recommendations to the Faculty Senate.

Meetings: The GC will meet on the first Thursday of each month.

(1) Membership shall consist of one representative from each college and off campus academic unit, who shall be selected by the Faculty Senate Committee on Committees after consultation with the college deans and caucuses (chair of college graduate instruction committees and associate deans for graduate programs shall be considered for appointment); two representatives of the Graduate Faculty; two graduate students; and the Associate Provost for Graduate Studies as an Ex-Officio member. All faculty members shall be members of the Graduate Faculty.

All of the above members except the Associate Provost shall be voting members. In the absence of the appointed member, a substitute may vote on behalf of that unit.

The Associate Directors of Graduate Studies, one representative of the University Library Council, and one member of the Medical Sciences Library shall serve as non-voting members. In addition, a representative from Curricular Services shall serve and provide advice as a non-voting member.

All faculty members shall serve three-year terms. Those serving on a committee as a result of their Texas A&M University position shall continue to serve as long as they are in that position. Student members shall serve one-year terms.

A representative from the Office of Graduate and Professional Studies (OGAPS) shall serve as secretary but not have voting privileges.

(2) The election for the GC Chair and Vice-Chair should take place during the October meeting for an effective date of 1 January. The chair and vice chair will be limited to one three-year term; the elevation of the vice-chair to chair, though commonplace, shall not be automatic. It is recommended that the Chair and Vice-Chair represent different Colleges. Special elections shall be conducted to accommodate mid-term changes in leadership.

(3) The GC shall review all proposed courses, programs, and changes to existing curricula at the graduate level and shall recommend appropriate policies to improve and develop graduate academic programs. An ad hoc subcommittee of the GC (assembled by the Chair) shall review special requests for graduate admission, such as baccalaureate equivalency decisions. All items for review by the GC or GC subcommittees shall be routed through the appropriate colleges for approval.

(4) Items requiring vote include New Courses, Course Withdrawal, Change in Courses, Change in Curricula, Administrative Changes and Special Considerations (including new programs, degrees and certificates). These items may be approved, not approved, approved with changes (friendly amendments), referred to an electronic vote (e-vote, see item 11) prior to the deadline to submit to Faculty Senate, or postponed to a certain time (tabled, see item 12). Each item must receive a majority vote to pass. That is, at least half (50 percent) of GC voting members in attendance must
approve an agenda item.

(5) The College representative or designee must be present to answer any questions regarding an agenda item. If a question arises and no representative is present, then the item will not be considered.

(6) Letters of support from all academic programs affected by curricular changes shall be provided to the GC by the department bringing the item(s) forward.

(7) Proposed courses in which undergraduate and graduate students meet together at the same time with the same instructor (“stacked courses”) must have an instructor of record that is a member of the Graduate Faculty and the syllabus must clearly indicate the additional work required for the graduate students.

(8) New cross-listed courses require individual sets of approval forms. Adding a cross-listed course to an existing course only needs to be considered by the GC if the course is a new course.

(9) Approval of research and problem-based credit hours (685 and 691) and exploratory new (special topics) courses (689) do not require the GC approval.

(10) The GC shall operate under these rules:

  Eight working days prior to meeting (e.g., Tuesday prior to a Thursday meeting the following week) all agenda items are due to OGAPS.

  No later than Monday on the week of meeting all voting and non-voting members will receive the agenda as a digital file easily searched and including all materials necessary to complete an informed review.

  No Consent Agenda is designated. Rather, all agenda items will be fully considered at the Thursday meeting.

  Any agenda item may be challenged at the meeting by a motion from a Committee Member with a second from another Committee Member.

(11) The Chair and/or Vice-Chair may elect to hold an electronic vote (e-vote) meeting when agenda items are minimal and there are no pending deadlines. An e-vote for a specific agenda item with an extremely tight deadline may also be used as deemed appropriate by the Chair or Vice-Chair and voted by the committee. E-votes by the committee are sent to the Secretary for compilation. The Chair and Vice-Chair are notified and the agenda item either passes or fails based on the e-votes received.

(12) The GC may vote to postpone voting on an agenda item (table the item) for various reasons (i.e., no representative present, support letters missing, corrections to form/syllabus, etc.). It is the responsibility of the department to resubmit the postponed item for reconsideration with the updates as requested by the committee.

(13) Submissions for consideration by the GC that are not complete or correct by stated GC standards will be returned by the Secretary, in consultation with the Chair and/or Vice Chair.

(14) New course requests and course changes involving significant content modification or alteration in course credit hours must include syllabi that comply with current University minimum syllabus requirements (http://curricularservices.tamu.edu).
New Courses
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: [ ] Undergraduate  [x] Graduate  [ ] First Professional (e.g., DPM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Biomedical Engineering
3. Course prefix, number and complete title of course: BMEN 622 - BIOELECTROMAGNETISM
4. Catalog course description (not to exceed 50 words): This course will provide an introduction to electric, magnetic, and electromagnetic phenomena in association with biological tissues. It will address source modeling based on physiological current including line and volume conductor models as well as electromagnetic-based stimulation, sensing, and imaging.

5. Prerequisite(s): Graduate classification or permission of instructor
Cross-listed with: [ ] Stacked with: BMEN 422
Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? [ ] Yes  [x] No  If yes, from _____ to _____
7. Is this a repeatable course? [ ] Yes  [x] No  If yes, this course may be taken _____ times.
Will this course be repeated within the same semester? [ ] Yes  [x] No

8. Will this course be submitted to the Core Curriculum Council? [ ] Yes  [x] No

9. This course will be:
a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
M.S., M.Eng., Ph.D. in Biomedical Engineering

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. [x] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix: BMEN  Course #: 622  Title (excluding punctuation): BIOELECTROMAGNETISM

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and ENU Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
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</table>

Approval recommended by: Gerard L. Coté
Department Head or Program Chair (Type Name & Sign) 7-15-14
Chair, College Review Committee 9/12/14

Department Head or Program Chair (Type Name & Sign) (if cross-listed course) Date
Dean of College 9/12/14

Submitted to Coordinating Board by: Chair, GC or UCC

Submitted Date Effective Date

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 04/14
Course title and number: BMEN 422/622. Bioelectromagnetism. (3-0). Credit 3.
Term: TBA
Meeting times and location: TBA, TBA

Course Description and Prerequisites
Introduction to electric, magnetic, and electromagnetic phenomena in the context of interactions with biological tissues and medical applications including electro- and magneto- cardiograms and encephalograms and imaging modalities.

Prerequisite: Graduate classification or permission of instructor

Learning Outcomes or Course Objectives

- Students will be able to use the techniques, skills, and modern engineering tools necessary for engineering practice in the study of electromagnetic interactions in association with biological tissues.
- Students will be able to evaluate the use of modeling methods in understanding bioelectromagnetic-based phenomenon.

Instructor Information

Name: Staff
Telephone number: TBA
Email address: TBA
Office hours: TBA
Office location: TBA

Textbook and/or Resource Material

References:
- Basic Introduction to Bioelectromagnetics by Durney and Christensen
- Bioelectricity: A Quantitative Approach by Plonsey and Barr
- Bioelectromagnetism by Jaako Malmivuo, Robert Plonsey
- Div Grad Curl and All That by H.M. Schey
- CRC Handbook of Biological Effects of Electromagnetic Fields, Second Edition
- Fundamental and Applied Aspects of Nonionizing Radiation by Michaelson, Miller, Magin, Carstensen

Grading Policies

BMEN 422:

<table>
<thead>
<tr>
<th>Exam 1</th>
<th>20/100</th>
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<tbody>
<tr>
<td>Exam 2</td>
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<tr>
<td>Final</td>
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<tr>
<td>Homework/Quizzes</td>
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BMEN 622:

<table>
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<tr>
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<tbody>
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<tr>
<td>Homework/Quizzes</td>
<td>20/120</td>
</tr>
<tr>
<td>Special Topics Project</td>
<td>20/120</td>
</tr>
</tbody>
</table>
Scale: 90-100 A, 80-89 B, 70-79 C, 60-69 D, Below 60 F
These ranges are guaranteed, but may expand or contract based on semester grade distribution.

All exams will be cumulative. Quizzes will be based entirely on homework. Homework will be graded as a completion grade. The completed homework/quiz set comprises a single total grade with the quiz accounting for 75% and the completed homework for 25%. Homeworks will be assigned at least one week in advance. Only officially excused university absences (http://student-rules.tamu.edu/rule07) will justify a make-up exam. The exam must be rescheduled by the student within one week of the missed exam.

Course Topics

1. Basic electromagnetic quantities
2. Vector Calculus
3. Maxwell's Equations
4. Physiological Sources
5. Statics: Electro- and Magneto- cardiograms and encephalograms
6. Statics: Electro- and Magneto- cardiograms and encephalograms
7. Statics: Magnetic Resonance Imaging
8. Dynamics: Magnetic Resonance Imaging
9. Dynamics: Magnetic Resonance Imaging
10. Dynamics: Specific Absorption Rate
11. Visible Radiation
12. Ionizing Radiation: radiography and nuclear medicine
13. Special topics: electromagnetic modeling techniques
14. Special topics: ablation techniques, terahertz imaging

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B1'8, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

Attendance Policy

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully but is not technically considered in the calculation of grades (see Grading Policies above). University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.
Texas A&M University

Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: □ Undergraduate  ☑ Graduate  □ First Professional (e.g., D.O., M.D., M.D., etc.)
2. Request submitted by (Department or Program Name): Biomedical Engineering
3. Course prefix, number and complete title of course: BMEN 641^ Numerical Methods in Biomedical Engineering
4. Catalog course description (not to exceed 50 words): The application of numerical analysis to analyze molecular, cellular and physiological systems; students will learn general techniques used to analyze steady and dynamic systems; these techniques will be applied in a MATLAB programming environment.

5. Prerequisite(s): BIOL 213, VTTP 435 and BMEN 207, graduate level, or permission of instructor

Cross-listed with: Stacked with: BMEN 441

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  ☑ No  If yes, from _______ to _______
7. Is this a repeatable course? □ Yes  ☑ No  If yes, this course may be taken _______ times.

Will this course be repeated within the same semester? □ Yes  ☑ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes  ☑ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   M.S., M.Eng, Ph.D. in Biomedical Engineering

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.

   Attach approval letters.

11. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    BMEN  641  NUMER METH BIOMED ENGR

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<th>Lab</th>
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<th>Admin. Unit</th>
<th>Acad. Year</th>
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Approval recommended by: __________________________ __________________________

Department Head or Program Chair (Type Name & Sign) Date Chair, College Review Committee Date

Department Head or Program Chair (Type Name & Sign) Date
(if cross-listed course) Dean of College Date

Submitted to Coordinating Board by: __________________________

Chair, GC or UCC Date

Associate Director, Curricular Services Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 04/14
Course title and number  BMEN 641 Numerical Methods in Biomedical Engineering
Term  TBA
Meeting times and location  TBA, TBA

Course Description and Prerequisites

The purpose of the course is to apply numerical analysis to analyze molecular, cellular and physiological systems. Students will learn general techniques used to analyze steady and dynamic systems. These techniques will be applied in a MATLAB programming environment.
Prerequisites: BIOL 213, VTPP 435 and BMEN 207, graduate level, or permission of instructor

Learning Outcomes

The learning outcomes include the following ABET criteria (A, E and K).
- Students will be able to apply knowledge of mathematics, science, and engineering relative to numerical methods in biomedical engineering
- Students will be able to identify, formulate, and solve engineering problems involving numerical methods in biomedical engineering
- Students will be able to use the techniques, skills, and modern engineering tools necessary for engineering practice when working with numerical methods in biomedical engineering

Instructor Information

Name  Roland Kaunas, Ph.D.
Telephone number  845-2412
Email address  rkaunas@bme.tamu.edu
Office location  5020 Emerging Technologies Building (ETB)
Office hours  TBA

Textbook and/or Resource Material


Grading Policies

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Letter Grading Scale</th>
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<tr>
<td>Homework 10%</td>
<td>A = 90-100</td>
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<tr>
<td>3 Exams 60%</td>
<td>B = 80-89</td>
</tr>
<tr>
<td>Research 30%</td>
<td>C = 70-79</td>
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<tr>
<td>Paper/Project</td>
<td>D = 60-69</td>
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<td></td>
<td>E = 60-69</td>
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## Course Topics

<table>
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<th>Modeling Applications Discussed</th>
<th>Required Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction: Modeling biosystems</td>
<td></td>
<td>Ch. 1</td>
</tr>
<tr>
<td>2-3</td>
<td>Concepts: Numerical algorithms, error propagation, Taylor series</td>
<td>Force balances in biomechanics, image processing, mass balance in metabolic reactions</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>4-5</td>
<td>Steady state behavior in linear models: methods for solving simultaneous equations</td>
<td>Enzyme kinetics, cell migration, bioheat transport, flow in narrow catheters</td>
<td>Ch. 4</td>
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<tr>
<td>6-7</td>
<td>Steady state behavior of nonlinear models: Newton-Raphson method for single equations, Newton's method for simultaneous equations</td>
<td>(Examples to be determined)</td>
<td>Ch. 5</td>
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<tr>
<td>8-9</td>
<td>Finite difference methods, Interpolating of functions, Newton-Coates methods for integration</td>
<td></td>
<td>Ch. 6</td>
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<tr>
<td>10-11</td>
<td>Dynamic behavior of ordinary differential equations: Euler methods, Runge-Kutta methods, stability analysis</td>
<td>Unsteady reaction kinetics, pharmacokinetics, action potential propagation</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>12-14</td>
<td>Dynamic behavior of partial differential equations</td>
<td>Molecular diffusion, stretching of membranes under pressure and tension, cell migration</td>
<td>Ch. 8</td>
</tr>
</tbody>
</table>

### Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

### Academic Integrity

*For additional information please visit: [http://aggiehonor.tamu.edu/](http://aggiehonor.tamu.edu/)*

*"An Aggie does not lie, cheat, or steal, or tolerate those who do."

### Attendance Policy and Grading Scale Examples

*"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at [http://student-rules.tamu.edu/rule07.]*
Texas A&M University  
Departmental Request for a New Course  
Undergraduate * Graduate * Professional  
* Submit original form and attach a course syllabus.*

Form Instructions

1. Course request type:  
   🔺 Undergraduate 🔺 Graduate 🔺 First Professional (ODS, MD, JD, PharmD, DVM)

2. Request submitted by (Department or Program Name):  
   Department of Teaching, Learning and Culture  
   EDCI 701: Elementary Science Instructional Strategies and STEM Learning

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Focuses on developing engaging STEM activities using inquiry and project-based learning approaches; creation of appropriate assessments for STEM activities and integrated STEM learning units.

Graduate Classification

5. Prerequisite(s):
   __________________________________________________________________________
   Cross-listed with: 
   __________________________________________________________________________
   Stacked with: 
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  
   ☐ Yes  ☑ No  
   If yes, from ________ to ________

7. Is this a repeatable course?  
   ☐ Yes  ☑ No  
   If yes, this course may be taken ________ times.

   Will this course be repeated within the same semester?  
   ☐ Yes  ☑ No

   Will this course be submitted to the Core Curriculum Council?  
   ☐ Yes  ☑ No

8. How will this course be graded:  
   ☑ Grade  ☐ S/U  ☐ P/F (CLMD)

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Online M.Ed. in Curriculum and Instruction
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
      M.Ed., M.S., Ph.D. in Curriculum and Instruction

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix  
    Course #  
    Title (excluding punctuation)
    EDCI 701  Elem Science Inst Strat

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Approval recommended by:  
Dr. Yeping Li  
Yeping Li  9/1/14

Dr. George Cunningham  
Chair, College Review Committee  
09/19/14

Dr. George Cunningham  
Dean of College  
09/19/14

Dr. Mark Zoran  
Chair, GC or UCC  
Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 07/14
EDCI 701 Elementary Science Instructional Strategies and STEM Learning
Spring 2016

Instructor:
Julie Singleton, PhD
Office: 354 Harrington Tower
Office hours: By appointment
Email: jsingle@tamu.edu or jsingle47@yahoo.com

Course Description: Online elementary STEM science methods course; focus on developing engaging STEM activities using inquiry and project-based learning approaches; creation of appropriate assessments for STEM activities and integrated STEM learning units.
Prerequisites: Graduate classification.

Learning outcomes: The objectives of this course will focus on preparing elementary school teachers to draw on a rich knowledge of science content and pedagogy to provide meaningful STEM learning experiences for all students. Specifically, students will:
- Participate in STEM learning experiences
- Design STEM inquiry learning experiences for elementary students
- Create integrated units around STEM themes
- Generate alternative assessments appropriate to STEM activities
- Explore funding opportunities for STEM projects
- Discuss and reflect upon STEM readings and class projects as a learning community.

Textbook:

Expectations and Student Responsibilities
It is essential that you complete the required readings, discussions and other tasks in the given time period. Anticipate and prepare for projects with due dates in mind. Communicate with each other in a positive and critically constructive manner. Ask me if a task is unclear to you. Read weekly announcements. I expect all students to contribute their best effort.

Evaluation: Your grade in the course will be determined by the following:

- Online discussions (6, 20pts each) 120
- Peer reviews (6, 20pts each) 120
- Helicopter video 100
- Integrated STEM Lesson 100
- Cardboard Design video 100
- Verbal design space colony 100
- Alternative Assessments 90
- Real World Lesson 130
- Funding Web Search 40
- Final Quiz 100

Grading: Letter grades will be assigned on the following basis:
1000-930 A  929-840 B  839-760 C  759-700 D  699> F
## Tentative Course Schedule:

The instructor reserves the right to change any activities and assignments based on class needs.

<table>
<thead>
<tr>
<th>Week/Topic</th>
<th>Activity</th>
<th>Reading/Video</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STEM Inquiry Helicopter: test design &amp; material variables</td>
<td>Intro video; Engineering for All; Inquiry Handout</td>
<td>Online discussion</td>
</tr>
<tr>
<td>2</td>
<td>STEM Inquiry Helicopter: Present best design with data video</td>
<td>Science for All Americans</td>
<td>Post/Peer review helicopter designs</td>
</tr>
<tr>
<td>3</td>
<td>STEM Inquiry Brainstorm Airplane inquiry</td>
<td>Etheridge &amp; Rudinski</td>
<td>Online discussion</td>
</tr>
<tr>
<td>4</td>
<td>Integration Design Integrated STEM Unit</td>
<td>Models for Curriculum Integration</td>
<td>Post/Peer Review Integrated units</td>
</tr>
<tr>
<td>5</td>
<td>Cardboard Designs Brainstorm cardboard designs that teach science concepts</td>
<td>Video: Caine’s Arcade</td>
<td>Post list/Online discussion</td>
</tr>
<tr>
<td>6</td>
<td>Cardboard Designs Create cardboard designs</td>
<td>Attributes of a Great STEM teacher</td>
<td>Online discussion</td>
</tr>
<tr>
<td>7</td>
<td>Verbal Design Present cardboard designs</td>
<td>Chap. 1 Textbook</td>
<td>Post/Peer Review Cardboard designs</td>
</tr>
<tr>
<td>8</td>
<td>Verbal Design Design a space colony</td>
<td>Tyson Video; Human Needs in Space</td>
<td>Online discussion</td>
</tr>
<tr>
<td>9</td>
<td>Spring break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Verbal Design Present space colony</td>
<td>Power Point: Authentic Assessment</td>
<td>Post/Peer review space colony</td>
</tr>
<tr>
<td>11</td>
<td>Alternative Assessments Create assessments</td>
<td>Chap. 4 Textbook</td>
<td>Post/Peer review assessments</td>
</tr>
<tr>
<td>12</td>
<td>Real World STEM Design an integrated STEM Project using the outdoors or a field trip as the context</td>
<td>Chap. 5 Textbook; Greening STEM</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Real World STEM Continue from week 12</td>
<td>Chap. 7 Textbook</td>
<td>Post/peer review Real World lessons</td>
</tr>
<tr>
<td>14</td>
<td>Funding Web search funding for STEM projects Final quiz</td>
<td>Science Proficiencies</td>
<td>Post/online discussion funding for STEM Quiz; Real World STEM revisions</td>
</tr>
</tbody>
</table>

**Online Discussions:** Reply to discussion prompts about the readings or video. Engage with at least three other students’ responses. Discussion will open Monday at 8:00AM and close the following Sunday at 11:00PM.

**Peer Reviews:** Comment on what was done well and also give suggestions for improvement in terms of the pedagogy, science content/process, presentation and overall quality for at least two students. If a student already has been peer reviewed, choose a different student to review.
Helicopter Video: Design a helicopter that stays aloft the longest, collect data, revise the design. Present your investigation process, data and best helicopter in a 3-5 minute video. Rubric posted. Group assignment.

Integrated Lesson: Using the problem-based model format, provide a central theme and give an objective and activity description for science, math, technology, writing, reading and fine arts lessons.

Cardboard Design Video: Based on Caine's Arcade, build and present your cardboard design in action. Include science and math applications. Rubric posted.

Verbal design space colony: Design a colony for humans on a space ship or body in space that can meet survival needs and exploration goals. Rubric and reading on human needs in space is posted.

Alternative Assessments: Create a Rubric, concept map structure, and diagram assessment for the science activity from your integrated lesson, verbal design, cardboard design or airplane lesson.

Real World STEM Project: Design a STEM unit around a field trip or community project. Include proposal, timeline and a specific science lesson. Rubric and example posted.

Funding Web Search: Find at least 4 STEM education funding opportunities; post online.

Texas A&M University Rules and Regulations

Texas A&M Code of Honor

"Aggies do not lie, cheat, or steal, nor do they tolerate those who do."

"The Aggie Code of Honor is an effort to unify the aims of all Texas A&M men and women toward a high code of ethics and personal dignity. For most, living this code will be no problem, as it asks nothing of a person that is beyond reason. It only calls for honesty and integrity, characteristics, which Aggies have always exemplified. The Aggie Code of Honor functions as a symbol to all Aggies promoting understanding and loyalty to truth, and confidence in each other."

To review the Student Rules access http://student-rules.tamu.edu/ and click on Part 1: Academic Rules. Please visit the Academic Integrity web-site, http://aggiehonor.tamu.edu/ to learn more about the Aggie Honor System Office at Texas A&M University.

Make-up work will be accepted for an excused absence. Alternative assignments can be given for class participation activities such as online discussions and peer reviews. For further information see: http://student-rules.tamu.edu/rule07

ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their
disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in
Cain Hall, Room B118, or call 979-845-1637. For additional information visit http://disability.tamu.edu.

Course Evaluation
The course evaluation information will be e-mailed to your tamu account during the last month of classes. Please
participate in the evaluation process so I can improve the course. The address for submitting evaluation is
https://pica.tamu.edu

Attendance Policy and Late Work Submission Policy: Make-up work will be accepted for an excused absence.
Alternative assignments will be given for class participation activities such as online discussions. It is the student’s
responsibility to communicate attendance issues to the instructor. For further information see: http://student-
rules.tamu.edu/rule07

Bibliography


professional development intervention on elementary teachers’ science process skills.
Research in the Schools, 18(2), 16-25.

Education, 132(1), 77-84.


Judson, E.(2014). Effects of transferring to STEM-focused charter and magnet schools on
doi:10.1080/00220671.2013.823367

Kuenzi, J. J. (2007). Science, technology, engineering, and mathematics (STEM) education
issues and legislative options (CRS Report No. RL33434). Retrieved from: Congressional
Research Service.HTTP://congressional.proquest.com.lib-ezproxy.tamu.edu:


helping all students succeed in the engineering design process. Science and Children,
47(7), 24-27.


President’s Council of Advisors on Science and Technology (2010). Prepare and inspire: K-12 education on science, technology, engineering, and math (STEM) for America’s future. Retrieved from: http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-stemed-report.pdf


Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:
   - Undergraduate
   - Graduate
   - First Professional (DDS, MD, JD, PharmD, DVM)

2. Request submitted by (Department or Program Name):
   Department of Teaching, Learning and Culture
   EDCI 702: Elementary Mathematics Instructional Strategies and STEM Learning

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Focuses on teaching models and the design of elementary mathematics instruction for digital age learners; emphasizes placed on inquiry learning modes in science, technology, engineering, and mathematics (STEM).

Graduate Classification

5. Prerequisite(s):

   Cross-listed with: ____________________________
   Stacked with: ____________________________

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?
   - Yes
   - No
   If yes, from ________ to ________

7. Is this a repeatable course?
   - Yes
   - No
   If yes, this course may be taken ________ times.

   Will this course be repeated within the same semester?
   - Yes
   - No

8. Will this course be submitted to the Core Curriculum Council?
   - Yes
   - No

9. How will this course be graded?
   - Grade
   - S/U
   - P/F (CLMD)

10. This course will be:
    a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
       Online M.Ed. in Curriculum and Instruction
    b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
       M.Ed., M.S., Ph.D. in Curriculum and Instruction

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix  Course #  Title (excluding punctuation)

<table>
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<th>Prefix</th>
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   Approval recommended by:

   - Dr. Yeping Li
   - Dr. George Cunningham
   - Dr. Mark Zoran
   - Chair, College Review Committee
   - Dean of College
   - Chair, GC or UCC
   - Date
   - Date
   - Date

   Submitted to Coordinating Board by:

   - Associate Director, Curricular Services
   - Date
   - Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 07/14
EDCI 702: Elementary Mathematics Instructional Strategies and STEM Learning
Department of Teaching, Learning, and Culture
(Spring 2016) – Syllabus

Course Instructor
Dr. Trina J. Davis
Texas A&M University, College Station, TX 77843-4232

Office: 412/425 Harrington Tower
Email: trinadavis@tamu.edu
http://people.cehd.tamu.edu/~tdavis

Mobile Phone: 979.255.0051
Skype Username: dr.trina.davis

Virtual Office & Classroom Sessions: By Appointment and per the Schedule
Course Site on eCampus: http://ecampus.tamu.edu
We will also use the Blackboard (Bb) Collaborate tool in eCampus to engage in our
synchronous/real time virtual sessions.

Course Description –
Online course, focus on teaching models and the design of elementary mathematics
instruction for digital age learners; emphases placed on inquiry learning models in
science, technology, engineering, and mathematics (STEM).
Prerequisite: Graduate Classification

Learning Outcomes:
Upon successful completion of the course students will:
- Develop an understanding of the trends and perspectives in early
  mathematics learning including a critical examination of scholarly work
  focused on research and best practices
- Examine and utilize an array of teaching models that can be employed to
  engage 21st century digital-age learners
- Explore the affordances of embedding the development of information and
  communication technology (ICT) skills in mathematics learning or integrated
  STEM learning [e.g., national educational technology ISTE standards]
- Develop ability to design instruction for digital age learners with emphases in
  inquiry learning in science, technology, engineering, and mathematics
  (STEM).

REQUIRED TEXT
century learners. Pearson Education.

ADDITIONAL SELECTIONS FROM


**Statement on Plagiarism**
All materials generated for this class (which may include but are not limited to syllabi and in-class materials) are copyrighted. You do not have the right to copy such materials unless the instructor expressly grants permission. As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have permission of that person. Plagiarism is one of the worst academic violations, for the plagiarist destroys trust among others. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

I understand the Aggie Honor Code and will honor it the entire semester in EDCI 689. If I chose to not honor it, consequences will occur according to the University Rules concerning Plagiarism and the Aggie Honor Code.

**Aggie Honor Code**
"An Aggie does not lie, cheat, or steal or tolerate those who do."

For more information please consult Honor Council Rules and Procedures on the web http://www.tamu.edu/aggiehonor

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."

**Americans with Disabilities Act (ADA)**
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

**Excused Absence**
http://student-rules.tamu.edu/rule07

7.1 The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Among the reasons absences are considered excused by the university are the following:

7.1.6 Injury or illness that is too severe or contagious for the student to attend class.
7.1.6.1 Injury or illness of three or more days. For injury or illness that requires a student to be absent from classes for three or more university business days (to include classes on Saturday), the student should obtain a medical confirmation note from his or her medical provider. The Student Health Center or an off-campus medical professional can provide a medical confirmation note only if medical professionals are involved in the medical care of the student. The medical confirmation note must contain the date and time of the illness and medical professional's confirmation of needed absence.

7.1.6.2 Injury or illness less than three days. Faculty members may require confirmation of student injury or illness that is serious enough for a student to be absent from class for a period less than three university business days (to include classes on Saturday). At the discretion of the faculty member and/or academic department standard, as outlined in the course syllabus, illness confirmation may be obtained by one or both of the following methods:

a. Texas A&M University Explanatory Statement for Absence from Class form available at [http://attendance.tamu.edu](http://attendance.tamu.edu)
b. Confirmation of visit to a health care professional affirming date and time of visit.

7.1.6.3 An absence for a non-acute medical service does not constitute an excused absence.

To view all Student Rules, please go to: [http://student-rules.tamu.edu](http://student-rules.tamu.edu)

**COURSE REQUIREMENTS & ASSIGNMENTS —**

Students enrolled in the Elementary Education program option will be encouraged to develop class projects and papers that reflect materials and issues related to teaching in elementary schools. I trust that you are motivated to work independently, because this course will be completely web-based. Guidance and asynchronous communication will be provided, but the experience of working through the reading assignments and related tasks will require independent work and much self-directed effort. Opportunities for engaging in synchronous learning experiences (online/virtually) will also be a component of the course.

Assignment 1 — **Early Mathematics Learning Research Brief:** Develop a research brief on perspectives in early mathematics learning. Briefs should address key components of the research (e.g., subjects, context, methods, findings, implications for practice or future research) (15 Points).

Assignment 2 — **Micro Lesson Analysis:** Analyze video of a micro lesson that demonstrates the ISTE national technology standards. This assignment will be completed in two parts. For part 1, students will explore resources that help to define and unpack the national technology standards. Part 2 will focus on the micro lesson analysis (15 Points).
Teaching Models in Action:
Assignment 3 – **Concept/Instructional Analysis:** Develop an instructional analysis for the formal level of attainment of the concept that includes (20 Points):
- A multimedia presentation of an actual lesson for the concept
- Inclusion of all 7 guidelines (Klausmeier & Allen, 1978) in a document that specifically examines the defining attributes and variable attributes (of your target concept) in the example/non-example sets
- Develop an actual instructional presentation that provides all of the elements of an instructional analysis for attaining a concept at the formal level.
- This should be an actual lesson, not simply a PowerPoint presentation of your instructional analysis.

Assignment 4 – **Math and STEM Exercises:** Multiple opportunities to design, engage in, and critique math and STEM activities. Instructional planning, designs and activities should reflect effective strategies for inquiry, and the like, explored in the course (32 Cumulative Points).

Assignment 5 – **Engagement:** Actively participate in weekly technology engagement, planning, reflection, and sharing micro-activities during the specified time range (0-2 Points per sharing exercise, Total - 18 Possible Points).

**GRADING SYSTEM**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Research Brief</td>
<td>= 15</td>
</tr>
<tr>
<td>Micro Lesson Review</td>
<td>= 15</td>
</tr>
<tr>
<td>Concept/Instructional Analysis</td>
<td>= 20</td>
</tr>
<tr>
<td>Mathematics-STEM Learning Activities</td>
<td>= 32</td>
</tr>
<tr>
<td>Technology Engagement, Reflection, and Sharing</td>
<td>= 18</td>
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<tr>
<td><strong>Total Points for Course</strong></td>
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**Course Grade**

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<tr>
<th>Grade</th>
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<tr>
<td>A</td>
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<tr>
<td>B</td>
<td>80 - 89</td>
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<tr>
<td>C</td>
<td>70 – 79</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>below 60</td>
</tr>
</tbody>
</table>

**Late Assignments**
Late assignments: grades on assignments submitted after the due date will be reduced by 5% each day, to a maximum of 50%. Late assignments will not be accepted after the
date the class assignments are graded and returned to students who submitted their assignments on time. Rules on excused university absences also apply.

<table>
<thead>
<tr>
<th>OVERVIEW OF READINGS SCHEDULE</th>
<th>Weekly Topics &amp; Readings</th>
</tr>
</thead>
</table>
| **Week 1** Jan 20 - 25       | *Teacher as Educational Designer, Trends in the 21st Century Learning Landscape*  
                                Kilbane & Milman (2014), Chap 1 |
| **Week 2** Jan 26 - Feb 1     | *Research and Perspectives on Early Mathematics Learning* |
| **Week 3** Feb 2 – 8          | *Why STEM? Setting the STEM Context*  
                                Moomaw (2013), Chap 1 |
| **Week 4** Feb 9 – 15         | *Instructional Tools: Models, Strategies, and Technologies*  
                                Kilbane & Milman (2014), Chap 3 |
| **Week 5** Feb 16 – 22        | *Unpacking Information and Communication Technology Standards and K-6 Mathematics.* Materials will be provided by Dr. Davis |
| **Week 6** Feb 23 – March 1   | *Direct Instruction Model*  
                                Kilbane & Milman (2014), Chap 5 |
| **Week 7** March 2 - 8        | *Classroom-Based Assessment in the 21st Century*  
                                Kilbane & Milman (2014), Chap 4 |
| **Week 8** March 9 - 15       | *Concept Attainment Model,*  
                                *Developing a Concept/Instructional Analysis*  
                                Kilbane & Milman (2014), Chap 6 |
| **March 16 - 22**             | *Spring Break* |
| **Week 9** March 23 - 29      | *Inquiry Model*  
                                Kilbane & Milman (2014), Chap 10 |
| **Week 10** March 30 – April 5| *Problem-Based Learning (PBL) Model; and Problem-Based Learning Versus Project-Based Learning*  
                                Kilbane & Milman (2014), Chap 11 |
| **Week 11** April 6 - 12      | *STEM Learning & Activities*  
                                Moomaw (2013), Chap 2, and 3 |
| **Week 12** April 13 - 19     | *STEM Learning & Activities*  
                                Moomaw (2013), Chap 6 |
| **Week 13** April 20 - 26     | *Changing Views on Assessment,*  
                                *Classroom-Based Assessment in the 21st Century Cont.*  
                                Kilbane & Milman (2014), Chap 4 |
| **Week 14** April 27 – May 3  | *Mathematics/STEM Lesson Exploration* |
**WEEKLY SCHEDULE** (Monday to Sunday)
Note, all assignments unless otherwise instructed will be due on Sundays by 11:59 pm.

**Online Discussions** Reply to discussion prompts about the readings or exercises. Engage with at least three other students' responses. Discussion will open Monday at 8:00AM and close the following Sunday at 11:59 PM.

<table>
<thead>
<tr>
<th>WEEKS/DATES</th>
<th>Readings/Assignments</th>
<th>Tech Engagement/Sharing/Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weekly Topics –</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Week 1**  
*Teacher as Educational Designer, Trends in the Learning Landscape* | Familiarize Yourself with the Course: Read Over Syllabus  
Read: Kilbane & Milman (2014), Chap 1 | Ice-breaker Exercise |
| **Week 2**  
*Research and Perspectives on Early Mathematics Learning* | Research Brief Topic Selection | Online Discussion/Sharing  
Virtual Collaborate Session TBA |
| **Week 3**  
*Why STEM? Setting the STEM Context* | Read: Moomaw (2013), Chap 1 | Submit Assignment 1 – Research Brief |
| **Week 4**  
*Instructional Tools: Models, Strategies, and Technologies* | Read: Kilbane & Milman (2014), Chap 3 | Online Discussion/Sharing |
| **Week 5**  
*Unpacking Information and Communication Technology Standards and K-6 Math* | Engage in Technology Standards Exercise and Lesson Review | Virtual Collaborate Session  
Submit Assignment 2 – Micro Lesson Review |
| **Week 6**  
*Direct Instruction Model* | Read: Kilbane & Milman (2014), Chap 5 | Online Discussion/Sharing |
| **Week 7**  
*Classroom-Based Assessment in the 21st Century* | Read: Kilbane & Milman (2014), Chap 4 | Online Discussion/Sharing  
Virtual Collaborate Session |
| **Week 8**  
*Concept Attainment Model, Developing a Concept/Instructional Analysis* | Read: Kilbane & Milman (2014), Chap 6 | Submit Assignment 3 – Concept/Instructional Analysis |

*Spring Break*
<table>
<thead>
<tr>
<th>Week 9</th>
<th>Inquiry Model</th>
<th>Read: Kilbane &amp; Milman (2014), Chap 10</th>
<th>Online Discussion/Sharing</th>
</tr>
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<tbody>
<tr>
<td>Week 10</td>
<td>Problem-Based Learning (PBL) Model; and Problem-Based Learning Versus Project-Based Learning</td>
<td>Read: Kilbane &amp; Milman (2014), Chap 11</td>
<td>Online Discussion/Sharing</td>
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<tr>
<td>Week 11</td>
<td>STEM Learning &amp; Activities</td>
<td>Read: Moomaw (2013), Chap 2, and 3</td>
<td>Virtual Collaborate Session</td>
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<td></td>
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<td>Engage in Math-STEM Learning Activity</td>
<td>Mathematics-STEM Learning Activity – Due</td>
</tr>
<tr>
<td>Week 12</td>
<td>STEM Learning &amp; Activities</td>
<td>Read: Moomaw (2013), Chap 6</td>
<td>Online Discussion/Sharing</td>
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<td>Week 13</td>
<td>Changing Views on Assessment, Classroom-Based Assessment in the 21st Century Cont.</td>
<td>Read: Kilbane &amp; Milman (2014), Chap 4</td>
<td>Online Discussion/Sharing</td>
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<tr>
<td>Week 14</td>
<td>Mathematics/STEM Lesson Exploration</td>
<td>Engage in Math-STEM Learning Activity Wrap Up</td>
<td>Virtual Collaborate Session</td>
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<td>Complete Course Evaluation <a href="http://pica.tamu.edu">http://pica.tamu.edu</a></td>
<td>Mathematics-STEM Learning Activity – Due</td>
</tr>
</tbody>
</table>

THE INSTRUCTOR RESERVES THE RIGHT TO CHANGE ANY COURSE ACTIVITIES AND ASSIGNMENTS BASED ON CLASS NEEDS ANYTIME DURING THE SEMESTER. STUDENTS WILL BE ADEQUATELY NOTIFIED WHENEVER CHANGES OCCUR.

**Technology Engagement, Reflection and Sharing**

I have set up spaces for discussions and engagement within online discussion boards. In addition to the formal asynchronous learning activities that I've designed for the course, I will provide opportunities for synchronous virtual class sessions as well (we will use Blackboard Collaborate). I believe that this kind of engagement has the potential to be a powerful component of the course. I hope that it will in some ways help to foster a strong community of learners and provide a venue for scholarly engagement throughout the course.
Discussion Etiquette:

*The whole class online discussion areas ARE:*

- A space for assigned activities that include scholarly exchanges
- A space where I can share valuable resources and just-in-time information and opportunities with you
- A space where I/we can share work that you and other scholars are doing that is germane to the course and/or our collective scholarly interests

*The whole class online discussion areas ARE NOT:*

- A place to discuss individual grades or assignment issues
- An ideal place where pairs or small groups of folks can meet to discuss personal/individual stories or issues. This tends to be distracting for other students who are trying to follow the scholarly exchanges. Please use the email system that is integrated in the course (OR arrange “private” virtual meetings) to collaborate with fellow classmates in small groups or one on one.
- Again, personal or individual messages that are meant for one or two students or a question for the professor should be sent via private correspondences rather than posted in the public discussion boards or areas. Any inquiries about assignments or grades should be addressed to the professor or a particular student privately. When in doubt, an email or private correspondence to the individual(s) is always best.

I encourage you to support each other as you progress through the course.

**eCampus Course Tip**

A good convention is to access the course eCampus site at least three times per week (at the beginning, middle, and end of the week). Logging in more frequently or daily is optimal, for a few minutes to check for updates by the professor or to read student posts/sharing.

**Netiquette Guidelines**

"Netiquette" is Network Etiquette, the rules of proper behavior in an online environment. Online communication can be difficult sometimes due to the absence of non-verbal cues and body language that we all depend upon when communicating face to face--thus the need for proper Netiquette. Because the online medium is a relatively new one, rules of conduct are somewhat in a state of flux, but the following are always worthwhile suggestions to observe:

1. Remember, there's always a human on the other end of an electronic communication. Treat him or her with the same respect that you'd like to receive.
2. What you say may be forgotten, but what you write will live on for a long time.
3. Be careful with humor; what appears witty or ironic to you may appear sarcastic and critical to your reader. By the same token, you may misinterpret messages sent by others to you.
4. Use emoticons and other symbols to indicate humorous intent. 😊
5. Be diplomatic; written communication often appears harsher than spoken communication.
6. DON'T USE ALL CAPS—in addition to being difficult to read, this is considered "shouting" in electronic communication.
7. Be brief.
8. Use pertinent subject lines.
9. Keep in mind that an e-mail lacking a greeting and/or a closure may appear curt and unfriendly to your reader. (ex: Howdy! Or Regards, )


BIBLIOGRAPHY


Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: □ Undergraduate  □ Graduate □ First Professional (ex., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): NFSC
3. Course prefix, number and complete title of course: FSTC 644 • DISEASE MECHANISMS OF FOODBORNE PATHOGENS
4. Catalog course description (not to exceed 50 words): Principles of pathogenicity of foodborne bacteria; mechanisms used by disease-causing bacteria leading to human illness; basic principles of immunology and human and bacterial physiology; investigation of bacterial virulence factors and effects of stress response, quorum sensing and other external factors.

5. Prerequisite(s): FSTC 326 OR BIOL 351 OR INSTRUCTOR APPROVAL
Cross-listed with:  Stacked with:  Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  □ No  If yes, from _____ to _____
7. Is this a repeatable course? □ Yes  □ No  If yes, this course may be taken _____ times.
Will this course be repeated within the same semester? □ Yes  □ No
8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No
9. This course will be:
a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
not required
b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
M.S., Ph.D. degree plans (varied degree programs)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix: FSTC  Course #: 644  Title (excluding punctuation): DIS MECH FOOD PATH
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Approval recommended by: 7/29/14

Department Head or Program Chair (Type Name & Sign) Date
Chair, College Review Committee
Date

Department Head or Program Chair (Type Name & Sign) Date
(if cross-listed course)
Dean of College
Date

Submitted to Coordinating Board by: 8/27/14
Chair, GC or UCC
Date

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 04/14
FSTC 644
"Disease Mechanisms of Foodborne Pathogens"
Fall 2014

Instructor: Dr. Elsa A. Murano, Professor and President Emerita, Dept. of Nutrition and Food Science, Director of Norman Borlaug Institute for International Agriculture
AGSV Building 2nd Floor Suite, emurano@tamu.edu

Meeting Times: T & Th 8:00-9:15am, Room 300 Kleberg Center

Course Description:
Principles of pathogenicity of foodborne bacteria; mechanisms used by disease-causing bacteria leading to human illness; basic principles of immunology and human and bacterial physiology; investigation of bacterial virulence factors and effects of stress response, quorum sensing and other external factors.

Pre-requisites:
FSTC 326 or similar microbiology course at the undergraduate level. Enrollment in FSTC 606 is desirable, but not required.

Textbook:
No textbook is required. However, for students lacking in microbiology background, the following are recommended:

Learning Outcomes:
The student will gain an appreciation for the complexity of the mechanisms which foodborne bacteria utilize to survive and thrive, which can result in disease in humans.

Learning Objectives:
The student should be able to:
1. Describe the general concepts of bacterial and human physiology, and immunology.
2. Explain in detail the major virulence mechanisms of foodborne pathogenic bacteria.
3. Describe how external factors affect the ability of foodborne bacteria to cause disease.

Teaching Philosophy:
I will assume that students have not been introduced to many of the concepts covered in this course, so it is taught at an advanced, yet introductory level, in an organized step-by-step process. I will assume, however, that the student has recall of previous knowledge regarding general food bacteriology, as well as basic biochemistry. As course instructor, I will come to class prepared to address certain topics.

Student Responsibilities:
I expect the student to act as a professional: come to class on time and ready to learn, pay attention, review the material ahead of time when appropriate, make the most of the time in class, and to ask questions on topics not completely understood. Electronic communication devices are to be turned off or placed in silent mode when in the classroom. This will benefit the learning environment for you, your fellow classmates, and the instructor. A cell phone ringing may be confiscated for the rest of the class. Doodling on any electronic device during class (checking cell phone messages, text messaging, etc.) will also result in the loss of the device for the rest of the class period.

Exams:
There will be four, one-hour exams given throughout the semester, with only three exams counting toward the final grade. The fourth exam can be used to make up a missed exam, or to take the place of the lowest grade on one of the other three exams. When used to replace the lowest grade, whatever score is obtained on the fourth exam will replace the previous lowest grade, even if the score on the fourth exam is lower. Exam questions will be a combination of True and False, short answers, and longer essay questions designed to test critical thinking skills. Exam format may be altered as necessary, with adequate time given for student notification.

Grading System:
Grading will consist of points accumulated for three of the exams given, with each exam consisting of 100 points, for a maximum total of 300 points. Grades will be assigned as follows:

A: 270-300 points
B: 240-269 points
C: 210-239 points
D: 180-209 points
F: <180 points

Grades will be made available as soon as possible, and will be posted online. Actual exam papers will be handed back to the student.

Make-ups:
Absolutely NO makeup exams will be given. A student may exercise the option of dropping the grade on a missed exam.

Course Calendar:
The following is a tentative class schedule. Exam dates are tentative, and will be finalized only after the material on that exam has been covered. Also taken into consideration will be scheduled exams in other courses so as not to overload the student.
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<td>2: General human physiology</td>
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<td>7: Antibiotic Resistance</td>
<td>9: Attachment and Invasion Factors</td>
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<td>14: Intracellular Survival Factors</td>
<td>16: EXAM #2</td>
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<td>28: Exotoxins (EHEC, C. jejuni, ETEC)</td>
<td>30: Exotoxins (C. botulinum, Y. enterocolitica, superantigen)</td>
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<td>4: The Stress Response and Virulence</td>
<td>6: EXAM #3</td>
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<td>11: Virulence Assays</td>
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<td>18: Vaccine Development</td>
<td>20: Secondary sequelae</td>
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<td>25: Secondary sequelae</td>
<td>27: Thanksgiving – NO CLASS</td>
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<td>December</td>
<td>2: Quorum sensing and ecology</td>
<td>4: EXAM #4</td>
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**Americans with Disabilities Act:**
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services in Cain Hall, Room B118, or call 845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

**Academic Integrity Statement and Policy:**
Cheating, plagiarism, and similar acts are unbecoming of Texas A&M University students. According to Part I, Section 309 of the University Regulations, such conduct can result in a variety of disciplinary actions, including assignment of “F” in the course, suspension, or expulsion. In other words, don’t forget the Aggie Honor Code: “Aggies do not lie, cheat, or steal, nor do they tolerate those who do”. For more information, visit [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor).
Texas A&M University
Departmental Request for a New Course
Undergraduate □ Graduate □ Professional

Submit original form and attach a course syllabus.

Form Instructions:

1. Course request type: □ Undergraduate □ Graduate □ First Professional (DDS, MD, JD, PharmD, DVM)

2. Request submitted by (Department or Program Name): Department of Geology and Geophysics
GEOP 631 Seismic Data Processing

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
Methods used to image the Earth using seismic reflection data, including deconvolution, f-k filtering, velocity analysis, and migration; processing software; emphasis on field data.

5. Prerequisite(s):

Cross-listed with: 

Stacked with: Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes □ No 
If yes, from _______ to _______

7. Is this a repeatable course? □ Yes □ No 
If yes, this course may be taken ______ times.

Will this course be repeated within the same semester? □ Yes □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes □ No

9. How will this course be graded: □ Grade □ S/U □ P/F (CLMD)

10. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

M.S. or Ph.D. in Geology, Geophysics, Oceanography

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix Course # Title (excluding punctuation)

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Approval recommended by:

Department Head or Program Chair (Type Name & Sign) Date 8/13/14

Chair, College/Department Committee Date 8/27/2014

Department Head or Program Chair (Type Name & Sign) Date (if cross-listed course)

Submitted to Coordinating Board by:

Chair, GC or UCC Date

Associate Director, Curricular Services Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845 8201 or sandra.williams@tamu.edu.
Curricular Services – 07/14
Course title and number  Seismic Data Processing  GEOP 631

Term
Meeting times and location  TBA

Course Description and Prerequisites

Survey of basic methods used to image the Earth using seismic reflection data, including deconvolution, f-k filtering, velocity analysis, and migration; introduction to processing software; exercises emphasize developing experience with field data.

Prerequisites: Graduate standing or approval of instructor.

Learning Outcomes

Students will be able to:

- explain the major processing steps required from field data acquisition to generation of seismic images
- design and test data processing work flows to apply seismic data to answer geologic questions
- apply quantitative tests to choose optimal data processing methods depending on acquisition geometry, signal-to-noise ratio and other variations in data quality
- distinguish artifacts associated with data processing steps from features indicating important geological structures
- discuss and interpret seismic processing results to communicate corresponding geological insights to other scientists and engineers

Instructor Information

Name  Richard L. Gibson, Jr.
Telephone number  979-862-8653
Email address  gibson@tamu.edu
Office hours  TBA
Office location  Halbouty 351

Textbook and/or Resource Material

Practical Seismic Data Analysis, by H.-W. Zhou (Cambridge University Press, 2014 ISBN: ). The syllabus, course announcements, and some other supplementary materials will be posted during the semester on the course website. The syllabus, course announcements, and some other supplementary materials will be posted during the semester on the course website.

Grading Policies

The most important course component for grade assignment will be completion of data processing tasks on field data provided for each student. Each student will also prepare an oral report on the assigned data and the results of the processing tasks, including a description of the final seismic image obtained during the semester. A midterm and final exam will also be given to test comprehension of processing methods.

The grade will be determined as follows:

Processing assignments and homework  50%
Term project presentation  20%
Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

Copyright and Plagiarism Policy

All materials used in this class are copyrighted. These materials include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless permission is expressly granted.

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the Aggie Honor Code site (http://aggiehonor.tamu.edu) or the latest issue of the Texas A&M University Student Rules, http://students-rules.tamu.edu.
Texas A&M University
Departmental Request for a New Course
Undergraduate + Graduate + Professional
- Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: □ Undergraduate   ☒ Graduate   □ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program In Energy, ICPE
3. Course prefix, number and complete title of course: ICPE 601: Environmental Issues of Energy Systems
4. Catalog course description (not to exceed 50 words): Introduction to energy-related engineering principles and energy conservation and efficiency; basic processes and chemicals/materials used in the current and emerging energy systems; impact on the environment; approaches for minimizing contaminants released by usage of energy sources.

5. Prerequisite(s): Graduate classification
Cross-listed with: Stacked with:
Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes   ☒ No
   If yes, from _______ to _______
7. Is this a repeatable course? □ Yes   ☒ No
   If yes, this course may be taken ______ times.
   Will this course be repeated within the same semester? □ Yes   ☒ No
8. Will this course be submitted to the Core Curriculum Council? ☒ Yes   □ No
9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
11. ☒ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-contrl-basics-for-distance-education).

12. Prefix: Course #  Title (excluding punctuation)
    ICPE 601  ENVIRONMENTAL ISSUES OF ENERGY

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Approval recommended by:

Dr. Costas N. Georgiadis
Department Head or Program Chair (Type Name & Sign) Date
Chair, College Review Committee Date

Department Head or Program Chair (Type Name & Sign) Date
(If cross-listed course)

Dean of College Date

Submitted to Coordinating Board by:

Chair, GC or UCC Date

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8281 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-601: Environmental Issues of Energy Systems

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Dr. Mustafa Akbulut
Texas A&M University
Artie McFerrin Department of Chemical Engineering
230 Jack E. Brown Engineering Building
3122 TAMU
College Station, TX 77843-3122
Tel:(979)-847-8766
Email: makbulut@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
While all energy sources affect the environment, some have a greater impact than others. First, this module will seek to provide a short introduction to energy-related engineering principles and energy conservation and efficiency. Then, it will aim to familiarize students with the basic processes and chemicals/materials used in the current and emerging energy systems; and discuss their impact on the environment in detail. The next objective of the module will be to describe approaches for minimizing contaminants released by usage of energy sources. In addition, the module will seek to provide the knowledge and understanding of traditional and novel environmental remediation technologies for spills and accidents that are related to the energy systems.

Course Content:
1. Introduction (2 x 2hr)
   1a. Forms of Energy, Energy Transformation
   1b. Conservation Law for Energy, Net Energy Analysis, Thermodynamic Efficiency
   1c. Methods and Techniques in Environmental Science
   1d. Health and Hazard Risk Evaluation Process
2. Oil/Natural Gas (3 x 2hr)
   2a. Principles of Oil and Natural Gas Recovery
   2b. Materials and Chemicals Used in Oil and Natural Gas Recovery
   2c. Environmental Impact of Oil and Natural Gas Recovery
2d. Oil Spills and Natural Gas Accidents
2e. Strategies for Oil Spill Remediation
2f. Environmental Impact of Oil and Natural Gas Usage
2g. Emission Reduction Techniques for Oil and Natural Gas Activities
3. Coal (1 × 2hr)
3a. Basics of Coal Mining
3b. Environmental Impact of Coal Mining
3c. Operation of Coal Power Plants
3d. Environmental Effects of Coal Power Plants
3e. Technologies for Reducing Environmental Impacts of Coal-Fired Plants
4. Biomass and Biofuel (0.5 × 2hr)
4a. Biomass Power Plants
4b. Conversion of Biomass into Biofuel
4c. Environmental Issues of Biomass Power Plants and Biomass Production
5. Nuclear Energy (0.5 × 2hr)
5a. Introduction to Nuclear Power Generation
5b. Effects of Radiation on Environment and Health
5c. Approaches for Radioactive Cleanup
6. Geothermal Energy (0.5 × 2hr)
6a. Sources of Geothermal Energy
6b. Geothermal Power Generating Systems
6c. Geothermal Power Plant Case Studies
6d. Environmental Effects of Geothermal Power Plants
7. Hydropower (0.5 × 2hr)
7a. Fundamentals of Hydropower
7b. Environmental Issues of Hydroelectric Power
8. Wind Energy (0.5 × 2hr)
8a. Introduction to Wind energy
8b. Environmental Issues of Wind Energy
9. Solar Energy (0.5 × 2hr)
9a. Principles of Solar Energy
9b. Solar Energy Materials and Their Environmental Impact
9c. Solar Power Plants and Their Environmental Issues
10. Battery, Fuel Cells, Supercapacitors (1 × 2hr)
10a. Basics of Batteries, Fuel Cells, and Supercapacitors
10b. Chemicals and Materials Used in Batteries, Fuel Cells, and Supercapacitors
10c. Environmental Impacts of Materials Used in Batteries and Supercapacitors

**Required Textbook:** *Energy Resources: Availability, Management, and Environmental Impacts*

**Suggested Reading:**
  - Material (e.g., articles) from instructor(s).
Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final exam 50%.

_grade scale_: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

"Take home exam" due by 4:00pm two days after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism: http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

**U.S. ENERGY CONSUMPTION BY SOURCE**

- **Biomass** 2.9% renewable: Heating, electricity, transportation
- **Petroleum** 38.1% nonrenewable: Transportation, manufacturing
- **Hydropower** 2.7% renewable: Electricity
- **Natural gas** 22.9% nonrenewable: Heating, manufacturing, electricity
- **Geothermal** 0.3% renewable: Heating, electricity
- **Coal** 23.2% nonrenewable: Electricity, manufacturing
- **Wind** 0.1% renewable: Electricity
- **Uranium** 8.1% nonrenewable: Electricity
- **Solar & other renewable** 0.1% renewable: Light, heating, electricity
- **Propane** 1.7% nonrenewable: Manufacturing, heating
Texas A&M University
Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional
• Submit original form and attach a course syllabus. •

Form Instructions:

1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy
3. Course prefix, number and complete title of course: ICPE 602: Reservoir Characterization and Modeling
4. Catalog course description (not to exceed 50 words): Application of geostatistical techniques to build reservoir models through the integration of geological, core/well log, seismic and production data to generate a consistent reservoir description; background and insights to geostatistical modeling techniques and situations where the application of geostatistics could add value.

5. Prerequisite(s):

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Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  □ No  If yes, from ________ to ________
7. Is this a repeatable course? □ Yes  □ No  If yes, this course may be taken ________ times.
   Will this course be repeated within the same semester? □ Yes  □ No
8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No
9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vr.tamu.edu/resources/export-controls/export-control-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation):

| ICPE 602 | RESERVOIR CHARACTERIZATION AN |

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Approval recommended by: Level 5

Dr. Costas N. Georgiades
Department Head or Program Chair (Type Name & Sign) Date 9/22/14
Chair, College Review Committee Date 9/22/14

Department Head or Program Chair (Type Name & Sign) Date 9/22/14
(if cross-listed course)

Department Head or Program Chair (Type Name & Sign) Date 9/22/14
Dean of College Date 9/22/14

Submitted to Coordinating Board by:

Chair, GC or UCC Date

Associate Director, Curricular Services Date

Effective Date Date
ICPE-602: Reservoir Characterization and Modeling

Term: Fall 2015  
Day: MTuWThF  
Time: TBD (4.4hrs/day)  
Location: TBD  
Number of Credits: 1.5 Credits

Instructors: 
Dr. Akhil Datta-Gupta  
Harold Vance Department of Petroleum Engineering  
401G Richardson  
Texas A&M University, TAMU 3116  
Phone: (979) 847-9030  
Fax: (979) 862-1272  
Email: a.datta-gupta@pe.tamu.edu  
Office hours: by appointment

Dr. Michael King  
Harold Vance Department of Petroleum Engineering  
401E Richardson  
Texas A&M University, TAMU 3116  
Phone: (979) 845-1488  
Email: mike.king@pe.tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description: 
This course addresses the application of geostatistical techniques to build reservoir models through the integration of geological, core/well log, seismic and production data to generate a consistent reservoir description. It will introduce reservoir modeling workflow from construction of the 3D static reservoir model through upscaling and dynamic reservoir simulation. The course provides background and insights to geostatistical modeling techniques and the situations where the application of geostatistics could add value. It will also provide guidance in the assembly and analysis of the required data for geostatistical techniques and the resulting numerical models.

Day 1  
- Morning  
  - Geostatistical Reservoir Modeling - An Overview  
  - Heterogeneity Measures /Decision Making Under Uncertainty  
- Afternoon  
  - Review of Probability/Distributions
• Univariate Analysis/Data Transformations

Day 2
  – Morning
    • Covariance and Variograms
    • Variogram Modeling and Interpretation
  – Afternoon
    • Simple and Ordinary Kriging
    • Cross-validation

Day 3
  – Morning
    • Co-kriging/Collocated Co-kriging
    • Conditional Simulation/Sequential Methods
  – Afternoon
    • Indicator Simulation of Lithofacies
    • Boolean/Object-based Models
    • Multipoint Geostatistics
    • Software Applications

Day 4
  – Morning
    • Multidisciplinary Data Integration
    • Data Correlation/Electrofacies Classification
    • Integration of Seismic Data
  – Afternoon
    • Upscaling
    • Experimental Design and Applications

Day 5
  – Morning
    • Flow Simulation Through Geologic Models
    • Streamline Simulation: Applications
  – Afternoon
    • Streamline Simulation: Applications (contd.)
    • Conclusions

Course Goals and Objectives
- Understand the reservoir modeling workflow from construction of the 3D static reservoir model through upscaling for dynamic reservoir simulation
- Review basic concepts of univariate and bi-variate statistics
- Improve awareness of geostatistics and the situations where the application of geostatistical techniques could add value
- Learn how to gather and analyze the required data for geostatistical techniques
- Appreciate the limitations of the resulting geocellular models and the geostatistical techniques
- Outline a systematic approach to a reservoir modeling study (layering, rock type modeling, porosity modeling, permeability modeling)
- Get an introduction to flow simulation through geologic models

Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructors and made available via email or during class.
Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism: http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (ex. DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE 603: Bioenergy
4. Catalog course description (not to exceed 50 words): Introduction to the fundamentals of biomass (biochemistry and resources); basics of important processing technologies for the pre-treatment and conversion of biomass to useful products.

5. Prerequisite(s): Graduate classification
   Cross-listed with:  Stacked with:
   Cross-listed courses require the signature of both department heads.
6. Is this a variable credit course? □ Yes  □ No  If yes, from _____ to _____
7. Is this a repeatable course? □ Yes  □ No  If yes, this course may be taken _____ times.
   Will this course be repeated within the same semester? □ Yes  □ No
8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No
9. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.
11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix: ICPE  Course #: 603  Title (excluding punctuation): BIOENERGY
    Lect  Lab  S/U  CRF and Fund Code  Admin. Unit  Acad Year  EIC Code
    1  5  1  5
    Approval recommended by:
Dr. Costas N Georgiadis  9/22/14  Chair, College Review Committee  9/22/14
Department Head or Program Chair (Type Name & Sign)  Date
   Department Head or Program Chair (Type Name & Sign)  Date
   Dean of College  Date
   Submitted to Coordinating Board by:
   Chair, GC or UCC  Date
   Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu
Curricular Services – 04/14
ICPF-603: Bioenergy

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Dr. Mark T. Holtzapple
Department of Chemical Engineering
200 Jack E. Brown Engineering Building
Texas A&M University
College Station, TX 77843
Phone: (979) 845-9708
Email: m-holtzapple@mail.che.tamu.edu
Office hours: by appointment

Dr. Sergio Capareda
Department of Biological and Agricultural Engineering
303D Scoates Hall
Texas A&M University
College Station, TX 77843
Phone: (979) 458-3028
Email: scapareda@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
This course will introduce the students to the basics of biochemistry, elemental cycles, biomass resources, physical processing, thermal processing, biological processing and separations technologies. The specific topics are presented below:

<table>
<thead>
<tr>
<th>Topics</th>
<th>Instructor</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biochemistry</strong></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Basics (e.g., sugars, starch, cellulose, hemicellulose, lignin, fats, proteins, enzymes)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Plant structure</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Cell structure</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Photosynthesis (C3, C4)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Aerobic metabolism</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Anaerobic metabolism</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td><strong>Elemental cycles</strong></td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Carbon</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Phosphorous</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td><strong>Biomass resource</strong></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Plants (production, crop selection, yields, storage)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Starch crops</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Oil crops</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Lignocellulose crops (woody, herbaceous)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Algae</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Wastes (e.g., municipal solid waste, sludge, manure, ag residues)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Biomass characteristics (e.g., composition, heat of combustion, density)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td><strong>Physical processing</strong></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Grinding</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Pelleting</td>
<td>Holtzapple</td>
<td></td>
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<tr>
<td><strong>Thermal processing</strong></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Torrefaction</td>
<td>Capareda</td>
<td></td>
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<tr>
<td>Pyrolysis</td>
<td>Capareda</td>
<td></td>
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<tr>
<td>Gasification</td>
<td>Capareda</td>
<td></td>
</tr>
<tr>
<td>Advanced gasification</td>
<td>Capareda</td>
<td></td>
</tr>
<tr>
<td>Biomass liquefaction</td>
<td>Capareda</td>
<td></td>
</tr>
<tr>
<td>Combustion</td>
<td>Capareda</td>
<td></td>
</tr>
<tr>
<td><strong>Biological processing</strong></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Starch processing (dry mill, wet mill)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Lignocellulose pretreatment</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Saccharification (enzymatic, acid)</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Direct microbial conversion</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td><strong>Separation technology</strong></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Extraction</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Distillation and evaporation</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td>Ion exchange</td>
<td>Holtzapple</td>
<td></td>
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<tr>
<td>Adsorption</td>
<td>Holtzapple</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

**Required Textbook:** There is no required textbook.

**Suggested Reading:**
Articles and book chapters will be assigned by the instructors and made available via email or during class.
Course requirements:

- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm two days after the last lecture. One letter grade will be deducted for each day past the deadline.

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http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

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Texas A&M University
Departmental Request for a New Course
Undergraduate □ Graduate □ Professional □
Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: □ Undergraduate □ Graduate □ First Professional (e.g., DPM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy

3. Course prefix, number and complete title of course: ICPE 604: Energy Systems Engineering I

4. Catalog course description (not to exceed 50 words): State-of-the-art topics for energy systems engineering, including modelling of energy systems, mixed integer and continuous optimization techniques for the analysis of energy systems, model based control & interactions of design, control and scheduling of power and energy systems.

5. Prerequisite(s): Graduate classification
Cross-listed with: ____________________________
Stacked with: ____________________________

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes □ No
If yes, from _________ to _________

7. Is this a repeatable course? □ Yes □ No
If yes, this course may be taken _________ times.
Will this course be repeated within the same semester? □ Yes □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.

11. I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-control/export-control-basics-for-distance-education).

12. Prefix Course # Title (excluding punctuation)
    ICPE 604 ENERGY SYSTEMS ENGINEERING I

<table>
<thead>
<tr>
<th>Lect</th>
<th>Lab</th>
<th>SCI</th>
<th>CP and Fund Code</th>
<th>Admin Unit</th>
<th>Acad Year</th>
<th>HCC Code</th>
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</thead>
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<td>5</td>
<td>1 5</td>
<td>16</td>
<td>0 0 3 6 3 2</td>
</tr>
</tbody>
</table>

Approval recommended by:

Dr. Costas N. Georgiadis
Department Head or Program Chair (Type Name & Sign) Date 9/22/14
Chair, College Review Committee Date 9/22/14

Department Head or Program Chair (Type Name & Sign) Date 9/22/14
(if cross-listed course)

Chair, GC or UCC Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-604: Energy Systems Engineering I

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day) Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Professor Christodoulos A. Floudas (Effective February 1, 2015)
Department of Chemical Engineering
225 Brown Building
Texas A&M University
College Station, TX 7843-3122
Email: floudas@tamu.edu
Office hours: by appointment

Professor Efstratios N. Pistikopoulos (Effective January 1, 2015)
Department of Chemical Engineering
217 Brown Building
Texas A&M University
College Station, TX 7843-3122
Email: stratos@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
This course covers state-of-the-art topics for energy systems engineering, including modelling of energy systems, mixed integer and continuous optimization techniques for the analysis of energy systems, model based control & interactions of design, control and scheduling of power and energy systems.

The course will focus on:
- Modelling principles for the synthesis, design, analysis and control of energy systems - modelling with 0-1 variables
- Continuous optimization
- Mixed integer linear and nonlinear programming
- Heat exchanger network synthesis and optimization
- Optimization under uncertainty - design for flexibility & operability
Suggested books and Reading

- Articles and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:

- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

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Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: ☐ Undergraduate  ☒ Graduate  ☐ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE 605: Energy Systems Engineering II
4. Catalog course description (not to exceed 50 words): State-of-the-art topics for energy systems engineering, including modeling of hybrid feedstock energy systems, energy supply chain networks, polygeneration systems, model predictive control, fuel cells, and combined heat and power systems.

5. Prerequisite(s): ICPE-604
   Cross-listed with: 
   Stacked with: 
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? ☐ Yes  ☒ No  If yes, from ______ to ______
7. Is this a repeatable course? ☐ Yes  ☒ No  If yes, this course may be taken ______ times.
   Will this course be repeatable within the same semester? ☐ Yes  ☒ No
8. Will this course be submitted to the Core Curriculum Council? ☒ Yes  ☐ No
9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.
11. ☐ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    ICPE  605  ENERGY SYSTEMS ENGINEERING II

    | Lect. | Lab | #  | CH # | Fund Code | Admin. Unit | Acad. Year | HCL Code |
    |-------|-----|----|------|-----------|-------------|------------|----------|
    | 1     | 5   | 14 | 5    |            |             | 15         | 16       |

    Approval recommended by:
    Dr. Costas N. Georgiades  9/22/14
    Department Head or Program Chair (Type Name & Sign)  Date
    Chair, College Review Committee  9/22/14
    Date

    Department Head or Program Chair (Type Name & Sign)
    (If cross-listed course)  9/22/14
    Date
    Dean of College
    Date

    Submitted to Coordinating Board by:
    Chair, GC or UCC  9/22/14
    Date
    Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 04/14
ICPE-605: Energy Systems Engineering II

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Professor Christodoulos A. Floudas (Effective February 1, 2015)
Department of Chemical Engineering
225 Brown Building
Texas A&M University
College Station, TX 7843-3122
Email: floudas@tamu.edu
Office hours: by appointment

Professor Efstratios N. Pistikopoulos (Effective January 1, 2015)
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Email: stratos@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: ICPE-604, Graduate classification.

Total contact hours: 22hrs

Course description:
This course covers state-of-the-art topics for energy systems engineering, including modelling of hybrid feedstock energy systems, energy supply chain networks, polygeneration systems, model predictive control, fuel cells, and combined heat and power systems.

The course will focus on:
- Hybrid Feedstock Energy Processes: Supply Chain Network
- Synthesis, design and optimization of flexible poly-generation energy systems
- Model predictive control; multi-parametric programming and control
- Fuel cell energy systems – modelling, optimization and design & control
- Residential Combined Heat and Power (CHP) energy systems – design, optimization, control and scheduling aspects
Suggested books and Reading

- Articles and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:

- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
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**Grade scale:** 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

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Texas A&M University
Departmental Request for a New Course
Undergraduate ✗ Graduate ✗ Professional
Submit original form and attach a course syllabus.

Form Instructions
1. Course request type:  ☐ Undergraduate  ✗ Graduate  ☐ First Professional (ex. DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE 606: Introduction to Optimization
4. Catalog course description (not to exceed 50 words): Basics of deterministic optimization, with focus on modeling and computer solutions; practical examples to develop understanding of modeling and solution techniques that can be used to improve decision-making; linear, nonlinear, mixed integer, combinatorial, and network optimization problems

5. Prerequisite(s):  Graduate classification
Cross-listed with:  Stacked with:

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  ☐ Yes  ✗ No  If yes, from ______ to ______
7. Is this a repeatable course?  ☐ Yes  ✗ No  If yes, this course may be taken ______ times.
Will this course be repeated within the same semester?  ☐ Yes  ✗ No
8. Will this course be submitted to the Core Curriculum Council?  ✗ Yes  ☐ No
9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history):
   Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

☒ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    ICPE  606  INTRODUCTION TO OPTIMIZATION

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>HCE Code</th>
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<tbody>
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<td>1 5 - 1 6 0 0</td>
<td>3 6 3 2</td>
</tr>
</tbody>
</table>

Approval recommended by:
Dr. Costas N. Georgiades 9/22/14
Department Head or Program Chair (Type Name & Sign)  Date
Chair, College Review Committee  9/22/14
Date

Department Head or Program Chair (Type Name & Sign)  Date
Dean of College  9/22/14
Date

Submitted to Coordinating Board by:
Chair, GC or UCC  Date

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services—04/14
ICPE-606: Introduction to Optimization

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)  Location: TBD

Number of Credits: 1.5

Instructor:
Dr. Sergiy Butenko
Department of Industrial and Systems Engineering
Texas A&M University
4037 Emerging Technologies Building,
TAMU-3131, College Station, TX 77843-3131
Phone: 979-458-2333
Fax: 979-458-4299
Email: butenko@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course Description:
This short course will introduce basics of deterministic optimization, with focus on modeling and computer solutions. Using practical examples, the course will develop understanding of modeling and solution techniques that can be used to improve decision-making. The types of problems to be discussed include linear, nonlinear, mixed integer, combinatorial, and network optimization problems.

Topics
1. Formulating an optimization model
2. Understanding complexity and implications of the model choice
3. Brief overview of solution methods
4. Solving optimization problems of a computer
5. Interpreting solutions of optimization models

Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructor and made available via email or during class.
Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: Due by 4:00pm two days after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism: http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (e.g., DMA, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE 607: Energy Finance and Economics
4. Catalog course description (not to exceed 50 words): Exploration of the financial aspects of the energy industry; emphasis on oil and gas with additional attention placed on all sources of power generation, including alternatives; interactive with cases worked in each session; advanced preparation guided by the instructor.

5. Prerequisite(s): Graduate classification
   Cross-listed with: Stacked with:
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  □ No  If yes, from _____ to _____
7. Is this a repeatable course? □ Yes  □ No  If yes, this course may be taken _____ times.
   Will this course be repeated within the same semester? □ Yes  □ No
8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No
9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://wpr.tamu.edu/resources/export-controllers/export-controllers-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    ICPE  607  ENERGY FINANCE AND ECONOMICS

    Lect.  Lab  SCH  CRIP and Fund Code  Admin. Unit  Acad. Year  HSC Code
    1  5  1  5

    Approval recommended by:
    Dr. Costas N. Georgiades  9/22/14  9/22/14
    Department Head or Program Chair (Type Name & Sign)  Date  Chair, College Review Committee  Date
    Department Head or Program Chair (Type Name & Sign)  Date  Dean of College  Date

    Submitted to Coordinating Board by: Chair, GC or UCC  Date  Effective Date

    Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 04/14
ICPE-607: Energy Finance and Economics

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Shannon Deer, CPA
Mays Business School
Texas A&M University
487 Wehner Building, 445D
College Station 77843
Tel.: 979-575-3851
Email: sdeer@mays.tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course Description:
This course will explore the financial aspects of the energy industry. Emphasis will be placed on oil and gas with additional attention placed on all sources of power generation, including alternatives. The course will be interactive with cases worked in each session. The course format will require advanced preparation, which will be guided by the instructor.

Learning Outcomes:
By the end of the course students should be able to:

- Bridge the communication gap between operational experts (engineers, geoscientists, etc.) and business professionals in an energy company.
- Identify the differences in upstream, midstream, downstream, and integrated energy companies from a financial perspective.
- Use net present value analysis to evaluate potential energy projects in oil and gas, nuclear, and alternatives.
- Determine the impact of reserves on an upstream company’s annual report and on project evaluations, while recognizing the differences between the two.
- Evaluate the profitability of key financial decisions and potential projects within an energy company.
- Evaluate common hedging strategies used by energy companies and analyze the cash flow implications of a specific hedging strategy on a company’s cash flow.
- Determine the impact of mark-to-market accounting on a company’s financial statements as a result of specific hedging strategies.
- Develop a financing strategy for the expansion of an energy company.
Class Schedule:

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Deliverables before class session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course &amp; industry introduction</td>
<td>Case #1 preparation</td>
</tr>
<tr>
<td>2</td>
<td>Acquisition valuation (NPV)</td>
<td>Case #2 preparation and online Quiz #1</td>
</tr>
<tr>
<td>3</td>
<td>Acquisition valuation continued, including</td>
<td>Online Quiz #2</td>
</tr>
<tr>
<td></td>
<td>reserves</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Derivatives – strategy and financial statement impact</td>
<td>Case #3 preparation and online Quiz #3</td>
</tr>
<tr>
<td>5</td>
<td>Energy financial statement impact</td>
<td>Company analysis</td>
</tr>
</tbody>
</table>

Required Course Materials:


Suggested Reading:

Articles and book chapters will be assigned by the instructor and made available via email or during class.

Course requirements:

- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading:

- Case preparation (3 cases at 15 points each) 45
- Online pre-class quiz (3 quizzes at 5 points each) 15
- Company analysis 40
- Total 100

**Grade scale:** 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

**Americans with Disabilities Act (ADA):** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact
Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

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"An Aggie does not lie, cheat, or steal, or tolerate those who do."

**I Promise To:**
1) Lead by being a content *expert*
2) *Organize* the course effectively and guide *time on task*
3) *Communicate* by being responsive to questions and responding quickly
4) Facilitate learning through *active engagement*
5) Demonstrate *genuine interest* in your learning
6) *Assess fairly and quickly*
7) Provide *challenge with support*
8) Emphasize relevance using *real-world examples*
9) Reflect and *adapt* appropriately based on your feedback
10) Provide a *reasonable* amount of work outside of class with *clear guidance*
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
- Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:  □ Undergraduate  □ Graduate  □ First Professional (ex., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
ICPE-608: Beyond Science and Technology: The Role of Policy in the Future of Energy in the U.S.

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Introduction to the history of U.S. science and technology policy with a specific emphasis on energy; focus on regulatory rules, the key government agencies at the national level, the role states and localities play, how government funds are allocated in research and technology transfer related to energy innovations, the role of universities, the threats and opportunities to energy-related educational success at all levels.

5. Prerequisite(s):  Graduate classification
Cross-listed with:  
Stacked with:  Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  □ Yes  □ No
   If yes, from _______ to _______

7. Is this a repeatable course?  □ Yes  □ No
   If yes, this course may be taken _______ times.
Will this course be repeated within the same semester?  □ Yes  □ No

8. Will this course be submitted to the Core Curriculum Council?  □ Yes  □ No

9. This course will:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    ICPE  608  BEYOND SCIENCE AND TECHNOLOGY:

    | Lab | SCH | CIP and Fund Code | Admin. Unit | Acad. Year | HEC Code |
    |-----|-----|-------------------|-------------|------------|----------|
    | 1   | 1   |                   | 1 5         | 15 - 16    | 3 6 3 2  |

    Approval recommended by:  [Signature]  9/22/14
    Department Head or Program Chair (Type Name & Sign)

    Date  Chair, College Review Committee  9/22/14

    Date

    Department Head or Program Chair (Type Name & Sign)
    (if cross-listed course)

    Date  Dean of College  9/22/14

    Date

    Submitted to Coordinating Board by:
    Chair, GC or UCC  Date

    Associate Director, Curricular Services  Date

    Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-608: Beyond Science and Technology: The Role of Policy in the Future of Energy in the US

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5Credits

Instructor(s):
Dr. Arnold Vedlitz
The Bush School of Government & Public Policy
Texas A&M University
Allen Room 1113A
College Station, TX 77843
Tel.: 979-845-2929
Email: avedlitz@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
This course will focus on the role and impact of U.S. government and policy decisions in the future of energy. The following topics will be covered.

Day 1
1. What is Science and Technology and why is it important
2. What is the history of U.S. Science and Technology Policy with a specific emphasis on energy policy
3. Who are the main participants in the making of U.S. Energy policy
4. What role does the public play

Day 2
1. Who supports and opposes government spending on energy research and why
2. What is the regulatory rule making process related to the development of energy policy
3. What are the key government agencies at the national level in the development of energy policy
4. What role do states and localities play in the development and implementation of energy policies
5. How is government money allocated in research and technology transfer related to energy innovations
Day 3
1. How do science and technology discoveries about energy affect other government policies
2. What is the role of scientist and engineers with energy expertise in crafting laws, rules and regulations related to energy policies directly and other policies that might be related to energy expertise, such as climate change and natural resources management
3. How do scientists and engineers balance advocacy with scientific neutrality
4. What are the roles of other stakeholders, like industries and interest groups

Day 4
1. Where does scientific and technological expertise come from
2. What is the role of universities
3. What are threats and opportunities to energy-related educational success at all levels
4. What is STEM promotion policy--is it needed

Day 5
1. Group-based case study exercise on identifying a specific energy related problem and developing and "testing" a set of viable policy options, with associated costs and benefits
2. Final discussion and module takeaways.

Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructor(s) and made available via email or during class.

Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons
with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

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"*An Aggie does not lie, cheat, or steal, or tolerate those who do.*"
Texas A&M University
Departmental Request for a New Course
Undergraduate □ Graduate □ Professional
Submit original form and attach a course syllabus.

Form Instructions:

1. Course request type: □ Undergraduate □ Graduate □ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE


4. Catalog course description (not to exceed 50 words): Introduction to energy law and regulation in the United States; focus on the key sources of energy (both nonrenewable and renewable) driving the U.S. economy, and identifies the various challenges facing the industry in their production and distribution; key regulations and laws governing energy production as well as the jurisdictional and regulatory divisions between federal and state governments.

5. Prerequisite(s): Graduate classification

Cross-listed with: Stacked with:

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes □ No If yes, from ________ to ________

7. Is this a repeatable course? □ Yes □ No If yes, this course may be taken ________ times.

Will this course be repeated within the same semester? □ Yes □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   Executive Master of Science in Energy

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix Course # Title (excluding punctuation)

ICPE 609 INTRODUCTION TO U.S. ENERGY LAW

<table>
<thead>
<tr>
<th>Lect</th>
<th>Lab</th>
<th>SCH</th>
<th>CPI and Fund Code</th>
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Approval recommended by:

Dr. Costas N. Georgiades
Department Head or Program Chair (Type Name & Sign) Date

Chair, College Review Committee Date

Department Head or Program Chair (Type Name & Sign) Date

Dean of College Date

Submitted to Coordinating Board by:

Chair, GC or UCC Date

Associate Director, Curricular Services Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-609: Introduction to U.S. Energy Law & Policy

Term: Spring 2016  
Day: MTuWThF  
Time: TBD (4.4hrs/day)  
Location: TBD  
Number of Credits: 1.5 Credits

Instructor:  
Dr. Gina S. Warren  
School of Law  
Texas A&M University  
1515 Commerce Street  
Fort Worth, TX 76102  
Tel.: 817-212-3935  
Email: gswarren@law.tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course Description:
This 5-day (4.4 hours per day) module provides a basic introduction to energy law and regulation in the United States. It focuses on the key sources of energy (both nonrenewable and renewable) driving the U.S. economy, and identifies the various challenges facing the industry in their production and distribution. It considers the key regulations and laws governing energy production as well as the jurisdictional and regulatory divisions between federal and state governments. The module addresses electricity production, transmission, and regulation and considers the interface of energy production and energy transmission, as well as the various challenges facing the electricity industry. In addition, the module addresses related legal, policy, and societal concerns including environmental, land use, regulatory, and economic issues as they relate to each energy source.

Class Format and Student Participation: Each class will begin with a lecture followed by class discussion and participation in problem solving exercises. You are expected to come to class prepared to engage in a conversation and analysis on each class day. Accordingly, you must read the assigned materials in advance of each class. In addition, based on the readings for each day, you must prepare two questions for each class session that you would like discussed in class that day. Questions must be turned in via email or hardcopy no later than the start of class each day.
## Class Schedule:

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPICS</th>
<th>READINGS</th>
</tr>
</thead>
</table>
| Day 1 | **Introduction to Energy Law & Policy**  
- Background and history of the origination of energy laws in the US  
- Federal/state regulatory framework  
|   |   | • Nutshell = pp. 1-52  
• US Energy Information Administration  
|   | **Introduction to US Energy Sources**  
- Background, history, statistics, and energy industry basics  
- Framing the energy issue  
|   |   | • Nutshell = pp. 52-65, 95-106, 140-155 (skim 65-95)  
• US Energy Information Administration  
  ○ Energy Explained ([http://www.eia.gov/energyexplained/index.cfm](http://www.eia.gov/energyexplained/index.cfm))  
• What are the major sources and users of energy in the United States? ([http://www.eia.gov/energy_in_brief/article/major_energy_sources_and_users.cfm](http://www.eia.gov/energy_in_brief/article/major_energy_sources_and_users.cfm))  
• EPA, How does electricity affect the environment? ([http://www.epa.gov/cleanenergy/energy-and-you/affect/index.html](http://www.epa.gov/cleanenergy/energy-and-you/affect/index.html)) Click and thoroughly read the description of the various sources of energy ("Electricity Generation Technologies"), as well as environmental impacts related to each source. |
| Day 2 | **Nonrenewable Energy - Coal**  
- Process of extraction  
- Regulatory structure  
- Industry challenges  
- Environmental concerns  
|   |   | • Nutshell = pp. 316-358  
|   |   | Case excerpts:  
  ○ Wisconsin Electric Power Co. v. Reilly, 893 F.2d 901 (1990)  
| Day 3 | **Nonrenewable Energy - Oil & Gas**  
- Process of  
|   |   | • Nutshell = pp. 218-236, 252-268, 269-315  
• US Energy Information Administration, Oil Explained |
Day 4

Nonrenewable Energy – Nuclear
- Process of production
- Regulatory structure
- Industry challenges
- Environmental concerns

Renewable Energy – Hydro, Solar, Wind, Biomass, & Geothermal
- Processes of production
- Regulatory structures
- Renewable Energy Policies

- Nutshell = pp. 426–474
- Case excerpt:

- Nutshell = pp. 475–508, 511–531, 539–543
- US Energy Information Administration, Most states have Renewable Portfolio Standards (http://www.eia.gov/todayinenergy/detail.cfm?id=4850#)

Day 5

Introduction to Electricity
- Understanding electricity
- Production & transmission of electricity

- Edison Electric Institute: “About the Industry” (http://www.eei.org/whoweare/AboutIndustry/Pages/default.aspx, including linked page “History of Electricity”)
Required Text & Reading Material (see also in the class schedule):

- Articles, excerpts, and websites indicated in the syllabus

Course requirements:

- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm two days after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism: http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional
Submit original form and attach a course syllabus.

1. Course request type:
   - Undergraduate
   - Graduate
   - First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):
   Interdisciplinary Curricular Program in Energy, ICPE

3. Course prefix, number and complete title of course:
   ICPE-610: The Global Energy Future

4. Catalog course description (not to exceed 50 words):
   Global energy outlook, including energy demand, population growth and humanitarian issues, environmental and climate concerns, and the energy/water nexus and water scarcity; evolution of the global oil and gas industry; controlling nations, laws, and agencies (OPEC, IEA, etc.); international and domestic climate change laws and policies; global future of climate change adaptation and mitigation.

5. Prerequisite(s):
   Graduate classification

   Cross-listed with:
   Stacked with:

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?
   - Yes
   - No
   If yes, from _____ to _____

7. Is this a repeatable course?
   - Yes
   - No
   If yes, this course may be taken _____ times.
   Will this course be repeated within the same semester?
   - Yes
   - No

8. Will this course be submitted to the Core Curriculum Council?
   - Yes
   - No

9. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.

11. I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix   Course #   Title (excluding punctuation)
    ICPE   610   THE GLOBAL ENERGY FUTURE

    | Lect | Lab | SCH | COP and Fund Code | Admin Unit | Acad Year | HUCE Code |
    |------|-----|-----|-------------------|------------|-----------|-----------|
    | 1    | 5   | 1   | 5                 | 1          | 15        | 16 0 0 3 6 3 2 |

    Approval recommended by:
    Dr. Costas N. Georgiadis
    Department Head or Program Chair (Type Name & Sign) Date
    Chair, College Review Committee Date
    Department Head or Program Chair (Type Name & Sign) Date
    Dean of College Date

    Submitted to Coordinating Board by:
    Chair, GC or UCC Date

    Associate Director, Curricular Services Date

    Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8311 or sandra-williams@tamu.edu
Curricular Services – 04/14
ICPE-610: The Global Energy Future

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Dr. Gabriel Eckstein
School of Law
Texas A&M University
1515 Commerce Street
Fort Worth, TX 76102
Tel.: 817-212-3912
Email: gabrieleckstein@law.tamu.edu
Office hours: by appointment

Dr. Gina S. Warren
School of Law
Texas A&M University
1515 Commerce Street
Fort Worth, TX 76102
Tel.: 817-212-3935
Email: gswarren@law.tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course Description:
This 5-day (4.4 hours per day) module will look at our global energy outlook, including energy demand, population growth and humanitarian issues, environmental and climate concerns, and the energy/water nexus and water scarcity. Worldwide demand for natural resources for fuel, shelter, food, and fiber is growing exponentially. Many forms of energy, especially fossil fuel generation but also renewables like solar and hydropower, require significant amounts of increasingly scarce water resources to develop. Conversely, most water production and purification processes are critically dependent on energy to pump, move, and treat water. This so-called “water-energy nexus” is now essential for countries around the world as they debate and consider how best to grow their economies while sustaining and protecting their natural resources. At the center of much humanitarian and environmental controversy is fossil fuel production and distribution – particularly oil and gas. This module will explore the evolution of the global oil and gas industry, and it will look at the controlling nations, laws, and agencies
(OPEC, IEA, etc.). In addition, this module will also explore international and domestic climate change laws and policies and discuss the global future of climate change adaptation and mitigation. The exploitation of natural resources around the world has resulted in profound, long-term, and destructive impacts on the climate. It has also brought about movements to reduce societal dependence on natural resources as well as identify and introduce alternatives that would lessen and possibly eliminate many of the destructive natural resource-related activities.

**Class Format and Student Participation:** Each class will begin with a lecture followed by class discussion and participation in problem solving exercises. You are expected to come to class prepared to engage in a conversation and analysis on each class day. Accordingly, you must read the assigned materials in advance of each class. In addition, based on the readings for each day, you must prepare two questions for each class session that you would like discussed in class that day. Questions must be turned in via email or hardcopy no later than the start of class each day.

**Class Schedule:**

<table>
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<tr>
<th>DATE</th>
<th>TOPICS</th>
<th>READINGS</th>
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</table>
| Day 1 | **Introduction to Global Energy**  
- Energy overview (demand, growth, distribution, environmental concerns, energy/water nexus, and scarcity) |  
| Day 2 | **Global Oil & Gas Trade**  
- OPEC, the IEA and global oil  
- Regulatory structures  
- International challenges & concerns |  
- Excerpts from Daniel Yergen's “The Prize” and “The Quest”  
| Day 3 | **International Climate Change Laws & Policies**  
- Brief introduction to international law  
- International environmental law  
- International challenges & concerns |  
**Required Text & Reading Material (see also in the class schedule):**

- Articles, excerpts, and websites indicated in the syllabus

**Course requirements:**

- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

**Grading:** Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final exam 50%.

**Grade scale:** 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

**Take home exam:** due by 4:00pm two days after the last lecture. One letter grade will be deducted for each day past the deadline.

**Americans with Disabilities Act (ADA):** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

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Texas A&M University
Departmental Request for a New Course
Undergraduate □ Graduate □ Professional
- Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: □ Undergraduate □ Graduate □ First Professional (ex., DVMD, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-611: Economics of Energy

4. Catalog course description (not to exceed 50 words): Basics of economics concepts as they relate to energy applications; how the government policies affect the energy economy; present the economics of energy and climate change; introduction to renewable technologies and their impact.

5. Prerequisite(s): Graduate classification

6. Is this a variable credit course? □ Yes □ No If yes, from ________ to ________

7. Is this a repeatable course? □ Yes □ No If yes, this course may be taken ________ times.

8. Will this course be repeated within the same semester? □ Yes □ No

9. Will this course be submitted to the Core Curriculum Council? □ Yes □ No

10. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
   Executing Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. Prefix: ICPE □ Course #: 611 □ Title (excluding punctuation): ECONOMICS OF ENERGY

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<th>Lect.</th>
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Approval recommended by: [Signature]

Dr. Costas N. Georgiades
Department Head or Program Chair (Type Name & Sign) Date "Bigno 9/22/14"

Chair, College Review Committee Date "Bigno 9/22/14"

Department Head or Program Chair (Type Name & Sign) Date (if cross-listed course)

Dean of College Date "Bigno 9/22/14"

Submitted to Coordinating Board by: [Signature]

Chair, GC or UCC Date "Bigno 9/22/14"

Associate Director, Curricular Services Date "Bigno 9/22/14"

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 04/14
ICPE-611: Economics of Energy

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Dr. Bruce A. McCarl
Department of Agricultural Economics
Texas A&M University
College Station, Texas 77843-2124
Tel.: (979) 845-1706
Email: mccarl@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
The course will cover the following topics:

I. Why study economics as an energy topic
   A. Vanishing values of byproducts - the concept of product demand
   B. Increasing costs of feedstocks - the concept of input supply
   C. Demand growth and price impacts - the concepts of international trade, market linkages, and income related demand expansions
   D. Who gains and who loses - the concept of welfare economics
   E. Damages through pollution and emissions - the concept of externalities
   F. Treatment of costs and income over time – investment, discounting and present value concepts

II. Basic economic concepts review
   A. Demand and supply
   B. Market equilibrium in single and multiple markets including transportation concerns
   C. Determinants of demand and supply – income, prices, compliments, substitutes, factor supply, derived demand, projected supply.
   D. Welfare economics and cost-benefit analysis
   E. Net present value, discounting, timing of investments and returns
   F. The concept of externalities and their correction - taxes, regulations, tradable
permits

G. Economics of byproducts
H. Public and private goods

III. What might cause the way we use energy to change – an economic exploration
A. Depletion and extractable energy
B. Emissions and climate change
C. Pollution and energy
D. Prices and energy substitutes

IV. How can and does government policy influence the energy economy
A. Commodity Subsidies, Taxes and Tariffs
B. Technology subsidies
C. Tax policy
D. Clean air act
E. Electricity markets and regulation
F. EISA and RFS

V. Economics of energy and climate change
A. Energy emission rates
B. Emissions and externalities
C. Development, growth and emissions
D. Momentum, emissions, and the inevitability of climate change
E. Nature and economics of climate change effects
   1. Sea Level Rise
   2. Hotter Temperatures
   3. Altered Precipitation
   4. Extremes
   5. Agricultural Production
   6. Unmanaged Ecosystems
   7. Ocean acidification
F. Climate change and policy decision-making
   1. Adaptation
   2. Mitigation
   3. Trade-offs in investment and conventional funds use
G. Adaptation economics
   1. Private versus public adaptation
   2. Limits to adaptation
   3. Means of adaptation
   4. modeling and analysis
   5. co-benefits
   6. synergies with mitigation
H. Mitigation economics and concepts
1. Lifecycle analysis
2. Marginal abatement curves
3. Passing a price signal - taxes, cap and trade
4. Regulation
5. International comparative advantage
6. Low hanging fruit
7. Asset fixity and rate of adjustment
8. energy substitution
9. nuclear and licensing
10. modeling and analysis
11. co-benefits
12. synergies with adaptation

VI. Alternative forms of energy - renewables and bioenergy

A. why bioenergy
   1. energy security
   2. domestic source
   3. greenhouse gas offsets
   4. payments to agriculture and regions
   5. mandates and GHG desires

B. good and bad experiences
   1. the biodiesel industry a study and excess optimism
      a) input prices
      b) byproduct values
      c) capacity utilization
   2. economics of corn ethanol and agriculture
      a) cost of production
      b) inputs and price escalation
      c) economics of transportation and Texas production
   3. cellulose ethanol – where are we

C. ethanol, oxygenate and the blend wall
   1. oxygenate requirement
   2. infrastructure compatibility and drop in fuels
      a) cars e10, e15, E 85
      b) pumps and distribution
   3. exports

D. bio electricity

E. difficulties in feedstock supply
1. seasonality
2. perishability
3. storage
4. stochastic yields
5. logistics, hauling area, cost and transport
6. energy concentration
7. land competition and leakage
8. marginal lands and productivity
9. externalities, the dead zone, input use, water quality
10. lack of alternative markets, need for contracting, difficulties with increases in crop yields and processing plant efficiencies
11. opportunity cost of removing crop residues, nutrients, erosion and sequestration

F. Alternative sources of feedstock
1. Urban wastes
2. crop residues
3. marginal lands including their heterogeneity
4. energy crops
5. forests
6. forest byproducts
7. forest logging residue

G. other issues
1. rural development
2. jobs
3. land and water degradation
4. water consumption, availability and localized depletion
5. spatial monopolies
6. perennial versus annual and irreversible land uses
7. RINS
8. uncertainty and mandates
   a) relaxation under drought
   b) industrial uncertainty and relaxation – flex fuel cars and pumps
9. appraising innovation who is a charlatan
10. arguments for subsidization
11. regional comparative advantage
12. effects of agricultural technical change and agricultural prices
13. welfare to producers and consumers
14. liquid versus electricity for transport
15. including ccs

Required Textbook: There is no required textbook.

Suggested Reading: Articles and book chapters will be assigned by the instructors and made available via email or during class.
Course requirements:
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Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:  [ ] Undergraduate  [x] Graduate  [ ] First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE

3. Course prefix, number and complete title of course: ICPE-612: Entrepreneurship in Energy

4. Catalog course description (not to exceed 50 words): Focus on developing an understanding of the techniques and issues for growing emerging organizations in the energy field; participants will be guided through a range of issues faced by a venture team in building and growing a new organization or pursuing innovative projects inside existing organizations.

5. Prerequisite(s): Graduate classification

6. Is this a variable credit course?  [ ] Yes  [x] No  If yes, from ______ to ______

7. Is this a repeatable course?  [ ] Yes  [x] No  If yes, this course may be taken ______ times.

8. Will this course be repeated within the same semester?  [ ] Yes  [x] No

9. Will this course be submitted to the Core Curriculum Council?  [x] Yes  [ ] No

10. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   Executive Master of Science in Energy

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. Prefix  Course #  Title (excluding punctuation)
    ICPE  612  ENTREPRENEURSHIP IN ENERGY

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<th>Type</th>
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Approval recommended by:

Dr. Costas N. Georgiadis
Department Head of Program Chair (Type Name & Sign)  Date  9/22/14
Chair, College Review Committee  Date  9/22/14

Department Head or Program Chair (Type Name & Sign)  Date  9/22/14
Dean of College  Date

Submitted to Coordinating Board by:

Chair, GC or UCC  Date

Associate Director, Curricular Services  Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-612: Entrepreneurship in Energy

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Dr. Richard H. Lester
Department of Management
Mays School of Business
Texas A&M University
College Station, TX 77843
Phone: 979-862-7091
Email: rlester@mays.tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
Entrepreneurship in Energy is focused on developing an understanding of the techniques and issues for growing emerging organizations in the energy field. This distinguishes the course from a business planning class in that participants will be guided through a range of issues faced by a venture team in building and growing a new organization or pursuing innovative projects inside existing organizations.

Entrepreneurship is often defined as “the pursuit of opportunity without regard to resources currently controlled.” In this course the objective is to develop in you a different way of thinking and behaving that is appropriate for both established and nascent organizations. Many of our illustrations will come from activities and behavior related to new venture creation. However, entrepreneurship is neither for the meek and mild nor those who disdain ambiguity. Normally we view it for those who are self-motivated, willing to take calculated risks and learn from the inevitable failures that will occur along the way. We will also discover there is no certain profile for entrepreneurs; they come in many different sizes and shapes and characteristics. Our focus therefore is to develop in you an entrepreneurial mindset. This you will find is somewhat different from a managerial approach to problem solving.

The intellectual basis for the course is rooted in concepts garnered from the work of Eric Reis and Steve Blank regarding Lean Startup Methodology and the Business Model Canvas by Alexander Osterwalder.

Approach
Several methods of instruction are utilized: lectures, case discussions, workshops, group projects, and guest presentations. The core concepts and discussions are presented in the main sessions, which are led by the instructor. This course incorporates both individual and group efforts.
We accomplish course objectives by:

1. Studying entrepreneurship from application perspectives
2. Assessing the human set of knowledge, skills, talents and strengths for their suitability to influence new venture creation.
3. Learning to identify new opportunities and screen them.
4. Looking at new opportunities from the perspective of their underlying business model.
5. Developing a pre-business plan...what analysis and due-diligence must you do prior to deciding if the opportunity is worth pursuing.

**Required Textbook:** There is no required textbook.

**Suggested Reading:**
Articles and book chapters will be assigned by the instructors and made available via email or during class.

**Course requirements:**
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
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Texas A&M University
Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional
Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
   ICPE-613: Natural and Shale Gas Monetization: Technologies, Fundamentals, Economics, and Applications

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words): Focuses on the important role played by natural and shale gas in the energy market and the potentials to grow; major monetization processes including production, treatment, processing, and conversion; key economic and technical aspects as they pertain to the processing technologies and the supply chains of natural and shale gas.

5. Prerequisite(s):
   Graduate classification
   Cross-listed with:  
   Stacked with:  
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  □ No  If yes, from _______ to _______

7. Is this a repeatable course? □ Yes  □ No
   Will this course be repeated within the same semester? □ Yes  □ No
   If yes, this course may be taken _______ times.

8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Executive Master of Science in Energy
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
   Attach approval letters.

11. I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://yr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    ICPE  613  NATURAL AND SHALE GAS MONETIZATION

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Approval recommended by:
Dr. Costas N. Georgaliades 3/21/14
Department Head or Program Chair (Type Name & Sign)
Date  Chair, College Review Committee 9/22/14
Department Head or Program Chair (Type Name & Sign)
(if cross-listed course)
Date  Dean of College 9/22/14

Submitted to Coordinating Board by:
Chair, GC or UCC  Date  Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu
Curricular Services – 04/14
ICPE-613: Natural and Shale Gas Monetization: Technologies, Fundamentals, Economics, and Applications

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Dr. Nimir Elbashir
Department of Chemical Engineering
Texas A&M University-Qatar
Doha, Qatar
Tel.: 974-4423-0128
Email: nimir.elbashir@qatar.tamu.edu
Office hours: by appointment

Dr. Mahmoud El-Halwagi
Texas A&M University
Artie McFerrin Department of Chemical Engineering
230 Jack E. Brown Engineering Building
3122 TAMU
College Station, TX 77843-3122
Tel: (979)-845-3484
Email: el-halwagi@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
This module highlights the important role played by natural and shale gas in the energy market and the potentials to grow. The module covers the major monetization processes including production, treatment, processing, and conversion. The key economic and technical aspects are discussed as they pertain to the processing technologies and the supply chains of natural and shale gas. The following topics will be covered:

- Gas production technologies
- Gas treatment technologies
- Monetization, pathways, and process technologies for shale and natural gas (e.g., liquefied natural gas “LNG”, gas-to-liquid “GTL”, gas-based chemical and petrochemical supply chains)
- Reaction and separation systems in gas monetization
• Importance of catalysis in natural gas conversion
• Ultra-clean fuels from natural and shale gas
• Process integration for conserving mass and energy resources in gas processing
• Capital cost estimation for gas-processing facilities
• Operating cost estimation for gas-processing facilities
• Profitability analysis for gas-processing facilities

**Required Textbook:** There is no required textbook.

**Suggested Reading:**
Articles and book chapters will be assigned by the instructors and made available via email or during class.

**Course requirements:**
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

**Grading:** Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final exam 50%.

**Grade scale:** 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

**Take home exam:** due by 4:00pm two days after the last lecture. One letter grade will be deducted for each day past the deadline.

**Americans with Disabilities Act (ADA):** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

**Academic Integrity:** For additional information please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu). Please pay close attention to guidelines on avoiding plagiarism: [http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx](http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx)

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
* Submit original form and attach a course syllabus.*

Form Instructions:

1. Course request type: □ Undergraduate  X  Graduate  □ First Professional (ex., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE

3. Course prefix, number and complete title of course: ICPE-614: CO2 Sequestration

4. Catalog course description (not to exceed 50 words): Introduction to the goals and methods of CO2 sequestration in the subsurface and of monitoring its effectiveness; discussion and explanation of current technological challenges and problems in monitoring CO2 in the subsurface and in implementing sequestration for mitigating climate change; addresses how carbon is transferred between atmosphere, hydrosphere, biosphere and geosphere by natural processes; basic geologic processes influencing sequestration programs.

5. Prerequisite(s):

   Cross-listed with:  
   Stacked with:

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  X  No  If yes, from _______ to _______.

7. Is this a repeatable course? □ Yes  X  No  If yes, this course may be taken _______ times.

   Will this course be repeated within the same semester? □ Yes  X  No

8. Will this course be submitted to the Core Curriculum Council?  X  Yes  □  No

9. This course will be:

   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)

   Executive Master of Science in Energy

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11.  □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-control-s-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)

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Approval recommended by:

Dr. Costas N. Georgiadis  
Department Head or Program Chair (Type Name & Sign)  Date 9/22/19

Chair, College Review Committee  Date 9/22/19

Department Head or Program Chair (Type Name & Sign)  Date 9/22/19

Dean of College  Date

Submitted to Coordinating Board by: Chair, GC or UCC  Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu

Curricular Services – 04/14
ICPE-614: CO2 Sequestration

Term: Spring 2016  
Day: MTuWThF  
Time: TBD (4.4hrs/day)  
Location: TBD  
Number of Credits: 1.5 Credits

Instructor:  
Dr. Richard Gibson  
Department of Geology and Geophysics  
Texas A&M University  
Room 351, Hallboudy  
College Station, TX 77843  
Tel.: 979-862-8653  
Email: Gibson@tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:  
This module will focus on:
• Explaining the goals and methods of CO2 sequestration in the subsurface and of monitoring its effectiveness
• Identifying and explain current technological challenges and problems in monitoring CO2 in the subsurface and in implementing sequestration for mitigating climate change
• Understanding how carbon is transferred between atmosphere, hydrosphere, biosphere and geosphere by natural processes; basic geologic processes influencing sequestration programs

It will cover the following topics:
1. CO2 and climate  
1.1. Overview of CO2 in the atmosphere and climate change – recent and in deep time  
1.2. Carbon cycle – exchange of carbon between major Earth systems: geosphere, hydrosphere, biosphere and atmosphere; important geologic processes  
1.3. Comparison of natural processes and industrial activity on carbon levels  
2. Carbon Capture and Sequestration (CCS) as a solution to global climate change  
2.1. Definitions and examples of sequestration; mechanisms for storage; capture technologies  
2.2. Sequestration sites – geological settings, rock properties, relationship to petroleum exploration activities [potential guest lecturer - geologist]  
2.3. Injection of CO2 – physical properties of CO2; flow processes; rock properties controlling flow [potential guest lecturer – petroleum engineer]
2.4. Summary – optimal sequestration sites; global capacity and requirements for mitigating global climate change
3. Technological challenges and problems
3.1. Long term storage goals; leakage potential and effectiveness of capture; consequences of leakage to environment, including groundwater
3.2. Monitoring and verifying CO₂ storage in the subsurface: overview; accuracy requirements
3.3. Seismic monitoring of CO₂ movement and leakage detection; relationship to geology and rock properties; examples of seismic methods
3.4. Alternative geophysical techniques: gravity, electromagnetic, well data
3.5. Geochemical sampling of borehole fluids and direct measurement of leakage
4. Other risks and challenges
4.1. Public perception and cost; alternative energy solutions
5. Summary
5.1. Current state of the art in CO₂ sequestration – major existing projects
5.2. Ongoing research efforts – what questions need to be answered? What is required to make sequestration a major means of CCS? Can sequestration be applied on the scales required for significant impact on climate

Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructor and made available via email or during class.

Course requirements:
• Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
• Read all required material.
• Participate actively in discussions.
• Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final exam 50%.
Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm two days after the last lecture. One letter grade will be deducted for each day past the deadline.

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be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

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"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional
• Submit original form and attach a course syllabus.

Form Instructions:
1. Course request type: [ ] Undergraduate [X] Graduate [ ] First Professional (ex., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-615: Smart Grid Fundamentals
4. Catalog course description (not to exceed 50 words): Fundamentals of electricity grid development; monitoring, control and protection; renewable generation; microgrids and grid integration; electricity markets; long term planning and associated risk, and grid robustness.

5. Prerequisite(s):

Graduate classification

Cross-listed with: ____________________ Stacked with: ____________________

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? [ ] Yes [X] No If yes, from ______ to ______

7. Is this a repeatable course? [ ] Yes [X] No If yes, this course may be taken ______ times.

Will this course be repeated within the same semester? [ ] Yes [X] No

8. Will this course be submitted to the Core Curriculum Council? [X] Yes [ ] No

9. This course will be:

a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. [X] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix Course # Title (excluding punctuation)

| ICPE | 615 | SMART GRID FUNDAMENTALS |

Lect. Lab ST H CP and Fund Code Admin. Unit Acad. Year ECL Code
1 5 1 5

Approval recommended by:

Dr. Costas N. Georgiades
Department Head or Program Chair (Type Name & Sign)
Date

Chair, College Review Committee
Date

Dean of College
Date

Submitted to Coordinating Board by:

Chair, GC or UCC
Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services - 04/14
ICPE-615: Smart Grid Fundamentals

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)

Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Dr. Mladen Kezunovic
Department of Electrical Engineering
Texas A&M University
323C WEB
College Station, TX 77843
Tel: 979-845-7509
Email: kezunov@ece.tamu.edu
Office hours: by appointment

Dr. Chanan Singh
Department of Electrical Engineering
Texas A&M University
3011 WEB
College Station, TX 77843
Tel: 979-862-1553
Email: singh@ece.tamu.edu
Office hours: by appointment

Dr. Le Xie
Department of Electrical Engineering
Texas A&M University
301H WEB
College Station, TX 77843
Tel: 979-845-7563
Email: lxie@ece.tamu.edu
Office hours: by appointment

Dr. Robert Balog
Department of Electrical Engineering
Texas A&M University
205D WEB
College Station, TX 77843
Tel: 979-862-4985
Email: rbalog@ece.tamu.edu
Office hours: by appointment
Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
The course will cover the following topics:

1. Electricity grid development (M.K.):
   - History of development of electricity systems
   - Challenges of future grid developments
   - Smart Grid requirements and expected impacts

2. Monitoring, Control and Protection (M.K.)
   - How the electricity grid is controlled today and what are future control concepts
   - The role of Big Data
   - Outage and asset management

3. Renewable generation (R.B., L.X.)
   - Overview of non-thermal generation
   - Understanding energy availability and mitigation of renewable intermittency
   - Opportunities to serve load while alleviating congestion on distribution feeder system

4. Microgrids and grid integration (R.B.)
   - New concepts for “last mile” of distribution at the point-of-use including variable voltage, variable frequency (including DC) distribution feeder systems
   - Grid-interactive codes and standards for interconnection and safety
   - Mitigation of variability at PCC for utility, quality of service (QOS) as a system design considerations

5. Electricity markets (L.X.)
   - Foundations of Energy Economics
   - Locational Marginal Price and Power Market Operations
   - Challenges and Opportunities in Market Design in Support of Smart Grid

6. Customer participation (L.X.)
   - Background of Demand Response
   - Models and Types of Demand Response
   - Customer Participation in Wholesale and Retail Level

7. Operational and long term planning and associated risk (C.S.)
   - An overview of the operational and long term planning process
   - The conventional and new sources of uncertainty
   - Models for planning and risk management

8. Reliability and grid robustness (C.S.)
   - New sources of potential reliability issues in the smart grid
   - How can the reliability and grid robustness be assured
   - Models and methods for reliability forecasting and assurance
Required Textbook: There is no required textbook.

Suggested Reading:
- Articles and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
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Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

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Texas A&M University  
Departmental Request for a New Course  
Undergraduate ♦ Graduate ♦ Professional  
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: ☐ Undergraduate ☒ Graduate ☐ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-616: Multi-functional Materials for Energy Conversion
4. Catalog course description (not to exceed 50 words): Focus on the two most important multi-functional materials (MFMs): piezoelectric materials and shape memory alloys (SMAs); understanding the materials, and how devices are designed using these materials; energy conversion will be studied via: (1) actuators that convert electrical or thermal energy into mechanical work; and (2) energy harvesting, in which mechanical work is converted into electrical energy.

5. Prerequisite(s): Graduate classification  
Cross-listed with:  
Stacked with:  
Cross-listed courses require the signature of both department heads.
6. Is this a variable credit course? ☐ Yes ☒ No  
If yes, from _____ to _____
7. Is this a repeatable course? ☐ Yes ☒ No  
If yes, this course may be taken _____ times.
Will this course be repeated within the same semester? ☐ Yes ☒ No
8. Will this course be submitted to the Core Curriculum Council? ☒ Yes ☐ No
9. This course will be:  
a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)  
b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)  
Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
11. ☒ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)  
ICPE  616  MULTI-FUNCTIONAL MATERIALS FOR  

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Approval recommended by:  
Dr. Costas N. Georgiadis  
Department Head or Program Chair (Type Name & Sign)  
Date  
Chair, College Review Committee  
Date  
Department Head or Program Chair (Type Name & Sign)  
(if cross-listed course)  
Date  
Dean of College  
Date

Submitted to Coordinating Board by:  
Chair, GC or UCC  
Date  
Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 04/14
ICPE-616: Multi-functional Materials for Energy Conversion

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)  
Location: TBD  
Number of Credits: 1.5

Instructors:
Dr. James G. Boyd  
Department of Aerospace Engineering  
Texas A&M University  
741C HRBB  
College Station, TX 77843  
Tel.: 979-458-0419  
Email: jboyd@tamu.edu  
Office hours: by appointment

Dr. Dimitris Lagoudas  
Department of Aerospace Engineering  
Texas A&M University  
109C HRBB  
College Station, TX 77843  
Tel.: 979-845-1604  
Email: d-lagoudas@tamu.edu  
Office hours: by appointment

Dr. Raymundo Arroyave  
Department of Materials Science and Engineering  
Texas A&M University  
522 MEOB  
College Station, TX 77843  
Tel.: 979-845-5416  
Email: rarroyave@tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
This course module will focus on the two most important multi-functional materials (MFMs): piezoelectric materials and shape memory alloys (SMAs). There are two parts to the course: understanding the materials, and understanding how devices are designed using these materials. Energy conversion will be studies from two aspects: (1) Actuators that convert electrical or
thermal energy into mechanical work; and (2) Energy harvesting, in which mechanical work is converted into electrical energy.

The course meets four hours per day for five consecutive days. We will divide the course into ten 2.2 hour lectures.

**Lecture 1:**
Introduction to MFMs; energy conversion; performance comparison of MFMs using energy density, frequency, efficiency, etc.; current and future industrial applications.

**Lecture 2:**
Materials science of coupled fields, thermodynamic potentials.

**Lecture 3:**
Materials science of coupled fields, thermodynamic potentials.

**Lecture 4:**
Piezoelectrics – electrical aspects: definitions of free charge, bound charge, polarization charge, electric polarization, electric displacement, electric field; 1-D forms of Gauss law and Faraday’s law.

**Lecture 5:**
Piezoelectrics – mechanical aspects: solid mechanics in 1-D: strain-displacement equations; mechanical equilibrium; elasticity.

**Lecture 6:**
Piezoelectrics: combined electrical and mechanical equations.

**Lecture 7:**
Piezoelectrics: device design for piezoelectric stacks and bending bimorphs.

**Lecture 8:**
Shape memory alloys: phase diagrams

**Lecture 9:**
Shape memory alloys: shape memory effect.

**Lecture 10:**
Shape memory alloys: pseudoelasticity

**Required Textbook:** There is no required textbook.

**Suggested Reading:**
Articles and book chapters will be assigned by the instructors and made available via email or during class.

**Course requirements:**
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
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**Grading:** Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

**Grade scale:** 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

**Take home exam:** due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

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Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (e.g., DPh, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
   ICPE-617: Gas Separations for Energy: Fundamentals, Applications and New Directions

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words): Robust foundation of advanced expertise in gas separation technologies including (i) solid-phase adsorbent technologies, (ii) liquid amine-based adsorption technologies, (iii) polymeric and inorganic membrane technologies, and (iv) emerging reactive separation concepts for process intensification.

5. Prerequisite(s): Graduate classification
   Cross-listed with: Stacked with:
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  □ No
   If yes, from ________ to ________

7. Is this a repeatable course? □ Yes  □ No
   If yes, this course may be taken ________ times.
   Will this course be repeated within the same semester? □ Yes  □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes □ No

9. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
   Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-control-basics-for-distance-education).

12. Prefix: Course #: Title (excluding punctuation)
   ICPE  617  GAS SEPARATIONS FOR ENERGY: FU

   Lect. Lab SOC H CP and Fund Code Admin Unit Acad Year HFL Code
   1 5 1 5

   Approval recommended by: Dr. Costas N. Georghiades
   Department Head or Program Chair (Type Name & Sign) Date 9/24/14
   Chair, College Review Committee Date 9/22/14

   Department Head or Program Chair (Type Name & Sign) Date 9/24/14
   (if cross-listed course) Dean of College Date

   Submitted to Coordinating Board by: Chair, GC or UCC Date

   Associate Director, Curricular Services Date Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu
Curricular Services – 04/14
ICPE-617: Gas Separations for Energy: Fundamentals, Applications and New Directions

Term: Fall 2015  
Day: MTuWThF  
Time: TBD (4.4hrs/day)  
Location: TBD  
Number of Credits: 1.5Credits

Instructor:  
Dr. Benjamin A. Wilhite  
Texas A&M University  
Artie McFerrin Department of Chemical Engineering  
226 Jack E. Brown Engineering Building  
3122 TAMU  
College Station, TX 77843-3122  
Tel: (979)-845-0406  
Email: benjaminwilhite@mail.che.tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:  
A central challenge to the existing energy industry (oil & natural gas processing) is the separation and purification of fuel-grade chemicals. For example, the distillation of petroleum into liquid fuels (kerosenes, gasoline, diesels) remains a linchpin to the refining of raw petroleum. Existing gas separation technologies are primarily employed for oxygen and/or nitrogen enrichment from air, recovery of refinery hydrogen from cracking and reformer units, and carbon dioxide sequestration. The rapidly expanding natural gas and shale gas industry will require significant expansion of gas separation capacity for removing nitrogen, carbon dioxide and water from well-head natural gas. This course will provide a robust foundation of advanced expertise in gas separation technologies including (i) solid-phase adsorbent technologies, (ii) liquid amine-based adsorption technologies, (iii) polymeric and inorganic membrane technologies, and (iv) emerging reactive separation concepts for process intensification.

Course Content: The course will span the following topics to prepare students with both a qualitative understanding of existing and emerging technologies for gas separations and a quantitative understanding of the design and analysis of these technologies:

Section II: Gas-Liquid Separations. Review of existing absorption tower and stripping tower applications and designs. Derivation of design equations and graphical techniques (McCabe-Thiele diagrams) for sizing gas-liquid stripping and absorption/adsorption columns. [5.5 hours]

Section III: Gas-Solid Separations. Review of existing pressure-swing adsorption and desulfurization systems for natural gas processing. Derivation of design equations and graphical techniques for adsorbent evaluation and process scale-up. Discussion of emerging reactive-separation concepts (e.g., sorption-enhanced reforming processes) for advanced natural gas processing. [5.5 hours]

Section IV: Gas Membrane Separations. Review of membrane technology from 1970’s to present and present challenges / needs. Discussion of polymeric membranes for light-gas separations and their limitations (e.g., Robeson’s upper boundary). Discussion of inorganic membranes based upon carbon molecular sieves, zeolites and metal-organic frameworks. Derivation of design equations for evaluating membrane processes. [5.5 hours]

Required Textbook:
“Transport Processes and Separation Process Principles” by C.J. Geankoplis

Suggested Reading:
Articles, monographs, and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their
disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism: http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: □ Undergraduate □ Graduate □ First Professional (ex., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-618: Carbon Capture, Utilization and Storage, CCUS
4. Catalog course description (not to exceed 50 words): Introduction to technologies for carbon capture, modeling and technoeconomic analysis and comparison of different carbon capture technologies, and economics of carbon capture, utilization, and storage statewide and nationwide.

5. Prerequisite(s):
Graduate classification
Cross-listed with: 
Stacked with:

6. Is this a variable credit course? □ Yes □ No If yes, from _______ to _______
7. Is this a repeatable course? □ Yes □ No If yes, this course may be taken _______ times.
Will this course be repeated within the same semester? □ Yes □ No
8. Will this course be submitted to the Core Curriculum Council? □ Yes □ No
9. This course will be:
a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   Executive Master of Science in Energy
b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
Attach approval letters.
11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix □ Course # □ Title (excluding punctuation)
ICPE □ 618 □ CARBON CAPTURE, UTILIZATION AND STORAGE

Approval recommended by:
Dr. Costas N. Georghiades
Department Head or Program Chair (Type Name & Sign) Date 8/22/14
Chair, College Review Committee Date 9/22/14

Department Head or Program Chair (Type Name & Sign) Date 9/22/14
(if cross-listed course)
Dean of College Date

Submitted to Coordinating Board by:
Chair, GC or UCC Date

Associate Director, Curricular Services Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-618: Carbon Capture, Utilization and Storage, (CCUS)

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<th>Fall 2015</th>
<th>Location:</th>
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<td>Day:</td>
<td>MTuWThF</td>
<td>Number of Credits:</td>
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<td>Time:</td>
<td>TBD (4.4hrs/day)</td>
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Instructor:
Dr. Faruque M.M. Hasan  
Texas A&M University  
Artie McFerrin Department of Chemical Engineering  
241 Jack E. Brown Engineering Building  
3122 TAMU  
College Station, TX 77843-3122  
Tel: (979)-862-1449  
Email: hasan@tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:  
The course will cover the following topics:

**Day 1 (hour 1 – 4): Introduction to Carbon Capture and Storage**

1. CO₂ emissions from energy and other sectors, relation with global-warming and climate change
2. Terminologies: power plant, flue gas, stationary source, parasitic loss, energy penalty, CO₂ captured, CO₂ avoided, CO₂ capture, CO₂ sequestration, feed dehydration, compression, purity, recovery, CO₂ injection, CO₂-EOR (enhanced oil recovery)
3. How to address the grand challenge of “energy and the environment”; Description of a general CO₂ capture, utilization and storage (CCUS) framework
4. CCUS potentials; Current CCUS status; Factors affecting the CCUS costs

**Day 2 (hour 5 – 9): Technical Review of Carbon Capture Processes**

5. Overview of CO₂ capture alternatives: post-combustion, pre-combustion and oxycombustion technologies for CO₂ capture; Absorption, adsorption, membrane, cryogenic, chemical looping, and microbial processes for CO₂ capture; Direct air capture.
6. Absorption-based CO₂ capture: MEA absorption, process configuration, flowsheet optimization, heat integration
7. Adsorption-based CO₂ capture: Pressure swing adsorption, vacuum swing adsorption, cyclic process design, grey-box modeling and optimization for CO₂ capture
8. Membrane-based CO₂ capture: multi-stage and multi-component process configuration, membrane model, analysis of membrane processes

Day 3 (hour 10 – 14): Technology Comparison for Carbon Capture
9. Materials and processes for capture; Introduction to Zeolites, Metal Organic Frameworks (MOFs) for CO₂ capture, Multi-scale framework for adsorbent (zeolite) screening
10. Solvent (amines, ionic liquids) selection for the absorption-based CO₂ capture
11. Membrane selection for the membrane-based CO₂ capture
12. Technology comparison for CO₂ capture: Capture costs of various materials and processes

13. CO₂ transportation, CO₂-based enhanced oil recovery, CO₂ sequestration and geological storage alternatives
14. How to select the most cost-effective materials, processes and networks for CCUS networks: mixed integer programming for CCUS supply chain network optimization
15. Case study 1: State-wide CO2 management in Texas
16. Case study 2: Nationwide CO₂ management in the U.S.A.

Day 5 (hour 19 – 22): Other issues related to CCUS
17. CCUS implementation: retrofitting power plants, process integration, scale up, safety, uncertainty, storage and monitoring
18. Policy issues: carbon tax, carbon trading, electricity prices and capture costs
19. Alternative approaches to CO₂ utilization from CCUS
20. Future opportunities in CCUS

Required Textbook: There is no required textbook.

Suggested Reading:


**Course requirements:**
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

**Grading:** Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

**Grade scale:** 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

**Take home exam:** due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

**Americans with Disabilities Act (ADA):** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

**Academic Integrity:** For additional information please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu). Please pay close attention to guidelines on avoiding plagiarism: [http://aggiehonor.tamu.edu/Descriptions/Pagiarism.aspx](http://aggiehonor.tamu.edu/Descriptions/Pagiarism.aspx)

*"An Aggie does not lie, cheat, or steal, or tolerate those who do."*
Derivation and application of Thermal Stress Approx,

Derivation of Shear Center for various cross-sections

EXAM #1 (in class)

Application of Beams on Elastic Foundations to practical structural problems

Continue.....Application of Beam on Elastic Foundation to practical structural problems

Application of Plastic Hinges (Plasticity)

Continue .....Application of Plastic Hinges (Plasticity)

Application of Castigliano’s Theorem

EXAM #2 (in class)

Continue ----- Application of Castigliano's Theorem
Graduate Project #2 (to be determined) i. e. Use of Castigliano’s Theorem to determine the displacement, stresses and loads in a complex structure. May need to write a brief report.

Machine Design Considerations

COURSE LEARNING OUTCOMES: At the end of this course, students should be able to:

1. determine response of structural members undergoing extensional, bending and twisting deformations
2. understand and calculate the response of materials and structures subject to various loading conditions
3. analyze response of structural members (bars, beams, plates) with coupled axial, bending, and twisting
4. derive the critical buckling (instability) of beams with various end conditions and supports along the beam.
5. set-up governing equations for deformation in structures
6. use energy methods to calculate deformations, unknown forces and stresses in multifunctional and shaped structures
7. determine the interface forces, stress in members of a complex multi-component structure using beams on elastic foundations
8. determine the instability of thin walled structural members due to bending ans compression loads
9. determine the stresses and displacement in composite beams
10. determine the approximate thermal stress and displacement in members subject to thermal gradients
11. determine the critical failure load in beams with multiple supports using plastic hinge (plasticity)
12. determine the stress and deflection in curved beams of various cross-sections
Texas A&M University
Departmental Request for a New Course
Undergraduate ● Graduate ● Professional
● Submit original form and attach a course syllabus.●

Form Instructions

1. Course request type:  
   - Undergraduate  
   - Graduate  
   - First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):  
   Interdisciplinary Curricular Program in Energy, ICPE

3. Course prefix, number and complete title of course:  
   ICPE-619: Nanomaterials Engineering and Energy Storage

4. Catalog course description (not to exceed 50 words):  
   Nanomaterial synthesis and processing with an emphasis on the creation of materials relevant to energy storage (batteries, capacitors, etc.). Prior knowledge of an undergraduate engineering level of familiarity of chemistry and physics is desirable

5. Prerequisite(s):  
   Graduate classification; Prior knowledge of an undergraduate engineering level of familiarity of chemistry and physics is desirable.

6. Is this a variable credit course?  
   - Yes  
   - No
   If yes, from ______ to ______

7. Is this a repeatable course?  
   - Yes  
   - No
   If yes, this course may be taken ______ times.

   Will this course be repeated within the same semester?  
   - Yes  
   - No

8. Will this course be submitted to the Core Curriculum Council?  
   - Yes  
   - No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. Executive Master of Science in Energy

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. Prefix  
   ICPE  
   Course #  
   619  
   Title (excluding punctuation)  
   NANOMATERIALS ENGINEERING AND

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Approval recommended by:

Dr. Costas N. Georgiades
Department Head or Program Chair (Type Name & Sign)  
Date  
Chair, College Review Committee
Date  
Chair of College
Date  

Department Head or Program Chair (Type Name & Sign)
(if cross-listed course)
Date  

Submitted to Coordinating Board by:

Chair, GC or UCC  
Date  

Associate Director, Curricular Services
Date  

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-619: Nanomaterials Engineering and Energy Storage

Term: Spring 2016  
Day: MTuWThF  
Time: TBD (4.4hrs/day)  
Location: TBD  
Number of Credits: 1.5Credits

Instructors:
Dr. Jodie Lutkenhaus  
Texas A&M University  
Artie McFerrin Department of Chemical Engineering  
218 Jack E. Brown Engineering Building  
3122 TAMU  
College Station, TX 77843-3122  
Tel: (979)-845-2682  
Email: jodie.lutkenhaus@che.tamu.edu  
Office hours: by appointment

Dr. Micah Green  
Texas A&M University  
Artie McFerrin Department of Chemical Engineering  
202 Jack E. Brown Engineering Building  
3122 TAMU  
College Station, TX 77843-3122  
Tel: (979)-862-1588  
Email: micah.green@tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:  
Nanomaterials offer unique properties for energy storage applications and are poised to enable a new generation of high capacity batteries, high-power supercapacitors, and flexible power sources. Specifically, nanomaterials offer high surface area, catalytic activity, structural reinforcement, and conductivity, depending on the chemistry, structure, and manner in which they are processed. Examples of promising nanomaterials include carbon nanotubes, graphene, porous carbons, hybrid nanocomposites, and electroactive polymers.
This module will cover the broad area of nanomaterial synthesis and processing with an emphasis on the creation of materials relevant to energy storage (batteries, capacitors, etc.). Prior knowledge of an undergraduate engineering level of familiarity of chemistry and physics is desirable.

Course content: This course will introduce students to the basics of nanomaterials in energy storage applications. Initially, students will learn the basics of energy storage applications and operations, followed by an overview of the unique structure, properties, and intermolecular interactions of nanomaterials in electrodes and electrolytes. The course will then cover nanomaterials synthesis (or isolation from bulk materials) and purification techniques; students will learn about the current processing challenges related to the scalable production of nanomaterials and associated quantity-quality tradeoffs. Particular emphasis will be directed toward how synthesis, doping, chemical functionalization, and liquid-phase processing can control the structure and surface chemistry of nanomaterial-based electrodes in batteries and supercapacitors. Students will learn the state-of-the-art techniques for how processing can enable both top-down templating of nanostructured materials as well as bottom-up self-assembly of films and porous structures. The multifunctional nature of these nanostructured materials will also be covered to show how energy storage may be coupled with structural or sensing needs. The final portion of the course will provide an overview of current research directions in regard to meet industrial energy needs in a manner that addresses scalability, environmental, and health concerns; this portion is particularly critical as industrial interest in nanomaterials increases and regulatory agencies form policies for nanomaterial production, handling, and disposal.

Course outcomes: Each student will exit the module with an understanding of nanomaterials chemistry for use in energy storage applications, with an emphasis on the fundamentals of processing-structure-property relations.

Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

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Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F
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**Academic Integrity:** For additional information please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu). Please pay close attention to guidelines on avoiding plagiarism:
[http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx](http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx)

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University  
Departmental Request for a New Course  
Undergraduate ✦ Graduate ✦ Professional  
• Submit original form and attach a course syllabus. •  

Form Instructions  
1. Course request type:  
   ☐ Undergraduate  ☑ Graduate  ☐ First Professional (e.g. DVM, JD, MD, etc.)  

2. Request submitted by (Department or Program Name):  
   Interdisciplinary Curricular Program in Energy, ICPE  

3. Course prefix, number and complete title of course:  
   ICPE-620: Thermoelectric Materials and Devices  

4. Catalog course description (not to exceed 50 words):  
   Methods useful for the synthesis of both bulk crystals and nanomaterials  
   (nanoparticles and nanowires); focus on the underlying thermodynamics and kinetic principles involved  
   in the synthesis of these materials; pathways useful for the integration of nanomaterials into functional  
   thermoelectric devices, methods useful for ascertaining the thermoelectric performance of materials and devices.  

5. Prerequisite(s):  
   Graduate classification  
   Cross-listed with:  
   Stacked with:  
   Cross-listed courses require the signature of both department heads.  

6. Is this a variable credit course?  
   ☐ Yes  ☑ No  
   If yes, from ______ to ______  

7. Is this a repeatable course?  
   ☐ Yes  ☑ No  
   If yes, this course may be taken ______ times.  
   Will this course be repeated within the same semester?  
   ☐ Yes  ☑ No  

8. Will this course be submitted to the Core Curriculum Council?  
   ☑ Yes  ☐ No  

9. This course will be:  
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)  
   b. an elective for students enrolled in the following degree programs(s) (e.g., M.S., Ph.D. in geography)  
   Executive Master of Science in Energy  

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.  
   Attach approval letters.  

11. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-kesics-for-distance-education).  

12. Prefix  
   Course #  
   Title (excluding punctuation)  
   ICPE  
   620  
   THERMEOLECTRIC MATERIALS AND DEVICES  

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   Approval recommended by:  
   Dr. Costas N. Georgiadis  
   Department Head or Program Chair (Type Name & Sign)  
   Date  
   Chair, College Review Committee  
   Date  
   Dean of College  
   Date  
   (if cross-listed course)  
   Submitted to Coordinating Board by:  
   Chair, GC or UCC  
   Date  
   Effective Date  

Questions regarding this form should be directed to Sandra Williams at 845-8911 or sandra.williams@tamu.edu  
Curricular Services – 04/14
ICPE-620: Thermoelectric Materials and Devices

Term: Fall 2015  
Day: MTuWThF  
Time: TBD (4.4hrs/day)  
Location: TBD  
Number of Credits: 1.5 Credits

Instructor:  
Dr. Sreearam Vaddiraju  
Texas A&M University  
Artie McFerrin Department of Chemical Engineering  
237 Jack E. Brown Engineering Building  
3122 TAMU  
College Station, TX 77843-3122  
Tel:(979)-862-1615  
Email: sreearam.vaddiraju@tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course Description:

• **Fundamental semiconductor physics**: Introduction to metals, semiconductors and insulators, electronic properties of semiconductors
• **Bulk semiconductor crystal synthesis**: Czochralski process and Bridgman process
• **Inorganic nanomaterials synthesis**: quantum dot and inorganic nanoparticle synthesis, inorganic one-dimensional structure synthesis (nanotubes, nanowires, nanobelts, hierarchical branched nanowires, nanowire superlattices) and superlattice thin films
• **Assembly of nanomaterials**: layer-by-layer assembly, assembly using Langmuir-Blodgett films, epitaxy, pelletization and sintering, printing, spin-casting and doctor-blade techniques.
• **Thermoelectric materials synthesis**: Synthesis of bulk crystals and nanostructures of clathrates, silicides, skutterudites, oxides and half-Heusler alloys
• **Fabrication and Testing of Thermoelectrics**: Fabrication of thermoelectrics from bulk semiconductor crystals and nanomaterials, analysis of the performance of thermoelectric materials and devices

**Course Objectives:**

• Upon completion of this class, the students will gain insight into the methods useful for the synthesis of both bulk crystals and nanomaterials (nanoparticles and nanowires), and understand the underlying thermodynamics and kinetic principles involved in the synthesis of
these materials. The students will also learn the pathways useful for the integration of nanomaterials into functional thermoelectric devices. Finally, the students will learn methods useful for ascertaining the thermoelectric performance of materials and devices.

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### Tentative Course Schedule:

<table>
<thead>
<tr>
<th>Topics (timeline)</th>
<th>Reading Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and fundamentals of semiconductor physics</td>
<td>Instructor notes</td>
</tr>
<tr>
<td>Bulk crystal growth, doping of semiconductors, p-n junctions</td>
<td>Instructor notes</td>
</tr>
<tr>
<td>Nanomaterial (nanoparticle) synthesis, nanowire synthesis using liquid phase techniques, template-based, template-free methods for nanowire synthesis</td>
<td>References 3 and 4</td>
</tr>
<tr>
<td>Nucleation and growth aspects of nanowire synthesis</td>
<td>References 3 and 4</td>
</tr>
<tr>
<td>Assembly of nanowires, epitaxy, self-assembly, assembly using shear forces</td>
<td>Instructor notes</td>
</tr>
<tr>
<td>Seebeck effect, Thermoelectrics, fundamental operating principles and methods for testing thermoelectric performance</td>
<td>References 1 and 2</td>
</tr>
<tr>
<td>Synthesis of bulk crystals and nanostructures of clathrates, silicides, skutterudites, oxides and half-Heusler alloys; and fabrication and testing of thermoelectrics based on these materials</td>
<td>References 1 and 2, instructor notes</td>
</tr>
<tr>
<td>Nanomaterial-based thermoelectrics and their efficiencies</td>
<td>Reference 1</td>
</tr>
</tbody>
</table>

### Suggested Textbooks and Reading:

2. CRC Handbook of Thermoelectrics, Edited by D. M. Rowe, CRC Press 1995 (E-book available through TAMU library)

### Course requirements:

- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.
**Grading:** Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

*Grade scale:* 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

**Take home exam:** due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

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*"An Aggie does not lie, cheat, or steal, or tolerate those who do."*
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions:

1. Course request type: ☐ Undergraduate ☒ Graduate ☐ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
   ICPE-621: THERMOELECTRICS: FUNDAMENTALS OF ELECTRONIC AND THERMAL TRANSPORT

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words): Fundamentals of electronic and phononic transport phenomena; understanding of thermodynamics and transport properties from a microscopic viewpoint; thermal transport theories for analyzing and designing energy conversion devices, nanomaterials, microelectronics, and nano/micro-electromechanical systems (NEMS/MEMS).

5. Prerequisite(s):

   Graduate classification

   Cross-listed with:

   Stacked with: Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? ☐ Yes ☒ No
   If yes, from _____ to _____

7. Is this a repeatable course? ☐ Yes ☒ No
   If yes, this course may be taken _____ times.
   Will this course be repeated within the same semester? ☐ Yes ☒ No

8. Will this course be submitted to the Core Curriculum Council?
   ☒ Yes ☐ No

9. This course will:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

☒ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix | Course # | Title (excluding punctuation)
   ICPE | 621 | THERMOELECTRICS: FUNDAMENTALS

   Lec. | Lab | S/U | CR | CP and Fund Code | Admin. Unit | Year | Year | HCC Code
   1 | 5 | 1 | 5 | | | 1 | 5 | - | 1 | 6 | 0 | 0 | 3 | 6 | 3 | 2

   Approval recommended by: [Signature]
   Dr. Costas N. Georgiades
   Department Head or Program Chair (Type Name & Sign) Date Chair, College Review Committee Date

   Department Head or Program Chair (Type Name & Sign) Date Dean of College Date
   (if cross-listed course)

   Submitted to Coordinating Board by:
   Date

   Chair, GC or UCC Date Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-621: Thermoelectrics: Fundamentals of Electronic and Thermal Transport

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Dr. Choongho Yu
Texas A&M University
Department of Mechanical Engineering
312 MEOB
College Station, TX 77843
Tel:(979)-862-1073
Email: chyu@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
This course introduces the fundamentals of electronic and phononic transport phenomena. The main focuses and learning outcomes are:

(i) An understanding of thermodynamics and transport properties from a microscopic viewpoint;
(ii) Thermal transport theories for analyzing and designing energy conversion devices, nanomaterials, microelectronics, and nano/micro-electromechanical systems (NEMS/MEMS).

The course covers the following topics:

- Kinetic theory - Transport properties
- Maxwell Boltzmann equilibrium distribution
- Crystal structure of solids; reciprocal lattice
- Lattice vibrations: acoustic and optical modes
- Phonons: energy quantization, Bose-Einstein statistics
- Phonon specific heat
- Phonon scattering and thermal transport
- Free electron model of metals- Fermi Dirac statistics
- Internal energy; Specific heat and thermal conductivity of electrons
- Electron scattering, Thermal and electrical transport
- Semiconductors
- Band structure of semiconductors
- Carrier densities
- Drude model
- Phonon-electron interactions
- Boltzmann transport theory – Basic/conservation equations

Suggested Textbooks and Reading


Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
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Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
- Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: ☐ Undergraduate ☒ Graduate ☐ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE

3. Course prefix, number and complete title of course: ICPE-622: Energy Efficiency in Buildings

4. Catalog course description (not to exceed 50 words): Introduction to energy efficiency in buildings; understanding the energy use in buildings, the heating and cooling requirements, the role of renewable energy resources, the impact of lighting, the role of optimal control measures in existing and new buildings, the verification of energy savings, and the building energy simulation.

5. Prerequisite(s):

   Graduate classification

   Cross-listed with:

   Stacked with:

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? ☐ Yes ☒ No

   If yes, from _______ to _______

7. Is this a repeatable course? ☐ Yes ☒ No

   If yes, this course may be taken _______ times.

   Will this course be repeated within the same semester? ☐ Yes ☒ No

8. Will this course be submitted to the Core Curriculum Council? ☒ Yes ☐ No

9. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.

    Attach approval letters.

11. ☒ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix Course # Title (excluding punctuation)

<table>
<thead>
<tr>
<th>ICPE</th>
<th>622</th>
<th>ENERGY EFFICIENCY IN BUILDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lect</td>
<td>Lab</td>
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<td>1 5</td>
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</tr>
</tbody>
</table>

Approval recommended by:

Dr. Costas N. Georgiades
Date

Chair, College Review Committee
Date

Department Head or Program Chair (Type Name & Sign)

(if cross-listed course)

Date

Dean of College

Submitted to Coordinating Board by:

Chair, GC or UCC

Date

Effective Date

Associate Director, Curricular Services

Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu
Curricular Services – 04/14
ICPE-622: Energy Efficiency in Buildings

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Dr. David Claridge
Department of Mechanical Engineering
Texas A&M University
327 MEOB
College Station, TX 77843
Tel.: 979-845-1280
Email: dclaridge@tamu.edu
Office hours: by appointment

Dr. Charles Culp
Department of Architecture
Texas A&M University
A17 Langford
College Station, TX 77843
Tel.: 979-458-3600
Email: cculp@tamu.edu
Office hours: by appointment

Course description:
The course covers the following topics:
1. Introduction to Energy Efficiency in Buildings (~ 60 slides, with 2 exercises)
   Learning: Understand the current and projected impact of energy use and methods that can be used to reduce consumption and maintain comfort.
   Define the issue and where energy is used
   Show changes over time
   Show impact on world
   What are the limits of energy efficiency?
   Discuss pollution – causes and cures
   Introduce global warming (true / false?)
   Exercise 1. Pose a dire problem and have students work through a solution.
   Exercise 2. Define sustainability and write a two page summary on impact and solution.

2. Building Energy Use / Building Design (~ 60 slides, with 2 exercises)
   Learning: Understand pictorially and with rough calculations how/when buildings use the various energy sources. The final exercise will be a spreadsheet calculation which enables students to see the impact of each load.
   Show residential building energy flows
   Show commercial building energy flows
Discuss heat flow in walls, windows and roofs and magnitude of impact
Discuss lighting and plug loads and their impact on heating and cooling
Discuss solar gains and impact on heating and cooling
Discuss heat flows to the ground and impact on heating and cooling

Exercise 1. List the energy gains and losses and estimate the relative magnitude on the building in a) a peak summer day, b) a low temperature winter day, and c) an average day in September.

Exercise 2. Create a spreadsheet which calculates hourly energy consumption for a building with large solar heat gain. This will be set up in class and given as homework.

3. Building Heating and Cooling Equipment (~ 60 slides, with 2 exercises)
   Learning: Understand pictorially what equipment is used in buildings and the function and impact of each component.
   Heating and cooling equipment - chillers, boilers, DHW
   Getting heating and cooling to occupants - air handler units, pumps, ducts, piping and efficiency issues
   Building controls from thermostats to energy management systems and control (EMCS)
   Exercise 1. Start with a building diagram and locate the water and air side equipment. Also include the piping routing and air duct routing. The idea is to have the students understand the tradeoffs that get made.
   Exercise 2. Draw an air flow diagram with each of the main components and list their function.

4. Renewable Energy (~ 60 slides, with 2 exercises)
   Learning: Understand pictorially renewable energy sources and their technical strengths / weaknesses.
   Show windmills with pictures. Start with a US map showing good areas. Cover the types of applications / sizes of windmills, when the high / low output times are, value including costs of installation and operations,
   Show photovoltaics. Use pictures, do an exercise on sizing with cost analysis,
   Show solar thermal systems (passive and active).
   Show co-generation (combined heat-power).
   Show ground source heat pumps
   Show hydro
   Discuss Biomass
   Exercise 1. Size a PV system, show the various components and draw a diagram of when the energy is available.
   Exercise 2. Design an off-grid house powered by renewable energy so that it always has adequate power to operate appliances, lighting and HVAC equipment.

5. Envelope/Building Lighting Measures (~ 60 slides, with 2 exercises)
   Learning: Understand pictorially the building envelope (windows, walls, roofs, floors) and heating and cooling flows. Understand lighting and the impact on energy consumption.
   Cover walls, flooring, insulation and the impact on energy use. Include wall construction methods (normal stick built, wood with spray insulation, ICFs, straw bales, sod-walls, stone walls, adobe, green walls (living plant material).
   Cover windows. Discuss U-value, SHGC, VT and how advanced technology is changing fenestration. Cover electro-chromic windows and other advanced coatings that are put on windows. Explain with pictures and minimal calculations.
Cover roofs including cool roofs. See LBL for pictures and material. Discuss green roofs. Cover the main types of lighting technology and discuss the relative light output, energy consumption and uses of each.

Exercise 1. Create an envelope for a home and show where energy reductions could be implemented.

Exercise 2. Create a 5 story office building (20kft² per floor) and show how to make this more energy efficient.

6. Control Measures (~ 60 slides, with 2 exercises)
Learning: Understand the basic operation of control systems in residential and commercial buildings.

Cover Energy Efficiency Measures including 1) timed start-stop, 2) optimum start-stop, 3) demand control (including ratchet clauses, time based, and real time pricing), 4) economizer, 5) cold-deck/hot-deck resets, 6) optimized feedback, 7) static pressure reset, 8) PID and advanced loop controls, 9) adaptive controls.

Exercise 1.
Exercise 2.

7. Building Energy Standards (~ 60 slides, with 2 exercises)
Learning: Understand the standards process, the basic set of standards used in the building industry and how codes are created from standards. The key HVAC/R standards are ASHRAE 90.1-20XX (Energy efficiency in commercial buildings), ASHRAE 62.1-20XX (Indoor air standard), ASHRAE 55-20XX (Thermal comfort), and the EPA air quality standards.

Cover the above standards and show how these have been used to create the Texas State energy codes. Also discuss how the air quality standards have evolved and the interrelationship with energy efficiency standards.

Exercise 1.
Exercise 2.

8. Commissioning (New and existing buildings) (~ 60 slides, with 2 exercises)
Learning: Understand the concepts and practice of new building commissioning and commissioning of existing buildings.

Cover the growth and changes that commissioning processes have gone through in the past 2 decades and their impact on energy efficiency. Show the processes that are effective and the results that should be obtained.

Exercise 1.
Exercise 2.

9. Measurement and verifying (M&V) energy savings (~ 60 slides, with 2 exercises)
Learning: Understand the practical application of M&V technologies.

Cover the relevant guidelines including IPVMP and ASHRAE Guideline 14-20XX.

Exercise 1.
Exercise 2.

10. Building Simulation and energy efficiency (~ 60 slides, with walk through demonstration and 2 exercises)
Learning: Understand the basic types of building energy simulation.

Load eQuest and use this simulation software to model a building and determine the energy use of the planned structure and HVAC systems.

Exercise 1. Create a baseline building and determine the monthly energy use.
Exercise 2. Add energy efficiency measures and determine the yearly savings.

Sections – 2.2 hours each

1. Introduction to Energy Efficiency in Buildings (~ 60 slides, with 2 exercises)
2. Building Energy Use / Building Design (~ 60 slides, with 2 exercises)
3. Building Energy Using Equipment (~ 60 slides, with 2 exercises)
4. Renewable Energy (~ 60 slides, with 2 exercises)
5. Building Envelope/Building Lighting Measures (~ 60 slides, with 2 exercises)
6. Building Control Measures (~ 60 slides, with 2 exercises)
7. Building Energy Standards (~ 60 slides, with 2 exercises)
8. Commissioning New Buildings and Existing Buildings (~ 60 slides, with 2 exercises)
9. Measuring and Verifying Energy Savings (~ 60 slides, with 2 exercises)
10. Simulation and Energy Efficiency in Buildings (~ 60 slides, with walk through demonstration and 2 exercises)

Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:
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Texas A&M University
Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional
Submit original form and attach a course syllabus.

1. Course request type:
   - Undergraduate
   - Graduate
   - First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):
   Interdisciplinary Curricular Program in Energy, ICPE
   ICPE-623: Water-Energy-Food Nexus: Towards Sustainable Resource Allocation

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Securing energy, clean water and greening agriculture; principles of the Water -
   Energy - Food nexus and its application to the corresponding three themes; includes hands on laboratory.

5. Prerequisite(s):
   Graduate classification
   Cross-listed with:
   Stacked with:
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  □ Yes  ★ No
   If yes, from ________ to ________

7. Is this a repeatable course?  □ Yes  ★ No
   If yes, this course may be taken ________ times.
   Will this course be repeated within the same semester?  □ Yes  ★ No

8. Will this course be submitted to the Core Curriculum Council?  ★ Yes  □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.

11. ★ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    ICPE  623  WATER-ENERGY-FOOD NEXUS: TOWAR

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<th>Lec.</th>
<th>Lab</th>
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Approval recommended by:
Dr. Costas N. Georgiadis
Department Head or Program Chair (Type Name & Sign)  Date
Chair, College Review Committee  Date
Dean of College  Date

Department Head or Program Chair (Type Name & Sign)  Date
(If cross-listed course)

Submitted to Coordinating Board by:
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Associate Director, Curricular Services  Date
Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 04/14
ICPE-623: Water-Energy-Food Nexus Towards Sustainable Resource Allocation

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5Credits

Instructor:
Dr. Rabi H. Mohtar
Department of Civil Engineering
Texas A&M University
410B CE/TTI
College Station, TX 77843
Tel.: 979-458-9780
Email: mohtar@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course Description:
The course will cover securing energy, clean water and greening agriculture. It will include lectures and hands on laboratory. The course will be designed that can be intellectually digested by learners or various backgrounds. Lectures will cover principles of the Water - Energy -Food nexus and its application to the corresponding three themes above.

After covering the subject matter fundamentals, students will work on real world projects or case studies relevant to the subject being discussed.

Case Studies
The Water-Energy-Food nexus is a crosscutting theme. We therefore aim to provide at least two case studies to connect domestic water use with industrial and agricultural use. The scope of the case studies is to provide the young generation with improved knowledge on water use all along the food supply chain.

1. **Securing clean water**: Providing access to safe drinking water, revealing the extent of water use and thereby teaching a new American generation on how to reduce water stress in the food value chain
2. **Green agriculture**: Growing agricultural production through innovative clean energy technologies and reduced carbon emissions
3. **Role of renewable energy** in energy portfolio and in bridging water and food gap.

Nexus Tool to be used:
The Water-Energy-Food nexus tool developed by Mohtar and Daher (2014) will be used in this module. The tool designed off a scenario-based framework that quantifies the interlinkages and tradeoffs between these resources.
Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
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1. Course request type: □ Undergraduate ✗ Graduate □ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-624: Energy-Water Nexus
4. Catalog course description (not to exceed 50 words): Various aspects of energy-water nexus including the fundamentals, technologies, applications, and economics; focus on energy production, conversion and utilization; connection with water: production, treatment, delivery and usage.

5. Prerequisite(s): Graduate classification

Cross-listed with: ________________________
Stacked with: ________________________

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes ✗ No

If yes, from ________ to ________

7. Is this a repeatable course? □ Yes ✗ No

If yes, this course may be taken ________ times.

Will this course be repeated within the same semester? □ Yes □ No

8. Will this course be submitted to the Core Curriculum Council? ✗ Yes □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.

11. Attach approval letters.

12. Prefix: ICPE

Course #: 624
Title (excluding punctuation): ENERGY-WATER NEXUS

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<th>Lect.</th>
<th>Lab</th>
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Approval recommended by:

Dr. Costas N. Georgiades
Department Head or Program Chair (Type Name & Sign) Date
Chair, College Review Committee Date

Department Head or Program Chair (Type Name & Sign) (if cross-listed course) Date
Dean of College Date

Submitted to Coordinating Board by:

Chair, GC or UCC Date

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 04/14
ICPE-624: Energy-Water Nexus

Term: Fall 2015
Day: MTuWThF
Time: TBD (4.4hrs/day)
Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Dr. Mahmoud El-Halwagi
Texas A&M University
Artie McFerrin Department of Chemical Engineering
230 Jack E. Brown Engineering Building
3122 TAMU
College Station, TX 77843-3122
Tel: (979)-845-3484
Email: el-halwagi@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
Energy and water are among the most ubiquitously used natural resources in the world. These two vital resources are mutually dependent. Energy production, conversion, and utilization involve water. Likewise, water production, treatment, delivery, and usage involve energy. The course is intended to cover various aspects of energy-water nexus including the fundamentals, technologies, applications, and economics. The following topics will be addressed:

- Forms of energy: sources, domestic and global usage, reserves, and economics
- Forms of water: sources, qualities, usage, and economics
- Water needs for upstream energy production (e.g., oil production, shale-gas production, heavy oil production)
- Water needs for energy conversion (e.g., thermoelectric cooling, hydropower) and downstream processing (e.g., steam in combined heat and power cycles in industrial facilities, water usage in oil refining, energy-water nexus in gas-to-liquid plants)
- Energy needs for water: technologies and basic principles for water extraction, treatment (e.g., thermal desalination, membrane desalination), disposal (e.g., wastewater treatment), and transportation.
- Energy-water nexus for renewable energy sources (e.g., the use of renewable energy for water desalination, the production and usage of water in biofuels plants)
• Water and energy usage and conservation in industrial processes
• Economic aspects of energy-water nexus
• Environmental aspects of energy-water nexus
• Creating, assessing, and selecting sustainable options for energy-water nexus
• An open-ended group project on energy-water nexus (technologies, applications, economics, and regulatory aspects)

Required Textbook: There is no required textbook.

Suggested Reading:
Articles and book chapters will be assigned by the instructors and made available via email or during class.

Course requirements:
• Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
• Read all required material.
• Participate actively in discussions.
• Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

   Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism: http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University

Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional
- Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: □ Undergraduate  ☑ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-625: Integrated Risk Management for Exploration and Production Projects
4. Catalog course description (not to exceed 50 words): Structured introduction to project systems and advance analysis of integrated project risks to practicing engineers and decision makers in the energy sector; emphasis on risks in context of a) project phase-gate process, b) systems representation, and c) flow across different functional and design requirements, areas of expertise/specialization, and construction/installation methods.

5. Prerequisite(s):  Graduate classification
Cross-listed with:  
Stacked with:  

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  ☑ No  If yes, from _____ to _____
7. Is this a repeatable course? □ Yes  ☑ No  If yes, this course may be taken _____ times.
Will this course be repeated within the same semester? □ Yes  ☑ No
8. Will this course be submitted to the Core Curriculum Council?  ☑ Yes  □ No
9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
11. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
ICPE  625  INTEGRATED RISK MANAGEMENT FOR

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Approval recommended by:

Dr. Costas N. Georgiades  9/22/14
Department Head or Program Chair (Type Name & Sign)  Date

Chair, Core Review Committee  9/22/14
Date

Department Head or Program Chair (Type Name & Sign)  Date
(if cross-listed course)

Dean of College  9/22/14
Date

Submitted to Coordinating Board by:

Chair, GC or UCC  Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu
Curricular Services – 04/14
ICPE-625: Integrated Risk Management for Exploration and Production Projects

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day) Location: TBD
Number of Credits: 1.5 Credits

Instructors:
Dr. Ivan Damnjanovic
Department of Civil Engineering
Texas A&M University
705C CE/TTI
College Station, TX 77843
Tel.: 979-862-6616
Email: idamnjanovic@civil.tamu.edu
Office hours: by appointment

Dr. Zenon Medina-Cetina
Department of Civil Engineering
Texas A&M University
702D CE/TTI
College Station, 1X 77843
Tel.: 979-845-6567
Email: zmedina@civil.tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course Description:
The current approaches to planning, delivery, and operations of exploration and production (E&P) projects are highly fragmented. What makes the delivery process highly fragmented are the advances in drilling and installation technologies, better understanding of geophysical characteristics of the site and the corresponding development of unique designs, as well as the general industry trend of mitigating liability/risk and focusing only on core competencies; hence outsourcing the supporting operations and services. Academic and industry reports have noted this trend and have linked it to major project failures and accidents including the Macondo oil spill in the Gulf of Mexico.

The industry leaders are fully aware of this problem and have emphasized the need for the industry to provide education and training on how different elements of project design, delivery, and operations interact. In fact, a number of efforts on this topic are currently underway. For
example, large operators have started implementing in-house training programs and complex knowledge management systems to have their engineers understand the bigger picture of a project and how different project elements are interconnected. However, only larger operators can afford this. Smaller and mid-size operators do not have enough resources to provide training and mainly rely on professional organizations courses. While these courses are very informative on a narrow topic, they fall short in communicating the big picture, filling the gaps in fundamentals of risk assessment and management, and linking everything together in a method that promotes active learning.

The objective of this course is to provide a structured introduction to project systems and advance analysis of integrated project risks to practicing engineers and decision makers in the energy sector. The emphasis will be given to risks in context of a) project phase-gate process, b) systems representation, and c) flow across different functional and design requirements, areas of expertise/specialization, and construction/installation methods. Hence, the course would provide sufficient theoretical introductions in systems modeling, decision analysis, and probability theory to enable students to develop and implement decision-support models, understand and interpret model results, as well as propose original solutions using advanced risk analysis methods for exploration and production projects. The course delivery will be based on a combination of lectures, in-class and group homework assignments, and remote communication to promote active learning. In addition, two case studies would be used to illustrate the new materials – unconventional shale gas project and deep-water offshore project case study.

**Required Textbook:** There is no required textbook.

**Suggested Reading:**
Articles and book chapters will be assigned by the instructors and made available via email or during class.

**Course requirements:**
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

**Grading:** Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

**Grade scale:** 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

**Take home exam:** due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.
Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism: http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

Form Instructions:
1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (ex., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-626: Safety in Energy Systems
4. Catalog course description (not to exceed 50 words): Role of leadership and development of management systems to ensure safety performance in energy systems, a systems approach to safety management for energy systems, lifecycle analysis and the energy supply chain, and applications of engineering principles to process safety and hazards analysis.

5. Prerequisite(s):
   Graduate classification
   Cross-listed with: 
   Stacked with:
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  □ No
   If yes, from _______ to _______

7. Is this a repeatable course? □ Yes  □ No
   If yes, this course may be taken ______ times.
   Will this course be repeated within the same semester? □ Yes  □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix Course# Title (excluding punctuation)
    ICPE 626 SAFETY IN ENERGY SYSTEMS

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Approval recommended by:

Dr. Costas N. Georgiades
Department Head or Program Chair (Type Name & Sign) Date
Chair, College Review Committee Date

Department Head or Program Chair (Type Name & Sign)
Date
Dean of College (if cross-listed course) Date

Submitted to Coordinating Board by:

Chair, GC or UCC Date

Associate Director, Curricular Services Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
ICPE-626: Safety in Energy Systems

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)  
Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Dr. Sam Mannan
Texas A&M University
Artie McFerrin Department of Chemical Engineering
246 Jack E. Brown Engineering Building
3122 TAMU
College Station, TX 77843-3122
Tel: (979) 845-6446
Email: mannan@tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
Energy safety and security is of essential importance for society and engineering for sustainable development. Over the whole spectrum of energy systems, which include electricity and fuels generated from a variety of sources such as nuclear, fossil fuels, hydrogen and fuel cell, solar, biomass, wind, ocean and geothermal as well as others, there are various safety aspects to be considered. These safety concerns may be prevalent in one or more stages of the energy supply chain, i.e., production, storage, distribution and application. Life cycle analysis, also known as life cycle assessment, is a technique to assess the safety and environmental aspects and potential impacts of a product, process or service with all the stages of a product, process or service from-cradle-to-grave (e.g., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling).

This course module will consist of 10 2.2 hour segments delivered over a period of 1-1.5 weeks that will focus on developments of strategies and techniques to assess and enhance safety levels in energy systems. Topics covered in this course module are listed below.

- Case studies on financial ramifications of major incidents
- The role of leadership and development of management systems to ensure safety performance in energy systems
- A systems approach to safety management for energy systems
- Lifecycle analysis and the energy supply chain
- Applications of engineering principles to process safety and hazards analysis
- A three-pronged approach: prevention, mitigation, and response
- Use of modeling techniques in incident prediction and risk management
• Use of leading and trailing indicators
• Use of qualitative and quantitative methods in process safety and risk assessment
• Layer of protection and the multiple barriers concept
• Risk identification, assessment and management techniques and applications
• Risk-benefit analyses of safety concepts in energy systems
• Risk-based decision making
• Risk perception and risk acceptance
• Regulatory and permitting activities
• The concept of as low as reasonably practicable
• The relationship of reliability of energy systems and sustainability
• Security of energy systems; a multi-faceted and growing issue
• Managing chronic and acute environmental impacts
• Case studies in safety and security

**Required Textbook:** There is no required textbook.

**Suggested Reading:**
Articles and book chapters will be assigned by the instructor and made available via email or during class.

**Course requirements:**
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).
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"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: □ Undergraduate ☑ Graduate □ First Professional (ex., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Interdisciplinary Curricular Program in Energy, ICPE
3. Course prefix, number and complete title of course: ICPE-627: Interfacial Phenomena of Energy Systems
4. Catalog course description (not to exceed 50 words): Fundamentals of interfacial phenomena, energy related interfacial materials, and interfacial issues of energy systems; specific energy-related applications include oil recovery, lubrication, thermal management, photovoltaics, battery, fuel cells, and supercapacitors.

5. Prerequisite(s): Graduate classification

Cross-listed with: Stacked with:

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes ☑ No
    If yes, from ______ to ______

7. Is this a repeatable course? □ Yes ☑ No
    Will this course be repeated within the same semester? □ Yes ☑ No
    If yes, this course may be taken ______ times.

8. Will this course be submitted to the Core Curriculum Council? ☑ Yes □ No

9. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.
11. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix Course # Title (excluding punctuation)
    ICPE 627 INTERFAcial PHENOMENA OF ENERG

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Approval recommended by:

Dr. Costas N. Georgakides
Department Head or Program Chair (Type Name & Sign) Date 9/22/14
Chair, College Review Committee Date 9/22/14

Department Head or Program Chair (Type Name & Sign) Date 9/22/14
(If cross-listed course)
Dean of College Date

Submitted to Coordinating Board by:

Chair, GC or UCC Date

Associate Director, Curricular Services Date Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu
Curricular Services – 04/14
4. Aggregation, Flocculation, and Colloidal Stability (1 × 2hr)

II. Energy Related Interfacial Materials (2 × 2hr)
5. Amphiphiles (0.5 × 2hr)
6. Polymers (0.5 × 2hr)
7. Nanoparticles and Colloids (0.5 × 2hr)
8. Thin Films (0.5 × 2hr)

III. Interfacial Issues of Energy Systems (5 × 2hr)
9. Oil Recovery and Hydraulic Fracturing (1 × 2hr)
10. Energy Efficiency [obra]
11. Energy Efficiency [obra]
12. Photovoltaics (1.0 × 2hr)
13. Batteries, Fuel Cells, and Supercapacitors (1.0 × 2hr)

Required Textbook:

Suggested Reading:

Course requirements:
- Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
- Read all required material.
- Participate actively in discussions.
- Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact
Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

**Academic Integrity:** For additional information please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu). Please pay close attention to guidelines on avoiding plagiarism: [http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx](http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx)

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

ICPE-627: Interfacial Phenomena of Energy Systems

Term: Spring 2016
Day: MTuWThF
Time: TBD (4.4hrs/day)  Location: TBD
Number of Credits: 1.5 Credits

Instructor:
Dr. Mustafa Akbulut  
Texas A&M University  
Artie McFerrin Department of Chemical Engineering  
230 Jack E. Brown Engineering Building  
3122 TAMU  
College Station, TX 77843-3122  
Tel:(979)-847-8766  
Email: makbulut@tamu.edu  
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
Because materials interact with the outside world through their surfaces, the significance of surface science cannot be overemphasized for scientific and engineering applications, in particular energy systems. For instance, in oil recovery, surface active compounds are typically used to lower the interfacial tension or capillary pressure that impedes oil droplets from moving through a reservoir. Likewise, for heterogeneous catalysis applications, adsorption -which is the accumulation of atoms, ions, molecules, macromolecules, or particles at an interface- is a critical interfacial phenomenon to consider.

This module will be divided in three sections: (i) Fundamentals of Interfacial Phenomena, (ii) Energy Related Interfacial Materials, and (iii) Interfacial Issues of Energy Systems. Specific fundamental topics will include Intermolecular and Surface Forces; Contact Angle, Wetting, and Capillarity; Adsorption, Desorption, and Removal; and Aggregation, Flocculation and Colloidal Stability. Amphiphiles, Polymers, Nanoparticles and Colloids, and Thin films will be the interfacial materials of interest. The specific energy-related applications that will be covered include Oil Recovery; Lubrication; Thermal Management; Photovoltaics; and Battery, Fuel Cells, and Supercapacitors.

Course Content:
I. Fundamentals of Interfacial Phenomena (4 × 2hr)  
1. Intermolecular and Surface Forces (1 × 2hr)  
2. Contact Angle, Wetting, and Capillarity (1 × 2hr)  
3. Adsorption, Desorption, and Removal (1 × 2hr)
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:
   □ Undergraduate • □ Graduate • □ First Professional (ex. DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):
   Interdisciplinary Curricular Program in Energy, ICPE
   ICPE-628: Multi-Physics Geomechanics for Energy Applications (CO2, fracking, nuclear waste)

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Focuses on main physical phenomena and processes that control the behavior of porous media; formulation for non-isothermal multiphase flow and transport problems in deformable porous media; problems of practical interest in the broad field geo-engineering and geo-mechanics.

5. Prerequisite(s):
   Graduate classification
   Cross-listed with: 
   Stacked with:
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes • □ No
   If yes, from _____ to _____

7. Is this a repeatable course? □ Yes • □ No
   If yes, this course may be taken _____ times.
   Will this course be repeated within the same semester? □ Yes • □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes • □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   Executive Master of Science in Energy

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
    Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix
    Course #: Title (excluding punctuation)
    ICPE 628
    MULTI-PHYSICS GEOMECHANICS FOR

    Lect. Lab SCH CIP and Fund Code
    1 • 5 1 • 5

    Approval recommended by:

    Dr. Costas N. Georgiadis
    Department Head or Program Chair (Type Name & Sign) Date
    Chair, College Review Committee Date

    Department Head or Program Chair (Type Name & Sign)
    (if cross-listed course) Date
    Dean of College Date

    Submitted to Coordinating Board by:
    Chair, GC or UCC Date

    Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 04/14
ICPE-628: Multi-physics Geomechanics for Energy Applications (CO2, fracking, nuclear waste)

Term: Fall 2015                         Location: TBD
Day: MTuWThF                             Number of Credits: 1.5Credits
Time: TBD (4.4hrs/day)

Instructor:
Dr. Marcelo Sanchez
Zachry Department of Civil Engineering
Texas A&M University
CE-TTI Building
3136 TAMU
College Station, TX 77843-3136
Tel.: 979 862 6604
Email: msanchez@civil.tamu.edu
Office hours: by appointment

Email will be the primary means of communication for the course. Check your email often and keep your mailbox below quota. Go to elearning.tamu.edu for course materials.

Course prerequisites: Graduate classification.

Total contact hours: 22hrs

Course description:
In the last few years geo-engineering has expanded its domain of intervention, particularly in the field of geo-environmental engineering and geo-technology applied to assist present and future energy challenges (i.e. from energy production, to waste management and carbon sequestration). This has led to study the behavior of soils and rocks under extreme and complex conditions involving simultaneous hydraulic (both: liquid and gas), thermal, mechanical and geochemical actions. This course focuses on the study of the main physical phenomena and processes that control the behavior of porous media. The formulation is presented for the general case of non-isothermal multiphase flow and transport problems in deformable porous media. The course also contemplates a brief introduction to the numerical approximation of the mathematical formulation. Problems of practical interest in the broad field geo-engineering and geo-mechanics are analyzed during the course.

Outline of topics:
1. Introduction and basic concepts
   1.1 Notation. Approximation of the porous medium as a continuum. Representative elementary volume. Porosity and effective porosity. Particle-size/pore-size distribution. Other statistical descriptions.
   1.2 Properties of the liquid water. Density, compressibility, viscosity and surface tension.
   1.3 Properties of the water vapor and gaseous phase (wet air).
1.4 Influence of temperature, pressure and solutes on water and gas properties. Influence of capillary tension and suction on vapor concentration

2. **Single-phase flow in non deformable porous media**
   2.3 Laboratory and in-situ tests.

3. **Multiphase flow in non deformable porous media**
   3.2 Darcy’s law for two-phase media (e.g., water-air, gas-oil) media. Relative permeability. Piezometric level. Flow equations for multiphase porous media. Richards’s equation.
   3.4 Short introduction to laboratory and in-situ tests.

4. **Mass transport in non deformable porous media**
   4.2 Adsorption. Transport of radioactive nuclides (radioactive decay).
   4.3 Solute transport in multiphase flow. Introduction to reactive transport...

5. **Energy transport in non deformable porous media**
   5.3 Issues related to advective-dispersive terms in transport equations. Characteristic times. Peclet and Rayleigh numbers.
   5.4 Short introduction to laboratory and in-situ testing.

6. **Deformable porous media**
   6.1 Stresses and strains. Momentum balance equation. Porosity changes.
   6.2 Elastic and Elastoplastic models for soils and rocks
   6.4 Deformation in unsaturated (multiphase) porous media. Effect of net stresses and capillary pressure on deformation. Behavior of swelling clays and shales. Mechanical behavior of fractures.
   6.5 Short introduction to laboratory and in-situ testing

7. **Applications**
   7.1 Applications to ‘Enviromental Geomechanics’: waste containment system, clay barriers, drainage materials. multiple barriers concept. underground storage.
   7.2 Applications to ‘Energy Geomechanics’: borehole stability, CO2 sequestration, hydraulic fracking, fault reactivation, hydrate bearing sediments, geothermal piles, CAES design.

**Suggested Textbooks and Reading:**
Handouts and Course Notes.
Journal Papers.

Course requirements:
• Attend all lectures. Absences for previously scheduled activities will only be excused if they are communicated well in advance. If you have not discussed an absence with the instructor ahead of time, it will be considered unexcused unless proper documentation is provided. See http://student-rules.tamu.edu/rule07.
• Read all required material.
• Participate actively in discussions.
• Complete assignment(s) and final take home exam. Late assignments/exam will be downgraded a letter grade for each late day.

Grading: Letter grades will be assigned based on: active participation 25%; homework assignments 25%; final take home exam 50%.

Grade scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D; <60 F

Take home exam: due by 4:00pm the day after the last lecture. One letter grade will be deducted for each day past the deadline.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity: For additional information please visit: http://aggiehonor.tamu.edu. Please pay close attention to guidelines on avoiding plagiarism:
http://aggiehonor.tamu.edu/Descriptions/Plagiarism.aspx

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate ∙ Graduate ∙ Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Department of Mechanical Engineering
3. Course prefix, number and complete title of course: MEEN 645 - Engineering Applications of Solid Mechanics
4. Catalog course description (not to exceed 50 words): Mechanical and mathematical basis for modeling response of solid bodies undergoing coupled mechanical and non-mechanical effects, analysis of stress and deformation for structural members subjected to axial, torsional and bending loads, design of multifunctional systems.

5. Prerequisite(s): CVEN 305, MEEN 368, or equivalent

Cross-listed with:  Stacked with: MEEN 445

Cross-listed courses require the signatures of both department heads.

6. Is this a variable credit course? □ Yes  □ No  If yes, from _____ to _____

7. Is this a repeatable course? □ Yes  □ No  If yes, this course may be taken _____ times.

Will this course be repeated within the same semester? □ Yes  □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

M.S. or M.Eng. in MEEN

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    MEEN  645  ENG. APP. OF SOLID MECHANICS

<table>
<thead>
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<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acal. Year</th>
<th>FICE Code</th>
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</table>

Approval recommended by:

Dr. Daniel McAdams

Department Head or Program Chair (Type Name & Sign)  Date  Chair, College Review Committee  Date

Chair of College  Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Date  Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 04/14
REQUIRED OR ELECTIVE: Elective course

CATALOG DESCRIPTION: Credit 3. Mechanical and mathematical basis for modeling response of solid bodies undergoing coupled mechanical and non-mechanical effects, analysis of stress and deformation for structural members subjected to axial, torsional, and bending loads, design of multifunctional systems.

PREREQUISITES: Undergraduate Mechanics courses (CVEN 305, MEEN 368, or equivalent)

INSTRUCTOR: Dr. William C. Schneider
Engineering Physics Building (ENPH) Room 305
e-mail: wschneider@tamu.edu

LECTURE: ----------------------------------

GRADING: HW & Quiz 10%, EXAM #1 25%, EXAM #2 25%, , Final Exam 25%, Graduate projects 15%
A(>=90); B(80-90); C(70-80); D(60-70); F(<60)

There will be two “Graduate Projects” requiring their individual approach to solving a complex problem or deriving a general solution. The project may require approximate mathematical solutions. In some cases there will be no single correct answer. The grades will be based on their logical, but practical, approach to the project.

TEXTBOOK AND OTHER RELEVANT MATERIALS:
No Formal Text  Dr. Schneider Notes


   New York-Toronto-London 1951


TOPICS COVERED:
# Week

1  Introduction to Course; Beams in general

2  Application and Derivation Instability of Beams, Plates, Thin Section Beams

3  Continue Application and derivation of Instability of Beams, Plates, and Thin Section Beams

Graduate Project # 1 (To be determined) i.e. Derive the buckling instability load for a beam with various elastic end constraints and multiple constraints along the beam. May need to write a brief report.

4  Application and derivation the stress and deflection of Composite Beams
CLASS/LABORATORY SCHEDULE: Two, 75 minute sessions per week, taught in mixed lecture-problem session style. Project and problem-solving materials are assigned.

EXAM #1: -------, class period time (tentative)
EXAM #2: -------, class period time (tentative)
Final Exam: To be determined

RELATIONSHIP OF COURSE TO PROGRAM OUTCOMES:

ABET Program Outcome

x a. ability to apply knowledge of mathematics, science and engineering
x b. ability to design and construct experiments, as well as to analyze and interpret data
x c. ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. ability to function on multi-disciplinary teams
x e. ability to identify, formulate and solve engineering problems

x f. understanding of professional and ethical responsibility
x g. ability to communicate effectively
h. broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
x i. recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
x k. ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Prepared by Dr. William C. Schneider Date May 13, 2014

Absences:

Work missed due to absences will only be excused for University-approved activities in accordance with TEXAS A&M UNIVERSITY STUDENT RULES (see http://student-rules.tamu.edu/rule7.htm). Specific arrangements for make-up work in such instances will be handled on a case-by-case basis. In accordance with recent changes to Rule 7, please be aware that in this class any "injury or illness that is too severe or contagious for the student to attend class" will require "a medical confirmation note from his or her medical provider" even if the absence is for less than 3 days (see 7.1.6.2 Injury or Illness less than three days.).

Notice: The Americans with disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Disability Services (disability.tamu.edu) in Room B118 of Cain Hall or call 845-1637.

Aggie Honor Code: "An Aggie does not lie, cheat, or steal, or tolerate those who do." Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System.
Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: www.tamu.edu/aggiehonor/
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: □ Undergraduate □ Graduate □ First Professional (MPH, MFA, MEd, etc.)
2. Request submitted by (Department or Program Name): Materials Science and Engineering
3. Course prefix, number and complete title of course: MSEN 636 Damage Mechanics and Failure in Composite Materials
4. Catalog course description (not to exceed 50 words): Mechanisms and models related to damage and failure in composite materials subjected to mechanical loads.

5. Prerequisite(s): Courses in composite materials, elasticity; graduate classification
Cross-listed with: AERO 616; MEMA 616
Stacked with:

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes □ No If yes, from ______ to _______
7. Is this a repeatable course? □ Yes □ No If yes, this course may be taken ______ times.
Will this course be repeated within the same semester? □ Yes □ No

8. Will this course be submitted to the Core Curriculum Council? □ Yes □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

M.S., Ph.D., Materials Science and Engineering

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix Course # Title (excluding punctuation)
    MSEN 636 DAMAGE IN COMPOSITE MATLS

<table>
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<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
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</table>

Approval recommended by:
Johnny Wurtado (MEMA and AERO) 8-20-14

Department Head or Program Chair (Type Name & Sign) Date
John Criscone Chair, College Review Committee Date

Nikola Radovic (MSEN)
Department Head or Program Chair (Type Name & Sign) Date
Katarina Butler-Parry Chair, GC or UCC Date

Submitted to Coordinating Board by:
Associate Director, Curricular Services Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services — 04/14
# Syllabus

**Damage Mechanics and Failure in Composite Materials (Fall 2015)**  
**AERO 616 • MEMA 616 • MSEN 636**

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Ramesh Talreja, Professor, Department of Aerospace Engineering and Department of Materials Science and Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor contact</td>
<td>(979) 458-3256; <a href="mailto:talreja@aero.tamu.edu">talreja@aero.tamu.edu</a>; 735A HRBB</td>
</tr>
<tr>
<td>Class meeting time and location</td>
<td>To be announced.</td>
</tr>
<tr>
<td>Course Description</td>
<td>Physical mechanisms of damage and failure in composite materials; in-depth treatment of the methods of analysis of damage, its evolution, and the ensuing failure.</td>
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<tr>
<td>Prerequisite:</td>
<td>Courses in composite materials, elasticity; graduate classification.</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>Students will become familiar with the physical mechanisms of damage and failure in composite materials. They will learn how these mechanisms are modeled using mechanics principles. They will know three different approaches to developing those models, and the assumptions and complexities involved.</td>
</tr>
<tr>
<td>Grading Assignments</td>
<td>The course grade will be based on three individually assigned projects. The course topics are grouped into three parts, and each project will cover topics from a corresponding course part. Projects will include both analytical and design aspects. Each assignment will carry 33% weight.</td>
</tr>
</tbody>
</table>
| Grading scale               | The final weighted average of each student will be calculated based on the indicated grade distribution. The letter grade will be assigned by the following criterion:  
                               | A >= 90; 80 <= B < 90; 70 <= C < 80; 60 <= D < 70; F < 60.                                            |
| Copyrights                  | The handouts used in this course are copyrighted. By "handouts" we mean all materials generated for this class, which include but are not limited to syllabi, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless the author expressly grants permission. |
| Topics to be covered        | Observations of damage and measurements of materials response (stress-strain behavior) caused by damage. General definition of damage. Single versus multiple cracking. The Aveston-Cooper-Kelly (ACK) analysis for unidirectional composites. |
| Week 3 | ACK analysis applied to composite laminates. Assignment 1 |
| Week 4 | Variational analysis of transverse cracking in laminates. The Hashin approach. |
| Week 5 | Assignment 1 due. |
| Week 6 | Micromechanics applied to damage in composites. The Varna approach. Cross ply laminates with transverse cracks |
| Week 7 | More general laminates. |
| Week 8 | Evolution of damage in static and cyclic loading. |
| Week 9 | Models for evolution. Assignment 2. |
| Week 10 | Fracture mechanics approaches to damage evolution |
| Week 11 | Damage mechanics approached to evolution. Assignment 2 due. |
| Week 12 | Continuum damage mechanics: damage characterization, thermodynamics based theories, experimental characterization. |
| Week 13 | Assignment 3 |
| Week 14 | Cross ply laminates; general laminates. Assignment 3 due |

**Americans with Disabilities Act (ADA) Policy Statement**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

**Academic Integrity Statement and Policy**

"An Aggie does not lie, cheat or steal, or tolerate those who do." For additional information, please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu).

As commonly defined, plagiarism consists of passing off as one's own the ideas, work, writings, etc., that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules [http://student-rules.tamu.edu/], under the section "Scholastic Dishonesty."

**Attendance policy**

Attendance policy conforms to Student Rule 7.

**Make-up Policy**

If an absence is excused, the instructor will either provide the student an opportunity to make up any quiz, exam or other work that contributes to the final grade or provide a satisfactory alternative by a date agreed upon by the student and instructor. If the instructor has a regularly scheduled make up exam, students are expected to attend unless they have a university approved excuse. The make-up work must be completed in a timeframe not to exceed 30
calendar days from the last day of the initial absence. The reasons absences are considered excused by the university are listed below. See Student Rule 7 for details (http://studentrules.tamu.edu/rule07). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

1. Participation in an activity that is required for a class and appears on the university authorized activity list at https://studentactivities.tamu.edu/app/sponsauth/index

2. Death or major illness in a student's immediate family.

3. Illness of a dependent family member.

4. Participation in legal proceedings or administrative procedures that require a student's presence.

5. Religious holy day. NOTE: Prior notification is NOT required.

6. Injury or illness that is too severe or contagious for the student to attend class.
   a. Injury or illness of three or more class days: Student will provide a medical confirmation note from his or her medical provider within one week of the last date of the absence (see Student Rules 7.1.6.1)
   b. Injury or illness of less than three class days: Student will provide one or both of these (at instructor’s discretion), within one week of the last date of the absence:
      (i) Texas A&M University Explanatory Statement for Absence from Class form available at http://attendance.tamu.edu, or
      (ii) Confirmation of visit to a health care professional affirming date and time of visit.

7. Required participation in military duties.

8. Mandatory admission interviews for professional or graduate school that cannot be rescheduled.

Other absences may be excused at the discretion of the instructor with prior notification and proper documentation. In cases where prior notification is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class.
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name):
   Department of Veterinary Integrative Biosciences

2. Course prefix, number and complete title of course:
   NRSC 621 - Functional Neuroanatomy

3. Catalog course description (not to exceed 50 words):
   A comprehensive review of the neuroanatomical determinants of function; rigorous neuroanatomical foundation relevant for research investigating changes in neural pathways and/or networks involved in sensory and motor functions, learning and memory, perception, selective attention, as well as recovery of function following brain damage.

4. Prerequisite(s):
   None

5. Cross-listed with:
   VIBS 621

6. Is this a variable credit course? □ Yes  ☑ No
   If yes, from _______ to _______

7. Is this a repeatable course? □ Yes  ☑ No
   If yes, this course may be taken _______ times.

8. Will this course be repeated within the same semester? □ Yes  ☑ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      N/A
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
      NRSC or BIMS

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix  Course #  Title (excluding punctuation)
    NRSC 621  FUNCTIONAL NEOUROANATOMY

   Lect.  Lab  SCH  CIP and Fund Code  Admin. Unit  Acad. Year  FICE Code
   0  4  0  0  4  2  6  1  5  0  2  0  0  0  2

   Approval recommended by:
   C. Jane Welsh  8-20-14
   Department Head or Program Chair (Type Name & Sign)  Date

   Evelyn Tiffany-Castiglioni  8-21-14
   Department Head or Program Chair (Type Name & Sign)  Date
   (if cross-listed course)

   Submitted to Coordinating Board by:
   Chair, GC or UCC  Date

   Associate Director, Curricular Services  Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 3/0
Course title and number | Functional Neuroanatomy 4 credits NRSC/VIBS 621
--- | ---
Term | Spring 2014
Meeting times and location | Functional Neuroanatomy, 4 credits NRSC 689, Reynolds Building, Room 230, on Monday and Wednesday, from 16.00 hrs to 18.00 hrs

Course Description and Prerequisites

A comprehensive review of the neuroanatomical determinants of function as a foundation course for the TAMIN neuroscience program. It will provide a rigorous neuroanatomical foundation relevant for research investigating changes in neural pathways and/or networks involved in sensory and motor functions, learning and memory, perception, selective attention, as well as recovery of function following brain damage.

There are no prerequisites for this course.

Learning Outcomes or Course Objectives

Course objectives:

It is expected the students who obtain a passing grade in this course will have gained an essential training to understand the basic integrative actions of the nervous system, which is an essential foundation for most areas of research in Neuroscience.

Goals of the course:

The primary objective is to emphasize a comprehensive knowledge of neuroanatomical connections/organization and to emphasize the ways in which morphology determines function. During the last few decades there have been major paradigm shifts in brain mapping from strict localization of function to specific centers to concepts of distributed systems which coordinate neural control programs into functional behavior. The contemporary trend is to move away from the notion of brain centers where there is a strict isomorphic relation between both specific behaviors and specific brain locations.

Instructor Information

Name | Dr. Ian Steele-Russell
Required reading material:

Required reading materials will be available on the course website. Students are expected to read the material before attending class in order to be able to follow the lecture material and participate in classroom question and answer discussions. This material provides a unified approach to the subject and will serve as the course textbook.

Grading Policies

Grades and exams etc:

Students' grades will derive from two sources. First there will be five assigned essay topics which will be available at the start of the course. This will contribute 80% of the overall grade. Second part will be points given to the students for their scores on the all of the class quizzes. This will account for 20% of the overall grade. Essays will be graded numerically both on their content and the clarity of their exposition.

- A - 100 to 90 points
- B - 89 to 80 points
- C - 79 to 70 points
- D - 69 to 60 points
- F - a total score below 60.

Course Topics, Calendar of Activities, Major Assignment Dates

Schedule: Dates for 2014

<table>
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<tr>
<th>Day</th>
<th>Topics</th>
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<tr>
<td>TBA</td>
<td>introduction, form determines function, brain size - its significance</td>
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<td>neurons, nerve impulse, nodes of Ranvier, conduction</td>
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<td>axoplasmic flow, transmitter vesicles, synapses, neuroglia</td>
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<td>cutaneous sense and muscle receptors</td>
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<td>spinal cord I: ascending pathways</td>
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<td>spinal cord II: descending pathways and motor cortex</td>
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<td>brainstem</td>
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<td>reticular formation I: isodendritic core</td>
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<td>reticular formation II: nuclei. Behavioral influences arousal and sleep</td>
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<td></td>
<td>hypothalamus I: brainstem integration of ANS, major &quot;nuclei&quot;</td>
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<td>hypothalamus II: motivation-homeostasis</td>
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<td>hypothalamus III: hormonal functions and pituitary interactions</td>
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<td>thalamus and epithalamus - pathway control to the cortex</td>
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<td>limbic system I: anatomy - hippocampal memory involvement</td>
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<td>limbic system II: - amygdala motivational control by context filtering/linking</td>
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<td>cerebral cortex - general anatomical features</td>
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<td>sensorimotor cortex and pyramidal tracts</td>
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<td>pyramidal tracts and motor control</td>
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<td>basal ganglia and motor control</td>
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<td>cerebellum I: gross anatomy, cerebral interconnections</td>
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<tr>
<td>cerebellum II: microanatomy, fractured somatopy, microzones</td>
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<td>cerebellum III: Cerebral cortex - intrinsic structure and regional specialization</td>
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<tr>
<td>Cortical visual areas - how the cortex ignores and/or edits the retinal image</td>
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<tr>
<td>Retino-thalamic- striate pathways - visuomotor control</td>
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<tr>
<td>The role of the corpus callosum in cerebral integration</td>
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<td>Critical stages in development of cortical function</td>
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<td>Hemispheric asymmetries</td>
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<td>The exploration of the frontal lobe and its control functions</td>
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<td>Dorsal versus ventral pathways in the cerebral cortex</td>
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<td>the rewriting of the motor system in visual coordinates</td>
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<td>Plasticity and recovery of function</td>
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<td>Neural mechanisms of language</td>
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<tr>
<td>The triumph of the visual system: polysensory cells and mirror cells - their role in the binding problem.</td>
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<tr>
<td>Final term papers due by 5.00 PM</td>
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</table>

**Other Pertinent Course Information**

**Format of the class:**

The major part of the class will be lecture presentations of the neuroanatomical systems. At the end of each class will be a question and answer period on the material presented. From time to time there will be short anatomical lab quizzes at the beginning of class. It is important therefore to arrive to class on time.

As neuroanatomy is a highly hierarchically organized discipline it is crucial that students attend all classes. It is not possible to understand the material without the classroom presentation and discussion. After each class arrangements can be made for additional tuition on any topic that has been covered. **Accordingly no more than three absences will be permitted.**
Copyright
The handouts in this course are copyrighted. Therefore you do not have the right to copy the material unless permission is granted by the course coordinator. As commonly defined, plagiarism consists of claiming the ideas, words, writings etc of another person as your own work. This means that you are committing plagiarism if you copy work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is on the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under section “Scholastic Dishonesty”.
PLAGIARISM: You are responsible for the information on plagiarism available at on the web at http://library.tamu.edu/vgn/portal/tamulib/content/translator/children/0.2875

Americans with Disabilities Act (ADA)
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that: provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity
For additional information please visit: http://aggiehonor.tamu.edu

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type: [ ] Undergraduate  [ ] Graduate  [ ] First Professional (e.g., PLAN 174A, etc.)

2. Request submitted by (Department or Program Name):
   Department of Landscape Architecture and Urban Planning
   PLAN 624 Digital Communication in Landscape Architecture and Urban Planning

3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Learn, develop, and apply fundamental knowledge and skills throughout the process of environmental design and planning: base map preparing, site plan designing, cross-section drawing, 2-dimensional plan rendering, 3-dimensional model rendering, and poster presentation.

5. Prerequisite(s): None

6. Is this a variable credit course? [ ] Yes  [ ] No
   If yes, from _______ to _______

7. Is this a repeatable course? [ ] Yes  [ ] No
   If yes, this course may be taken _______ times.
   Will this course be repeated within the same semester? [ ] Yes  [ ] No

8. Will this course be submitted to the Core Curriculum Council? [ ] Yes  [ ] No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography) any

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. [ ] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)

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<th>624</th>
<th>DIGITAL COMMUNICATION IN LAUP</th>
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Approval recommended by:

Forster Ndubisi  Date

Department Head or Program Chair (Type Name & Sign)

Chair, College Review Committee  Date

Department Head or Program Chair (Type Name & Sign)
(if cross-listed course)

Date

Submitted to Coordinating Board by:

Chair, GC or UCC  Date

Associate Director, Curricular Services  Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
[PLAN 624] DIGITAL COMMUNICATION IN LAUP

INSTRUCTOR
- Name: Yang Mi Kim
- Email: ymkim@arch.tamu.edu
- Office: Langford A105
- Office Phone: (979) 845-7888
- Office Hour: To be determined or by appointment

INTRODUCTION
PLAN 624 Digital Communication in LAUP focuses on the communication techniques and process in environmental design and planning professions, which include developing representation concepts and computing fundamental design productions in graphical formats, designing a comprehensive project poster with written descriptions, and participating discussions.

COURSE DESCRIPTION
As graphics are the language of design, it is essential to understand how they are used to communicate design ideas and plans from the initial stage of design preparation through final productions, and to acquire the visual communication ability to translate the preliminary design concept into various forms of digital representation.

In addition to that, oral, aural, and written communication abilities are critical to persuade people with your designs or plans in the professions. Therefore, a series of communication skills will be emphasized by means of well-represented graphics, well-documented technical drawings and project posters, effective presentations and interactive discussions.

PLAN 624 is a digital communication course to learn, develop, and apply fundamental knowledge and skills throughout the process of environmental design and planning: base map preparing, site plan designing, cross-section drawing, 2-dimensional plan rendering, 3-dimensional model rendering, and poster presentation.

The teaching motto of this course is "Learning by Doing". Through a series of lectures, demonstrations and assignments, students will learn efficient and effective methods in terms of
computer-aided drafting and graphic presentation techniques which are the most demanding abilities in the environmental design and planning professions. Also this course is intended that students learn how various graphic software including AutoCAD, Adobe Photoshop, SketchUp, and Adobe InDesign is closely interrelated and widely used during the design and planning process. These hands-on learning experience will help students obtain the fundamental techniques thoroughly and develop their own applications independently.

**LEARNING OBJECTIVES**
The knowledge and skills the instructor wants students to acquire by the end of the course are:

1. To understand the entire design work frame and how graphic software programs are used at each design stage. [*Critical Thinking*]

2. To be able to refine design ideas and translate them into the technical drawings and graphical representations by means of acquired knowledge and skills. [*Critical Thinking*]

3. To understand how various graphic software programs are interrelated in each of the digital work flow and in the transition by importing and exporting design data. [*Critical Thinking*]

4. To identify the best practices in the field, and to develop more productive and suitable processes of your own with or in spite of the traditional drafting and graphic producing tools. [*Critical Thinking*]

5. To obtain fundamental drafting, plotting, rendering, and documenting techniques using AutoCAD and other digital graphic software programs including Adobe Photoshop, SketchUp, and Adobe InDesign. [*Communication*]

6. To know efficient and effective ways to share the outcomes with peers while understanding the processes of digital imagery producing, processing, and manipulating. [*Communication*] [*Teamwork*]

7. To develop the composition skills in written, visual, and oral communications in order to deliver the design/planning ideas clearly and effectively to audiences. [*Communication*]

8. To be able to create original works by means of well-built digital drafting and rendering skills and self-expression in visual, written, and oral communication. [*Personal Responsibility*]

**LEARNING OUTCOMES**
Upon successful completion of this course, students will be able to:

1. Create basic geometries to site plans and cross-sections using drawing and editing commands in AutoCAD.

[PLAN 624] DIGITAL COMMUNICATION IN LAUP • 2
2. Create and edit blocks, text objects, hatches, and dimensions to express design details and annotations on a drawing in AutoCAD.

3. Create layouts in the model space and plot drawings in a measurable scale and line hierarchy in AutoCAD.

4. Create site plan and cross-section renderings by exporting the line work from AutoCAD, importing into Photoshop, and applying textures, effects and entourage in Adobe Photoshop.

5. Create 3D model renderings by importing AutoCAD line work and applying textures and components in SketchUp.

6. Design poster layouts using produced graphic images and written descriptions during the design process in Adobe InDesign.

TECHNOLOGY REQUIREMENTS

ECAMPUS

- All of course materials will be provided via eCampus (https://ecampus.tamu.edu).

- Prior to the start of this course, it is recommended to read “Check Browser Support” on the eCampus webpage related to FAQs, Getting Started, Course Content, Help, and so on (https://help.blackboard.com/en-us/Learn/9.1_SP_12_and_SP_13/Student).

※ When you have any technical problem to use eCampus, contact the Help Desk.

Department: Help Desk Central (http://hdc.tamu.edu/)
Email: helpdesk@tamu.edu
Phone: 979-845-8300

REQUIRED SOFTWARE AND MATERIAL

The following software is **REQUIRED** for this course:

- Autodesk AutoCAD 2013 (Windows) (download at http://students.autodesk.com/) *registration required

- Adobe Photoshop CS6

- SketchUp (download at http://www.sketchup.com/) or SketchUp Pro

- Adobe InDesign CS6
The required Software is available for use at computer labs in Langford building A. When you use computer labs, it is recommended to have a USB flash drive in order to store/make a copy of your data. Please make sure to keep your assignment files safe and secure. They will be used over again in the other assignments.

Adobe Photoshop and InDesign (Adobe Creative Suites 6) are not downloadable for free. If you would like to purchase it for your personal computer, it will be available to buy a Student/Teacher Edition via on-line vendors (e.g. Adobe.com, Amazon.com, and etc).

When you encounter any problem on lab computers in Langford building, contact the ITS Helpdesk (located at Langford A 122). Email: helpdesk@arch.tamu.edu Phone: (979) 862-8584

REFERENCE BOOKS
The following books are suggested for this course:


Some books are available as an electronic version on the TAMU library website.

EVALUATION AND EXPECTATIONS
GRADING POLICY
The student’s final grade for the course will be determined by the following:

A = 90 or above, B = 80 to 89.9, C = 70 to 79.9, D = 60 to 69.9, F = below 60.

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<tr>
<td>In-Class Exercises (total 6)</td>
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<td>Assignments (total 12)</td>
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<td>Mid-term Assignment (#6)</td>
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<td>Final Assignment (#14)</td>
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<tr>
<td>Peer Teaching</td>
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<tr>
<td>Total</td>
<td>100</td>
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</table>

[PLAN 624] DIGITAL COMMUNICATION IN LAUP • 4
LECTURE & DEMONSTRATION

- Lectures and class materials for each topic are uploaded on eCampus on the scheduled release date and time. (*See class schedule to find topics and release dates.)

- Students are required to watch the video clips of lectures and/or demonstrations and to practice in-class exercises during the week for each topic. The links of video clips will be available by the last day of semester.

- Students are responsible to access eCampus regularly/frequently during a week in order to have adequate communication with the instructor (e.g. updates/changes on class schedule, announcements, assignment review, weekly office hour and so on).

IN-CLASS EXERCISE

- In-class exercises are designed for hands-on trainings to learn fundamental digital communication skills and their applications on a drawing. While watching the demonstrations, students will be able to complete in-class exercises.

- Selected in-class exercises must be submitted for evaluation. They should be worked individually and be neatly finished. (*See class schedule to find the due date/time for each in-class exercise.)

ASSIGNMENT

- Students will have assignments related to the topics. Complete course assignments INDEPENDENTLY and submit each assignment by the due date and time. (*See class schedule to find the due date/time for each assignment.)

- Assignments are designed to be linked to each other consecutively. If any assignment is missed, it will significantly affect to complete your next assignments. Therefore, it is important to complete each assignment by the designated due date/time.

- Students of PLAN624 are expected to spend about 6 - 9 hours a week (including 3 hours in watching video clips) on average in order to complete course assignments with satisfactory quality.

- Assignments will be evaluated based on competency, accuracy, completeness, legibility, composition, craftsmanship, and creativity (if applicable), and will be calculated as the standard average of the overall performance scores in all of the assignments.

PEER TEACHING

- Peer Teaching is an important activity in this course. Each student will pick a topic of their own interests but relevant to the broad issues of applying digital communication to produce better works/solutions in environmental design and planning professions.
Each student is required to submit a subject and a written tutorial. Project due dates may vary depending on individual topic. If your topic is closely related to one of the lecture topics scheduled, each student may be asked to introduce the project before the final due date based on a discussion with the instructor. Project description for Peer Teaching will be issued on a scheduled date.

**SUBMISSION**

- All submissions are expected to be turned in by the scheduled date and time. If any in-class exercise or assignment is not submitted by its due date/time, it will not be eligible for a full grade.
- Late submissions that are turned in at any time up to one week after its due date/time will only earn 80% of the final evaluation in that submission (for example, from 95 points to 76 points).
- Any late submission turned in more than one week after the due date **WILL NOT BE ACCEPTED/GRADED** (zero point will be given).
- Submission dates will be extended in exceptional circumstances which are University approved absences stated in the Student Handbook (http://student-rules.tamu.edu/rule07). If you have a university excused absence, you must inform me via email prior to the due date/time, and provide the written proof (for example, doctor's note). Any deviation from the assigned date/time of submission must be arranged with the instructor.
- All of the required file formats must be turned in to get proper evaluations on the submissions (for example, in AutoCAD, students will be asked to submit DWG and PDF file formats).
- Submission requirements will be explained in the Assignment Description uploaded on the release date of each assignment. If a student doesn’t submit all of the required file formats, the submission will be returned to the student and asked to resubmit by the rescheduled due date/time. If he/she fails to resubmit the work on time, it will be considered as an incomplete submission (awarded 60% of the final evaluation).
- All of submissions must be completed **INDEPENDENTLY**. If any evidence is found that one submission is identically same with other student’s submission, it will be considered plagiarized. Both submissions will be given zero credit and the violation will be reported to Aggie Honor System Office.
- All students’ submissions are the property of the Department of Landscape Architecture and Urban Planning at TAMU. Students' submissions will be kept by the department for the purpose of accreditation review and teaching reference for future classes.
- If you have any concern or question regarding this course, please inform the instructor in a timely manner.
UNIVERSITY POLICY STATEMENTS

ATTENDENCE POLICY

“The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.”

For the online course, I interpret attendance as “watching video clips of lectures and demonstrations, and submitting assignments following the course schedule on students' own responsibility”.

ACADEMIC INTEGRITY STATEMENT AND POLICY

"An Aggie does not lie, cheat, or steal or tolerate those who do."

The Aggie Code of Honor states that the students at Texas A&M University should value honesty and person integrity. Therefore, it is the responsibility of students and faculty members to help maintain scholastic integrity at the University by refusing to participate in or tolerate scholastic dishonesty. Students are referred to the Honor Council Rules and Procedures that may be found at the website: http://aggiehonor.tamu.edu/.

AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

CLASS SCHEDULE (* see attached)
### CLASS SCHEDULE

Topics, class assignments, and schedule are subject to change according to progress of the students, lectures, and/or the academic schedule. **It is students' responsibility to stay aware of any change to the schedule.** Any update to the schedule will be announced via eCampus.

*Remarks:*
- March 10 - 14: Spring Break.
- March 26 - 29: CELA Conference, Baltimore MD.
- April 14, 5 p.m.: Last day for all students to drop courses with no penalty (Q-drop).
- April 29: Last day of spring semester classes.

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<tr>
<th>Topic</th>
<th>Release Date (by 9am)</th>
<th>Software</th>
<th>Lecture Topic</th>
<th>Assignment</th>
<th>Due Date (by 9am)</th>
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</table>
| 1     | 1/20 (Tue)            | AutoCAD 1| - Course Introduction  
- AutoCAD Introduction & Commands I  
- In-Class Ex. – Basic Commands | - Introduce Yourself!  
- A#1. Self-portrait | |
| 2     | 1/27 (Tue)            | AutoCAD 2| - AutoCAD Commands II  
- In-Class Ex. – Polyline, Units | - Peer Teaching Project Description  
- A#2. Soccer Field | - In-Class: CAD1  
- A #1 |
| 3     | 2/3 (Tue)             | AutoCAD 3| - AutoCAD Commands III  
- Organizing AutoCAD Drawings  
- Raster Image Digitizing  
- In-Class Ex. – Properties, Layers, PEdit, Raster Image Digitizing | - A#3. Bike Road | - In-Class: CAD2  
- A #2 |
| 4     | 2/10 (Tue)            | AutoCAD 4| - Creating Blocks, Texts & Hatches  
- Paper Space & Page Setup  
- In-Class Ex. – Text & Hatch, Block  
- Demo – Base Map Preparing & Set a Layout/Measurable Scales | - A#4. Base Map | - In-Class: CAD3  
- A #3 |
| 5     | 2/17 (Tue)            | AutoCAD 5| - Creating Layout, Plot Style & Site Plan  
- In-Class Ex. – Plot Style  
- Demo – Site Plan Drawing | - A#5. Site Plan | - In-Class: CAD4  
- A #4 |
| 6     | 2/24 (Tue)            | AutoCAD 6| - Creating Dimension & Inserting Xrefs  
- Cross-Sections  
- In-Class Ex. – Dimensions, External Reference  
- Demo – Cross-Section Drawing | *Mid-Term  
- A#6. Cross-Section | - In-Class: CAD5  
- A #5 |
| 7     | 3/3 (Tue)             | Photoshop 1| - Photoshop Introduction  
- Basic Photoshop Tools & Photo Stitch  
- Navigating & Basic Coloring Tools  
- Demo – Photo Stitch, Self-portrait Coloring  
- Read – Cantrell Ch.3, 5 & 6 | - A#7. Self-portrait Coloring | - In-Class: CAD6  
- A #6 (Mid-term) |
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<th>Software</th>
<th>Lecture Topic / In-Class Exercise &amp; Demonstration</th>
<th>Assignment</th>
<th>Due Date by Sam</th>
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| 0     | 3/10 (Tue)          | Photoshop 2 | • Basic Site Plan 2D Color Rendering  
• Example: Award Winning Projects  
• Demo – Site Plan I (Importing the Line Work, Applying Base Colors & Adding Filters/Effects)  
• Read – Cattrell Ch.7, 8, 16-18 | • A#8. Site Plan 2D Rendering | • A #7 |
| 9     | 3/24 (Tue)          | Photoshop 3 | • Advanced Site Plan 2D Color Rendering  
• Demo – Site Plan II (Creating a Mask & Seamless Pattern, Rendering a Texture & Rippiling Water, Creating a Building Shadow)  
• Read – Cattrell Ch.19-23 | • A#9. Site Plan 2D Rendering II | • A #8 |
| 10    | 3/30 (Tue)          | Photoshop 4 | • Cross-Section Color Rendering  
• Demo – Cross-Section (Importing the Line Work, Applying Base Colors & Placing Entourage)  
• Read – Cattrell Ch.24 | • A#10. Section 2D Rendering | • A #9 |
| 11    | 4/7 (Tue)           | SketchUp 1 | • SketchUp Introduction  
• Basic SketchUp Tools & 3D Model Rendering I  
• Navigating Tools, Drawing & Editing Tools  
• Demo – 3D model | • A#11. 3D Model I | • A #10 |
| 12    | 4/14 (Tue)          | SketchUp 2 | • 3D Model Rendering II  
• Selecting, Erasing & Measuring Tools, Manipulating Tools, Importing Materials & Components  
• Demo – 3D model | • A#12. 3D Model II: Sculpture | • A #11 |
| 13    | 4/21 (Tue)          | SketchUp 3 | • 3D Model Rendering III  
• Work Process of SU 3D Modelling  
• Demo – 3D model (Importing the Line Work/Blocks, Creating Base Planes, Adding Volume, Placing Components, Creating Scenes) | • A#13. 3D Model III: Site 3D Model | • A #12 |
| 14    | 4/28 (Tue)          | InDesign 1 | • InDesign Introduction  
• Essential InDesign Tools, Concept Diagram & Design Poster Design  
• Wrap-up Discussion  
• Example: Work Samples  
• Navigating, Layout, Mater Tools  
• DEMO – Diagram & Design Poster | • Final  
• A#14. Design Poster | • A #13 |
| 15    | 5/5 (Tue)           |          |                                                |            | A #14 (Final)   
• Peer Teaching Project |
Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional  
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:  
   □ Undergraduate  ✔ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):  
   Department of Landscape Architecture and Urban Planning

3. Course prefix, number and complete title of course:  
   PLAN 667 Site Planning

4. Catalog course description (not to exceed 50 words):  
   Introduces student to physical planning and design aspects of city planning. Through both lecture and studio, students will learn the relationship between urban design and city/regional planning; the history of design paradigm; essential tools and applications for physical planning; and site planning and design of physical attributes.

5. Prerequisite(s):  
   n/a

   Cross-listed with:  
   Stacked with:  
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  
   □ Yes  ✔ No  
   If yes, from _______ to _______

7. Is this a repeatable course?  
   □ Yes  ✔ No  
   If yes, this course may be taken _______ times.

   Will this course be repeated within the same semester?  
   □ Yes  ✔ No

8. Will this course be submitted to the Core Curriculum Council?  
   □ Yes  ✔ No

9. This course will be:  
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Master of Urban Planning
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. ✔ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #: Title (excluding punctuation)  

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</tbody>
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   Approval recommended by:  
   Forster Ndubisi  
   Department Head or Program Chair (Type Name & Sign)  
   Date

   Chair, College Review Committee  
   Date

   Department Head or Program Chair (Type Name & Sign) (if cross-listed course)  
   Date

   Dean of College  
   Date

   Submitted to Coordinating Board by:  
   Chair, GC or UCC  
   Date  
   Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu. 
Curricular Services – 04/14
DEPARTMENT OF LANDSCAPE ARCHITECTURE AND URBAN PLANNING
TEXAS A&M UNIVERSITY

<PLAN 667> SITE PLANNING
Spring 2014
Mon: 11:30am – 12:20pm, ARCA348
Wed: 10:20am – 12:00pm, ARCA300C

Instructors:
Dr. Hwanyong Kim
Office: Langford A313
Email: hykim@arch.tamu.edu
Phone: 979.845.3119
Office hours: TBD, or by appointment

COURSE DESCRIPTION
The purpose of this course is to introduce the students on physical planning and design aspect of city planning. This course is key preparation for becoming a planner, and is the basis upon which contemporary design practice is built. Students will understand the process of city design, especially in terms of site planning and other associated physical attributes. Throughout studio-type practices and discussions students will learn:

- Urban design and its relation to city & regional planning;
- Design paradigm and its application;
- Essential tools and techniques for physical planning; and
- Site planning & design of physical attributes.

COURSE OBJECTIVES
Upon completion of the course, students enrolled in PLAN 667 should be able to:

- Identify urban design paradigms and their implication to city & regional planning;
- Articulate key elements of physical planning and their application;
- Conduct a site suitability analysis with raster-based geographic information systems (GIS);
- Demonstrate skillsets allowing students to communicate with design products as well as other key professionals such as architects, urban designer, and landscape architects; and
- Understand how to conceptualize and design a site plan.

REQUIRED TEXT
The following textbook is required and available at the TAMU Bookstore, or from your favorite online bookseller:


ADDITIONAL TEXT
The following textbook is not required for this class, but it will help understand the policy and guideline side of design process, and will be referred frequently.


Additional readings will be made available on e-learning. Further, you are asked to view several films/videos over the course of the semester. These are available online, through the libraries streaming service. To access these films, visit [https://mediamatrix.tamu.edu/](https://mediamatrix.tamu.edu/) and enter your library username and password. You will see a list for our class.

COURSE REQUIREMENTS
Your work will be evaluated using the assignments and projects listed below. More detailed instructions for each assignment will be distributed in class. Due dates are shown on the course schedule.

**Attendance & Participation:** Attendance is critical for passing this course. Attendance will be taken into account when determining final participation grades. Also, this is a studio type class, meaning that attendance and participation is part of your work process. Students are expected to ask and answer questions and share their ideas with each other. Course participation will be considered in the determination of final grades.

**Grading:** Final course grades will be awarded on a 100-point scale. Completion of all course assignments does not guarantee a student an A grade. As will be awarded to students who demonstrate consistently high quality in their work.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score</th>
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<tbody>
<tr>
<td>A</td>
<td>90-100</td>
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<tr>
<td>B</td>
<td>80-89.49</td>
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<tr>
<td>C</td>
<td>70-79.49</td>
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<tr>
<td>D</td>
<td>60-69.49</td>
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<tr>
<td>F</td>
<td>Anything lower</td>
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</tbody>
</table>

COURSE STRUCTURE
The course is structured as three consecutive mini-mesters or modules of approximately 5 weeks each. Each mini-mester addresses a foundational area of design practice:

<table>
<thead>
<tr>
<th>Week Range</th>
<th>Topic</th>
<th>Adhered Class</th>
<th>Support Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks 1 - 6</td>
<td>Physical Elements of City</td>
<td>Lectures &amp; Lab exercises</td>
<td></td>
</tr>
<tr>
<td>Weeks 7 - 13</td>
<td>Design Process</td>
<td>Studio Work</td>
<td></td>
</tr>
<tr>
<td>Weeks 14 - 15</td>
<td>Final Presentation</td>
<td>Presentation</td>
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</tr>
</tbody>
</table>

CLASS SESSIONS
Class will meet twice a week for 1 hour and 15 minutes. Because class time is very limited, we will use class time for discussion and application of materials. Students must come prepared in order to maximize class time. Participation and attendance are an important part of your grade.
In the first six weeks, students are expected to take lectures about design elements in physical planning. Also, students are given with a set of laboratory exercises for appropriate skillsets, such as AutoCAD, Photoshop, SketchUp, and GIS. Starting in week 7, students will work as groups to design a physical plan for the given site. Brief explanation on the site is attached as an appendix. Each group will have 4 to 5 students (depending on the total number of students) including at least one student with design experience or tool experience at least.

Students will prepare two reviews. During the midterm pinups, each group will discuss their findings on suitability analysis, existing comprehensive plan, and basic design concepts. The final presentation will be held during the last two weeks. Final product will be 2 to 3 24”x36” posters. Detailed instructions on the final poster will be given on a separate sheet.

CASE STUDY PRESENTATION
Every Thursday, students are required to present their case study result. As can be seen in the detailed course schedule (p7), you will be given with one design element per week until week 6. Students are asked to do case studies on the corresponding topics. One example would be visiting a city of your interest and pay particular attention to the element that you are assigned to do on that week. You can visit the site, city, or any place you desire, or simply you can refer to books, journals, or magazine articles where the elements are illustrated thoroughly.

The main purpose of this case study is to give you an idea of how the design elements applied to the city. By conducting a case study on a number of different urban design elements, students understand how each element works as a part of physical planning process and at the same time, briefly conceptualize a city as a comprehensive design product. Since this is a group project, diverse perspectives on the element as well as coordinated work progress is of great importance.

LABORATORY EXERCISES
Design in now days rely heavily on technologies. In such extent, it is very critical for a designer or physical planners to understand how to use such software packages. In this lab exercise, you will be asked to complete a series of application packages starting from AutoCAD, Photoshop, SketchUp, InDesign, and GIS. Each week, you will be given with instructions on each application package and complete the given assignment with each tool. These exercises are intended to provide you the basic tools for your design process.

SUITABILITY ANALYSIS ASSIGNMENT
As the first written assignment, students are asked to perform a raster-based suitability analysis. Your selected city will be given with the corresponding datasets, and instruction will also be provided. This assignment is to set up a brief boundary for your site plan. By conducting a suitability analysis, you will understand how future development pattern will occur, and where should land uses be allocated to adequately meet the future demands. Using different scenarios, you will need to compare and develop the positive and negative sides of each scenario, and select one that most fits to your (groups') objectives. This is very important, as
how you set up the priorities will significantly change your final outcome. Therefore, collaboration and cooperation is a virtue. Your submission should include suitability analysis results based on your scenarios and a summary of your analysis.

READ-THE-PLAN ASSIGNMENT
Your site is selected from real world, meaning that you are not working under a hypothesized circumstances. Accordingly, understanding existing plan and the current circumstantial aspects are an important task. In this assignment, you will be asked to develop a report summarizing the current plan of the city and the direction where the city should aim.

SWOT analysis will be basic form of your analysis, but you are more than welcome to use any type of tools to effectively analyze your city’s plan and future. The final deliverables will be a summary of the existing plan, SWOT analysis, and any possibilities that you think necessary.

MIDTERM PINUPS
Presenting your design scheme in front of public is an important task for a designer as well as a planner. In the 8th week of the class, students will be asked to present their work progress. This midterm pinup will replace your midterm exam. Accordingly, your grading on midterm pinup is an important aspect of your final grade.

You will be asked to show the process of your thoughts and design schemes. You are also required to show your suitability analysis result and read the plan assignment result. Design is communication. In this extent, understanding other’s plans and circumstantial background is a crucial part of design process. Grading will be given in consideration of the following,

- How much progress you have made
- How thoughtful your design scheme is
- What logics behind your design scheme
- The level of your understanding on the existing plan.

Also, you will be asked to submit your suitability analysis result. During the lab exercises, you will be introduced to GIS-based suitability analysis. Using raster datasets, you are required to create the final suitability map. This suitability analysis is important because it will be used as a guideline to allocate proper resources and land uses on the sites. Detailed instructions and grading guidelines will be given at the time of class.

FINAL PRESENTATION
Final presentation shows all of your works throughout the semester. It is an utmost part of this class. You will be asked to use any types of skills or knowledge you have gained in this class. The main purpose of this final presentation is to show your design schemes in accordance with the analysis results, existing plans, and community goals. Depending on the quality of your design outcome and the logic behind your design, your presentation will be graded. The final products will be 2 to 3 24”x36” posters, but students are encouraged to use any types of technologies to make your presentation more effective. A detailed instruction will be given at
the time of class. Since this is a group project, students are required to complete peer evaluation for each group member.

**GRADING POLICY**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Case Study Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Laboratory Exercises</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm Pinup</td>
<td>30%</td>
</tr>
<tr>
<td>Final Presentation</td>
<td>35%</td>
</tr>
<tr>
<td>In-Class Attendance and Participation</td>
<td>10%</td>
</tr>
</tbody>
</table>

**CLASS POLICIES**

*Late work:* Unless otherwise noted, work is due at the beginning of class on the due date. All assignments will be submitted electronically through e-learning. Absence from class is not an excuse for failing to turn work in. Work that is turned in late with no prior notification will not be accepted or evaluated. With prior notification and an acceptable excuse (at my discretion), late work may be accepted with a deduction of one letter grade per day.

*Plagiarism and academic honesty:* “An Aggie does not lie, cheat, or steal or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. To meet this standard in this course, all ideas (as well as data or other information) that are not your own must be cited. If you have questions about what constitutes plagiarism, please see the “Student Resources on Academic Integrity and Plagiarism” section on the TAMU Library website (also placed in the course VISTA resource folder). Violations of university policies on academic integrity will be handled according to university guidelines. Depending on the severity of the infraction, sanctions for academic dishonesty may include:

- A failing grade for the assignment
- A failing grade for the course
- Student dismissal from the program
- Student dismissal from the university

*Attendance:* Students will attend each class. If a student is unable to attend a particular class meeting, the student should let the instructor know in advance. Students who accrue more than five absences without university-acceptable excuses will be assigned a failing grade for the course. If illness or injury prevents you from attending class (and you need to be excused), you must provide documentation in the form of a medical confirmation note from a medical professional who treated you, or the Explanatory Statement for Absence from Class (available at http://shs.tamu.edu/attendance.htm). For more information, see Student Rule 7.

*Grades of Incomplete:* Incompletes will only be granted in extreme cases, with a documented reason why the student was unable to complete course requirements.
Cell phones and other disruptions. Cell phones must be turned off or to silent during class. No calls may be taken. Personal computers may be used to take notes during class, but computers and other devices may not be used for non-class related purposes, such as checking e-mail, instant messaging or texting, or Facebook pages. If I catch you using a computer or other electronic device for non-class related purposes, I will likely ask you to leave the class for the remainder of the class session.

Americans with Disabilities Act (ADA) Policy Statement. The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.
# Lecture Schedule (Weeks 01 ~ 06)

<table>
<thead>
<tr>
<th>WK</th>
<th>Topic</th>
<th>Mon</th>
<th>Wed</th>
<th>Assigns.</th>
</tr>
</thead>
</table>
| 01 | Introduction & Design Element#01: Buildings | - Class introduction  
- Skillset survey & Design background survey  
- Site selection and explanation | - **Lecture on City Element#01: Buildings**  
| 02 | Design Element#02: Public Space | - **Lecture on City Element#02: Public Space**  
- Case study presentation#01: City and Buildings | |
| 03 | Design Element#03: Streets & Transportation | - **Lecture on City Element#03: Streets & Transportation**  
- Case study presentation#02: City and Public Space | |
| 04 | Design Element#04: Landscape & Environment | - **Lecture on City Element#04: Landscape**  
- Case study presentation#03: City and Streets and Transportation | |
| 05 | Suitability Analysis | - **Lecture on Suitability Analysis**  
- Case study presentation#04: City and Landscape |
### WK 06

**Topic:** Urban Design & Physical Planning  
**Readings:**  
- Lecture on Site Planning & Urban Design Paradigms  
**Assigns.:**  
- Lab#05 - GIS  
- Wed: Case study presentation#05: City and Design

### Studio Schedule (Weeks 06 - 15)

<table>
<thead>
<tr>
<th>WK</th>
<th>Topic</th>
<th>Readings</th>
<th>Assigns.</th>
</tr>
</thead>
<tbody>
<tr>
<td>07</td>
<td>Studio Session#01</td>
<td>Understanding your sites</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Studio Session#02</td>
<td>Design scheme</td>
<td>Read the Plan</td>
</tr>
</tbody>
</table>
| 09 | Midterm Pinup | - Display suitability analysis result  
- Discuss your city's existing plan (Read the plan assignment)  
- Discuss strength, weakness, opportunities, and threats (SWOT analysis)  
- Present the first design scheme based on existing plan review and suitability analysis result. |  |
| 10 | Spring Break | |  |
| 11 | Studio Session#03 | Design development | Group Critic#01 |
| 12 | Studio Session#04 | Design development cont’d |  |
| 13 | Studio Session#05 | Design development cont’d | Group Critic#02 |
| 14 | Studio Session#06 | Finalize design schemes and prepare for the final presentation |  |
| 15 | | | Final Presentation |
APPENDIX - SITE SELECTION: THE ENERGY CORRIDOR IN HOUSTON, TX

In 2001, the Texas State Legislature created the Energy Corridor Management District (ECMD). The main purpose is to enhance the district to relocate and optimize the companies and to support their needs such as infrastructure or public services. Firms ranging from energy to healthcare, engineering, and financial services, the district serves its purpose to diversify its economic base and to become competitive in regional economy.

The ECMD is about 1,500 acres, and there are more than 77,000 employees requiring not only the economic means of life, but also seeking for possible settlements and relocations. This is a great challenge as there are not enough residential space within the district to handle such a great number of employees and thus, most of them commute for long distance. In this extent, the main focus should direct upon how to effectively manage the demands, and how to create a space that is both workable to the employees and livable to the residents.

![ECMD in Houston](http://www.energycorridor.org/)

The main task for this site is to redesign the ECMD for a work-live place. There are retails and some other amenities to serve the employees. Also, there are great natural assets, such as the Bee Creek Park or George Bush Park. The problem is, however, such infrastructures are not properly interconnected to create a place where both the residents and workers enjoy the atmosphere. In addition, convenient location to the interstate highways does not guaranty better accessibility to the pedestrians. We need more diversified means of transportation and public space design to promote the pedestrian-oriented development.

Considering such aspects, students are asked to critically think about the needs and improvements that are in demand to make the place more livable as well as workable. With the main design elements that you are going to learn during lecture sessions, students are required to redesign the ECMD district to fit into more sustainable regional context that will reduce the auto-dependency and suggest more balanced perspectives on landscape and the built environment. More details will be provided by the time you are asked to start the assignments and group works.
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type:
   - Undergraduate
   - Graduate
   - First Professional (DDS, MD, JD, PharmD, DVM)
2. Request submitted by (Department or Program Name):
   Public Service and Administration
3. Course prefix, number and complete title of course:
   PSAA 657, Terrorism in Today's World
4. Catalog course description (not to exceed 50 words):
   Comprehensive survey of international terrorism from its origins to the present; emphasis on how the U.S. government has responded and how it has organized to counter the threat; all major terrorist groups studied, understanding of the nature of the terrorist threat and the implications for the U.S. Government.

5. Prerequisite(s):
   Graduate Classification
   Cross-listed with: INTA 657, Terrorism in Today's World
   Stacked with: 

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?
   - Yes
   - No
   If yes, from ________ to ________

7. Is this a repeatable course?
   - Yes
   - No
   If yes, this course may be taken ________ times.

   Will this course be repeated within the same semester?
   - Yes
   - No
   If yes, this course may be taken ________ times.

8. Will this course be submitted to the Core Curriculum Council?
   - Yes
   - No

9. How will this course be graded:
   - Grade
   - S/U
   - P/F (CLMD)

10. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   Master of Public Service and Administration

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix | Course # | Title (excluding punctuation) | TERRORISM IN TODAY'S WRLD
   PSAA | 657 |

   Lec. | Lab | Other | SCH | CIP and Fund Code | Admin. Unit | Acad. Year | FICE Code
   3.00 | 0.00 | 0.00 | 3.00 | 4509010001 | 2415 | 15 | 16 | 0 | 0 | 3 | 6 | 3 | 2

Approval recommended by:
William F. West (PSAA)
Department Head or Program Chair (Type Name & Sign) Date
Leonard Bright
Chair, College Review Committee Date
Gregory Grass (INTA)
Department Head or Program Chair (Type Name & Sign) Date
Ryan Crocker
Dean of College Date

Submitted to Coordinating Board by:
Mark Zoran
Chair, GC or UCC Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 07/14
PSAA 657
TERRORISM IN TODAY’S WORLD
Fall 2014

Richard C. Mac Namee
The Bush School of Government and Public Service
Texas A&M University
Room 1104, Allen Building, 4220 TAMU
College Station
TX 77843-4220

Telephone: +1-979-845-1938
Email: richard.macnamee@tamu.edu

Class Location and Hours: Monday 1:30pm-4:20pm, Room 1017
Office Hours: By appointment only.

COURSE DESCRIPTION
This course consists of two units of study. Unit 1 seeks to develop a broad understanding of “Traditional” and “Non-Traditional” terrorism. We examine how best to define terrorism, its history, the strategies and tactics utilized, and the nature of the threat posed by contemporary groups and movements. In contrast, Unit 2 explores the basic concepts of Counter-Terrorism (CT) at the policy, strategic, operational and tactical levels. The rationale for utilizing a two unit format is that in order to effectively counter the threat posed by terrorism, it is necessary to understand how a terrorist thinks, perceives the outside world, recruits, trains, funds, plans and executes operations. The course is multi-disciplinary in nature, examining terrorism through the lenses of political science, history, law, economics, criminology, and religious studies. The course is designed to provide a basis for understanding the phenomenon of terrorism, and to set it in an appropriate context in relation to other critical issues facing a globalized society. Classes will be seminar in nature and require students to research and present case studies relating to terrorist operations or organizations.
REQUIRED TEXTBOOK

COURSE REQUIREMENTS
Course grades will be based on a student’s performance as follows;
- Class Participation - 25%
- Reading Reactions - 25%
- Working Group Presentation - 25%
- Final Policy Memorandum - 25%

GRADING
The following scale will be used for calculating final grades for this course:
- Grade A - 90 to 100%
- Grade B - 80 to 89%
- Grade C - 70 to 79%
- Grade D - 60 to 69%
- Grade F - 0 to 59%

Grading for written deliverables is established through the use of a 10 point grading rubric. A copy of the template utilized is at Annex A.

1. Participation (Percentage of Grade - 25%)
Active participation is central to this course and as such represents a major component of the course grade. Please note, class participation is not just attendance, it is about contribution. Contribution is not just about how much you speak, but about the quality of your commentary and it how informs the broader discussion. Thus, asking a good question is of equal value to bringing some new information to the class’ collective attention. The Oxford Debating style will be used to assess students’ abilities to frame arguments and defend positions with minimum preparation time at both policy and strategic planning levels. This also affords students the opportunity to refine their “real world” presentation and briefing skills. The readings assigned to each session are indicated in the following pages. These readings will provide essential background for the course sessions. Students are also encouraged to be adventurous and seek out relevant and interesting readings (from reputable sources) independently. Students are required to attend all sessions, arrive on time, and have read the *Required Readings* prior to each session.

2. Reading Reactions (Percentage of Grade - 25%)
Students should ensure that they attend class not simply prepared to discuss the readings, but also be prepared to present the readings when called upon to do so by the instructor. Students will be randomly selected to provide “Reading Reactions” to
begin discussion. Students should be prepared not only to describe what they have read, but to critique arguments and present independent thoughts.

3. Working Group Presentation (Percentage of Grade – 25%)
Students will also prepare a team presentation (no more than 5-6 students per team) in which the individual teams will provide background analysis to a notional “Head of Agency” (role played by the lecturer) on a terrorist operation or organization. The lecturer will determine Working Groups and allocate subject areas during Week 2.

4. Final Policy Memorandum (Percentage of Grade – 25%)
The final assignment will be a Policy Memorandum. The instructor will not allocate a topic as it is hoped that by this stage of the course students will have developed an interest in particular area in which they would like to conduct more detailed research of their own. Students should therefore select a contemporary and significant terrorism issue to analyze and makerecommendations to a policymaker as to how best address the issue in question. The paper should be no more than 5 double spaced pages, using FONT 12 Point Arial with 1” margins at top and bottom and 1.25 margins at right and left. You should reach agreement with the lecturer on a topic for this paper by November 03rd, 2014 by email or in person. The deadline for the Final Policy Memorandum is at the start of class on November 24th, 2014 in hardcopy and e-copy (WORD). Late papers will be penalized five points per day (from A to A-, from A- to B+, etc.). Incompletes will not be allowed except in extreme or unusual circumstances (e.g. serious illness). Problems with technology are not an acceptable reason for late work. It is essential that you exercise “best practice” in terms of contingency and save your work in several places as you write.

5. Attendance and Make-up Assignment Policy
The policy for attendance and making up missed assignments is consistent with Texas A&M University Student Rule 7: (https://student-rules.tamu.edu/rule07).

SIMULATION AND GUEST SPEAKERS
During Week 14 of the course, students will either participate in a terrorism simulation or will be fortunate enough to attend two closed seminars with guest speakers coordinated by the lecturer. The speakers’ availability is extremely restricted and will be confirmed once the semester has commenced. Both speakers are personal acquaintances of the lecturer and visit the school gratis. The first speaker is a career CIA Operations Officer who has intimate knowledge of the operations leading the eventual capture of Che Guevara, as well as other operations in Bolivia, Peru and Iran. The second speaker is a career US Special Forces Officer with extensive Counter-Terrorist (CT) and Counterinsurgency (COIN) advisory experience in Iraq and Afghanistan and is currently engaged by Special Operations Command (SOCOM) as a Senior Strategic Advisor. In the event that the speakers are not available, a simulation will take place, the details of which will be explained in advance of the class. Students will be assigned roles to play in the scenario.

IMPORTANT DATES
1. Final Policy Memorandum Topic Due November 03rd, 2014
2. Final Policy Memorandum Due November 24th, 2014
ATTENDANCE AND MAKE-UP ASSIGNMENT POLICY
The policy for attendance and making up missed assignments is consistent with Texas A&M University Student Rule 7: https://student-rules.tamu.edu/rule07

ACADEMIC INTEGRITY
*An Aggie does not lie, cheat, or steal or tolerate those who do.*
Students are expected to adhere to standards of academic integrity. Scholastic dishonesty consists of lying, cheating or stealing academic information with intent to gain academic advantage. Academic dishonesty comes in a variety of forms. The most common forms are plagiarism, cheating, and academic misconduct. Students who participate in any of these activities will be subject to appropriate University disciplinary action. Students are expected to review, utilize and adhere to the University’s Honor Council Rules and Procedures, which are posted on the University’s web site at http://www.tamu.edu/aggiehonor. This website provides detailed information and clarification policies, procedures, and rights and responsibilities related to academic integrity.

PLAGIARISM
The attention of each student is directed to the requirement to avoid plagiarism or the appearance of plagiarism through careless citation. As commonly defined, academic dishonesty/plagiarism consists of passing off as one's own ideas, words, writings, etc, that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and submit the final article as if it were your own, even if you have the permission of the person. It does not matter from where the material is borrowed - a book, an article, material off the web, another student's paper - all constitute plagiarism unless the source of the work is fully identified and credited. It is important when using a phrase, a distinct idea, concept, sentence, or sentences from another source to credit explicitly that source either in the text, a footnote or endnote. Plagiarism is a violation of academic and personal integrity and carries extremely serious consequences. Scholastic dishonesty (including cheating and plagiarism) will not be tolerated and will be punished in accordance with Texas A&M University Student Rules. If you have any questions, please consult the course instructor.

AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities at 979-845-1637 by phone or at disability@tamu.edu by email.

COURSE OUTLINE AND READING
  Unit 1: The Fundamentals of Terrorism (Weeks 1-10)
  Week 1 (September 01st): Course Overview and Defining Terrorism
**Required Reading**

**Recommended Reading and Media**
1. *Noam Chomsky - Power and Terror* – Video Stream
2. *BBC Documentary Podcasts* – America’s Own Extremist

**Week 2 (September 08th): Terrorism - Historical Context**
**Required Reading**

**Recommended Reading and Media**
1. *The Baader Meinhoff Complex* – Video Stream

**Week 3 (September 15th): Terrorism - Causes and Motivations**
**Required Reading**

**Recommended Reading and Media**
1. *Michael Collins* – Video Stream
2. *BBC Documentary Podcasts* – Parts 1-4 – Is al-Qaeda winning?
   a. Part 1 - September 29th, 2008
   b. Part 2 – October 03rd, 2008
   c. Part 3 – October 10th, 2008
   d. Part 4 – October 20th, 2008
Week 4 (September 22nd): Terrorism - Strategy and Tactics
Required Reading

Recommended Reading and Media
1. The Battle of Algiers – Video Stream
2. BBC Documentary Podcasts
   a. The Art of War – June 25th, 2010
   b. Part 1 – Generation Jihad – April 05th, 2010
   c. Part 2 – Generation Jihad – April 12th, 2010
   d. Part 3 – Generation Jihad – April 19th, 2010

Week 5 (September 29th): Propaganda, Public Affairs and “Info Ops”
Group 1 – The World Trade Center Bombing 1993
Group 2 – The City of London Bombing 1993
Required Reading

Recommended Reading and Media
1. BBC Documentary Podcasts – The Virtual Revolution – February 22nd, 2010

Week 6 (October 06th): State Support and Ungoverned Territories
Group 3 – The Oklahoma City Bombing 1995
Required Reading

Recommended Reading and Media
1. Carlos – Video Stream
Week 7 (October 13th): WMD Terrorism
Group 4 – Aum Shinrikyo Tokyo Sarin Gas Attack 1995

Required Reading

Recommended Reading and Media
1. Dirty War – Video Stream
2. BBC Documentary Podcasts
   a. Securing Pakistan’s Bomb – February 02nd, 2008

Week 8 (October 20th): Terrorist - Learning and Innovation
Group 5 – The Beslan School Hostage Crisis 2004

Required Reading

Recommended Reading and Media
1. Last Best Chance – Video Stream
2. BBC Documentary Podcasts – Parts 1-4 – Age of Terror
   b. Part 2 – June 11th, 2008
   c. Part 3 – June 18th, 2008

Week 9 (October 27th): Terrorism, Crime, and other Emerging Issues
Group 6 – The London Bombings 2005

Required Reading

Recommended Reading and Media
1. BBC Documentary Podcasts
Unit 2: Counter-Terrorism (CT) (Weeks 10-14)

Week 10 (November 03rd): Counterterrorism Strategy and Policies

Group 7 – The Mumbai Attacks - India 2008

Recommended Reading and Media
1. Why We Fight – Video Stream

Week 11 (November 10th): The Role of Intelligence in Counter-Terrorism

Group 8 – The Westgate Mall – Nairobi 2013

Policy Memorandum Topics

Required Reading

Recommended Reading and Media
1. PBS Frontline – Spying on the Home Front
http://www.pbs.org/wgbh/pages/frontline/homefront/view/
2. BBC Documentary Podcasts
   a. Al-Qaeda’s Internal Debate – August 26th, 2008
   b. Mission Bin Laden – May 05th, 2011
   c. Part 1 – MI6 - A Century in the Shadows
   d. Part 2 – MI6 – A Century in the Shadows

Week 12 (November 17th): Military Might vs. Soft Power

Required Reading

**Recommended Reading and Media**
1. *Restrepo* – Video Stream

**Week 13 (November 24th): How Terrorism Ends**

**Policy Memorandum Due**

**Required Reading**

**Recommended Reading and Media**
1. *PBS Frontline* – Endgame

**Week 14 (December 01st): GUEST SPEAKERS**

**Terrorism Over Time – A CIA Operative’s Perspective**

**Insurgency and Terrorism – The Condition and The Symptom**

**Week 15 (December 08th): Terrorism In Today’s World**

**Course Summary**
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional

Form Instructions
1. Course request type: □ Undergraduate  □ Graduate  □ First Professional (DDS, MD, JD, PharmD, DVM)
2. Request submitted by (Department or Program Name): Public Service and Administration
3. Course prefix, number and complete title of course: PSAA 660, Domestic Terrorism: The Internal Threat to America
4. Catalog course description (not to exceed 50 words): Survey of domestic terrorism from the first manifestation of terror tactics in the United States to the anarchist movement of the 1880s to the present. Study of domestic terrorist threats, the growing threats from weapons of mass destruction, and the implications WMDs have for all levels of government.
5. Prerequisite(s):
   Cross-listed with: 
   Stacked with: 
   Cross-listed courses require the signature of both department heads.
6. Is this a variable credit course? □ Yes  □ No  
   If yes, from _____ to _____
7. Is this a repeatable course? □ Yes  □ No  
   If yes, this course may be taken _____ times.
   Will this course be repeated within the same semester? □ Yes  □ No
8. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No
9. How will this course be graded: □ Grade  □ S/U  □ P/F (CLMD)
10. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   Master of Public Service and Administration
11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
12. [✓] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix  Course #  Title (excluding punctuation)
   PSAA  660  DOMESTIC TERRORISM

   Lect.  Lab  Other  SCI  CIP and Fund Code  Admin. Unit  Acad. Year  FICE Code
   3.00  0.00  0.00  3.00  4510020001  2415  15 - 16  0  0  3  6  3  2

   Approval recommended by:
   William F. West  Date
   Leonard Bright  Chair, College Policy Committee  Date
   Ryan Crocker  Dean of College  Date
   Mark Zoran  Chair, GC or UCC  Date

   Submitted to Coordinating Board by:
   Associate Director, Curricular Services  Date

   Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 07/14
PSAA 660
Domestic Terrorism:
The Internal Threat to America
Fall 2014 Syllabus

Instructor: Dr. Danny W. Davis

Communication: Email: dannywdavis@tamu.edu
Telephone: 830 556-4069

Office: Allen Building, room 1022
Thursdays, 4:30-5:30, and by appointment

COURSE DESCRIPTION

This course is a comprehensive survey of domestic terrorism from the first manifestation of terror tactics in the United States to the anarchist movement of the 1880s to the present. Where possible the written and virtual materials of the resistors/terrorists themselves are used in this course. All the major domestic terrorist groups are studied. Significant attention is given to the belief systems and motivation of “Lone Wolf” terrorists and individuals who follow the pattern of “leaderless resistance”. Some time is also spent on foreign groups that have used, and continue to use terror tactics, against the United States. The policies and strategies regulating how the United States Government has organized to counter the threat from those who would use violence to oppose law and order are also studied. The intent is to come to an understanding of the domestic terrorist threat, to include the growing threat from weapons of mass destruction (WMD), and the implications WMDs have for the all jurisdictional levels of government. Prerequisite: Graduate classification

COURSE OVERVIEW

History provides numerous examples of people attempting to change the conditions under which they live. Those who are unable to alter their environment through peaceful means sometimes resort to violence. And while the American public has developed a greater interest in terrorism since 9/11, the field of terrorism studies, though small, has existed for decades. While this course is focused on domestic terrorists, it does introduce students to the field of “terrorism studies”.
This should help them to develop a better understanding of the nature of terrorism, the variety of terrorist motivations, and the means by which our government has attempted to, and continues to deal with the threat from within. These objectives will be attained by not only examining current and classic research on terrorism, but also by exploring some of the many research puzzles that remain unanswered.

**COURSE CALENDAR**

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<tr>
<th>Week One</th>
<th>Thursday, September 4</th>
<th>Week Nine</th>
<th>Thursday, October 30</th>
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<td>Week Two</td>
<td>Thursday, September 11</td>
<td>Week Ten</td>
<td>Thursday, November 6</td>
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<td>Week Three</td>
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<td>Week Five</td>
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<td>Week Six</td>
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<td>Week Seven</td>
<td>Thursday, October 16</td>
<td>Exam Week</td>
<td>Wednesday, December 17</td>
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<td>Week Eight</td>
<td>Thursday, October 23</td>
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**COURSE OBJECTIVES**

Upon completion of this course, the student will be able to:

1. Distinguish terrorism from other forms of political violence.
2. Recognize the reasons and implications for various government agencies’ different definitions of terrorism.
3. Investigate and discuss the current federal policies and strategy designed to meet the threat of domestic terrorists. Understand the implications for future policy makers.
4. Differentiate the genesis and historic manifestations of terrorism in the United States.
5. Analyze the various motivations of domestic terrorism at the individual and group levels.
6. Explain the many varieties of sponsorship of terrorist causes, to including active and passive support.
7. Analyze the history of the American radical right, including the belief system known as Christian Identity; and ideologies that drive the Posse Comitatus mindset and the Sovereign Citizen movement.
8. Understand the differences between groups within the radical right that call for violence to oppose the government.
9. Analyze the phenomena of the individual engaged in terrorism, to include the principle of “leaderless resistance” and the “Lone Wolf” strategy.
10. Analyze the history of the American Communist movement and the current state of the radical left’s efforts today.
11. Analyze the origin and development of environmental and animal rights terrorism and explain the arguments given by these groups for why violence and vandalism are necessary to change the status quo. Also explore the link between these groups and the International Workers of the World and other socialist organizations.
12. Analyze the background of organizations and individuals who use vandalism and violence to oppose abortion and explain the arguments given by such groups and individuals for why “use of
"force" is necessary to protect the unborn.

13. Analyze the background of religiously motivated Islamist terrorism and explain the arguments given by such groups and individuals for why violence is necessary to create a worldwide Caliphate.

14. Discuss the development, motivation, influencing factors and other details of the radical Islamist movement in the United States.

15. Analyze the patterns of structure, recruiting methods, and financial sources of terrorist organizations.

16. Analyze the extent to which a free media assists terrorist groups. And discuss whether it is appropriate for the government to restrict the media or other civil liberties to protect against terrorist acts.

17. Analyze how modern terrorists use the Internet to promote and support their activities.

18. Examine the threat of terrorists acquiring and using weapons of mass destruction.

**FORMAT AND METHOD**

The course is delivered in a classroom environment. Class lectures are supported with Power Point slides. Supporting materials include:

- Syllabus
- Class Handouts
- Email
- End-of-Course Evaluation

**REQUIRED READINGS**

There is no required text book for this course. **Required readings are listed by week and available through course reserve files or at electronic sites as indicated in the syllabus.** When required, the instructor will provide additional reading materials in class or through course reserves.

**Optional Books on Domestic Terrorism**


**Optional Books on International Terrorism**

Resources

There are many other resources that students are encouraged to explore. First, there are numerous excellent homeland security and homeland defense research sources. Students should become familiar with the broad scope of homeland security sources and links available from the TAMU Policy Sciences Economic Library (PSEL) (http://library.tamu.edu/subject-guides/homeland-security). In addition, the TAMU Library can be accessed at http://library.tamu.edu. As a student, you have access to e-books, e-journals, databases, and other library resources such as live chats with a librarian, citation guides, and research guides. The Bush School provides you with links to library resources in your online course under Getting Started. If you are accessing the library off-campus, go to the TAMU Library homepage (http://library.tamu.edu) and click on “My Portal”. Log in using your NetID username and password. More information about accessing the library through the proxy server can be found under the “Help” link on the TAMU Library’s homepage. If you have trouble accessing TAMU library resources such as articles from off-campus or are being asked to pay for access, it may be because the connection is not recognizing your TAMU user status. You must go through the NetID authentication process to be recognized as a TAMU user.

Through PSEL, students can access a considerable amount of policy, strategy, and operational material from the Naval Postgraduate School Homeland Security Digital Library collections, including Congressional Research Service and Government Accountability Office reports pertaining to terrorism and homeland security. The Council for Foreign Affairs provides a daily news brief that often contains information related to terrorism and homeland security (http://www.cfr.org/). RAND has a robust homeland security and terrorism program (http://www.rand.org/research_areas/terrorism/), as does the Heritage Foundation (http://www.heritage.org/LeadershipForAmerica/protect-america.cfm). These sources will be useful for class discussion and research on current and emerging homeland security issues. Journals students should pay close attention to are the CTC Sentinel (online at the Combating Terrorism Center at West Point – http://ctc.usma.edu), Studies in Conflict and Terrorism, and Terrorism and Political Violence. Finally, two recommended resources for this course are the Teaching Terror website (http://www.teachingterror.net) and the Counterterrorism Blog (http://counterterrorismblog.org)

COURSE REQUIREMENTS and GRADING

All grades are weighted on a 4.0 system as A=90 to 100.0, B = 80-89.9, C = 70-79.9, D = 60-60.9, F = <60 and use the following allocation:

There will be several components used in determining your final grade for the course. The instructor will provide detailed feedback on oral and written assignments within 7 days of the
assignment due date. Students are expected to attend class and take notes from the lectures. Students are expected to read the required readings each week, prior to attending class. If any student has questions related to any of the information and/or course materials, then please contact the instructor for clarification.

1. **Class Participation (20% of grade).** Discussion is an integral part of the learning process. Students are expected to be prepared for class by reading the assigned weekly materials. Material presented in the class lectures parallel the assigned reading, but frequently contains additional material. The lectures represent the content expertise of the subject matter expert for this course. Students are expected to attend the lectures each week, understand the concepts that are presented, and become familiar with all the concepts and terminology introduced in the readings and lectures. Students should apply this knowledge in responses during class discussions and in written and oral assignments.

3. **Written Assignments. (combined 80% of grade).**

   *Prepare a Case Study that Compares and Contrasts a Religiously Motivated Terrorist/s with a left-wing group (20% of grade): The first written assignment requires you to prepare a case study that: (1) describes how the worldview/ideology of your subject compares with the revolutionary ideologies of the left-wing Marxist groups you read about in Week Four; (2) assesses why the chosen ideology resonates among certain communities in the US; and (3) give your prognosis about the future of the group or movement you are reporting on. This paper should not exceed 8-10 pages, not including note and reference pages. The Case Study Comparison is due during class period of Week Five.*

   *Oral Presentation on an individual terrorist (20% of grade): The second major assignment requires you to prepare a formal briefing on a right-wing or an anti-abortion terrorist. The total length of the oral brief to the class should not exceed 10 minutes. Prior to the brief the student will turn in reference pages in APSA format. The class presentation will be given in class Week Ten.*

   *Final Research Paper (40% of grade): The final written assignment of this course requires you to select a domestic terrorist group or an individual and analyze the group’s, his or her, goals and motivation, organization, operations, and downfall (if the group or person has been apprehended). The paper be no less than 15 pages, not including note and reference pages. The Final Research Paper is due during class of Week 13.*

Format for all written assignments: The standards of the American Political Science Association (APSA) apply - double-spacing; use of 12 pt. font; numbering of all pages; complete citation of sources by author and date, including page number for direct references or quotations; use of a reference section; and careful, well-edited writing. Papers should not rely solely on internet sources; thorough research is expected and should use scholarly journals, newspapers, and online databases.

*DO NOT use Wikipedia or any other unqualified, unverified website as a source (if in doubt about any source, ask your instructor).*
Paper Grading Criteria

A range:

The paper is clear, engaging, original, and focused; ideas and content are richly developed with details and examples. Organization and form enhance the central idea and theme; ideas are presented coherently to move the reader through the text. The voice of the writer is compelling and conveys the writer’s meaning through effective sentence structure and precise word choices. The writer successfully moves the paper through academic constructs and experiential documentation to critical analysis. The paper demonstrates a clear balance of these three components.

B range:

The paper is reasonably clear, focused, and well supported; ideas are adequately developed through details and examples. Organization and form are appropriate, and ideas are generally presented coherently. The voice of the writer contributes to the writer’s meaning through appropriate and varied sentence structure and word choices. Surface features do not interfere with understanding or distract from meaning. The writer has clearly brought the reader through properly cited academic constructs and experiential documentation, but has not fully developed the area of critical analysis.

C range:

The paper has some focus and support; ideas and content may be developed with limited details and examples. The writing may be somewhat disorganized or too obviously structured. The voice of the writer is generally absent; basic sentence structure and limited vocabulary convey a simple message. Surface feature errors may reduce understanding and interfere with meaning. The content areas of academic constructs are limited and large generalizations are made. Critical analysis is all but absent from the paper.

D range:

The paper has little focus and development; few details and examples support ideas and content. There is little discernible shape and no direction. The writer’s tone is flat. Awkward sentence structure and inadequate vocabulary interfere with understanding. Limited control of surface features makes paper difficult to read. Critical analysis is absent, and segments of the paper are given to rambling descriptions of life experience without academic context.

Attendance and Make-up Assignment Policy

The policy for attendance and making up missed assignments is consistent with Texas A&M University Student Rule 7: [https://student-rules.tamu.edu/rule07](https://student-rules.tamu.edu/rule07).

Late Assignments

The assignments should be submitted in class on the days that they are due. If a student is unable
to submit an assignment on time, s/he must make arrangements with the instructor for an extension. Keep in mind that extensions are at the instructor’s discretion and not automatically given. If at all possible, the student’s request for extensions should be made 24–48 hours in advance. We understand that this is not always possible. However, the instructor may only give extensions for true emergencies. If the student turns in an assignment late (without an approved extension), then they will not receive full credit for the late assignment. Typically, students lose 10% of the total grade per day late. Also keep in mind that all assignments, regardless of extensions, must be submitted by the last day of the class.

Format for Writing Assignments

All written assignments will have the following minimum requirements, which are in keeping with standards of the American Political Science Association (APSA), which serves as the style manual for the Bush School: double-spacing (not 1.5); use of 12 pt. font; numbering of all pages; complete citation of sources by author and date, including page number for direct references or quotations; use of a reference section; and careful, well-edited writing.

Performance Expectations

Graduate study means learning to learn from every possible source—from readings, peers, life experiences, the instructor, and research projects. The intent in any graduate course is to develop a learning community in which individuals’ ideas are freely expressed and the class works together to support and challenge each others work and ideas. The success of the learning experience in this class—and ultimately each student’s grade—is critically dependent on the excellence of each student’s preparation, written assignment submissions, and participation in online discussions where each student presents ideas and considers what others have to say as part of a reasoned, thoughtful discourse. Each student and his/her contributions should be treated with respect—not only taking them seriously but also challenging ideas. No student should feel left out, minimized, or otherwise discriminated against. The instructor will quickly and directly counter any discussions or comments that do not display professionalism and respect for the contributions of others.

Student Concerns

Students having a question, concern, or complaint about the course should raise it with the instructor first. If, for whatever reason, the student prefers not to do that or, if the issue was raised but not resolved, the student should communicate the question, concern, or complaint to MPSA Office at kreeves@tamu.edu.

ASSIGNMENTS By Week

Week 1

Topic: Introduction, Definitions and History

Lectures: 1.1 Introduction, Course Overview, and Terrorism Classified
1.2 A Short History of Terrorism that Affected the United States of America

Required Readings:


Optional Activity:

Review the following websites:
- START terrorism database (http://www.start.umd.edu/start/data_collections/tops/)
- National Counterterrorism Center (http://www.nctc.gov/site/groups/index.html)

Class Discussion Questions:
1. During our first class be prepared to introduce yourself to your classmates. In TWO MINUTES or less, provide a brief biography that includes your educational background, work experience, and personal interests or hobbies. Also include a brief statement about what you hope to gain from this course.

2. What makes an act of violence terrorism? What are the most central elements to any definition of terrorism?

3. Be prepared to give examples of terrorism from history.

4. Are school shootings terrorist acts?

**Week 2**

**Topic: Radicalization**

**Lectures:**

2.1 Frameworks and Theories

2.2 The Media and the Internet in Modern Terrorism

**Required Readings:**


Class Discussion Questions:

1. How do the actions and policies of a government impact the radicalization process at the individual, group and mass levels? Provide citations from the lectures and or readings to support your answer.

2. Describe how you have formed your view of the world, and your place within it. Who in your life has influenced your perceptions the most? What if your “influencers” were considered “extremists” by others”? Would you know? Support your answer as appropriate.

3. What effect do laws and the need to protect the constitutional rights of U.S. citizens have on monitoring cyberspace activities of domestic groups bent on violence or law breaking?

Week 3

Topic: Religious Extremist Groups and Ideologies

Lecture: 9.1 Religious Extremist Ideologies
9.2 Religious Extremist Groups

Required Readings:


Optional Reading:


Discussion Questions:
1. How are religious terrorist groups different from secular left-wing, right-wing and ethno-nationalist groups?

2. Are there any common factors of motivation, worldview or goals of Islamists and any elements of the American radical right?

**Week 4**

**Topic**: Communist, Left-Wing Groups and Ideologies

**Lectures**: Left-Wing Revolutionary Ideologies and Groups

**Required Readings**:


Recommended Readings:


Class Discussion Questions:

1. What do communist/left-wing groups have in common with regard to tactics, strategies and ideologies? Support your answer from the lectures and or readings.

2. Of all the left-wing groups you have read about thus far, which one do think was the most successful (i.e., came the closest to achieving its objectives)? Be specific and cite examples from your research.

3. Are communist/left-wing groups still operational in the United States? In other democratic nations?

**Week Five**

Topic: Ethno-Nationalist/Separatist Ideologies and Groups

Lecture: Ethno-Nationalist/Separatist Ideologies and Groups

Required Readings:


Class Discussion Question:

1. How do ethno-nationalists differ from the left-wing groups you read about last week? How are
they similar?

Assignment Due in Class:
Case Study Comparing and Contrasting a Religiously Motivated Terrorist/s with a left-wing group
(20% of grade

Week Six

Topic: The Radical Right – Motivations and Worldviews
Lectures: Ideologies, Worldviews and Christian Identity
Required Readings:


The National Alliance website.
http://www.natvan.com/national-vanguard/


“The Terror From the Right”, 2008. Intelligence Project of the Southern Poverty Law Center. Montgomery, AL.
http://www.splcenter.org/get-informed/publications/terror-from-the-right

The National Alliance website.
http://www.natvan.com/national-vanguard/

Optional Reading:
Dr. William Pierce Facebook page.
https://www.facebook.com/LegacyOfDrWilliamPierce

Class Discussion Questions:

1. How do the right-wing groups/individuals differ from the left-wing groups you read about last week? What similarities do you see? Be sure to support your answer with citations from you’re the lectures and or readings.

2. The FBI has noted an increase in membership of right-wing terrorist groups in American over the past few years. What social, political, economic or other factors might help explain why? Be specific and cite examples.

**Week Seven**

**Topic:** Early Resistors and Militias of the Radical Right

**Lecture 7:** Standard Setters and Militias

**Required Readings:**

Kingdom Identity Ministries. Harrison, Arkansas.
http://www.kingidentity.com/index.html

“Paranoia as Patriotism: Far-Right Influences on the Militia Movement”. The Nizkor Project.

“Identity Church Movement: Posse Comitatus”.


Miller, Joshua Rhett. “Sovereign citizen movement rejects gov't with tactics ranging from mischief to violence”, (2014, January 5). FoxNews.com

“Do not talk to the cops”.
http://www.resist.com/donttalktothecops.htm
“Richard Butler”.
http://archive.adl.org/learn/ext_us/butler.html?LEARN_Cat=Extremism&LEARN_SubCat=Extremism_in_America&xpicked=2&item=butler

Optional Reading:


http://sovereign-citizenship.net/

Class Discussion Questions:

1. Explain some of the early history of anti-Semitism and how it translated to modern times.

2. Be prepared to discuss some of the major development points of British Israelism and how it transformed into Christian Identity.

3. Discuss the major concepts of the Christian Identity worldview.

**Week Eight**

Topic: The Radical Right – Groups and Leaderless Resisters

Lecture: 5 “Leaderless Resistance” and “Lone Wolf Tactics” - Phinehas Priests, and Race Warriors

Required Readings:


“Terror From the Right”, 2008. Intelligence Project of the Southern Poverty Law Center. Montgomery, AL.
http://www.splcenter.org/get-informed/publications/terror-from-the-right

http://www.louisbeam.com/leaderless.htm

*David Lane. “Fourteen Words”.*  
http://www.stormfront.org/forum/t420259/

*The Insurgent; Lone Wolf.*  
http://www.resist.com/
Discussion Questions:

1. Be prepared to discuss the worldview or religious belief of one of the individuals or groups in your readings that has similar characteristics to a main stream group or religion in American today.

2. What are the strengths and weaknesses of “leaderless resistance” tactics?

3. Select one resistor from your readings and be prepared to discuss his motivation and actions against the government.

Week Nine

Topic: Use of Force to Oppose Abortion and the Army of God, I

Lectures: Lecture 9: Motivation and Goals of Abortion Resistors

Required Readings:

*The Army of God* website.
http://www.armyofgod.com/

http://www.prochoice.org/about-abortion/violence/army_god.html

http://www.armyofgod.com/AOGhistory.html

Soldiers in the Army of God 1/7. *YouTube*.
http://www.youtube.com/watch?v=5d1n0zDngPI

http://www.trackingterrorism.org/article/cell-strategy-and-terrorist-groups/definition-history-and-causes


http://www.christiangallery.com/ExplodingArmyofGodMyth.htm
Class Discussion Questions:

1. How is the internet used to support the idea of violence in opposition to abortion?

2. Become familiar with the activities two convicted anti-abortion resistors. And be prepared to discuss their activities.

3. Review the *Army of God Manual* and be prepared to discuss some of its attributes.

**Week Ten**

Topic: “Use of Force” Against Abortion and the Army of God, II

Lectures: Lecture 10: Actions by Abortion Resisters

Required Readings:

- The Authorized Eric Rudolph homepage.  
  [http://www.armyofgod.com/EricRudolphHomepage.html](http://www.armyofgod.com/EricRudolphHomepage.html)


  [http://www.christiangallery.com/KoppTranscript.htm](http://www.christiangallery.com/KoppTranscript.htm)


Class Discussion Questions:

1. Explore Eric Rudolph’s background. What was his motivation for his campaign?

2. Clayton Waggner was successful in closing abortion clinics across the nation. What were the factors of his campaign that made it so successful?

3. James Kopp became an anti-abortion activist, but then developed into a man that took at least one abortion doctor’s life. Be prepared to trace this transition in his activities opposing abortion.

4. Shelly Shannon (and others) carries on her anti-abortion activities from prison. What effect, if any, do you think her activities have with those that might decide to cross the line and use violence against abortion?

Assignment Due in Class:
Oral Presentation on an individual terrorist (20% of grade).

**Week Eleven**

Topic: Environmental and Animal Rights Terrorism

Lectures: Lecture 11.1 Earth First Movement, Disaffected Environmentalists and the Earth Liberation Front (ELF)
   Lecture 11.2 The Animal Liberation Front (ALF)

Required Readings:

*Earth First! Journal website.*
http://earthfirstjournal.org/

“Protesters Drop Banner Demanding Florida’s Briger Forest Be Saved”, *Everglades Earth! First!*
http://earthfirstjournal.org/newswire/2014/05/24/protesters-drop-banner-demanding-briger-forest-be-saved/

*Earth First News website.*
http://www.earthfirstnews.com/


Western Wildlife Unit of the Animal Liberation Front. *Memories of Freedom.*
http://www.animalliberationfront.com/ALFront/memories%20of%20freedom.pdf


http://archive.adl.org/learn/ext_us/ecoterrorism.html

Pearce, Matt. 2013, October 11. “Ecoterrorist pleads guilty, but won't snitch on 'the Family’”.
*Los Angeles Times.*

*Animal Liberation Front.com.*
http://www.animalliberationfront.com/index.html

The Daily Caller.
http://dailycaller.com/2012/01/12/animal-rights-terror-group-takes-credit-for-torching-cattle-trucks/#ixzz32sPWjWfG

www.animalliberationpressoffice.org
http://media.fresnobee.com/smedia/2012/01/10/16/16/HrPyX.So.8.pdf

Federal Bureau of Investigation website. “Putting Intel to Work Against ELF and ALF Terrorists”. 

Woodhouse, Leighton. 2012, October 12.“How The Pursuit Of Animal Liberation Activists Became Among The FBI's 'Highest Domestic Terrorism Priorities”’. Huffington Post.com
http://www.huffingtonpost.com/leighton-woodhouse/animal-liberation_b_2012426.html

Class Discussion Questions:

1. Do PETA and or other animal rights groups play any role in supporting the activities of the ELF and the ALF?

2. Discuss the various actions (monkey wrenching, etc.) that environmental resistors can take to work against the targets of their causes.

Week Twelve

Topic: Radical Islam in America

Lectures: Lecture 12.1 Radical Islamist Ideology, Worldview, Radicalization and Recruiting, History and
Evolution
Lecture 12.2 The Evolution of Radical Islamism in America

Required Readings:

Wiktorowicz, Quintan, “A Genealogy of Radical Islam,” in Howard and Hoffman (eds.) Terrorism and Counterterrorism, pp. 256-278.


Kippenberg, Hans “Consider That It Is a Raid on the Path of God”: The Spiritual Manual of the Attackers of 9/11”.
http://www2.uni-erfurt.de/maxwe/personen/kippenberg/texte/kippenberg.pdf

Class Discussion Questions:

1. Why does the radical Islamist ideology resonate among some Americans? Who are they and why do they respond to the message?

2. Over the past few years (other than two man team of the Boston bombers) Islamists have acted individually. Does evidence suggest cells of Islamists are forming/ed in the United States?

Week Thirteen

Topic: Homegrown Terrorism –

Lectures: Lecture: 13.1 Three Homegrown Terrorists
Lecture 13.2 Three More Homegrown Terrorists

Required Readings:

“The Pottawatomie Killings, It is Established Beyond Controversy That John Brown Was the Leader.
http://www.kansashistory.us/pottamassacre.html


http://www.theatlantic.com/past/docs/issues/2000/06/chase.htm (part one)
http://www.theatlantic.com/past/docs/issues/2000/06/chase2.htm (part two)

“The Unabomber Was Right”, The Technium website.
http://kk.org/thetechnium/2009/02/the-unabomber-w/

http://www.stratfor.com/weekly/20100505_uncomfortable_truths_times_square_attack


http://www.danielpipes.org/7763/major-nidal-hasan-islamist-life

http://law2.umkc.edu/faculty/projects/ftrials/mcveigh/mcveightrial.html


“Government Caught in Boston Bombing False Flag Cover-up”. (2013, April 18). Infowars.com

Class Discussion Questions:

1. Was John Brown’s cause a just one? Was he a terrorist?

2. After reviewing the cases of six homegrown terrorists, are there any factors common to all these people?

3. In the cases we’ve reviewed, which, if any of these does religion seem to be the driving motivation?

4. Where do law abiding citizens who support a cause being advanced by a terrorist, stand under the law?

Assignment Due:
Final Research Paper (40% of grade).
Week Fourteen

Topic: Terrorism with Weapons of Mass Destruction (WMD)

Lecture 14: The Choice to Use Weapons of Mass Destruction

Required Readings:


Class Discussion Questions:

1. The lecture described significant constraints on a terrorist group’s use of weapons of mass destruction. Under what circumstances would a well-funded group like Hizbollah or Islamic Jihad launch a WMD attack against the US, and what kind of weapon would they use?

2. Some analysts have argued that as long as high-yield explosives remain relatively easy to acquire or manufacture, the threat of a WMD terrorist attack is really exaggerated. Do you agree? Why or why not? Please be sure to reflect on the assigned readings (including the chapters by Richard Betts and Bruce Hoffman) in your response.
Week Fifteen

Topic: Counterterrorism Challenges and the Future of Domestic Terrorism

Lectures:
- Lecture 15.1: The Challenge
- Lecture 15.2: United States Counterterrorism Strategies and Organizations

Required Readings:


United States Department of Justice website. “Structural Changes to Enhance Counter-terrorism Efforts; Creating the Justice Department's National Security Division” & “Transforming the FBI to Meet the New Threat”. http://www.justice.gov/911/counterterrorism.html


Federal Bureau of Investigation website. “FBI Tactical Hostage Rescue Team (HRT)”.  
https://www.fbijobs.gov/116.asp

Class Discussion Question:

1. Several scholars have noted that groups who use the strategies and tactics of terrorism have rarely achieved any of their primary objectives. If this is true, won’t the problem of terrorism just naturally go away in time? Why or why not?

2. Where does the line come between meeting the terror threat and protecting liberties?

Feedback
The instructor will be providing feedback to questions within 24 to 48 hours and detailed feedback on written assignments within 7 days of the assignment due date. You are expected to read through all of the information and materials provided for the course. If you have questions related to any of the information or course materials, please contact the instructor as soon as possible for clarification.

OTHER POLICIES

AMERICAN WITH DISABILITIES ACT (ADA) INFORMATION

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 979-845-1637. For additional information, visit: http://disability.tamu.edu.

ACADEMIC INTEGRITY

An Aggie does not lie, cheat, or steal or tolerate those who do.

Students are expected to adhere to standards of academic integrity. Scholastic dishonesty consists of lying, cheating or stealing academic information with intent to gain academic advantage. Academic dishonesty comes in a variety of forms. The most common forms are plagiarism, cheating, and academic misconduct. Students who participate in any of these activities will be subject to appropriate University disciplinary action. Students are expected to review, utilize and adhere to the University’s Honor Council Rules and Procedures, which are posted on the University’s web site at http://aggiehonor.tamu.edu. This website provides detailed information and clarification policies, procedures, and rights and responsibilities related to academic integrity.
PLAGIARISM
The attention of each student is directed to the requirement to avoid plagiarism or the appearance of plagiarism through sloppy citation. As commonly defined, academic dishonesty/plagiarism consists of passing off as one's own ideas, words, writings, etc., that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of the person. It does not matter from where the material is borrowed--a book, an article, material off the web, another student's paper--all constitute plagiarism unless the source of the work is fully identified and credited. It is important when using a phrase, a distinct idea, concept, a sentence, or sentences from another source to credit explicitly that source either in the text, a footnote or endnote. Plagiarism is a violation of academic and personal integrity and carries extremely serious consequences. Scholastic dishonesty (including cheating and plagiarism) will not be tolerated and will be punished in accordance with Texas A&M University Student Rules. If you have any questions, please consult the course instructor.

OTHER HELPFUL INFORMATION
Library
The TAMU Library can be accessed by going to http://library.tamu.edu. As a student, you have access to e-books, e-journals, databases, and other library resources such as live chats with a librarian, citation guides, and research guides. The Bush School provides you with links to library resources in your online course under Getting Started. If you are accessing the library off-campus, go to the TAMU Library homepage (http://library.tamu.edu) and click on “My Portal”.

Log in using your NetID username and password. More information about accessing the library through the proxy server can be found under the “Help” link on the TAMU Library’s homepage.

Technical Help Desk Information

Texas A&M University (TAMU) Help Desk Central (open 24/7, 365 days a year):

Phone: Toll-free at 866.857.4112 or 979.845.8300

Email: helpdesk@tamu.edu

Books of Interest on Terrorism:

ASIA


Behram A. Sahukar, “India’s Response to Terrorism in Kashmir,” in Countering Terrorism and Insurgency in the 21st Century (Volume 3), edited by James J.F. Forest (Westport, CT: Praeger,


EUROPE & RUSSIA


**MIDDLE EAST & AFRICA**


Rob Wise, “Al Shabaab,” CSIS Case Study (July 2011).


Samuel Lindo, Michael Schoder and Tyler Jones, “Al Qaeda in the Arabian Peninsula,” CSIS Case Study (July 2011).


Sundara Vadlamudi, “The U.S. Embassy Bombings in Kenya and Tanzania,” in *Countering

William Thornberry and Jaclyn Levy, “Al Qaeda in the Islamic Maghreb,” Case Study CSIS (September 2011).


LATIN AMERICA


UNITED STATES


**GLOBAL ISSUES**

Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional  
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:  
   - [ ] Undergraduate  
   - [x] Graduate  
   - [ ] First Professional (DDS, MD, JD, PharmD, DVM)

2. Request submitted by (Department or Program Name):  
   Public Service and Administration

3. Course prefix, number and complete title of course:  
   PSAA 667, Principles of International Law

4. Catalog course description (not to exceed 50 words):  
   Introduction to the nature and sources of international law, including jurisdiction of states; law governing the making, interpretation, application and termination of treaties and agreements; recognition of states and government; nationality of persons and corporations; state immunities from jurisdiction and control; and human rights.

5. Prerequisite(s):  
   Graduate Classification

   Cross-listed with:  
   INTA 609, Principles of International Law  
   Stacked with:  
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  
   - [ ] Yes  
   - [x] No  
   If yes, from _____ to _____

7. Is this a repeatable course?  
   - [ ] Yes  
   - [x] No  
   If yes, this course may be taken _____ times.

   Will this course be repeated within the same semester?  
   - [ ] Yes  
   - [ ] No

8. Will this course be submitted to the Core Curriculum Council?  
   - [ ] Yes  
   - [x] No

9. How will this course be graded?  
   - [x] Grade  
   - [ ] S/U  
   - [ ] P/F (CLMD)

10. This course will be:  
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. [ ] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix | Course # | Title (excluding punctuation) | INTERNATIONAL LAW
| PSAA | 667 | Principles of International Law |

<table>
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<tr>
<th>Lecture</th>
<th>Lab</th>
<th>Other</th>
<th>SCH</th>
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<th>Admin. Unit</th>
<th>Acad. Year</th>
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Approval recommended by:  

William E. West (PSAA)  
Department Head or Program Chair (Type Name & Sign)  
Date

Gregory Gasse (INTA)  
Department Head or Program Chair (Type Name & Sign)  
(if cross-listed course)  
Date

Submitted to Coordinating Board by:  

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services - 07/14
PSAA 667 Principles of International Law

SYLLABUS

Instructor: Matthew Hover J.D.

Communication: Through eCampus messages

Phone calls: By appointment

Course Description

Introduction to the nature and sources of international law, including jurisdiction of states; law governing the making, interpretation, application and termination of treaties and agreements; recognition of states and government; nationality of persons and corporations; state immunities from jurisdiction and control; and human rights.

Prerequisite: Graduate classification

Course Overview

This introductory course introduces students to the basics of international law. The course will cover the history of international law, its major areas of practice and application, how international law is created through mechanisms such as treaties and agreements, custom, protocols, and court decisions; the role of nation-states and others, such as the United Nations, multi-national corporations, and non-governmental organizations; enforcement and compliance challenges; and current tensions and controversies in the creation and interpretation of international law and its application to specific contemporary policy situations.

Course Schedule

<table>
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<tr>
<th>Week 1</th>
<th>Mon-Sep-01</th>
<th>Tue-Sep-02</th>
<th>Wed-Sep-03</th>
<th>Thu-Sep-04</th>
<th>Fri-Sep-05</th>
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<tr>
<td>Week 2</td>
<td>Sun-Sep-07</td>
<td>Mon-Sep-08</td>
<td>Tue-Sep-09</td>
<td>Wed-Sep-10</td>
<td>Thu-Sep-11</td>
<td>Fri-Sep-12</td>
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<tr>
<td>Week 3</td>
<td>Sun-Sep-14</td>
<td>Mon-Sep-15</td>
<td>Tue-Sep-16</td>
<td>Wed-Sep-17</td>
<td>Thu-Sep-18</td>
<td>Fri-Sep-19</td>
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<tr>
<td>Week 4</td>
<td>Sun-Sep-21</td>
<td>Mon-Sep-22</td>
<td>Tue-Sep-23</td>
<td>Wed-Sep-24</td>
<td>Thu-Sep-25</td>
<td>Fri-Sep-26</td>
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Format and Method

The course is delivered via eCampus. Resources and materials provided with in the LMS may contain:

1. Syllabus, slide handouts, scripts, audio/video lectures, messages, discussion forums, assignments, exams.

Required Textbooks


Additional readings to assist with the Analytical Research Paper will be provided by Instructor.

Course Requirements and Grading

Final grades are weighted on a 4.0 system using the following allocation:

<table>
<thead>
<tr>
<th>Weekly Discussions</th>
<th>75%</th>
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<tr>
<td>Analytical Research Paper</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tbody>
</table>

Final Grading Scale:

A= 90-100%
B= 80-89%
C= 70-79%
There will be several components used in determining your final grade for the course. The instructor will be reading each posting and providing specific or general input where warranted within 24 to 48 hours, normally as part of questions on comments via the posting dialogue itself. Additionally, the instructor will provide detailed feedback on written assignments within 7 days of the assignment due date. Students are expected to read through all of the course information and materials provided on the course Web site. If any student has questions related to any of the information and/or course materials, then please contact the instructor as soon as possible for clarification.

**Weekly Discussions (75% of grade)**

- Discussion is an integral part of the learning process; it is an equivalent to the classroom.

- Effective online discussions require preparation by reading the assigned materials and answering discussion questions effectively using supporting statements with concepts from the readings.

- The lectures parallels the assigned readings, but frequently contain additional material, so discussions should relate to both, the theories and concepts from the readings, and the lecture’s materials; with the addition of references to the professional environment, as well as current events.

- Listen to the lectures each week, understand the concepts that are presented, and become familiar with all the concepts and terminology introduced in the readings and lectures, and apply this knowledge in responses contributing to the discussion, responding the initial question and enhancing the posts from other students.

- You will be provided a separate grade on your weekly questions. Unless the instructor has given approval for delayed submission, the window for postings will “close” at Sunday midnight as the class moves on to the next week. **Discussion board posts should consist of no less than 350 words in length.**

- On-line class discussions, including comments, should be timely and explicitly drawing from the theories and concepts from the readings and lectures. **Apply and cite this knowledge directly in the initial response (use references) to discussion questions and in subsequent responses to other students’ posts.**

- Each student’s discussion and response posts should be treated as mini-papers which are carefully researched and prepared. You may bring in related literature, examples, or experiences directly pertaining to the matter at hand.

- The Discussion Question grade will reflect your ability to understand and communicate ideas and concepts cogently and concisely, not the quantity of posts.
Here are tips for writing posts, for participating in class discussions:

1. Organize your thoughts before hitting the “send” button. This is graduate level work. Clear, coherent, thoughtful analysis requires a roadmap. Postings are essentially mini-papers that should reflect substantive analysis based on authority. As one tool, consider what lawyers do. Lawyers apply a “FRAC” analysis: identify the facts, state the applicable rule of law, apply the facts to the rule, and reach a conclusion. Do not make a reader root through a disorganized product to find the insight and analysis. Read and edit your posting before you hit “send.” Ask yourself, is this the best you can do?

2. Check your grammar. Sentence fragments and grammatical errors detract from any written product. And closely related are spelling errors. Such errors lead the reader to conclude that the writer is a sloppy one or does not truly understand the difference between words that sound the same. In most cases, poor writing habits raise doubt about the quality of the analysis and conclusions.

3. Do not view the discussion forum as an informal “chat room.” Postings that exhibit the view that informal text-messaging, complete with text-message abbreviations or graphics such as “smiley faces,” is not appropriate. Remember that every post is to be professional and substantive; each is, in effect, a mini-paper.

4. Support your writing with authorities. Postings that reflect personal opinions devoid of any citation to authority are inappropriate. Personal musings are not analysis. When you write, “I think,” “I like,” and other phrases beginning with “I,” ask yourself: What is the point being made, is there authority for this, have I cited it, am I merely repeating some ideological bent, or do I even need to use “I” in my writing?

5. Practice professionalism. To repeat, this is a graduate course filled with professional people. Professional courtesy rules. Students should not engage in what might be perceived as personal challenges or disparaging remarks to other students. Inflamed, personal rhetoric simply is not acceptable.

6. Avoid raising questions without a suggested answer. Postings that merely ask questions of the author, without more, are inappropriate. While easy enough to do, such postings do not advance the discussion, unless the questioner suggests an answer or an avenue of approach to the issue.

Written Assignments

The two written assignments have the following minimum requirements, which are in keeping with standards of the American Political Science Association (APSA). APSA is the style manual for the Bush School. Double-spacing (not 1.5); use of 12 pt. font; numbering of all pages; complete citation of sources by author and date, including page number for direct references or quotations; use of a reference section; and careful, well-edited writing; is the standard for all submissions.

Research Paper (25% of grade)

Using the set of readings and additional guidance provided by the instructor during the semester, write an analytical research paper that incorporates not only the readings but core concepts covered in the course. The critique paper should conform to the standards of the American Political Science Association (APSA), which serves as the style manual for the Bush School: double-spacing (not 1.5); use of 12 pt. font; numbering of all pages; complete citation of sources by author and date, including page number for direct references or quotations; use of a reference section; and a logically organized and argued, well-edited and polished manuscript. The Analytical Paper is due no later than 11:59 pm CT, Day 5 of Week 15. Since the student has the entire semester to write the paper and it is due at the end of class, no extensions will be granted.

Paper Grading Criteria

- **A range:** The paper is clear, engaging, original, and focused; ideas and content are richly developed with details and examples. Organization and form enhance the central idea and theme; ideas are presented coherently to move the reader through the text. The voice of the writer is compelling and conveys the writer’s meaning through effective sentence structure and precise word choices. The writer successfully moves the paper through academic constructs and experiential documentation to critical analysis. The paper demonstrates a clear balance of these three components.

- **B range:** The paper is reasonably clear, focused, and well supported; ideas are adequately developed through details and examples. Organization and form are appropriate, and ideas are generally presented coherently. The voice of the writer contributes to the writer’s meaning through appropriate and varied sentence structure and word choices. Surface features do not interfere with understanding or distract from meaning. The writer has clearly brought the reader through properly cited academic constructs and experiential documentation, but has not fully developed the area of critical analysis.
- **C range:** The paper has some focus and support; ideas and content may be developed with limited details and examples. The writing may be somewhat disorganized or too obviously structured. The voice of the writer is generally absent; basic sentence structure and limited vocabulary convey a simple message. Surface feature errors may reduce understanding and interfere with meaning. The content areas of academic constructs are limited and large generalizations are made. Critical analysis is all but absent from the paper.

- **D range:** The paper has little focus and development; few details and examples support ideas and content. There is little discernible shape and no direction. The writer’s tone is flat. Awkward sentence structure and inadequate vocabulary interfere with understanding. Limited control of surface features makes paper difficult to read. Critical analysis is absent, and segments of the paper are given to rambling descriptions of life experience without academic context.
Week 1

What is International Law?

We start this week by defining International Law, we will look at the history of public international law and some alternative perspectives. We will discuss the question about whether international law is really law and finally we will talk about international law theory and methodology.

Objectives:

1. Define international law.
2. Discuss the history of public international law and alternative perspectives

Lectures:

1. What is International Law? (23:05)

Readings:


Discussion Questions:

1. Welcome! Please take a few minutes to introduce yourself to your classmates on Day 1. Post a brief biography that includes your educational background, work experience, and personal interests or hobbies. Also include a brief statement about what you hope to gain from this course.

2. Summarize Henkin's main points. Has he convinced you that international law is "law"? That it has a significant effect on national behavior? [Carter et al pg. 31]

3. In 2005 remarks to the American Society of International Law, Condoleezza Rice made the following comments:

   The United States has been and will continue to be the world's strongest voice for the development and defense of international legal norms...When we observe our treaty and other international commitments, other countries are more willing to cooperate with us and we have a better chance of persuading them to live up to their own commitments. Thus, when we respect our international legal obligations and support an international system based on the rule of law, we do the work of making the world a better place, and also a safer and more secure place for America.


   How, if at all, do Secretary Rice's comments comport with the theoretical accounts of compliance with international law advanced by Professors Henkin, Goldsmith and Posner, Franck, and Koh? [Carter et al pg. 48]
**Deadlines**

1. Post a brief biography **DQ1 by Day 1**, and reply to at least 2 **peer posts** by **Day 3** of this week.
2. Answer **DQ2 by Day 3**, and reply to at least 2 **peer posts** by **Day 5** of this week.
3. Answer **DQ2 by Day 5**, and reply to at least 2 **peer posts** by **Day 6** of this week.
Week 2

The Creation of International Norms

This week we are going to talk about sources of international law. We will look at the statute of the International Court of Justice and the sources from which international law springs, which include international conventions, international custom, general principles as accepted by most civilized states, and judicial decisions among others.

Objectives:

1. Analyze historical and current international law formation.
2. Discuss the creation of international norms.

Lectures:


Readings:


Discussion Questions: (taken from Week 2 reading)
1. What is the purpose of treaty interpretation— to ascertain the meaning of the text or the intent of the parties? Or is it to determine how to apply treaty language to situations that may not have been contemplated when the treaty was concluded? Are these different? What practical difference would it make? If the objective is to ascertain the meaning of the text (as opposed to the intent of the parties), would the negotiation history (travaux) be relevant? How does the Vienna Convention resolve this issue? In any given dispute, is it likely that the meaning of the text will prove to be unambiguous? If not, is the travaux likely to be any less ambiguous? Will interpreting a treaty “in light of its object and purpose” assist in determining how to apply the treaty to unforeseen circumstances? [Carter et al pg. 104]

2. In January 2003, as tensions between North Korea and the United States and other states over North Korea’s suspected nuclear weapons program grew, North Korea announced that it was withdrawing from the Nuclear Nonproliferation Treaty (NPT). Article X(1) is the NPT’s withdrawal clause; it provides:

*Each party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.*

In announcing its withdrawal from the NPT, North Korea declared that “[a] dangerous situation where our nation’s sovereignty and our state’s security are being seriously violated is prevailing on the Korean peninsula due to the US vicious hostile policy towards [North Korea].” North Korea’s statement included President Bush’s characterization of North Korea as a member of states comprising an “axis of evil” and U.S. efforts to pursue resolutions condemning North Korea’s non-compliance with the NPT as a basis for its “self‐defensive” withdrawal from the treaty.

Is it for North Korea, or for other states, to decide whether North Korea’s stated reasons for withdrawing from the NPT satisfy Article X(1) of the treaty? Or should an international organization decide? Did North Korea’s withdrawal from the NPT violate the treaty? Was it consistent with the Vienna Convention on the Law of Treaties? [Carter et al pg. 119]

3. Should there be a negative implication drawn from the failure of a state to ratify a treaty? If most (say, 80%) of the countries of the world were to ratify a treaty that the United States strongly opposed, could the United States ever be bound by some of the norms of that treaty as norms of customary international law? For example, in 1999, the Ottawa Convention Banning Anti-Personnel Landmines entered into force. As of April 2006, 151 states had become parties to Convention, but the United States, which insists on the right to retain the right to use certain types of anti-personnel landmines in certain military scenarios, has not. Could other states argue that the United States is now prohibited, as a matter of customary international law, from using anti-personnel landmines covered by the treaty? [Carter et al pg. 137]

**Deadlines:**

1. Answer **DQ1** by **Day 3**, and reply to at least **2 peer posts** by **Day 5** of this week.

2. Answer **DQ2** by **Day 5**, and reply to at least **2 peer posts** by **Day 7** of this week.

3. Answer **DQ3** by **Day 5**, and reply to at least **2 peer posts** by **Day 7** of this week.
Week 3

States and Other Major International Entities

This week we will start by defining states and their role in the international legal order as well as international organizations.

Objectives:

1. Define a "State" and describe its capacities in the international community.
2. Identify national security conflicts and propose resolutions to these international conflicts.
Lectures:

1. States and Other Major International Entities (52:51)

Reading:

1. Carter, Barry E., Phillip R. Trimble, and Allen S. Weiner. 2007. *International Law*, 5th ed. New York City: Aspen Publishers. [pp. 443-457 (stop at the Note on the Special Status of Taiwan); 462 (starting at note 6) – 465; 474-489 (stop at Maynes & Williamson article); 520 (starting at section 3) – 537; 549 (starting at section b) – 550 (stop at section c)]

Discussion Questions:

1. In late 2001, a new interim government under Hamid Karzai came into power in Afghanistan and was recognized immediately by most countries. The new government replaced the defeated Taliban government, which had taken control in the late 1990s of about 90 percent of the territory of Afghanistan during a civil war, but had only been recognized by three countries. Most countries and the United Nations had continued to recognize the Northern Alliance during the late 1990s until 2002. Should the Karzai government be responsible for the debts of the Taliban? Or of the Northern Alliance? [Carter et al pg. 465]

2. The ability of the FSM, Marshall Islands, and Palau to act in the international realm could potentially bring the freely associated states into conflict with U.S. national security interests in the Pacific. How might this potential conflict be resolved, given that the United States retains control over the security and defense affairs of these states, while they retain authority over their foreign affairs? To what extent might "foreign affairs" be subsumed by "security and defense matter"? Is the United States being given a de facto voice in the foreign affairs of these states? [Carter et al pg. 478]

3. Because of their composition, which of the Union's key institutions—the Commission, European Parliament, Council, European Council, and the Court of Justice--seem more likely to favor greater integration in the Union? Which seem more likely to be inclined to promote the interests of the individual Member States? [Carter et al pg. 537]

Deadlines:

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.

3. Answer DQ3 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 4

**International Law in the United States (Part 1)**

This week we are going to talk about the relationship between international law and domestic law. We will cover the concepts of dualism and monism.

**Objectives:**

1. Discuss individual rights limitations.
2. Discuss the constitutional limits, critical facts in the Youngstown case.
3. Assess the Vienna Convention on Consular Relations as it relates to the federal Antiterrorism and Effective Death Penalty Act.

**Lectures:**

1. International Law in the United States Part 1 (28:06)

**Readings:**

1. Carter, Barry E., Phillip R. Trimble, and Allen S. Weiner. 2007. *International Law*, 5th ed. New York City: Aspen Publishers. [pp.159-168 (stop at note 3); 170 (start at section 2) – 171 (Stop at Asakura v. City of Seattle); 177 (start at section b) – 183 (stop at note 4); 186-206 (stop at United States v. Pink); 215 (start at section 3) – 219 (stop at section 4)]

**Discussion Questions:**

1. In Reid v. Covert, does Justice Black persuasively distinguish *Holland*? Or does Reid v. Covert completely overturn *Holland*? Or just to the extent that the liberty is specifically mentioned (like the right to a jury trial) in the Bill of Rights? In Boos v. Barry, 485 U.S. 312 (1988), the Court confirmed that the treaty power is subject to individual rights limitations. There, the Court held that legislation prohibiting the display of any sign within 500 feet of a foreign embassy if that sign tends to bring that foreign government into "public odium" or "public disrepute" violated the First Amendment. The Court held this even though the legislation was designed to implement the Vienna Convention on Diplomatic Relations. Quoting the *Reid* plurality opinion, the Court stated that "it is well established that 'no agreement with a foreign nation can confer power on the Congress, or on any other branch of Government, which is free from the restraints of the Constitution.'" Id. at 324. [Carter et al pg. 167]

2. The U.S. practice of attaching RUDs to human rights treaties has its detractors. They argue that U.S. RUDs emasculate the obligations that U.S. treaty makers purported to undertake when negotiating and signing human rights treaties. For example, the United States attached a reservation to the Torture Convention that limited the definition of “cruel, inhuman, or degrading treatment” to that conduct prohibited by the Fifth, Eighth, and Fourteenth Amendments of the Constitution. Professor Henkin, an opponent of these types of pervasive RUDs, suggests that “reservations designed to reject any obligation to rise above existing [U.S.] law and practice are of dubious propriety: if states generally entered such reservations, the conventions would be futile.” Louis Henkin, U.S. Ratification of Human Rights Conventions: The Ghost of Senator Bricker, 89 Am. J. Intl. L. 341, 343 (1995). Compare Professor Henkin’s view with the views by former Senator Jesse Helms, then the ranking minority member of the Senate Foreign Affairs Committee and an outspoken conservative, who suggested that if the Torture Convention were anything more than a “rhetorical gesture, then it may present a clear and present danger to U.S. sovereignty and the people of the United States.”
Proponents of RUDs note that their use has garnered bipartisan support in Congress and was instrumental in ending in the 1980s a deadlock that had blocked for years the U.S. ratification of major human rights treaties. Supporters also point out that, even with reservations making all or most of the treaty non-self-executing, the United States is binding itself internationally to these treaties. And the United States has actually passed federal laws to implement the Genocide and Torture Conventions. Moreover, when reservations go only to particular provisions of a treaty, the rest of the treaty continues to apply. See Curtis A. Bradley & Jack L. Goldsmith, Treaties, Human Rights, and Conditional Consent, 149 U. Pa. L. Rev. 399, 456-468 (2000).

Do you believe that RUDs should be employed frequently, sparingly, or not at all? When are RUDs most appropriate? Not appropriate? [Carter et al pg. 179-180]

3. Please answer one of the questions listed below: [Carter et al pg. 201]
   a. The steel seizure at issue in *Youngstown* tool place in the midst of, and indeed in alleged furtherance of, the Korean War. Under the analysis in *Curtiss-Wright*, isn't the Korean War an "external affair" regarding which the President has plenary power? Why does the Court take such a different approach to constitutional limits in *Youngstown*, where the majority opinion does not even cite *Curtiss-Wright*? Are the holdings in *Curtiss-Wright* and *Youngstown* reconcilable, as Justice Jackson suggests in note 2 of his concurrence?
   b. What was the critical fact in *Youngstown*? Would or should the decision have been the same if Congress had never considered the Taft-Hartley Act? Is it clear that President Truman's actions in *Youngstown* fell within Justice Jackson's third category, as Jackson argues?
   c. Justice Jackson's concurrence in *Youngstown*, especially its articulation of three categories of presidential power, has been very influential. Indeed, courts and commentators often give more weight to Jackson's concurrence than to the majority opinion. Why do you think this is so? How much guidance does Jackson's framework provide in ascertaining the scope of presidential power?

**Deadlines:**

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.
2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
3. Answer DQ3 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 5

**International Law in the United States (Part 2)**

This week we are going to look at some cases and discuss the allocation of power between the president and congress in times of war or other conflicts and the use of military forces.

**Objectives:**

1. Identify the key actors and authorities and explain their roles in the formation and enforcement of international law.

2. Evaluate approaches to the adoption, execution, and control of international law decisions and interpretations.
Lecture:

1. International Law in the United States Part 2 (38:50)

Readings:


Discussion Questions:

Please answer one of the questions below:

Did the U.S. Supreme Court treat the AUMF differently in Hamdi and Hamdan? Compare these opinions with the three categories of presidential action identified in Justice Jackson's concurrence in Youngstown and reiterated in Justice Kennedy's concurrence in Hamdan. In both cases, the President's actions may run counter to a preexisting statute: the President's detention of Hamdi appears contrary to section 4001(a), and the President's creation of the military commission to try Hamdan did not satisfy the standards set forth in the UCMJ. However, the four-Justice Hamdi plurality, plus Justice Thomas in his dissenting opinion, found that the AUMF authorized Hamdi's detention, thus placing the President's actions in Justice Jackson's first category, whereas the Hamdan majority found that the AUMF did not authorize military commissions, thus placing the President's action in Justice Jackson's third category. What does this different treatment suggest about the scope of the AUMF? [Carter et al pg. 232]

The independent constitutional authority of the President. Both Hamdi and Hamdan avoid deciding the issue of whether the President could conduct the actions at issue on the basis of his independent, or plenary, constitutional authority under Article II. Recall the provisions of Article II listed previously in this week's readings. Are some (or all) of these presidential powers implicated in the war on terrorism? If so, how? How does the Commander-in-Chief power relate to the AUMF? What does footnote 23 or the Court's opinion in Hamdan (which represented the views of five Justices in that section) suggest about the limits of these independent constitutional powers and, more generally, about the Court's attitude toward the assertion of broad executive power in the global war on terror? [Carter et al pg. 233]

What specifically seem to be the standards that the Court's opinion in Sosa establishes for a norm of customary international law ("law of nations") to qualify as a cause of action under the Alien Tort Statute? See especially Part IV.C. of the Court's opinion. Do you believe these standards are sufficiently precise to resolve most questions? [Carter et al pg. 266]

The Court in Garamendi discusses the differing views of the Zschernig majority and Justice Harlan's opinion regarding the nature of foreign affairs preemption. The Zschernig majority supported field preemption, concluding that any state action that had more than incidental effect in the field of foreign affairs should be preempted. Justice Harlan espoused conflict preemption, arguing that state legislation should be upheld, even if it affects foreign affairs, unless it conflicts with a federal policy. Does the Garamendi majority adopt one of these views, attempt to reconcile both, or replace both with a new framework of analysis? If the Zschernig majority opinion's field preemption still applies, what is the scope of its prohibition on state activity? What matters in answering this question: Foreign relations effects? The state's purpose in engaging in the activity? Both? Neither? [Carter et al pg. 282]

Deadlines

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.
2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.

3. Answer DQ3 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 6

**International Dispute Resolution**

This week we will read and research how the Department of Defense supports other federal departments, state, tribal, and local jurisdictions should these elements become overwhelmed in a natural disaster or manmade incident.
Objectives:

1. Explain the Department of Defense’s role in both HLD and HLS, the Posse Comitatus Act and its impact on HLD.

2. Explain the concept of Defense Support of Civil Authorities (DSCA) and describe the National Response Framework (NRF).

3. Analyze the Robert T. Stafford Act, the Economy Act, and the Insurrection Act and explain how these laws affect defense support of civil authorities.

4. Explore and discuss the concept of the Emergency Management Assistance Compacts (EMAC).

5. Analyze the Robert T. Stafford Act, the Economy Act, and the Insurrection Act and explain how these laws affect defense support of civil authorities.

Lectures:

1. Defense Support of Civil Authorities Part II (47:16)

Readings:


Discussion Questions:

1. What are the five response doctrines outlined in the National Response Framework? How does DOD support these?

2. What impact does the invocation of the Insurrection Act have? Has the Act ever been invoked, if so when and why?

Deadlines

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 7

National Level Command Structure

The Unified Command Structure for the Department of Defense begins with the President, the commander-in-chief. The Secretary of Defense, aided by the Chairman, Joint Chiefs, constitutes the rest of what is termed, the national command structure. There are nine Unified (Joint) Combatant Commands; each of these commanders (uniformed personnel) have a direct link to President and Secretary of Defense. Learning goals focus on students grasping the United States’ National Command structure and particularly its impact on Homeland Defense. Also, students will research and study the differences between US, Canadian, and Mexican force structures.
Objectives:

1. Compare and contrast Canadian and Mexican security strategies and force structures, with US security strategy.
2. Explain the historical basis for the prohibition of intelligence collection by military forces on U.S. citizens.
3. Explain the United States’ national command structure and particularly its impact on Homeland Defense.
4. Explain the service components, coordinating commands and subordinate joint task forces associated with USNORTHCOM
5. Describe the roles and missions of each subordinate joint task force.

Lectures:

1. National Level Command Structure (21:11)

Readings:


Websites:

3. CANADA COMMAND Brief http://www.canadacom.forces.gc.ca/
Optional:


Discussion Questions:

1. Describe the DOD’s organization from national level through combatant command levels. Include in your answer a comparison of the responsibilities of Canada Command and US Northern Command and a discussion of the National Command Authority.

2. Describe the organization, mission and responsibilities of USNORTHCOM and its service components. Include how that relates to the NORAD mission and how NORTHCOM is tasked and assigns DSCA missions.

Deadlines:

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 8

**National Guard**

The citizen soldier has been around since before the founding of our nation. Both the colonies at Plymouth and Jamestown formed militia companies to protect the settlements. This is the tradition of the National Guard. This week students we review the capabilities and organization of the modern Guard. Learning goals focus on the differences between Title 10, Title 32, and state active duty status as these affect the National Guard; and the tactical capabilities of the different elements of the Weapon of Mass Destruction-CST and CERFP teams.
Objectives:

1. Explain the differences between Title 10, Title 32, and state active duty status as these affect the National Guard; and the tactical capabilities of the different elements of the Weapon of Mass Destruction-CST and CERFP teams.

2. Describe the role of the U.S. Reserve Components, including the Reserves and the National Guard.

Lectures:

1. National Guard (38:02)

Readings:


Discussion Questions:

1. Indicate the National Guard’s current mission sets. In your opinion, what is the Guard’s most important mission? Support your answers with APSA citations and use no less than 350 words.

2. What topic in this course did you find most interesting or most applicable to your job?

Deadlines:

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 9

American and Canadian Armed Forces Reserves

The Reserve forces of the American and Canadian militaries have some common elements, but in many respects are quite different. If nothing else, the differences in size and capability are quite striking. The week’s learning goals are to understand the role of the American Reserve forces, particularly how does their role compare with that of the National Guard; and to investigate the differences between the United States’ Reserves and the Reserve Forces of Canada.
Objectives:

1. Investigate the differences between the United States' Reserves and the Reserve Forces of Canada.
2. Compare and contrast the missions and responsibilities of the American combatant commands with responsibilities for regions around the world and functional capabilities in particular defense mission areas.

Lectures:

1. Reserves (55:02)

Readings:


Discussion Questions:

1. Describe your technique in researching and writing your paper. What challenge(s) did you have while researching your final paper topic? (200 words)

Assignments:

1. Research Paper. Research a topic in homeland security. The paper should follow APSA style and format, 20-25 double-spaced pages (text, not including reference pages). Clear organization, logical arguments, supported by citation of sources are of critical importance in constructing the final paper. The paper should include an abstract (one page), introduction, main body, conclusion, and references. The conclusion to include a recommendation related to the subject. Research papers should be submitted through the assignments link.

Deadlines

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.
2. Submit assignment by Day 7 of this week.
Week 10

**Strategic Interests of the United States in the Southern Hemisphere**

This final week we will aim at understanding the United States’ policy toward the Caribbean region; a comparison of the USSOUTHCOM and USNORTHCOM missions; and discussion of DOD’s strategic approach to the southern hemisphere.

**Objectives:**

1. Compare and contrast the missions and responsibilities of the American combatant commands with responsibilities for regions around the world and functional capabilities in particular defense mission areas.

**Lectures:**

1. US Southern Command (21:53)

**Readings:**


**Discussion Questions:**

1. Compare and contrast the mission of USSOUTHCOM and USNORTHCOM. Be specific as to mission, roles, and responsibilities particularly in regards to U.S. Homeland Defense.
2. Reflect back on your impressions of the Department of Defense and Homeland Security before the semester began. How has your understanding of the Department of Defense and Homeland Security changed over the course of the semester?

**Deadlines:**

1. Answer **DQ1** by **Day 3**, and reply to at least 2 **peer posts** by **Day 5** of this week.
2. Answer **DQ2** by **Day 5**, and reply to at least 2 **peer posts** by **Day 7** of this week.
**Participation Policy**

Students must “visibly participate” in the online classroom 4 out of 7 days each week of the term. The act of participating in class is defined as active and positive contributions to the learning process. To meet participation requirements, students are expected to contribute substantively to the class discussion in addition to posting any written assignments for grading. Besides the initial response to a discussion question, students are expected to respond to a minimum of two of their classmates’ posts within the established deadlines.

We understand that life happens and occasionally you may be without access to the Internet. If at any time you must be away from the virtual classroom, for more than two consecutive days, you are required to notify the instructor prior to your absence.

In the event of an emergency, contact your instructor as soon as possible. If for some reason the instructor cannot be reached, contact the Office of Extended Education via email bushschoolonline@tamu.edu or at 979.845.7036 and the instructor will be notified.

**Late Assignments**

The assignments should be submitted on the days that they are due by 11:59 p.m. CT. If a student is unable to submit an assignment on time, s/he must make arrangements with the instructor for an extension. Keep in mind that extensions are at the instructor’s discretion and not automatically given. If at all possible, the student’s request for extensions should be made 24–48 hours in advance. We understand that this is not always possible. However, the instructor may only give extensions for true emergencies. If the student turns in an assignment late (without an approved extension), then they will not receive full credit for the late assignment. Typically, students lose 10% of the total grade per day late. Also keep in mind that all assignments, regardless of extensions, must be submitted by the last day of the class.

**Attendance and Make-up Assignment Policy**

The policy for attendance and making up missed assignments is consistent with Texas A&M University Student Rule 7: (https://student-rules.tamu.edu/rule07).

**Performance Expectations**

Graduate study means learning to learn from every possible source—from readings, peers, life experiences, the instructor, and research projects. The intent in any graduate course is to develop a learning community in which individuals’ ideas are freely expressed and the class works together to support and challenge each other’s work and ideas. The success of the learning experience in this class—and ultimately each student’s grade—is critically dependent on the excellence of each student’s preparation, written assignment submissions, and participation in online discussions where each student presents ideas and considers what others have to say as part of a reasoned, thoughtful discourse. Each student and his/her contributions should be treated with respect—not only taking them seriously but also challenging ideas. No student should feel left out, minimized, or otherwise discriminated against. The instructor will quickly and directly counter any discussions or comments that do not display professionalism and respect for the contributions of others.

**Student Concerns**

Students having a question, concern, or complaint about the course should raise it with the online instructor first. If, for whatever reason, the student prefers not to do that or, if the issue was raised but not resolved, the student should communicate the question, concern, or complaint to Student Services at bushschoolonline@tamu.edu. Student Services will ensure that the matter is looked into at the appropriate level and that the student receives a response.

**Feedback**

The instructor will be providing feedback to questions within 24 to 48 hours and detailed feedback on written assignments within 7 days of the assignment due date. You are expected to read through all of the information and materials provided for the course. If you have questions related to any of the information or course materials, please contact the instructor as soon as possible for clarification.

**Academic Integrity**

An Aggie does not lie, cheat, or steal or tolerate those who do.

Students are expected to adhere to standards of academic integrity. Scholastic dishonesty consists of lying, cheating or stealing academic information with intent to gain academic advantage. Academic dishonesty comes in a variety of forms. The most common forms are plagiarism, cheating, and academic misconduct. Students who participate in any of these activities will be subject to appropriate University disciplinary action. Students are expected to review, utilize and adhere to the University’s Honor Council Rules and Procedures, which are posted on the University’s web site at [http://aggiehonor.tamu.edu/](http://aggiehonor.tamu.edu/). This website provides detailed information and clarification policies, procedures, and rights and responsibilities related to academic integrity.

**Plagiarism**

The attention of each student is directed to the requirement to avoid plagiarism or the appearance of plagiarism through sloppy citation. As commonly defined, academic dishonesty/plagiarism consists of passing off as one’s own ideas, words, writings, that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of the person. It does not matter from where the material is borrowed—a book, an article, material off the web, another student’s paper—all constitute plagiarism unless the source of the work is fully identified and credited. It is important when using a phrase, a
distinct idea, concept, a sentence, or sentences from another source to credit explicitly that source either in the text, a footnote or endnote. Plagiarism is a violation of academic and personal integrity and carries extremely serious consequences. Scholastic dishonesty (including cheating and plagiarism) will not be tolerated and will be punished in accordance with Texas A&M University Student Rules. If you have any questions, please consult the course instructor.
Helpful Information

American with Disabilities Act (ADA) Information

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 979-845-1637. For additional information, visit: http://disability.tamu.edu.

Library

The TAMU Library can be accessed by going to http://library.tamu.edu. As a student, you have access to e-books, e-journals, databases, and other library resources such as live chats with a librarian, citation guides, and research guides. The Bush School provides you with links to library resources in your online course under Getting Started. If you are accessing the library off-campus, go to the TAMU Library homepage (http://library.tamu.edu) and click on “My Portal”. Log in using your NetID username and password. More information about accessing the library through the proxy server can be found under the “Help” link on the TAMU Library’s homepage.

Technical Help

Texas A&M University Help Desk Central (General Tech Problems) (24/7, 365 days/year):

- Phone: Toll-free at 866.857.4112 or 979.845.8300
- Email: helpdesk@tamu.edu

Bush School Online Support Team (eCampus Specific Problems)

- Phone: 1.866.988.2874
- Email: bushschoolonline@tamu.edu

This is the last page of the syllabus.
Departmental Request for a New Course
Undergraduate • Graduate • Professional

1. Course request type:
   □ Undergraduate  □ Graduate  □ First Professional (DMD, MD, JD, PharmD, DVM)

2. Request submitted by (Department or Program Name):
   Public Service and Administration

3. Course prefix, number and complete title of course:
   PSAA 668, U.S. Law and Homeland Security

4. Catalog course description (not to exceed 50 words):
   Analyze the threat to the homeland as reflected in a number of pre and post 9/11 commission reports; master's level course intended for individuals preparing for professional careers in the conduct of international affairs

5. Prerequisite(s):
   Graduate Classification
   Cross-listed with:
   INTA 612, U.S. Law and Homeland Security

6. Is this a variable credit course? □ Yes  □ No
   If yes, from _____ to _____

7. Is this a repeatable course? □ Yes  □ No
   If yes, this course may be taken _____ times.

8. Will this course be repeated within the same semester? □ Yes  □ No

9. Will this course be submitted to the Core Curriculum Council? □ Yes  □ No

10. How will this course be graded?
    □ Grade  □ S/U  □ P/F (CLMD)

11. This course will be:
    a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
    b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

12. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.

13. Prefix  Course #  Title (excluding punctuation)
    PSAA  668  LAW & HMLNDD SECURITY

    Lect.  Lab  Other  SCH  CIP and Fund Code  Admin. Unit  Acad. Year  FICE Code
    3.00  0.00  0.00  3.00  4510020001  2415  15  -  16  0  6  3  6  3  2

    Approval recommended by:  
    William F. West (PSAA)  
    Leonard Bright  
    Ryan Crocker  
    Mark Zoran  

    Submitted to Coordinating Board by:
    Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services - 07/14
PSAA 668 U.S. Law and Homeland Security

FALL 2014 SYLLABUS

Instructor: Dr. Tobias Gibson

Communication: Through eCampus messages

Phone calls: By appointment

Course Description

The course will analyze the threat to the homeland as reflected in a number of pre and post 9/11 commission reports. This master’s level course is intended for individuals preparing for professional careers in the conduct of international affairs.

Prerequisite: Graduate classification

Course Overview

This course addresses the constitutional sources and controversies surrounding the separation of powers and the institutions that share those powers. After forming a legal basis of the roles of the institutions, the latter portion of the class is dedicated to current legal issues in the area of homeland security facing the American government(s) and citizens today. Examples include, but are not limited to: borders; critical infrastructure; cyber-security; WMD; terrorism; surveillance; immigration reform; and “drones.” The discussion forums explore these areas in-depth and the written assignments provide students with opportunities to present their own research and conclusions in three different formats—a literature review, a PowerPoint briefing, and a paper to be submitted to Homeland Security Affairs.
Course Schedule

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Format and Method

The course is delivered via eCampus. Resources and materials provided with in the LMS may contain:

Syllabus, slide handouts, scripts, audio/video lectures, messages, discussion forums, assignments, exams.

Required Textbooks


A student of this institution is not under any obligation to purchase a textbook from a university-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Resources

There are many other resources that students are encouraged to explore:

- Become familiar with the broad scope of homeland security sources and links available from the TAMU Policy Sciences Economic Library (PSEL) (http://library.tamu.edu/subject-guides/homeland-security).

- Through PSEL, you can access a considerable amount of policy, strategy, and operational material from the Naval Postgraduate School Homeland Security Digital Library collections, including Congressional Research Service and Government Accountability Office reports pertaining to homeland security. If the PSEL link is not used, the Center for Homeland Defense and Security (http://www.chds.us/) at the Naval Postgraduate School has an easily accessible link to Homeland Security Affairs and the Center’s own podcasts and interviews. This website also has a link to all of the masters’ theses which provide students with different perspectives on homeland security research designs, observations, and findings.
- TAMU Library can be accessed at http://library.tamu.edu. You have access to e-books, e-journals, databases, and other library resources such as live chats with a librarian, citation guides, and research guides.

- Your course provides a link to library resources under e-Reserves, but if you are accessing the library off-campus, go to the TAMU Library homepage (http://library.tamu.edu) and click on “My Portal”.

- Subscribe to the free weekly newsletter from the Homeland Security Institute (http://www.homelandsecurity.org) and policy and management alerts. The Department of Homeland Security has its own email lists and blogs.


- The Council for Foreign Affairs provides a daily news brief that often contains information important for homeland security (http://www.cfr.org/).

- RAND has a robust homeland security and terrorism program (http://www.rand.org/research_areas/terrorism/)

- Heritage Foundation (http://www.heritage.org/LeadershipForAmerica/protect-america.cfm).

### Course Requirements and Grading

Final grades are weighted on a 4.0 system using the following allocation:

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<th>Weekly Discussions</th>
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<td>Homeland Security Legal Issue Review Brief Presentation</td>
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<tr>
<td>National Security Strategy Homeland Security Critique</td>
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<td>A= 90-100%</td>
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<tr>
<td>B= 80-89%</td>
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<tr>
<td>C= 70-79%</td>
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<tr>
<td>D= 60-69%</td>
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<tr>
<td>F= 59% and lower</td>
</tr>
</tbody>
</table>

There will be several components used in determining the final grade. Students are expected to read through all of the course information and materials provided on the course Web site. If any student has questions related to any of the information and/or course materials, they should contact the instructor as soon as possible for clarification.

### Weekly Discussions (30% of grade)

- Discussion is an integral part of the learning process; it is an equivalent to the classroom.

- Effective online discussions require preparation by reading the assigned materials and answering discussion questions effectively using supporting statements with concepts from the readings.

- The lectures parallels the assigned readings, but frequently contain additional material, so discussions should relate to both, the theories and concepts from the readings, and the lecture’s materials; with the addition of references to the professional environment, as well as current events.
Listen to the lectures each week, understand the concepts that are presented, and become familiar with all the concepts and terminology introduced in the readings and lectures, and apply this knowledge in responses contributing to the discussion, responding the initial question and enhancing the posts from other students.

You will be provided a separate grade on your weekly questions. Unless the instructor has given approval for delayed submission, the window for postings will “close” at Sunday midnight as the class moves on to the next week. **Discussion board posts should consist of no less than 350 words in length.**

On-line class discussions, including comments, should be timely and explicitly drawing from the theories and concepts from the readings and lectures. **Apply and cite this knowledge directly in the initial response (use references) to discussion questions and in subsequent responses to other students’ posts.**

Each student’s discussion and response posts should be treated as mini-papers which are carefully researched and prepared. You may bring in related literature, examples, or experiences directly pertaining to the matter at hand.

The Discussion Question grade will reflect your ability to understand and communicate ideas and concepts cogently and concisely, not the quantity of posts.

**Tips for writing posts and participating in class discussions:**

1. Organize your thoughts before hitting the “send” button. This is graduate level work. Clear, coherent, thoughtful analysis requires a roadmap. Postings are essentially mini-papers that should reflect substantive analysis based on authority. As one tool, consider what lawyers do. Lawyers apply a “FRAC” analysis: identify the facts, state the applicable rule of law, apply the facts to the rule, and reach a conclusion. Do not make a reader root through a disorganized product to find the insight and analysis. Read and edit your posting before you hit “send.” Ask yourself, is this the best you can do?

2. Check your grammar. Sentence fragments and grammatical errors detract from any written product. And closely related are spelling errors. Such errors lead the reader to conclude that the writer is a sloppy one or does not truly understand the difference between words that sound the same. In most cases, poor writing habits raise doubt about the quality of the analysis and conclusions.

3. Do not view the discussion forum as an informal “chat room.” Postings that exhibit the view that informal text-messaging, complete with text-message abbreviations or graphics such as “smiley faces,” is not appropriate. Remember that every post is to be professional and substantive; each is, in effect, a mini-paper.

4. Support your writing with authorities. Postings that reflect personal opinions devoid of any citation to authority are inappropriate. Personal musings are not analysis. When you write, “I think,” “I like,” and other phrases beginning with “I,” ask yourself: What is the point being made, is there authority for this, have I cited it, am I merely repeating some ideological bent, or do I even need to use “I” in my writing?

5. Practice professionalism. To repeat, this is a graduate course filled with professional people. Professional courtesy rules. Students should not engage in what might be perceived as personal challenges or disparaging remarks to other students. Inflamed, personal rhetoric simply is not acceptable.

6. Avoid raising questions without a suggested answer. Postings that merely ask questions of the author, without more, are inappropriate. While easy enough to do, such postings do not advance the discussion, unless the questioner suggests an answer or an avenue of approach to the issue.

**Written Assignments**

The two written assignments have the following minimum requirements, which are in keeping with standards of the American Political Science Association (APSA). APSA is the style manual for the Bush School. Double-spacing (not 1.5); use of 12 pt. font; numbering of all pages; complete citation of sources by author and date, including page number for direct references or quotations; use of a reference section; and careful, well-edited writing; is the standard for all submissions. Any source citations and/or bibliographies must be complete and use the formatting for Homeland Security Affairs (available here: [http://www.hsj.org/styleguide](http://www.hsj.org/styleguide)). Students are encouraged to use tables, graphics, and pictures as part of their written products; however, these do not count as part of the page count.

Please note **late work will lead to a deduction of a minimum of 10% of the assignment grade.**
**Literature Review (20% of grade)**

Each student is to prepare a literature review of no more than a 8 page (including references). Ensure this review is well-researched (at least 6 authoritative, professional grade references such as law review articles, professional journal articles, CRS works, or similar; note: up to three sources may be extended articles from professional legal blog sites, such as those listed in the “Key Resources” section). Students must pick from one of the following topics discussed at that point in the class: separations of power, president, Congress or bureaucracy. It also should examine the historical and/or current understanding of the role of these institutions, or the conflicts between them, in the creation of homeland security legal policy. Note: using work from the discussion forums is not allowed. Additionally, no more than a one-page summary of the literature review is to be posted to the Discussion Forum. Students should submit the analysis using the Assignments tool in eCampus and post the summary into the appropriate discussion forum. This Literature Review and summary are **due no later than 11:59 p.m. CT on Day 7 of Week 4.**

**Homeland Security In-Depth Legal Issue Brief Presentation (20% of grade)**

Each student is to prepare a 10-12 slide digital presentation briefing detailing the legal policy behind the current federal or state policy or policies in a particular legal policy space discussed in class during weeks 6-7. The exact topic is at the student’s discretion, but it should not be a broad topic such as “immigration” or “borders.” Instead, it should be highly-focused, such as the current debates in Washington over immigration reform or disputes between the national government and various states about requiring people to show IDs to local police departments when asked. The briefing presentation slides, with well-researched and annotated “speaker’s notes” on each slide must identify the current policy issues and debate and action or inaction to address the policy problem(s). The topic should be jointly agreed to by the student and the instructor. Each student briefing presentation is to be submitted to the instructor via the Assignment Tool within eCampus. Additionally, no more than a one-page written summary is to be posted on the Discussion Forum. In short, the student should envision providing a legal briefing of current debates, confusions, etc. in the legal policy space to a boss or superior in a homeland security legal environment. Students should submit their briefing presentation topic for approval to the instructor via the Messages tool **no later than 11:59 p.m. CT on Day 7 of Week 5.** Students should submit legal briefing to the Assignments tool and post the summary to the Discussions are **due no later than 11:59 p.m. CT on Day 7 of Week 7.**

**National Security Strategy Homeland Security Critique (30% of grade).** For the final assignment, each student is to develop a detailed article of the homeland security law in a policy area discussed in class, or on a policy space that was omitted from the class. While the paper may draw on class discussions, lectures, readings and assignments, this paper is primarily intended to be a research paper. Each student should produce a 20-25 page article and a one-page summary. The paper should be focused, and include an argument about the current state of the law in specific homeland security legal issue. Include strengths and weaknesses, histories, conflicts, analysis and recommendations as necessary (this will vary based on the legal issue selected). Format is to follow the format for Homeland Security Affairs. This paper should be professional grade research and writing. Students should submit the critique using the Assignments tool in eCampus and post the summary into the appropriate discussion forum. This critique and summary are **due no later than 11:59 p.m. CT on Day 7 of Week 10.**

**Paper Grading Criteria**
• **A range:** The paper is clear, engaging, original, and focused; ideas and content are richly developed with details and examples. Organization and form enhance the central idea and theme; ideas are presented coherently to move the reader through the text. The voice of the writer is compelling and conveys the writer’s meaning through effective sentence structure and precise word choices. The writer successfully moves the paper through academic constructs and experiential documentation to critical analysis. The paper demonstrates a clear balance of these three components.

• **B range:** The paper is reasonably clear, focused, and well supported; ideas are adequately developed through details and examples. Organization and form are appropriate, and ideas are generally presented coherently. The voice of the writer contributes to the writer’s meaning through appropriate and varied sentence structure and word choices. Surface features do not interfere with understanding or distract from meaning. The writer has clearly brought the reader through properly cited academic constructs and experiential documentation, but has not fully developed the area of critical analysis.

• **C range:** The paper has some focus and support; ideas and content may be developed with limited details and examples. The writing may be somewhat disorganized or too obviously structured. The voice of the writer is generally absent; basic sentence structure and limited vocabulary convey a simple message. Surface feature errors may reduce understanding and interfere with meaning. The content areas of academic constructs are limited and large generalizations are made. Critical analysis is all but absent from the paper.

• **D range:** The paper has little focus and development; few details and examples support ideas and content. There is little discernible shape and no direction. The writer’s tone is flat. Awkward sentence structure and inadequate vocabulary interfere with understanding. Limited control of surface features makes paper difficult to read. Critical analysis is absent, and segments of the paper are given to rambling descriptions of life experience without academic context.

**Policies**

**Participation Policy**

Students must “visibly participate” in the online classroom 4 out of 7 days each week of the term. The act of participating in class is defined as active and positive contributions to the learning process. To meet participation requirements, students are expected to contribute substantively to the class discussion in addition to posting any written assignments for grading. Besides the initial response to a discussion question, students are expected to respond to a minimum of two of their classmates’ posts within the established deadlines.

We understand that life happens and occasionally you may be without access to the Internet. If at any time you must be away from the virtual classroom, for more than two consecutive days, you are required to notify the instructor prior to your absence.

In the event of an emergency, contact your instructor as soon as possible. If for some reason the instructor cannot be reached, contact the Office of Extended Education via email bushschoolonline@tamu.edu or at 979.845.7036 and the instructor will be notified.

**Late Assignments**

The assignments should be submitted on the days that they are due by 11:59 P.M. CT. If a student is unable to submit an assignment on time, s/he must make arrangements with the instructor for an extension. Keep in mind that extensions are at the instructor’s discretion and not automatically given. If at all possible, the student’s request for extensions should be made 24–48 hours in advance. We understand that this is not always possible. However, the instructor may only give extensions for true emergencies. If the student turns in an assignment late (without an approved extension), then they will not receive full credit for the late assignment. Typically, students lose 10% of the total grade per day late. Also keep in mind that all assignments, regardless of extensions, must be submitted by the last day of the class.

**Performance Expectations**

Graduate study means learning to learn from every possible source—from readings, peers, life experiences, the instructor, and research projects. The intent in any graduate course is to develop a learning community in which individuals’ ideas are freely expressed and the class works together to support and challenge each other’s’ work and ideas. The success of the learning experience in this class—and ultimately each student’s
grade—is critically dependent on the excellence of each student’s preparation, written assignment submissions, and participation in online discussions where each student presents ideas and considers what others have to say as part of a reasoned, thoughtful discourse. Each student and his/her contributions should be treated with respect—not only taking them seriously but also challenging ideas. No student should feel left out, minimized, or otherwise discriminated against. The instructor will quickly and directly counter any discussions or comments that do not display professionalism and respect for the contributions of others.

**Student Concerns**

Students having a question, concern, or complaint about the course should raise it with the online instructor first. If, for whatever reason, the student prefers not to do that or, if the issue was raised but not resolved, the student should communicate the question, concern, or complaint to Student Services at bushschoolonline@tamu.edu. Student Services will ensure that the matter is looked into at the appropriate level and that the student receives a response.

**Feedback**

The instructor will be providing feedback to questions within 24 to 48 hours and detailed feedback on written assignments within 7 days of the assignment due date. You are expected to read through all of the information and materials provided for the course. If you have questions related to any of the information or course materials, please contact the instructor as soon as possible for clarification.

**Attendance and Make-up Assignment Policy**

The policy for attendance and making up missed assignments is consistent with Texas A&M University Student Rule 7: https://student-rules.tamu.edu/rule07).
**Academic Integrity**

An Aggie does not lie, cheat, or steal or tolerate those who do.

Students are expected to adhere to standards of academic integrity. Scholastic dishonesty consists of lying, cheating or stealing academic information with intent to gain academic advantage. Academic dishonesty comes in a variety of forms. The most common forms are plagiarism, cheating, and academic misconduct. Students who participate in any of these activities will be subject to appropriate University disciplinary action. Students are expected to review, utilize and adhere to the University's Honor Council Rules and Procedures, which are posted on the University's web site at [http://aggiehonor.tamu.edu/](http://aggiehonor.tamu.edu/). This website provides detailed information and clarification policies, procedures, and rights and responsibilities related to academic integrity.

**Plagiarism**

The attention of each student is directed to the requirement to avoid plagiarism or the appearance of plagiarism through sloppy citation. As commonly defined, academic dishonesty/plagiarism consists of passing off as one's own ideas, words, writings, that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of the person. It does not matter from where the material is borrowed—a book, an article, material off the web, another student’s paper—all constitute plagiarism unless the source of the work is fully identified and credited. It is important when using a phrase, a distinct idea, concept, a sentence, or sentences from another source to credit explicitly that source either in the text, a footnote or endnote. Plagiarism is a violation of academic and personal integrity and carries extremely serious consequences. Scholastic dishonesty (including cheating and plagiarism) will not be tolerated and will be punished in accordance with Texas A&M University Student Rules. If you have any questions, please consult the course instructor.

**Helpful Information**

**American with Disabilities Act (ADA) Information**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 979-845-1637. For additional information, visit: [http://disability.tamu.edu](http://disability.tamu.edu).

**Library**

The TAMU Library can be accessed by going to [http://library.tamu.edu](http://library.tamu.edu). As a student, you have access to e-books, e-journals, databases, and other library resources such as live chats with a librarian, citation guides, and research guides.

**Technical Help**

**Texas A&M University Help Desk Central (General Tech Problems) (24/7, 365 days/year):**

- Phone: Toll-free at 866.857.4112 or 979.845.8300
- Email: [helpdesk@tamu.edu](mailto:helpdesk@tamu.edu)

**Bush School Online Support Team (eCampus Specific Problems)**

- Phone: 1.866.988.2874
- Email: [bushschoolonline@tamu.edu](mailto:bushschoolonline@tamu.edu)
Week 1

Course Introduction

This week we will get to know each other and begin to research how Homeland Defense (HLD) differs from Homeland Security (HLS); and the part the Department of Defense plays in each mission. We will compare and contrast the attitudes toward HLD in the United States, Canada, and Mexico. The learning goals are to explain the difference between Homeland Security and Homeland Defense; and identify which federal department is the lead for each mission.

Objectives:

1. Describe the basis of the U.S. legal system.
2. Identify and discuss the sources of law related to homeland security, the constitutional conflicts between branches of the national government, and conflicts between the national and state governments.
3. Analyze and discuss the current debates regarding the legal roles of each of the three branches of the United States government.
4. Evaluate primary and secondary documents and the facts and arguments established within related to homeland security law.

Lectures:

1. Class Introduction (3:27)
2. Overview (11:21)

Readings:

2. U.S. Constitution, Article I, sections 1, 8 and 9: [http://www.law.cornell.edu/constitution/articlei](http://www.law.cornell.edu/constitution/articlei); Article II, sections 1 (clause 1), 2 and 3.

Optional:


Discussion Questions:

1. Welcome! Please take a few minutes to introduce yourself to your classmates. Post a brief biography on Day 1 that includes your educational background, work experience, personal interests or hobbies, and a brief statement about
what you hope to gain from this course. If you wish you may attach a photo so others can put a face with your name.

2. What is the basis of homeland security law?

3. Which branch(es) of the national government should be responsible for fixing the homeland security issues and shortcomings discussed in the 9/11 Commission Report? Is there a constitutional basis for your opinion?

**Deadlines:**

1. Post a brief biography DQ1 by Day 1, and reply to at least 2 peer posts by Day 3 of this week.

2. Answer DQ2 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

3. Answer DQ3 by Day 5, and reply to at least 2 peer posts by Day 6 of this week.
**Week 2**

**Congress**

This week covers a more in-depth discussion of Congress’s powers. By necessity, some of the discussion relates generally to the constitutional foundations of congressional power, the primary focus of this week is specific examples of those powers, as they relate to the governance and creation of homeland security laws. The learning objectives for this week are to have a basic understanding of the roles that Congress plays in homeland security law, and its potential strengths and weaknesses in this area.

**Objectives:**

1. Compare and discuss the constitutional powers and the organizational structure of Congress, including the complexities of passing laws, the impact of those laws, and congressional oversight roles.

2. Identify and discuss the political and legal environment of homeland security in the post-9/11 American context.

**Lectures:**

1. Congress: A Surprisingly Conflicted Branch (15:59)

**Readings:**


5. “Legislative Process: How a Senate Bill Becomes a Law,” [http://www.wyden.senate.gov/download/?id=8a7a4fd-382d-4d2f-aa58-de6cb0e6c13&download=1](http://www.wyden.senate.gov/download/?id=8a7a4fd-382d-4d2f-aa58-de6cb0e6c13&download=1)

6. USA Patriot Act overview, [http://epic.org/privacy/terrorism/usapatriot/](http://epic.org/privacy/terrorism/usapatriot/) (note: EPIC is a well regarded privacy group, so the information here is both high quality and biased towards limiting the Patriot Act; this means that while the overview is helpful, be aware of the perceptions of the group)


**Optional:**


**Discussion Questions:**

1. Discuss the powers that Congress has to impact laws and policy. Are any of the powers more (or less) important than the others? Which ones and why?
2. Are there shortcomings in entrusting Congress with taking the lead role in creating and maintaining the laws and policies necessary to meet the threats facing the United States?

**Deadlines:**

1. Answer **DQ1** by **Day 3**, and reply to at least **2 peer posts** by **Day 5** of this week.

2. Answer **DQ2** by **Day 5**, and reply to at least **2 peer posts** by **Day 7** of this week.
Week 3

President and the Force of Law

This week's content centers on the power and powers of the president within the realm of U.S. law, again, obviously, with a focus on homeland security. The learning objectives for this week are to develop an understanding of the roles that the president plays, especially vis-à-vis Congress. In particular, sources, types, and examples of presidential power will be introduced, discussed, and analyzed.

Objectives:

1. Analyze and explain the constitutional underpinnings of the President, as well as the tools of the President to impact homeland security.

Lectures:

1. The President: A Unilateral or Unitary Agent of Change? (15:47)

Reading:

1. Cooper, Phillip J. 2002. By Order of the President, chapters 2, 3, 6, 8 (executive orders; national security directives; issues related to unilateral power use).
2. Patriots Debate, chapter 1 (executive power)

Optional:

2. Presidential Directives, related to homeland security, issued by President Obama: http://www.hsdl.org/?collection&id=2481

Discussion Questions:

1. Discuss the powers that the president has to impact laws and policy. Are any of the powers more (or less) important than the others? Which ones and why?
2. What trends in the role of the president regarding security can you identify using the Presidential Policy Directives, National Security Directives, Executive Orders and Homeland Security Directives? What advantages or disadvantages can you identify with allowing the president “lawmaking” abilities over those of Congress?

Deadlines:

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.
Answer DQ2 by **Day 5**, and reply to at least **2 peer posts** by **Day 7** of this week.
Week 4

Homeland Security Bureaucracy

For this week's topic, we will discuss the creation of the Department of Homeland Security, the issues facing homeland security bureaucracy generally, and the oversight of the bureaucracy by the elected branches. The learning objectives for this week are to assess the implications of centralizing homeland security into a single department and of the system of oversight in place for the homeland security bureaucracy.

Objectives:

1. Examine and discuss the executive branch’s place in homeland security.
2. Analyze and describe the structure and formation of the homeland security bureaucracy.

Lectures:

1. Principal Agency Theory and Oversight (9:41)

Readings:

1. Alperen, chapters 2 and 5

Optional:


Assignments:

1. Submit the Literature Review using the Assignment tool and post the summary in the Discussions area of the LMS no later than 11:59 p.m. CT on Day 7 of Week 4. For additional information regarding this assignment, please see the Course Requirements and Grading section of this syllabus.

Discussion Questions:

1. How did the creation of the Department of Homeland Security impact its mission? Did the lessons of natural disaster improve its mission or overextend its purpose?

2. How might you answer the critics of “fusion centers?”

Deadlines:

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 5

The Judiciary

This week covers terrorism issues and strategies and criminal threats. The course will include discussion of domestic and international terrorist motives and environments and counterterrorism approaches. It also will cover transnational crime concerns. The learning objectives are to evaluate and apply policies to anticipate and confront terrorist threats and criminal threats.

Objectives:

1. Identify and discuss the powers of the judiciary, including its recent impact in areas such as detention and surveillance.

2. Analyze and discuss the competition between and among the branches of the United States government, due to the constitutional separation of powers.

Lectures:


Readings:


Optional:


Assignments:
1. Students should submit their topics for the Homeland Security In-Depth Legal Issue Brief Presentation Assignment via an email using the course Messages tool to the instructor no later than 11:59 p.m. CT on Day 7 of Week 5. For additional information regarding this assignment, please see the Course Requirements and Grading section of this syllabus.

Discussion Questions:

1. Alexander Hamilton opined in Federalist 78 that federal judiciary would be the weakest branch of the national government. Is this true in the homeland security law policy space? Why or why not?

2. What role(s) should the federal judiciary play in the conduct of the national government in security spheres?

Deadlines

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
**Week 6**

**Critical Infrastructure and Cyber-Security**

This week, we begin discussion of legal issues in particular policy spaces. We begin with two major issues, that of critical infrastructure and cybersecurity. The learning objectives are to evaluate and apply legal reasoning to confront these threats.

**Objectives:**

1. Identify and describe the challenges and threats in securing the critical infrastructure and cyber capabilities of the nation.

2. Apply the information related to the powers and roles of the national branches to policy.

3. Evaluate the debates inherent in homeland security law policy.

**Lectures:**

1. Securing the Homeland: CI and Cyber-Security (17:24)

**Readings:**

1. Alperen, chapters 11 and 12


7. Patriots Debate, chapters 5, 6 and 7

**Optional:**


**Discussion Questions:**

1. Why has the legal description of “critical infrastructure” shifted over time? Which of the three branches has the most impact in the protection of CI? Is there a constitutional, statutory or historical reason for this, and how does it impact the quality of the protection?
2. Given the differing views of the legal scholars in the Patriots Debate chapters for this week, how have recent technology improvements led to legal questions in the area of homeland/national security?

**Deadlines**

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 7

**Borders, Immigration, and ID**

This week we discuss the three interrelated policy legal issues of borders, immigration and identification requirements. While the focus remains on the national government’s role in these fields, by obvious necessity we also look to the legal efforts of the states here. The learning objectives are to evaluate, critique and apply legal understandings, struggles, competitions and reactions to these issues. The written assignment of the homeland security in-depth issue brief is due this week.

**Objectives:**

1. Identify and discuss policy issues related to border protection and immigration security.
2. Analyze and critique the roles that federal and state governments play in making the law related to immigration and border security.
3. Identify and assess the comparative approaches, including advantages and weaknesses, of both the national and state/local legal actors in securing the homeland.

**Lectures:**

1. Borders, Immigration, and ID (13:03)

**Readings:**

1. Alperen, chapters 10 and 18

**Optional:**


Assignments:

1. Submit the Homeland Security In-Depth Legal Issue Brief presentation using the Assignment tool and post the summary in the Discussions area of the LMS no later than 11:59 p.m. CT on Day 7 of Week 7. For additional information regarding this assignment, please see the Course Requirements and Grading section of this syllabus.

Discussion Questions:

1. What is the proper role of the states in protecting American borders? What is the proper role of the national government in protecting American borders?

2. How does the constitutional requirement of federalism help or harm U.S. border protection?

Deadlines:

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 8

**Military Roles in Homeland Security and Legal Responses to WMD Threats**

This week, we cover the legal powers and limitations of the military’s role in securing the homeland and the legal response to threats posed by access to weapons of mass destruction. Learning outcomes are to evaluate, critique and recognize legal challenges in these key policy spaces.

**Objectives:**

1. Describe the relationship between the military and the civilian within the context of homeland security policy, both historically and also through the policy lens of weapons of mass destruction.

2. Analyze and apply laws and issues, and to think critically about the strengths, weaknesses, and cultural bases of the relationship of the military and homeland security.

**Lectures:**

1. Our Guns and Their Bombs: Military Responses to Homeland Security Threats (15:14)

**Readings:**

1. Alperen, chapters 15, 16 and 22.


**Optional:**


**Discussion Questions:**

1. How have this week’s readings altered your view of the military’s domestic roles in homeland security?
2. Which specific threat to homeland security can the military address best? Can it address this threat better than national, state and local law enforcement agencies?

**Deadlines:**

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Answer DQ2 by Day 5, and reply to at least 2 peer posts by Day 7 of this week.
Week 9

Legal Responses to Terrorist Threats

This week’s topic is preventing and responding to terrorist threats to the homeland. The learning objective for this week is assessing and critiquing the legal framework the U.S. government has established to prevent terrorist groups and their actions to threaten the U.S. and its citizens.

Objectives:

1. Analyze the U.S. response to terrorism.
2. Describe how the cultural and historical reasons that the U.S. reacted to domestic terrorism affects the post-9/11 legal response to terror threats facing the homeland.
3. Apply course tenets in the current legal environment facing counter-terror and criminal justice efforts in the prevention of further terrorist attacks and movements in the U.S.

Lectures:

1. The United States: Countering Terrorism and Radicalization (16:19)

Readings:

1. Alperen, chapter 23
2. Patriots Debate, chapters 2 and 3

Optional:


Discussion Questions:

1. How can we effectively balance individual civil liberties versus the need to protect the United States and its citizens from domestic terrorist threats?
2. What do you feel is the biggest domestic terrorist threat? Briefly, what legal actions can be taken to prevent that threat from becoming a reality?
Deadlines

1. Answer DQ1 by Day 3, and reply to at least 2 peer posts by Day 5 of this week.

2. Submit assignment by Day 7 of this week.
Week 10

Current and Future Controversies

This week concludes the class, and presents material on one of the most controversial issues in homeland security law, data collection; and one likely future controversy (which already has been sparking), use of unmanned aerial vehicles for domestic surveillance. The learning objective for this week is to assess the legal sources and predict the legal challenges and outcomes of these debates. The final assignment, the homeland security law critique is due this week.

Objectives:

1. Assess, analyze, and critique the current legal understanding of the domestic use of unmanned aerial vehicles (UAVs) and electronic surveillance of U.S. persons.

2. Evaluate and apply policies, laws and legal actions within current and future “hot topics” of debate and policy struggles.

Lectures:

1. Surveillance Technology and Privacy (11:57)

Readings:


4. Patriots Debate, chapters 4


Optional:


Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:
   □ Undergraduate  □ Graduate  □ First Professional (DOS, MD, JD, PharmD, DVM)

2. Request submitted by (Department or Program Name):
   Department of Teaching, Learning and Culture
   RDNG 610 - Elementary Literacy Instruction for Facilitating STEM Learning

3. Course prefix, number and complete title of course:
   Cross-listed courses require the signature of both department heads.

4. Catalog course description (not to exceed 50 words):
   Focuses on evidenced based instruction of literacy skills and strategies facilitating student learning of STEM content and processes; traditional literacy and new literacies.

5. Prerequisite(s):

6. Is this a variable credit course?
   □ Yes  □ No
   If yes, from ________ to ________

7. Is this a repeatable course?
   □ Yes  □ No
   If yes, this course may be taken ________ times.

   Will this course be repeated within the same semester?
   □ Yes  □ No

8. Will this course be submitted to the Core Curriculum Council?
   □ Yes  □ No

9. How will this course be graded?
   □ Grade  □ S/U  □ P/F (CLMD)

10. This course will be:
    a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
      M.Ed in Curriculum and Instruction (online Elementary Education in STEM cohort)
    b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
      M.Ed., M.S. in Curriculum and Instruction

11. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

12. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix  Course #  Title (excluding punctuation)

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>Other</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FCE Code</th>
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</tr>
</tbody>
</table>

Approval recommended by:

Department Head or Program Chair (Type Name & Sign)  Date  Level 6

Chair, College Review Committee  Date

Dean of College  Date

Submitted to Coordinating Board by:

Chair, GC or UCC  Date

Associate Director, Curricular Services  Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.

Curricular Services – 07/14
RDNG 610 Elementary Literacy Instruction for Facilitating STEM Learning

Fall 2015

Instructor: Dr. Jack Helfeldt
Office: 222C Harrington tower
Office Hours: By Appointment
Phone: (979) 845 8384 (TLAC OFFICE)
Email: jhelfeldt@tamu.edu

Course Description: On line course, focus on evidenced based instruction of literacy skills and strategies facilitating student learning of STEM content and processes; traditional literacy and "new" literacies (ICT, visual, media) are studied.

Prerequisite: Graduate Classification

Learning Outcomes:

Upon successful completion of the course the student will:

- Develop an understanding of the various components included in a balanced reading instructional program designed to facilitate elementary children’s ability to comprehend traditional informational text materials relating to STEM topics.
- Develop an understanding of the need for teaching new literacies skills associated with ICT, media, visual, and other literacies that facilitate learning STEM related content and procedures.
- Develop the abilities to plan effective instruction for teaching the literacy skills and strategies for learning STEM content and procedures with traditional print based texts as well as digital, media and multimedia information sources.

Required Text:

There are no required texts for the course. The course will rely on articles, documents, videos which will be incorporated into various modules during the semester, or you may be asked to search for an article, video, web link or other credible sources to be shared within various modules during the semester. The following list of required readings will be integrated into instructional modules.

References for Required Readings by Topics

Principles of effective instruction and the processes involved in reading traditional texts


**Comparing and contrasting traditional and 21st century literacies**


**Teaching word identification and word analysis strategies**


Teaching and learning new word meanings/vocabulary


Fluency as a bridge to comprehension

Allington, R. L. (2006). Fluency: Still waiting after all these years. What research has to say about fluency instruction, 94-105


Facilitating comprehension of expository STEM related text


Teaching the new literacies (ICT, visual, media)


Williams, T. L. (2007). “Reading” the painting: Exploring visual literacy in the primary grades. The Reading Teacher, 60(7), 636-642. doi: 10.1598/rt.60.7.4

Effective strategies for understanding and creating procedural text


**Writing to learn activities to facilitate STEM learning**


Critical literacies, comparatively analyzing multiple texts, and visual media information sources


On Line Participation:

On line learning activities such as blogs, wikis, discussion boards, videos, assigned readings, power point presentations will be made available. The nature, degree, and frequency of participation and expected completion will be specified at the beginning of each week.

Course Requirements & Assignments:

Assignment 1 – Online participation: Completion of weekly online activities and substantive and timely participation in online discussion boards, blogs, wikis, chats is required. (0 – 3 points each week, 42 total points possible) Participation will be evaluated each week.

Assignment 2 – Initial Position Statement: Based on your prior knowledge and professional experiences as well as the understandings that you’ve acquired during the first two weeks of the course, develop a
statement (paper, brochure, media presentation, or some other format) designed to convince your colleagues, your administrators, and/or parents, and policy makers about the necessity of teaching elementary aged students the traditional literacy and “new literacies” skills that are essential for success in the 21st century. Consider including the “What, why, when, how, how much” should be taught at the elementary grade levels. Parents and policy makers especially will not read something that is long and detailed so you need to be succinct and emphatic to have an impact and be convincing. (30 points). **Assignment 2 is due on Friday of week 4.**

Assignment 3 – **Strategic Instruction Plan:** Design a series of teaching activities for facilitation of a reading comprehension strategy to facilitate understanding of STEM related content or processes, that includes the steps of explicit strategy instruction, and explains the stages (declarative, procedural, conditional) of strategic teaching and learning accomplished at various points in the sequence of instructional activities. Include a description of the amount of projected time and effort required for students to become strategic (conditional) users of the strategy or integrated strategies that you have included in your explanation of teaching activities. (35 points). **Assignment 3 is due on Friday of week 9.**

Assignment 4 – **Traditional and New Literacies - Integrated Technology, Instructional Plan:** Develop a plan for a 3 – 5 day instructional sequence requiring students to utilize traditional and new literacies skills/strategies to access, analyze, and evaluate information and acquire knowledge of content and understanding of procedures relating to a specific STEM related topic to be identified by the student and approved by the instructor. (35 points) **Assignment 4 is due on Friday of week 13.**

Assignment 5 – **Final Position Statement:** Redesign or redevelop your statement from assignment 1. After participating in course activities, discussions, and assignments you may wish to add, delete, or change the degree of emphasis of ideas initially included in your position. Include your recast statement which can be in the same or a different format or medium along with a separate explanation of why you changed or shifted from your original. OR, if your original ideas are not changed significantly, provide a rationale or explanation of your re-affirmation with even more conviction, and additional evidence of why you “got it right the first time.” (30 points) **Assignment 5 is due on the final day of the semester.**

*Due dates will be specified at least 2 weeks before it is due. Assignments may be modified or adjusted based on the progress and needs of the group.

**Grades:**

Course Grades will be determined by applying the following scale:

- A = 90% - 100% of possible points (155 pts. – 172 pts.)
- B = 80% - 89% of possible points (138 pts. – 154 pts.)
- C = 70% - 79% of possible points (120 pts. – 137 pts.)
- D = 60%-69% of possible points (103 pts. -119 pts.)
- F= <60% of possible points (102 pts. and below)
Late assignments: grades on assignments submitted after the due date, without a University Excused absence, will be reduced by 5% each day, to a maximum of 50%. Late assignments will not be accepted after the date the class assignments are graded and returned to students who submitted their assignments on time.

Excused Absence

http://student-rules.tamu.edu/rule07

7.1 The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Among the reasons absences are considered excused by the university are the following:

7.1.6 Injury or illness that is too severe or contagious for the student to attend class.

7.1.6.1 Injury or illness of three or more days. For injury or illness that requires a student to be absent from classes for three or more university business days (to include classes on Saturday), the student should obtain a medical confirmation note from his or her medical provider. The Student Health Center or an off-campus medical professional can provide a medical confirmation note only if medical professionals are involved in the medical care of the student. The medical confirmation note must contain the date and time of the illness and medical professional’s confirmation of needed absence.

7.1.6.2 Injury or illness less than three days. Faculty members may require confirmation of student injury or illness that is serious enough for a student to be absent from class for a period less than three university business days (to include classes on Saturday). At the discretion of the faculty member and/or academic department standard, as outlined in the course syllabus, illness confirmation may be obtained by one or both of the following methods:

a. Texas A&M University Explanatory Statement for Absence from Class form available at http://attendance.tamu.edu

b. Confirmation of visit to a health care professional affirming date and time of visit.

7.1.6.3 An absence for a non-acute medical service does not constitute an excused absence.

To view all Student Rules, please go to: http://student-rules.tamu.edu

Academic Integrity Statement and Policy

“An Aggie does not lie, cheat or steal, or tolerate those who do.”

The following web link provides further information regarding the Honor Code and the Honor Council Rules and Procedures:

http://aggiehonor.tamu.edu
Americans with Disabilities Act Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, room B118, or call 845 1637. For additional information visit http://disability.tamu.edu

Diversity Statement for the Department of Teaching, Learning and Culture

The Department of Teaching, Learning and Culture (TLAC) does not tolerate discrimination, violence, or vandalism. TLAC is an open and affirming department for all people, including those who are subjected to racial profiling, hate crimes, heterosexism, and violence. We insist that appropriate action be taken against those who perpetrate discrimination, violence, or vandalism. Texas A&M University is an Affirmative Action and Equal Opportunity institution and affirms its dedication to non-discrimination on the basis of race, color, religion, gender, age, sexual orientation, domestic partner status, national origin, or disability in employment, programs, and services. Our commitment to non-discrimination and affirmative action embraces the entire university community including faculty, staff, and students.

Plagiarism Statement

As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

Course Schedule*

Weekly Topics

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Understanding the processes involved in reading traditional texts and basic principles of effective instruction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 2</td>
<td>Identifying “new” 21st century literacies and contrasting with traditional literacy.</td>
</tr>
<tr>
<td>Week 3</td>
<td>Teaching word identification and word analysis strategies</td>
</tr>
<tr>
<td>Week</td>
<td>Topic</td>
</tr>
<tr>
<td>------</td>
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</tr>
<tr>
<td>4</td>
<td>Procedures for teaching and learning word meanings <em>(Assignment 2 Due)</em></td>
</tr>
<tr>
<td>5</td>
<td>Fluency as a bridge to comprehension</td>
</tr>
<tr>
<td>6</td>
<td>Facilitating the comprehension of narrative, and expository text forms/formats</td>
</tr>
<tr>
<td>7</td>
<td>Comprehension of Expository STEM related text, teaching children to become strategic learners</td>
</tr>
<tr>
<td>8</td>
<td>Teaching ICT, visual, and media literacies associated with STEM information</td>
</tr>
<tr>
<td>9</td>
<td>Teaching new literacies of the Internet <em>(Assignment 3 Due)</em></td>
</tr>
<tr>
<td>10</td>
<td>Internet literacies, continued</td>
</tr>
<tr>
<td>11</td>
<td>Procedural text strategies – reading to do, follow directions, construct, complete tasks relating to STEM related learning activities</td>
</tr>
<tr>
<td>12</td>
<td>Writing to learn strategies to facilitate STEM learning</td>
</tr>
<tr>
<td>13</td>
<td>4 C’s of Partnership for 21st Century Skills and Systems Thinking – Waters Foundation <em>(Assignment 4 Due)</em></td>
</tr>
<tr>
<td>14</td>
<td>Critical literacy, comparatively reading multiple text sources and information mediums <em>(Assignment 5 Due)</em></td>
</tr>
</tbody>
</table>

*This schedule is subject to change, based on the rate of progress the class makes pertaining to the various topics.*
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type: ☐ Undergraduate  ☑ Graduate  ☐ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name): Department of Recreation, Park and Tourism Sciences

3. Course prefix, number and complete title of course: RPTS 654 Amazon Field School

4. Catalog course description (not to exceed 50 words):
Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences, and solutions to biodiversity loss through ecology, culture, and governance.

5. Prerequisite(s):
VTMI 604 and WFSC 854
Cross-listed with: VTPB 404, RPTS 454, and WFSC 454
Stacked with: ________

6. Is this a variable credit course? ☐ Yes  ☑ No
If yes, from ________ to ________

7. Is this a repeatable course? ☐ Yes  ☑ No
If yes, this course may be taken ________ times.
Will this course be repeated within the same semester? ☐ Yes  ☑ No

8. Will this course be submitted to the Core Curriculum Council? ☐ Yes  ☑ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
      any master’s or doctoral program

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls-export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
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</table>

Approval recommended by:
Gary D. Ellis, PhD

Department Head or Program Chair (Type Name & Sign)  7/1/14

Linda L. Logan
Department Head or Program Chair (Type Name & Sign)  11/10/14
(if cross-listed course)

Michael Mazzuz
Submitted to Coordinating Board by:

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 04/14
Syllabus
Applied Biodiversity Science NSF-IGERT Program
AMAZON FIELD SCHOOL
Summer I 2014
RPTS 654/WFSC 654/VTMI 604
11 May – 29 May 2014
Tambopata, Peru

Instructors:

Donald Brightsmith
Veterinary Pathobiology
dbrightsmith@cvm.tamu.edu
(979) 458-0563

Leslie Ruyle
Conflict and Development
ruyle@tamu.edu
(979) 458-9397

Lee Fitzgerald
Wildlife Fisheries Sciences
lfitzgerald@tamu.edu
(979) 862-7480

Amanda Stronza
Recreation, Parks and Tourism Sciences
astronza@tamu.edu
(979) 845-8931

Local Counterparts:
Rainforest Expeditions
Native Community of Infierno

Description: This course is designed to investigate the social and ecological complexities of biodiversity conservation in tropical ecosystems. We will use a variety of field methods from the biological and social sciences to evaluate the causes, consequences, and solutions to biodiversity loss through the lenses of ecology, culture, and governance.

Prerequisites: Students must have a minimum 2.0 GPA, and approval from the instructor to participate in this course. There are no other prerequisites for participation in the course.

Textbook: There is no required textbook for this course. We will provide PDFs of selected journal articles.

Field Site: The course will take place in the Tambopata National Reserve and Bahuaja Sonene National Park in the Department of Madre de Dios, Peru. The region has some of the highest recorded levels of biodiversity in the world, but it is vulnerable to many new threats, including extensive agriculture, gold mining, illegal logging, and land speculation associated with the Inter-Oceanic Highway.

Activities: We will explore a variety of terrestrial and freshwater habitats in various settings, including two ecotourism lodges, a frontier town, a national park, and a local community. Interdisciplinary teams will examine all sides of complex issues surrounding the region's conservation challenges, talking with conservation practitioners and scientists.

Guiding Questions:
1) What are the threats to biodiversity and human livelihoods in Tambopata? What are the responses from local institutions and actors?
2) What is the role of scientific inquiry in addressing threats to biodiversity and human livelihoods?
3) How can social scientists and natural scientists collaborate in the field?
4) In “cultural landscapes,” how do we see nature? In “natural landscapes,” how do we see culture?
Learning Activities

- Collaborate in teams to gather ecological, cultural, and economic information on the following Conservation Case Studies:
  - a) WILDLIFE USE AND CONSERVATION: Ecological Challenges of Balancing Consumptive and Non-consumptive Uses
  - b) COMMUNITIES AND WATER: Governing Fish, Otters, Miners, and Tourists
  - c) FOREST AND CHOICES: Managing for Charcoal, Palm Fruits, Macaws, and Brazil Nuts
- Keep a journal of field notes and observations
- Present findings on Conservation Case Studies

Learning outcomes

- Students will demonstrate the ability to record relevant notes and observations in a field notebook.
- Students will employ effective communication and collaboration skills with colleagues in the biological and social sciences.
- Students will be able to explain the role of scientific inquiry in addressing threats to biodiversity and human livelihoods.
- Students will appraise the social and biological context in which issues of tropical biodiversity conservation are played out.
- Students will apply both data and perspectives from the biological and social sciences to inform decisions when addressing threats to biodiversity and human livelihoods.

Course Grades

Graduate students:

Level of participation
  - Discussions 200
  - Field trips 150
  - Field research 150
  - Compliance with rules 100

Presentations
  - Group presentation 200
  - Presentation on proposed thesis research 100
  - Research skill presentation 100

-------------

1000


Graduate students will be required to complete a presentation of a research skill in the field to the remainder of the class. The will be graded on their ability to clearly communicate the reasons to use this technique and demonstrate its use. They will also be required to make a short (10 – 15 min) formal presentation of their proposed thesis research in the format of a presentation for a scientific meeting. The graduate students will also be graded on their leadership roles within their research groups. Leadership responsibilities during specific research activities will be rotated among graduate students and this will be evaluated by the accompanying faculty.
If an assignment is completed after the due date, the grade will be reduced at a rate of up to 10% per day. Exceptions for this rule may be made for illness, TAMU-approved excused absence or instructor permission. All students will obtain full participation for each activity if they attend the activity and listen to the presentations given by the instructors. Students who must be reprimanded for talking or otherwise interrupting course activities or not remaining with the group for the duration of the activity will receive reduced grades (reprimanded once – 5% of total activity points, reprimanded twice – 10%, and then 15% reduction for each additional reprimand).

Attendance and make-up policies:
Students are required to attend all activities unless they are prohibited from doing so by TAMU approved excused absence, illness, logistical problems (transportation, etc.) which are outside of their control or instructor permission. Failure to participate in required activities in the absence of illness, logistical problems or other extenuating circumstances will be penalized by the loss of up to 50 points per activity missed.

Make-up Policy:
There will be no makeup for regularly scheduled activities. However, students forced to miss trips, discussions or activities can request to be briefed on them by the instructors. If students are unable to give their group presentations at the appointed time, instructors will find an alternative time for the presentation if timing and logistics allow. The reasons absences are considered excused by the university are listed below. See Student Rule 7 for details (http://studentrules.tamu.edu/rule07). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

1) Participation in an activity that is required for a class and appears on the university authorized activity list at: https://studentactivities.tamu.edu/app/sponsauth/index
2) Death or major illness in a student's immediate family.
3) Illness of a dependent family member.
4) Participation in legal proceedings or administrative procedures that require a student's presence.
5) Religious holy day. NOTE: Prior notification is NOT required.
6) Injury or illness that is too severe or contagious for the student to attend class.
   a) Injury or illness of three or more class days:
      Student will provide a medical confirmation note from his or her medical provider within one week of the last date of the absence (see Student Rules 7.1.6.1)
   b) Injury or illness of less than three class days:
      Student will provide one or both of these (at instructor’s discretion), within one week of the last date of the absence:
      (i.)Texas A&M University Explanatory Statement for Absence from Class form available at:
      http://attendance.tamu.edu
      or (ii.) Confirmation of visit to a health care professional affirming date and time of visit.
7) Required participation in military duties.
8) Mandatory admission interviews for professional or graduate school that cannot be rescheduled.

Other absences may be excused at the discretion of the instructor with prior notification and proper documentation. In cases where prior notification is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class.
Study Abroad Course Itinerary – (see attachment for proposed itinerary)

Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit: http://disability.tamu.edu.

Academic Integrity Statement

Scholastic misconduct is defined broadly as "any act that violates the rights of another student in academic work or that involves misrepresentation of your own work." Plagiarism is one of the worst academic offenses, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student.

The Aggie Honor Code

"An Aggie does not lie, cheat, or steal, and or tolerate those who do"

The Aggie Code of Honor is an effort to unify the aims of all Texas A&M men and women toward a high code of ethics and personal dignity. For most, living under this code will be no problem, as it asks nothing of a person that is beyond reason. It only calls for honesty and integrity, characteristics that Aggies have always exemplified. The Aggie Code of Honor functions as a symbol to all Aggies, promoting understanding and loyalty to truth and confidence in each other. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, Part 1, Section 20 which can be found on line at: http://student-rules.tamu.edu. Any suspected instances of scholastic dishonesty will be investigated and resolved according to the procedures outlined in the new Aggie Honor System: http://aggiehonor.tamu.edu.

Types of Academic Misconduct

There are several types of academic misconduct. The six most common ones that you should be aware of are:

1. **Cheating** - Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise.
2. **Fabrication** - Making up data or results, and recording or reporting them; submitting fabricated documents.
3. **Falsification** - Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
4. **Multiple Submissions** - Submitting substantial portions of the same work (including oral reports) for credit more than once without authorization from the instructor of the class for which the student submits the work.
5. **Plagiarism** - The appropriation of another person's ideas, processes, results, or words without giving appropriate credit.
6. **Complicity** - Intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty.
Conservation Symposium in Puerto Maldonado (17 May).

<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter</th>
<th>Organization</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 am</td>
<td>Donald Brightsmith</td>
<td>Texas A&amp;M, Applied Biodiversity Sciences Program</td>
<td>Welcome and opening of symposium</td>
</tr>
<tr>
<td>9:10 am</td>
<td>Juan Carlos Flores</td>
<td>Grupo de Trabajo de la Sociedad Civil para la Interoceánica Sur – Perú</td>
<td>Posición de la sociedad civil respecto a la construcción de la carretera Interoceánica Sur</td>
</tr>
<tr>
<td>9:55 am</td>
<td>Juan Loja</td>
<td>ISUR</td>
<td>Proyectos de desarrollo y conservación a realizarse en el ámbito de la Interoceánica Sur</td>
</tr>
<tr>
<td>10:40 am</td>
<td>Coffee Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 am</td>
<td>Carlos Sanchez and Deyvis Huaman</td>
<td>AIDER</td>
<td>Contrato de administración parcial Reserva Nacional Tambopata y el Parque Nacional Bahuaja Sonene</td>
</tr>
<tr>
<td>11:45 am</td>
<td>Leslie Ruyle</td>
<td>TAMU</td>
<td>TBA</td>
</tr>
<tr>
<td>12:30 pm</td>
<td>Lunch</td>
<td></td>
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</tr>
<tr>
<td>2:30 pm</td>
<td>Ramón Rivero</td>
<td>Sociedad Peruana de Derecho Ambiental</td>
<td>Mecanismos de conservación privada desarrollándose en Madre de Dios</td>
</tr>
<tr>
<td>3:15 pm</td>
<td>Cesar Ascorra</td>
<td>CARITAS</td>
<td>Impacto social y ambiental de la minería en Madre de Dios</td>
</tr>
<tr>
<td>4:00 pm</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:15</td>
<td>Chantelle Murtagh</td>
<td></td>
<td>Indigenous peoples of Madre de Dios - Politics and indigenous movements</td>
</tr>
<tr>
<td>5:00</td>
<td>John Janovec</td>
<td>Botanical Research Institute of Texas</td>
<td>Tropical botany and aguajales</td>
</tr>
</tbody>
</table>
Detailed schedule

11 May  Fly to Peru spend the night in Lima

12 May  Fly to Puerto Maldonado and take the boat up to Posada Amazonas
         Move in to rooms
         Brief guided walk in forest (depending on arrival time)
         Dinner
         Introduction to the course and Conservation Case Studies
         Overnight: Posada Amazonas

13 May  Overnight Posada Amazonas
         Breakfast
         Communities and water activity: Visit to Oxbow Lake
         Lunch
         Basic introduction to the ecology of Conservation Case Studies: Forest walk Focus on the
         forest and do NOT go to the canopy tower (wildlife, Brazil nuts, Dipteryx trees, inland
         water bodies, wildlife)
         Field notes lecture
         Dinner
         Discussion: Local maps and satellite imagery: connecting ecology, culture and governance
         Students choose their case study teams

14 May  Overnight Centro Ñape
         Wildlife techniques: Bird and Mammal Identification (all go to canopy tower)
         Breakfast
         Leave after breakfast (move out of rooms take an overnight bag leave large luggage)
         Tour of Centro Ñape and Don Honorato presentation about medicinal plants
         Lunch at Nape
         Participatory mapping activity
         Hunting and forest types walk (from late afternoon in to early evening return after dark)
         Late Dinner
         Brief discussion of transect methodology and estimating animal abundances

15 May  Overnight Posada Amazonas
         Early AM bird and primate transect methodology activity
         Breakfast
         Return to Posada after Breakfast
         Forests and Choices discussion and field lecture (walk down to harvested Brazil nut tree on
         way to big Kapok. Go to big Kapok, sit there and talk about the ecology of hardwoods versus
         softwoods, human park interactions, use of hardwoods and softwoods.)
         Lunch
         Tour of Posada Amazonas (with lodge manager, talk about Rainforest Alliance Certification,
         Green innovations, the importance of the lodge to the community etc.)
         Talk by Stronza on Tourism in Infierno
         Dinner
         Discussion of time at Centro Ñape

16 May  Overnight Puerto Maldonado
Early AM fishing activity (go super early 4 AM?) to make sure that we are early enough to be able to clearly see the transition from NIGHT fish to Day fish
Travel to Puerto Maldonado,
Visit to Mining site 2 hour drive to Quebrada Guacamayo
Lunch in car
Move in to Peru Amazonico
Lecture: Brief intro to the town and safety briefing
Dinner (students on their own)

17 May
Overnight Puerto Maldonado
9:00 AM – 5 PM Conservation Symposium (see schedule above)
Quick discussion on plans for visiting the market
Dinner (on your own)
Free Time

18 May
Overnight Puerto Maldonado
6 AM Visit to the local market
Students will be given instructions to search for information regarding a variety of local and regional products (wildlife, hardwood charcoal, Brazil nuts, Aguaje palm, edible palm larvae, fish, and gold). Breakfast on your own.
Lunch in PEM
2 PM Tour of farm with Victor Zambrano
Discussion of Market and or Victo Zambrano
Dinner on own

19 May
Overnight Infierno
8 AM pickup
Brief tour of the center of the community
Visit with community hunters
Meet with member of the Control Committee of the Native Community of Infierno
Box lunch provided by RFE
Transfer to homestays (split among Duran, Mishaja and one or two other sites)

20 May
Overnight Infierno
Breakfast
Ethnographic and biological field notes, participant observation, and informal conversations with local families
Lunch and Dinner with families

21 May
Overnight Infierno
Breakfast
Separate time in three households
Ethnographic and biological field notes, participant observation, and informal conversations with local families
Lunch and Dinner with families

22 May
Overnight Tambopata Research Center
11 AM Infierno to Tambopata Research Center (4 hours on river)
Move in to rooms
Dinner  
Discussion about time in Infierno  

23 May  
Overnight Tambopata Research Center  
Early AM Wildlife: Visit to parrot clay lick  
Breakfast  
Forest walk (wildlife observation, macaw nest sites natural and artificial in Dipteryx, wildlife identification, visit small water bodies in trail system)  
Lunch  
Free time  
Dinner  
Faculty Research Lecture: Brightsmith (Wildlife: Parrot community nesting)  

24 May  
Overnight Tambopata Research Center  
Breakfast 7:30  
Wildlife research activity  
Lunch  
Forests research activity  
Dinner  
Wildlife techniques: Bat mist netting  

25 May  
Overnight Tambopata Research Center  
Optional Early AM Visit to parrot clay lick or other activity  
Breakfast  
Aquatics activity: Trip to a stream for net fishing  
Lunch  
Team work on Conservation Case Studies  
Dinner  
Free time or night hike  

26 May  
Overnight Tambopata Research Center  
Free time work on Conservation Case Studies  
Lunch  
Presentation of Conservation Case Studies findings  
Dinner  

27 May  
Overnight El Gato  
Early departure to travel from TRC to El Gato  
Lunch on boat or at El Gato  
Free time for swim or forest exploration  
Final dinner at El Gato  

28 May  
Travel from El Gato to Puerto Maldonado  
11:35 AM Flight to Lima  
Afternoon in Lima (shopping and museums)  
Overnight flight back to the USA  

29 May  
Return to TAMU
Texas A&M University
Departmental Request for a New Course
Undergraduate + Graduate + Professional
• Submit original form and attach a course syllabus.

Form Instructions
1. Course request type:  □ Undergraduate  □ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):  SCSC 640

3. Course prefix, number and complete title of course:  Intellectual Property in the Plant Sciences

4. Catalog course description (not to exceed 50 words):  This course introduces major foci of intellectual property (IP) impacting plant sciences, including: 1) traditional vs. emerging knowledge economies, 2) governing statutes and treaties, 3) forms of IP, and 4) IP asset identification, valuation, capture, and deployment towards understanding best practices for IP strategy development and IP portfolio management.

5. Prerequisite(s):  None

   Cross-listed with:  NA  Stacked with:  NA

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  □ Yes  □ No  If yes, from ________ to ________

7. Is this a repeatable course?  □ Yes  □ No  If yes, this course may be taken ________ times.
   Will this course be repeated within the same semester?  □ Yes  □ No

8. Will this course be submitted to the Core Curriculum Council?  □ Yes  □ No

9. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
    SCSC  640  INTELL PROP PLNT SCI

    Lect.  Lab  SCL  CIP and Fund Code  Admin. Unit  Acct. Year  HICE Code
    0 3 0 0 0 3 0 1 1 1 0 2 0 0 0 5 2 6 2 0 1 4 - 1 5 0 0 3 6 3 2

    Approval recommended by:
    Wayne Smith  9-24-14
    Department Head or Program Chair (Type Name & Sign)  Date

    Chair, College Review Committee  9/24/14
    Date

    Dean of College  9/24/14
    Date

    Submitted to Coordinating Board by:

    Chair, GC or UCC  Date

    Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
SCSC 640
Intellectual Property in the Plant Sciences
SYLLABUS

NOTE
This is an ONLINE course.

TUESDAY/THURSDAY classes will be virtual, with students expected to review online notes/podcasts and complete online quizzes as described below.

EXAMS will be web-based on dates listed below.

Course Description
This course introduces the major foci of intellectual property (IP) impacting plant sciences, including: 1) traditional vs. emerging knowledge economies, 2) governing U.S. statutes and international treaties, 3) forms of IP protection, and 4) IP asset identification, valuation, capture, and deployment towards an understanding of best practices for the development of effective IP strategies and management of IP portfolios.

Instructor
Russell W. Jessup
Soil & Crop Sciences
Heep 431B
979-315-4242
rjessup@tamu.edu

Class Notes
All course content will be available via both html website
https://IPPS.tonidoid.com/app/webshare/share/IPPS/index.html
and eCampus
https://howdy.tamu.edu/cp/home/displaylogin

***A textbook is NOT required.

Extra Credit
30 points can be earned by:


Quizzes
100 points can be earned through completion of online class quizzes.
Exercises
100 points can be earned through completion of ‘mock’ IP documentation activities.

Examinations
There will be three major examinations, each worth 100 points. There will be no final exam, but 30% of each major exam will be cumulative.

<table>
<thead>
<tr>
<th>Exam Dates:</th>
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<tbody>
<tr>
<td>Exam 1:</td>
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<tr>
<td>February 13, 2014</td>
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<td>Exam 2:</td>
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<tr>
<td>March 27, 2014</td>
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<tr>
<td>Exam 3:</td>
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<td>April 29, 2014</td>
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Instructor Assessment
Feedback is encouraged & always welcome!

Grading

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<th>Maximum Points</th>
<th>Grading Scale</th>
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<tr>
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<td>100</td>
<td>450 to 500</td>
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<tr>
<td>Exam 2</td>
<td>100</td>
<td>400 to 449</td>
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<td>Exam 3</td>
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<td>Mock Exercises</td>
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Learning Outcomes
The successful student should be able to:

- Explain the scope, relevance, and impact of IP upon commercial, environmental, and societal interests.
- Identify the types of materials eligible for IP protection.
- Audit and assess whether a piece of IP merits protection.
- Discuss the major forms of IP: patents, trademarks, copyrights, and trade secrets.
- Describe the process for obtaining a patent.
- Demonstrate the process for filing a plant patent application.
- Discuss the legal environment that impacts plant breeding activities in regards to plant patents vs. plant variety patents.
- Identify restrictions and participatory countries for IP international treaties.
- Demonstrate knowledge of IP transfer and licensing agreement options.
- Evaluate existing and propose improvements for IP portfolios and strategies.
- Identify the areas where IP rights could constrain a business and identify the implications of IP for the business plan.
Course Outline

1. Introduction: IP Culture & the Knowledge Economy
2. Traditional Knowledge vs. Biopiracy
3. *Sui generis* Systems
4. International Treaties: UPOV
5. International Treaties: TRIPS, GATT, CBD, WTO, WIPO
6. Patents: Overview of Patentability
7. Utility Patents: Biotechnology
8. Plant Variety Patents: Germplasm

Exam 1

9. Trademarks, Copyrights, & Trade Secrets
10. USPTO: Mock Patent Search
11. Inventorship, Ownership, Compensation, IP Training: Mock Invention Disclosure
12. Confidential Information: Mock CIA
13. IP Audit: Mock IP Audit Questionnaire
14. IP Value: Core Asset Class
15. Competitive Intelligence
16. Cyberspace: IP and IT Cooperation

Exam 2

17. IP Transfer: License Agreements
18. IP Transfer: Exclusivity, Field of Use, Compensation, Termination
19. IP Transfer: Due Diligence
20. IP Enforcement: Liability, Role of Counsel
21. Case Studies: USA, EU, China, Russia, Australia, India, Brazil, South Africa
22. IP Portfolio
23. IP Strategy
24. Leveraging IP Value: Mock Boilerplate

Exam 3

Aggie Honor Code

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment
to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules
of the Honor System. Ignorance of the rules does not exclude any member of the Texas A&M
University community from the requirements or the processes of the Honor System. For additional
information please visit: [www.tamu.edu/aggiehonor/](http://www.tamu.edu/aggiehonor/).

Americans with Disabilities Act (ADA)

Policy Statement

The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides
comprehensive civil rights protection for persons with disabilities. Among other things, this legislation
requires that all students with disabilities be guaranteed a learning environment that provides for
reasonable accommodation of their disabilities. If you believe you have a disability requiring an
accommodation, please contact the Department of Student Life, Services for Students with Disabilities
in Room 126 of the Koldus Building, or call 845-1637. [http://disability.tamu.edu/](http://disability.tamu.edu/)
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name): Department of Veterinary Integrative Biosciences

2. Course prefix, number and complete title of course: VIBS 621 - Functional Neuroanatomy

3. Catalog course description (not to exceed 50 words):
A comprehensive review of the neuroanatomical determinants of function; rigorous neuroanatomical foundation relevant for research investigating changes in neural pathways and/or networks involved in sensory and motor functions, learning and memory, perception, selective attention, as well as recovery of function following brain damage.

4. Prerequisite(s):

<table>
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<tr>
<th>Cross-listed with:</th>
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<tr>
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Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? □ Yes ☑ No If yes, from ________ to ________

6. Is this a repeatable course? □ Yes ☑ No If yes, this course may be taken ________ times.
Will this course be repeated within the same semester? □ Yes ☑ No

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      N/A
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
      NRSC or BIMS

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.
Attach approval letters.

9. Prefix | Course # | Title (excluding punctuation) |
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<td>VIBS</td>
<td>621</td>
<td>FUNCTIONAL NEUROANATOMY</td>
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<th>Acad. Year</th>
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</table>

Approval recommended by:

Evelyn Tiffany-Castiglioni 8-21-14
Department Head or Program Chair (Type Name & Sign) Date

Chair, College Review Committee 9-14-14

J. Jane Welsh 8-20-14
Chair, Department of College (Type Name & Sign)

Dean of College 9-14-14

Submitted to Coordinating Board by:

Chair, GC or UCC  Date

Associate Director, Curricular Services Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 3/10
Course title and number | Functional Neuroanatomy 4 credits NRSC/VIBS 621  
---|---  
Term | Spring 2014  
Meeting times and location | Functional Neuroanatomy, 4 credits NRSC 689, Reynolds Building, Room 230, on Monday and Wednesday, from 16.00 hrs to 18.00 hrs  
Course Description and Prerequisites  
A comprehensive review of the neuroanatomical determinants of function as a foundation course for the TAMIN neuroscience program. It will provide a rigorous neuroanatomical foundation relevant for research investigating changes in neural pathways and/or networks involved in sensory and motor functions, learning and memory, perception, selective attention, as well as recovery of function following brain damage.  
There are no prerequisites for this course.  
Learning Outcomes or Course Objectives  
Course objectives:  
It is expected the students who obtain a passing grade in this course will have gained an essential training to understand the basic integrative actions of the nervous system, which is an essential foundation for most areas of research in Neuroscience.  
Goals of the course:  
The primary objective is to emphasize a comprehensive knowledge of neuroanatomical connections/organization and to emphasize the ways in which morphology determines function. During the last few decades there have been major paradigm shifts in brain mapping from strict localization of function to specific centers to concepts of distributed systems which coordinate neural control programs into functional behavior. The contemporary trend is to move away from the notion of brain centers where there is a strict isomorphic relation between both specific behaviors and specific brain locations.  
Instructor Information  
Name | Dr. Ian Steele-Russell
<table>
<thead>
<tr>
<th>Email address</th>
<th><a href="mailto:rrussell@neo.tamu.edu">rrussell@neo.tamu.edu</a></th>
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<tbody>
<tr>
<td>Office hours</td>
<td>TBA</td>
</tr>
<tr>
<td>Office location</td>
<td>TBA</td>
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**Textbook and/or Resource Material**

**Required reading material:**

Required reading materials will be available on the course website. Students are expected to read the material before attending class in order to be able to follow the lecture material and participate in classroom question and answer discussions. This material provides a unified approach to the subject and will serve as the course textbook.

**Grading Policies**

**Grades and exams etc:**

Students' grades will derive from two sources. First, there will be five assigned essay topics which will be available at the start of the course. This will contribute 80% of the overall grade. Second, part will be points given to the students for their scores on all of the class quizzes. This will account for 20% of the overall grade. Essays will be graded numerically both on their content and the clarity of their exposition.

- A - 100 to 90 points
- B - 89 to 80 points
- C - 79 to 70 points
- D - 69 to 60 points
- F - a total score below 60.

**Course Topics, Calendar of Activities, Major Assignment Dates**

**Schedule: Dates for 2014**

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics</th>
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<tbody>
<tr>
<td>TBA</td>
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</tr>
<tr>
<td></td>
<td>neurons, nerve impulse, nodes of Ranvier, conduction</td>
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<tr>
<td></td>
<td>axoplasmic flow, transmitter vesicles, synapses, neuroglia</td>
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<td></td>
<td>cutaneous sense and muscle receptors</td>
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<tr>
<td></td>
<td>spinal cord I: ascending pathways</td>
</tr>
<tr>
<td></td>
<td>spinal cord II: descending pathways and motor cortex</td>
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<td></td>
<td>brainstem</td>
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<td></td>
<td>reticular formation I: isodendritic core</td>
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<td>reticular formation II: nuclei. Behavioral influences arousal and sleep</td>
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<td>hypothalamus I: brainstem integration of ANS, major “nuclei”</td>
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<td>hypothalamus II: motivation-homeostasis</td>
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<td></td>
<td>hypothalamus III: hormonal functions and pituitary interactions</td>
</tr>
<tr>
<td></td>
<td>thalamus and epithalamus - pathway control to the cortex</td>
</tr>
</tbody>
</table>
limbic system I: anatomy - hippocampal memory involvement
limbic system II: - amygdala motivational control by context filtering/linking
cerebral cortex - general anatomical features
sensorimotor cortex and pyramidal tracts
pyramidal tracts and motor control
basal ganglia and motor control
cerebellum I: gross anatomy, cerebral interconnections
cerebellum II: microanatomy, fractured somatopy, microzones
cerebellum III:
Cerebral cortex - intrinsic structure and regional specialization
Cortical visual areas - how the cortex ignores and/or edits the retinal image
Retino-thalamic-striate pathways - visuomotor control
The role of the corpus callosum in cerebral integration
Critical stages in development of cortical function
Hemispheric asymmetries
The exploration of the frontal lobe and its control functions
Dorsal versus ventral pathways in the cerebral cortex
the rewriting of the motor system in visual coordinates
Plasticity and recovery of function
Neural mechanisms of language
The triumph of the visual system: polysensory cells and mirror cells - their role in the binding problem.
Final term papers due by 5.00 PM

Other Pertinent Course Information

Format of the class:

The major part of the class will be lecture presentations of the neuroanatomical systems. At the end of each class will be a question and answer period on the material presented. From time to time there will be short anatomical lab quizzes at the beginning of class. It is important therefore to arrive to class on time.

As neuroanatomy is a highly hierarchically organized discipline it is crucial that students attend all classes. It is not possible to understand the material without the classroom presentation and discussion. After each class arrangements can be made for additional tuition on any topic that has been covered. Accordingly no more than three absences will be permitted.
Copyright
The handouts in this course are copyrighted. Therefore you do not have the right to copy the material unless permission is granted by the course coordinator. As commonly defined, plagiarism consists of claiming the ideas, words, writings etc of another person as your own work. This means that you are committing plagiarism if you copy work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is on the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under section “Scholastic Dishonesty”.
PLAGIARISM: You are responsible for the information on plagiarism available at on the web at http://library.tamu.edu/vgn/portal/tamulib/content/renderer/children/0.2875

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity
For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional  
- Submit original form and attach a course syllabus. -

Form Instructions:
1. Course request type:  
   ☐ Undergraduate  ☑ Graduate  ☐ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name):  
   Department of Veterinary Pathobiology
3. Course prefix, number and complete title of course:  
   VTMI 604 Amazon Field School
4. Catalog course description (not to exceed 50 words):  
   Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences, and solutions to biodiversity loss through ecology, culture, and governance.

5. Prerequisite(s):  
   A minimum of 2.0 GPA and approval of instructor
   Cross-listed with:  
   WFSC 654 and RPTS 654
   Stacked with:  
   VTPB 404, RPTS 454, and WFSC 454
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  
   ☐ Yes  ☑ No  
   If yes, from _____ to _____

7. Is this a repeatable course?  
   ☐ Yes  ☑ No  
   If yes, this course may be taken _____ times.
   Will this course be repeated within the same semester?  
   ☐ Yes  ☑ No

8. Will this course be submitted to the Core Curriculum Council?  
   ☑ Yes  ☐ No

9. This course will be:  
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
   any master's or doctoral program

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments.  
    Attach approval letters.

11. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  
    Course #  
    Title (excluding punctuation)

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Approval recommended by:  
Linda L. Logan (Department Head or Program Chair)  
Date:  

Gary D. Ellis (Department Head or Program Chair)  
Date:  

Michael Masser (Department Head or Program Chair)  
Date:  

Submitted to Coordinating Board by:  
Associate Director, Curricular Services  
Date:  

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.  
Curricular Services – 04/14
Syllabus
Applied Biodiversity Science NSF-IGERT Program
AMAZON FIELD SCHOOL
Summer I 2014
RPTS 654/WFSC 654/VTMI 604
11 May – 29 May 2014
Tambopata, Peru

Instructors:

Donald Brightsmith
Veterinary Pathobiology
dbrightsmith@cvm.tamu.edu
(979) 458-0563

Leslie Ruyle
Conflict and Development
ruyle@tamu.edu
(979) 458-9397

Lee Fitzgerald
Wildlife Fisheries Sciences
lfitzgerald@tamu.edu
(979) 862-7480

Amanda Stroza
Recreation, Parks and Tourism Sciences
astronza@tamu.edu
(979) 845-8931

Local Counterparts:
Rainforest Expeditions
Native Community of Infierno

Description: This course is designed to investigate the social and ecological complexities of biodiversity conservation in tropical ecosystems. We will use a variety of field methods from the biological and social sciences to evaluate the causes, consequences, and solutions to biodiversity loss through the lenses of ecology, culture, and governance.

Prerequisites: Students must have a minimum 2.0 GPA, and approval from the instructor to participate in this course. There are no other prerequisites for participation in the course.

Textbook: There is no required textbook for this course. We will provide PDFs of selected journal articles.

Field Site: The course will take place in the Tambopata National Reserve and Bahuaja Sonene National Park in the Department of Madre de Dios, Peru. The region has some of the highest recorded levels of biodiversity in the world, but it is vulnerable to many new threats, including extensive agriculture, gold mining, illegal logging, and land speculation associated with the Inter-Oceanic Highway.

Activities: We will explore a variety of terrestrial and freshwater habitats in various settings, including two ecotourism lodges, a frontier town, a national park, and a local community. Interdisciplinary teams will examine all sides of complex issues surrounding the region's conservation challenges, talking with conservation practitioners and scientists.

Guiding Questions:
1) What are the threats to biodiversity and human livelihoods in Tambopata? What are the responses from local institutions and actors?
2) What is the role of scientific inquiry in addressing threats to biodiversity and human livelihoods?
3) How can social scientists and natural scientists collaborate in the field?
4) In “cultural landscapes,” how do we see nature? In “natural landscapes,” how do we see culture?
Learning Activities

- Collaborate in teams to gather ecological, cultural, and economic information on the following Conservation Case Studies:
  a) WILDLIFE USE AND CONSERVATION: Ecological Challenges of Balancing Consumptive and Non-consumptive Uses
  b) COMMUNITIES AND WATER: Governing Fish, Otters, Miners, and Tourists
  c) FORESTS AND CHOICES: Managing for Charcoal, Palm Fruits, Macaws, and Brazil Nuts
- Keep a journal of field notes and observations
- Present findings on Conservation Case Studies

Learning outcomes

- Students will demonstrate the ability to record relevant notes and observations in a field notebook.
- Students will employ effective communication and collaboration skills with colleagues in the biological and social sciences.
- Students will be able to explain the role of scientific inquiry in addressing threats to biodiversity and human livelihoods.
- Students will appraise the social and biological context in which issues of tropical biodiversity conservation are played out.
- Students will apply both data and perspectives from the biological and social sciences to inform decisions when addressing threats to biodiversity and human livelihoods.

Course Grades

Graduate students:

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<th>Level of participation</th>
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<td>Presentation on proposed thesis research</td>
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<td>Research skill presentation</td>
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<td><strong>Total</strong></td>
<td><strong>1000</strong></td>
</tr>
</tbody>
</table>


Graduate students will be required to complete a presentation of a research skill in the field to the remainder of the class. They will be graded on their ability to clearly communicate the reasons to use this technique and demonstrate its use. They will also be required to make a short (10 – 15 min) formal presentation of their proposed thesis research in the format of a presentation for a scientific meeting. The graduate students will also be graded on their leadership roles within their research groups. Leadership responsibilities during specific research activities will be rotated among graduate students and this will be evaluated by the accompanying faculty.
If an assignment is completed after the due date, the grade will be reduced at a rate of up to 10% per day. Exceptions for this rule may be made for illness, TAMU-approved excused absence or instructor permission. All students will obtain full participation for each activity if they attend the activity and listen to the presentations given by the instructors. Students who must be reprimanded for talking or otherwise interrupting course activities or not remaining with the group for the duration of the activity will receive reduced grades (reprimanded once – 5% of total activity points, reprimanded twice – 10%, and then 15% reduction for each additional reprimand).

Attendance and make-up policies:
Students are required to attend all activities unless they are prohibited from doing so by TAMU approved excused absence, illness, logistical problems (transportation, etc.) which are outside of their control or instructor permission. Failure to participate in required activities in the absence of illness, logistical problems or other extenuating circumstances will be penalized by the loss of up to 50 points per activity missed.

Make-up Policy:
There will be no makeups for regularly scheduled activities. However, students forced to miss trips, discussions or activities can request to be briefed on them by the instructors. If students are unable to give their group presentations at the appointed time, instructors will find an alternative time for the presentation if timing and logistics allow. The reasons absences are considered excused by the university are listed below. See Student Rule 7 for details (http://studentrules.tamu.edu/rule07). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

1) Participation in an activity that is required for a class and appears on the university authorized activity list at: https://studentactivities.tamu.edu/app/sponsauth/index

2) Death or major illness in a student's immediate family.

3) Illness of a dependent family member.

4) Participation in legal proceedings or administrative procedures that require a student's presence.

5) Religious holy day. NOTE: Prior notification is NOT required.

6) Injury or illness that is too severe or contagious for the student to attend class.
   a) Injury or illness of three or more class days:
      Student will provide a medical confirmation note from his or her medical provider within one week of the last date of the absence (see Student Rules 7.1.6.1)
   b) Injury or illness of less than three class days:
      Student will provide one or both of these (at instructor’s discretion), within one week of the last date of the absence:
      (i.)Texas A&M University Explanatory Statement for Absence from Class form available at: http://attendance.tamu.edu or (ii.) Confirmation of visit to a health care professional affirming date and time of visit.

7) Required participation in military duties.

8) Mandatory admission interviews for professional or graduate school that cannot be rescheduled.

Other absences may be excused at the discretion of the instructor with prior notification and proper documentation. In cases where prior notification is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class.
Study Abroad Course Itinerary – (see attachment for proposed itinerary)

Americans with Disabilities Act (ADA) Policy Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit: http://disability.tamu.edu.

Academic Integrity Statement
Scholastic misconduct is defined broadly as "any act that violates the rights of another student in academic work or that involves misrepresentation of your own work." Plagiarism is one of the worst academic offenses, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student.

The Aggie Honor Code
"An Aggie does not lie, cheat, or steal, and or tolerate those who do"

The Aggie Code of Honor is an effort to unify the aims of all Texas A&M men and women toward a high code of ethics and personal dignity. For most, living under this code will be no problem, as it asks nothing of a person that is beyond reason. It only calls for honesty and integrity, characteristics that Aggies have always exemplified. The Aggie Code of Honor functions as a symbol to all Aggies, promoting understanding and loyalty to truth and confidence in each other. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, Part 1, Section 20 which can be found on line at: http://student-rules.tamu.edu. Any suspected instances of scholastic dishonesty will be investigated and resolved according to the procedures outlined in the new Aggie Honor System: http://aggiehonor.tamu.edu.

Types of Academic Misconduct
There are several types of academic misconduct. The six most common ones that you should be aware of are:

1. Cheating - Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise.
2. Fabrication - Making up data or results, and recording or reporting them; submitting fabricated documents.
3. Falsification - Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
4. Multiple Submissions - Submitting substantial portions of the same work (including oral reports) for credit more than once without authorization from the instructor of the class for which the student submits the work.
5. Plagiarism - The appropriation of another person's ideas, processes, results, or words without giving appropriate credit.
6. Complicity - Intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty.
Conservation Symposium in Puerto Maldonado (17 May).

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<th>Time</th>
<th>Presenter</th>
<th>Organization</th>
<th>Topic</th>
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<tbody>
<tr>
<td>9:00 am</td>
<td>Donald Brightsmith</td>
<td>Texas A&amp;M, Applied Biodiversity Sciences Program</td>
<td>Welcome and opening of symposium</td>
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<tr>
<td>9:10 am</td>
<td>Juan Carlos Flores</td>
<td>Grupo de Trabajo de la Sociedad Civil para la Interoceánica Sur – Perú</td>
<td>Posición de la sociedad civil respecto a la construcción de la carretera Interoceánica Sur.</td>
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<tr>
<td>9:55 am</td>
<td>Juan Loja</td>
<td>ISUR</td>
<td>Proyectos de desarrollo y conservación a realizarse en el ámbito de la Interoceánica Sur.</td>
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<td>10:40 am</td>
<td>Coffee Break</td>
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<tr>
<td>11.00 am</td>
<td>Carlos Sanchez and Deyvis Huaman</td>
<td>AIDER</td>
<td>Contrato de administración parcial Reserva Nacional Tambopata y el Parque Nacional Bahuaja Sonene</td>
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<td>11.45 am</td>
<td>Leslie Ruyle</td>
<td>TAMU</td>
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<td>12.30 pm</td>
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<td>2.30 pm</td>
<td>Ramón Rivero</td>
<td>Sociedad Peruana de Derecho Ambiental</td>
<td>Mecanismos de conservación privada desarrollándose en Madre de Dios</td>
</tr>
<tr>
<td>3.15 pm</td>
<td>Cesar Ascorra</td>
<td>CARITAS</td>
<td>Impacto social y ambiental de la mineria en Madre de Dios</td>
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<tr>
<td>4.00 pm</td>
<td>Break</td>
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<td>4.15</td>
<td>Chantelle Murtagh</td>
<td></td>
<td>Indigenous peoples of Madre de Dios - Politics and indigenous movements</td>
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<tr>
<td>5:00</td>
<td>John Janovec</td>
<td>Botanical Research Institute of Texas</td>
<td>Tropical botany and aguajales</td>
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Detailed schedule

11 May  Fly to Peru spend the night in Lima

12 May  Fly to Puerto Maldonado and take the boat up to Posada Amazonas
Move in to rooms
Brief guided walk in forest (depending on arrival time)
Dinner
Introduction to the course and Conservation Case Studies
Overnight: Posada Amazonas

13 May  Overnight Posada Amazonas
Breakfast
Communities and water activity: Visit to Oxbow Lake
Lunch
Basic introduction to the ecology of Conservation Case Studies: Forest walk Focus on the
forest and do NOT go to the canopy tower (wildlife, Brazil nuts, Dipteryx trees, inland
water bodies, wildlife)
Field notes lecture
Dinner
Discussion: Local maps and satellite imagery: connecting ecology, culture and governance
Students choose their case study teams

14 May  Overnight Centro Ñape
Wildlife techniques: Bird and Mammal Identification (all go to canopy tower)
Breakfast
Leave after breakfast (move out of rooms take an overnight bag leave large luggage)
Tour of Centro Ñape and Don Honorato presentation about medicinal plants
Lunch at Nape
Participatory mapping activity
Hunting and forest types walk (from late afternoon in to early evening return after dark)
Late Dinner
Brief discussion of transect methodology and estimating animal abundances

15 May  Overnight Posada Amazonas
Early AM bird and primate transect methodology activity
Breakfast
Return to Posada after Breakfast
Forests and Choices discussion and field lecture (walk down to harvested Brazil nut tree on
way to big Kapok. Go to big Kapok, sit there and talk about the ecology of hardwoods versus
softwoods, human park interactions, use of hardwoods and softwoods.)
Lunch
Tour of Posada Amazonas (with lodge manager, talk about Rainforest Alliance Certification,
Green innovations, the importance of the lodge to the community etc.)
Talk by Stronza on Tourism in Infierno
Dinner
Discussion of time at Centro Ñape

16 May  Overnight Puerto Maldonado
Early AM fishing activity (go super early 4 AM?) to make sure that we are early enough to be able to clearly see the transition from NIGHT fish to Day fish
Travel to Puerto Maldonado,
Visit to Mining site 2 hour drive to Quebrada Guacamayo
Lunch in car
Move in to Peru Amazonico
Lecture: Brief intro to the town and safety briefing
Dinner (students on their own)

17 May
Overnight Puerto Maldonado
9:00 AM – 5 PM Conservation Symposium (see schedule above)
Quick discussion on plans for visiting the market
Dinner (on your own)
Free Time

18 May
Overnight Puerto Maldonado
6 AM Visit to the local market
Students will be given instructions to search for information regarding a variety of local and regional products (wildlife, hardwood charcoal, Brazil nuts, Aguaje palm, edible palm larvae, fish, and gold). Breakfast on your own.
Lunch in PEM
2 PM Tour of farm with Victor Zambrano
Discussion of Market and or Victor Zambrano
Dinner on own

19 May
Overnight Infierno
8 AM pickup
Brief tour of the center of the community
Visit with community hunters
Meet with member of the Control Committee of the Native Community of Infierno
Box lunch provided by RFE
Transfer to homestays (split among Duran, Mishaja and one or two other sites)

20 May
Overnight Infierno
Breakfast
Ethnographic and biological field notes, participant observation, and informal conversations with local families
Lunch and Dinner with families

21 May
Overnight Infierno
Breakfast
Separate time in three households
Ethnographic and biological field notes, participant observation, and informal conversations with local families
Lunch and Dinner with families

22 May
Overnight Tambopata Research Center
11 AM Infierno to Tambopata Research Center (4 hours on river)
Move in to rooms
Dinner
Discussion about time in Infierno

23 May
Overnight Tambopata Research Center
Early AM Wildlife: Visit to parrot clay lick
Breakfast
Forest walk (wildlife observation, macaw nest sites natural and artificial in Dipteryx, wildlife identification, visit small water bodies in trail system)
Lunch
Free time
Dinner
Faculty Research Lecture: Brightsmith (Wildlife: Parrot community nesting)

24 May
Overnight Tambopata Research Center
Breakfast 7:30
Wildlife research activity
Lunch
Forests research activity
Dinner
Wildlife techniques: Bat mist netting

25 May
Overnight Tambopata Research Center
Optional Early AM Visit to parrot clay lick or other activity
Breakfast
Aquatics activity: Trip to a stream for net fishing
Lunch
Team work on Conservation Case Studies
Dinner
Free time or night hike

26 May
Overnight Tambopata Research Center
Free time work on Conservation Case Studies
Lunch
Presentation of Conservation Case Studies findings
Dinner

27 May
Overnight El Gato
Early departure to travel from TRC to El Gato
Lunch on boat or at El Gato
Free time for swim or forest exploration
Final dinner at El Gato

28 May
Travel from El Gato to Puerto Maldonado
11:35 AM Flight to Lima
Afternoon in Lima (shopping and museums)
Overnight flight back to the USA

29 May
Return to TAMU
Course Changes
Texas A&M University  
Departmental Request for a Change in Course  
Undergraduate • Graduate • Professional  
• Submit original form and attachments •

Form Instructions
1. Course request type:  
   □ Undergraduate  □ Graduate  □ First Professional (DDS, MD, JD, PharmD, DVM)
2. Request submitted by (Department or Program Name):  
   Physics and Astronomy
3. Course prefix, number and complete title of course:  
   PHYS 614: Introduction to Methods of Mathematical Physics

   Attach a brief supporting statement for changes made to items 4a through 10 below.

4. Change requested
   a. Prerequisite(s):  From: ___________________________ To: ___________________________
   b. Withdrawal (reason):  No intention to teach in the future.
   c. Cross-list with:  
   d. Change in course title and description. Enter complete current course title and current course description in item 9; enter proposed course title and proposed course description in item 10. Complete item 11a and b for a change in title.
   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 11a and b. Attach a course syllabus.
5. Is this an existing core curriculum course?  
   □ Yes  □ No
6. If grade type is changing for existing course, indicate the new grade type:  
   □ Grade  □ S/U  □ P/F (CLAD)
7. If this course will be stacked, please indicate the course number of the stacked course:  
   □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-control/basics-for-distance-education).
8. Complete course title and current catalog course description:

10. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

11. a. As currently in course inventory:

   Prefix  Course #  Title (excluding punctuation)  
   Lect  Lab  Other  SCH  CPI and Fund Code  Admin. Unit  HCE Code  Level

   Dept  Lab  Other  SCH  CPI and Fund Code  Admin. Unit  Acad. Year  HCE Code  Level

   Approval recommended by:  
   George R. Welch  
   Department Head or Program Chair  
   Date  

   Department Head or Program Chair (Type Name & Sign)  
   (If cross-listed course) Date

   Submitted to Coordinating Board by:  
   Chair, GC or UCC  
   Date

   Associate Director, Curricular Services  
   Date  
   Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 08/14
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
• Submit original form and attachments •

Form Instructions
1. Course request type: □ Undergraduate  ■ Graduate  □ First Professional (DDS, MD, JD, PharmD, DVM)
2. Request submitted by (Department or Program Name): Physics and Astronomy
3. Course prefix, number and complete title of course: PHYS 690: Kinetics of Electronic Processes

4. Change requested
   a. Prerequisite(s): From: ____________________________ To: ____________________________
   b. Withdrawal (reason): Instructor (Keldish) retired, and course is so specialized that no one else will be able to teach it.
   c. Cross-list with: ____________________________

   Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 9; enter proposed course title and proposed course description in item 10. Complete item 11a and b for a change in title.

   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 11a and b. Attach a course syllabus.

5. Is this an existing core curriculum course? □ Yes  □ No

6. If grade type is changing for existing course, indicate the new grade type: □ Grade  □ S/U  □ P/F (CLMD)

7. If this course will be stacked, please indicate the course number of the stacked course:

   □ I verify that I have reviewed the FAQ for Export Controls Basics for Distance Education (http://vnr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

8. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

9. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

10. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

11. a. As currently in course inventory:

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<th>Prefix</th>
<th>Course #</th>
<th>Title (excluding punctuation)</th>
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b. Change to:

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Approval recommended by:
George R Welch 9/22/2014
Department Head or Program Chair (Type Name & Sign) Date
Chair, College Review Committee 9-22-14
Dean of College Date

Submitted to Coordinating Board by:
Chair, GC or UCC Date

Associate Director, Curricular Services Date
Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 08/14
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
Submit original form and attachments

Form Instructions
1. Course request type:     ☐ Undergraduate   ☑ Graduate   ☐ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name):  Department of Wildlife and Fisheries Sciences
3. Course prefix, number and complete title of course:  WFSC 654 Amazon Field School
4. Change requested
   a. Prerequisite(s): From: graduate classification  To:  
   b. Withdrawal (reason):  
   c. Cross-list with:  VTM 404 and RPTS 454  
   Cross-listed courses require the signature of both department heads.
   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.
   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.
5. Is this an existing core curriculum course?  ☑ Yes   ☐ No
6. If this course will be stacked, please indicate the course number of the stacked course:  VTM 404, RPTS 454, WFSC 45
7. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).
8. Complete current course title and current catalog course description:
Introduction to social and ecological complexities of biodiversity conservation in tropical ecosystems. Field methods from biological and social science approaches to evaluate causes, consequences, and solutions to biodiversity loss through lenses of ecology, culture, and governance.
9. Complete proposed course title and proposed catalog course description (not to exceed 50 words):
Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences, and solutions to biodiversity loss through ecology, culture, and governance.

10. a. As currently in course inventory:

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<tr>
<th>Prefix</th>
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b. Change to:

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Approved recommended by:  

Linda L. Logan  3 July 2014  

Rejected by:  

Linda L. Logan  10 July 2014  

Dean of College  2 July 2014  

Submitted to Coordinating Board by:  

Chair, GC or UCC  7/22/14  

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu  
Curricular Services – 04/14
July 1, 2014

MEMORANDUM

TO: Dr. Mark A. Hussey, Interim President
Texas A&M University

THROUGH: Dr. Walter C. Daugherity, Speaker
Faculty Senate

THROUGH: Dr. Robert Knight, Chair
Graduate Programs Council, College of Agriculture and Life Sciences
University Curriculum Committee, College of Agriculture and Life Sciences Representative

THROUGH: Dr. David Reed, Associate Dean for Graduate Programs and
Faculty Development
College of Agriculture and Life Sciences

THROUGH: Dr. Michael Masser, Professor and Department Head
Department of Wildlife & Fisheries Sciences

FROM: Amanda R. Schwede, Senior Academic Advisor
Department of Wildlife & Fisheries Sciences

SUBJECT: WFSC 654 Amazon Field School
Change in Course for 2015-2016 Catalog

WFSC 654 Amazon Field School is a new approved study abroad course for the Fall 2014 catalog. However, due to suggested changes in the course description and course hours, a Change in Course form to update the description and hours is needed for the Fall 2015 catalog.

This memo is to provide justification for these two changes. Please contact me at arschwede@tamu.edu or 979-845-5704 if you have questions. Thank you.
Syllabus
Applied Biodiversity Science NSF-IGERT Program
AMAZON FIELD SCHOOL
Summer I 2014
RPTS 654/WFSC 654/VTPB 604
11 May – 29 May 2014
Tambopata, Peru

Instructors:

Donald Brightsmith
Veterinary Pathobiology
dbrightsmith@cvm.tamu.edu
(979) 458-0563

Leslie Ruyle
Conflict and Development
ruyle@tamu.edu
(979) 458-9397

Lee Fitzgerald
Wildlife Fisheries Sciences
lfitzgerald@tamu.edu
(979) 862-7480

Amanda Stronza
Recreation, Parks and Tourism Sciences
astronza@tamu.edu
(979) 845-8931

Local Counterparts:
Rainforest Expeditions
Native Community of Infierno

Description: This course is designed to investigate the social and ecological complexities of biodiversity conservation in tropical ecosystems. We will use a variety of field methods from the biological and social sciences to evaluate the causes, consequences, and solutions to biodiversity loss through the lenses of ecology, culture, and governance.

Prerequisites: Instructor approval to participate in this course. There are no other prerequisites for participation in the course.

Textbook: There is no required textbook for this course. We will provide PDFs of selected journal articles.

Field Site: The course will take place in the Tambopata National Reserve and Bahuaja Sonene National Park in the Department of Madre de Dios, Peru. The region has some of the highest recorded levels of biodiversity in the world, but it is vulnerable to many new threats, including extensive agriculture, gold mining, illegal logging, and land speculation associated with the Inter-Oceanic Highway.

Activities: We will explore a variety of terrestrial and freshwater habitats in various settings, including two ecotourism lodges, a frontier town, a national park, and a local community. Interdisciplinary teams will examine all sides of complex issues surrounding the region's conservation challenges, talking with conservation practitioners and scientists.

Guiding Questions:
1) What are the threats to biodiversity and human livelihoods in Tambopata? What are the responses from local institutions and actors?
2) What is the role of scientific inquiry in addressing threats to biodiversity and human livelihoods?
3) How can social scientists and natural scientists collaborate in the field?
4) In “cultural landscapes,” how do we see nature? In “natural landscapes,” how do we see culture?
Learning Activities

- Collaborate in teams to gather ecological, cultural, and economic information on the following Conservation Case Studies:
  
a) WILDLIFE USE AND CONSERVATION: Ecological Challenges of Balancing Consumptive and Non-consumptive Uses
b) COMMUNITIES AND WATER: Governing Fish, Otters, Miners, and Tourists
c) FORESTS AND CHOICES: Managing for Charcoal, Palm Fruits, Macaws, and Brazil Nuts
- Keep a journal of field notes and observations
- Present findings on Conservation Case Studies

Learning outcomes

- Students will demonstrate the ability to record relevant notes and observations in a field notebook.
- Students will employ effective communication and collaboration skills with colleagues in the biological and social sciences.
- Students will be able to explain the role of scientific inquiry in addressing threats to biodiversity and human livelihoods.
- Students will appraise the social and biological context in which issues of tropical biodiversity conservation are played out.
- Students will apply both data and perspectives from the biological and social sciences to inform decisions when addressing threats to biodiversity and human livelihoods.

Course Grades

Graduate students:

<table>
<thead>
<tr>
<th>Level of participation</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussions</td>
<td>200</td>
</tr>
<tr>
<td>Field trips</td>
<td>150</td>
</tr>
<tr>
<td>Field research</td>
<td>150</td>
</tr>
<tr>
<td>Compliance with rules</td>
<td>100</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Presentations</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group presentation</td>
<td>200</td>
</tr>
<tr>
<td>Presentation on proposed thesis research</td>
<td>100</td>
</tr>
<tr>
<td>Research skill presentation</td>
<td>100</td>
</tr>
</tbody>
</table>

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1000


Graduate students will be required to complete a presentation of a research skill in the field to the remainder of the class. The will be graded on their ability to clearly communicate the reasons to use this technique and demonstrate its use. They will also be required to make a short (10 – 15 min) formal presentation of their proposed thesis research in the format of a presentation for a scientific meeting. The graduate students will also be graded on their leadership roles within their research groups. Leadership responsibilities during specific research activities will be rotated among graduate students and this will be evaluated by the accompanying faculty.
If an assignment is completed after the due date, the grade will be reduced at a rate of up to 10% per day. Exceptions for this rule may be made for illness, TAMU-approved excused absence or instructor permission. All students will obtain full participation for each activity if they attend the activity and listen to the presentations given by the instructors. Students who must be reprimanded for talking or otherwise interrupting course activities or not remaining with the group for the duration of the activity will receive reduced grades (reprimanded once – 5% of total activity points, reprimanded twice – 10%, and then 15% reduction for each additional reprimand).

**Attendance and make-up policies:**
Students are required to attend all activities unless they are prohibited from doing so by TAMU approved excused absence, illness, logistical problems (transportation, etc.) which are outside of their control or instructor permission. Failure to participate in required activities in the absence of illness, logistical problems or other extenuating circumstances will be penalized by the loss of up to 50 points per activity missed.

**Make-up Policy:**
There will be no makeups for regularly scheduled activities. However, students forced to miss trips, discussions or activities can request to be briefed on them by the instructors. If students are unable to give their group presentations at the appointed time, instructors will find an alternative time for the presentation if timing and logistics allow. The reasons absences are considered excused by the university are listed below. See Student Rule 7 for details (http://studentrules.tamu.edu/rule07). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

1) Participation in an activity that is required for a class and appears on the university authorized activity list at: https://studentactivities.tamu.edu/app/sponsauth/index
2) Death or major illness in a student’s immediate family.
3) Illness of a dependent family member.
4) Participation in legal proceedings or administrative procedures that require a student’s presence.
5) Religious holy day. NOTE: Prior notification is NOT required.
6) Injury or illness that is too severe or contagious for the student to attend class.
   a) Injury or illness of three or more class days:
      Student will provide a medical confirmation note from his or her medical provider within one week of the last date of the absence (see Student Rules 7.1.6.1)
   b) Injury or illness of less than three class days:
      Student will provide one or both of these (at instructor’s discretion), within one week of the last date of the absence:
      (i.) Texas A&M University Explanatory Statement for Absence from Class form available at: http://attendance.tamu.edu
      or (ii.) Confirmation of visit to a health care professional affirming date and time of visit.
7) Required participation in military duties.
8) Mandatory admission interviews for professional or graduate school that cannot be rescheduled.

Other absences may be excused at the discretion of the instructor with prior notification and proper documentation. In cases where prior notification is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class.
Study Abroad Course Itinerary – (see attachment for proposed itinerary)

Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit: http://disability.tamu.edu.

Academic Integrity Statement

Scholastic misconduct is defined broadly as "any act that violates the rights of another student in academic work or that involves misrepresentation of your own work." Plagiarism is one of the worst academic offenses, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student.

The Aggie Honor Code

"An Aggie does not lie, cheat, or steal, and or tolerate those who do"

The Aggie Code of Honor is an effort to unify the aims of all Texas A&M men and women toward a high code of ethics and personal dignity. For most, living under this code will be no problem, as it asks nothing of a person that is beyond reason. It only calls for honesty and integrity, characteristics that Aggies have always exemplified. The Aggie Code of Honor functions as a symbol to all Aggies, promoting understanding and loyalty to truth and confidence in each other. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, Part 1, Section 20 which can be found on line at: http://student-rules.tamu.edu. Any suspected instances of scholastic dishonesty will be investigated and resolved according to the procedures outlined in the new Aggie Honor System: http://aggiehonor.tamu.edu.

Types of Academic Misconduct

There are several types of academic misconduct. The six most common ones that you should be aware of are:

1. **Cheating** - Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise.
2. **Fabrication** - Making up data or results, and recording or reporting them; submitting fabricated documents.
3. **Falsification** - Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
4. **Multiple Submissions** - Submitting substantial portions of the same work (including oral reports) for credit more than once without authorization from the instructor of the class for which the student submits the work.
5. **Plagiarism** - The appropriation of another person's ideas, processes, results, or words without giving appropriate credit.
6. **Complicity** - Intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty.
Conservation Symposium in Puerto Maldonado (17 May).

<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter</th>
<th>Organization</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 am</td>
<td>Donald Brightsmith</td>
<td>Texas A&amp;M, Applied Biodiversity Sciences Program</td>
<td>Welcome and opening of symposium</td>
</tr>
<tr>
<td>9:10 am</td>
<td>Juan Carlos Flores</td>
<td>Grupo de Trabajo de la Sociedad Civil para la Interoceánica Sur – Perú</td>
<td>Posición de la sociedad civil respecto a la construcción de la carretera Interoceánica Sur.</td>
</tr>
<tr>
<td>9:55 am</td>
<td>Juan Loja</td>
<td>ISUR</td>
<td>Proyectos de desarrollo y conservación a realizarse en el ámbito de la Interoceánica Sur</td>
</tr>
<tr>
<td>10:40 am</td>
<td>Coffee Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 am</td>
<td>Carlos Sanchez</td>
<td>AIDER</td>
<td>Contrato de administración parcial Reserva Nacional Tambopata y el Parque Nacional Bahuaja Sonene</td>
</tr>
<tr>
<td></td>
<td>and Deyvis Huaman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:45 am</td>
<td>Leslie Ruyle</td>
<td>TAMU</td>
<td>TBA</td>
</tr>
<tr>
<td>12:30 pm</td>
<td>Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.30 pm</td>
<td>Ramón Rivero</td>
<td>Sociedad Peruana de Derecho Ambiental</td>
<td>Mecanismos de conservación privada desarrollándose en Madre de Dios</td>
</tr>
<tr>
<td>3.15 pm</td>
<td>Cesar Ascorra</td>
<td>CARITAS</td>
<td>Impacto social y ambiental de la minería en Madre de Dios</td>
</tr>
<tr>
<td>4.00 pm</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.15</td>
<td>Chantelle Murtagh</td>
<td></td>
<td>Indigenous peoples of Madre de Dios - Politics and indigenous movements</td>
</tr>
<tr>
<td>5:00</td>
<td>John Janovec</td>
<td>Botanical Research Institute of Texas</td>
<td>Tropical botany and aguajales</td>
</tr>
</tbody>
</table>
Detailed schedule

11 May  
Fly to Peru spend the night in Lima

12 May  
Fly to Puerto Maldonado and take the boat up to Posada Amazonas
Move in to rooms
Brief guided walk in forest (depending on arrival time)
Dinner
Introduction to the course and Conservation Case Studies
Overnight: Posada Amazonas

13 May  
Overnight Posada Amazonas
Breakfast
Communities and water activity: Visit to Oxbow Lake
Lunch
Basic introduction to the ecology of Conservation Case Studies: Forest walk Focus on the forest and do NOT go to the canopy tower (wildlife, Brazil nuts, Dipteryx trees, inland water bodies, wildlife)
Field notes lecture
Dinner
Discussion: Local maps and satellite imagery: connecting ecology, culture and governance
Students choose their case study teams

14 May  
Overnight Centro Ñape
Wildlife techniques: Bird and Mammal Identification (all go to canopy tower)
Breakfast
Leave after breakfast (move out of rooms take an overnight bag leave large luggage)
Tour of Centro Ñape and Don Honorato presentation about medicinal plants
Lunch at Ñape
Participatory mapping activity
Hunting and forest types walk (from late afternoon in to early evening return after dark)
Late Dinner
Brief discussion of transect methodology and estimating animal abundances

15 May  
Overnight Posada Amazonas
Early AM bird and primate transect methodology activity
Breakfast
Return to Posada after Breakfast
Forests and Choices discussion and field lecture (walk down to harvested Brazil nut tree on way to big Kapok. Go to big Kapok, sit there and talk about the ecology of hardwoods versus softwoods, human park interactions, use of hardwoods and softwoods.)
Lunch
Tour of Posada Amazonas (with lodge manager, talk about Rainforest Alliance Certification, Green innovations, the importance of the lodge to the community etc.)
Talk by Stronza on Tourism in Infierno
Dinner
Discussion of time at Centro Ñape

16 May  
Overnight Puerto Maldonado
Early AM fishing activity (go super early 4 AM?) to make sure that we are early enough to be able to clearly see the transition from NIGHT fish to Day fish
Travel to Puerto Maldonado,
Visit to Mining site 2 hour drive to Quebrada Guacamayo
Lunch in car
Move in to Peru Amazonico
Lecture: Brief intro to the town and safety briefing
Dinner (students on their own)

17 May
Overnight Puerto Maldonado
9:00 AM – 5 PM Conservation Symposium (see schedule above)
Quick discussion on plans for visiting the market
Dinner (on your own)
Free Time

18 May
Overnight Puerto Maldonado
6 AM Visit to the local market
Students will be given instructions to search for information regarding a variety of local and regional products (wildlife, hardwood charcoal, Brazil nuts, Aguaje palm, edible palm larvae, fish, and gold). Breakfast on your own.
Lunch in PEM
2 PM Tour of farm with Victor Zambrano
Discussion of Market and or Victo Zambrano
Dinner on own

19 May
Overnight Infierno
8 AM pickup
Brief tour of the center of the community
Visit with community hunters
Meet with member of the Control Committee of the Native Community of Infierno
Box lunch provided by RFE
Transfer to homestays (split among Duran, Mishaja and one or two other sites)

20 May
Overnight Infierno
Breakfast
Ethnographic and biological field notes, participant observation, and informal conversations with local families
Lunch and Dinner with families

21 May
Overnight Infierno
Breakfast
Separate time in three households
Ethnographic and biological field notes, participant observation, and informal conversations with local families
Lunch and Dinner with families

22 May
Overnight Tambopata Research Center
11 AM Infierno to Tambopata Research Center (4 hours on river)
Move in to rooms
Dinner
Discussion about time in Infierno

23 May
Overnight Tambopata Research Center
Early AM Wildlife: Visit to parrot clay lick
Breakfast
Forest walk (wildlife observation, macaw nest sites natural and artificial in *Dipteryx*, wildlife identification, visit small water bodies in trail system)
Lunch
Free time
Dinner
Faculty Research Lecture: Brightsmith (Wildlife: Parrot community nesting)

24 May
Overnight Tambopata Research Center
Breakfast 7:30
Wildlife research activity
Lunch
Forests research activity
Dinner
Wildlife techniques: Bat mist netting

25 May
Overnight Tambopata Research Center
Optional Early AM Visit to parrot clay lick or other activity
Breakfast
Aquatics activity: Trip to a stream for net fishing
Lunch
Team work on Conservation Case Studies
Dinner
Free time or night hike

26 May
Overnight Tambopata Research Center
Free time work on Conservation Case Studies
Lunch
Presentation of Conservation Case Studies findings
Dinner

27 May
Overnight El Gato
Early departure to travel from TRC to El Gato
Lunch on boat or at El Gato
Free time for swim or forest exploration
Final dinner at El Gato

28 May
Travel from El Gato to Puerto Maldonado
11:35 AM Flight to Lima
Afternoon in Lima (shopping and museums)
Overnight flight back to the USA

29 May
Return to TAMU
Curriculum Changes
Texas A&M University
Request for a Change in Curriculum
Undergraduate + Graduate + Professional

1. Program request type: ☑ Undergraduate ☑ Graduate ☑ First Professional (e.g., DVM, JD, MD, etc.)

2. Request change for:
   ☐ Degree Program ☐ Minor ☑ Certificate

3. Request submitted by (Department or Program Name):
   Biomedical Engineering

4. Program Designation and Name (e.g., B.A. in History, Minor in History, Certificate in European Union):
   Certificate in Engineering Therapeutics Manufacturing

5. Brief description of change:
   Make adjustments and additions to the courses that can satisfy this requirement.

6. Rationale for change:
   There are additional courses that have content relevant to this certificate. In addition, we have added several graduate level courses that will allow masters and doctoral students to pursue this certificate as well.

Use the checkboxes below to make sure that all information is included.

7. a. Proposed curriculum attached. ☑ Yes ☐ No
   b. Current catalog curriculum with handwritten edits attached. ☑ Yes ☐ No
   c. Current Howdy degree evaluation with handwritten edits attached. ☐ Yes ☑ No

   Please make sure the attached proposed curriculum, catalog and Howdy degree evaluation match.

8. a. Will degree program hours change (increase/decrease) due to the proposed curriculum changes? ☐ Yes ☑ No
   b. If yes, degree program hours will change from: ________ to: ________
   c. If yes, is the Texas Higher Education Coordinating Board form attached? ☑ Yes ☐ No

   http://www.thecb.state.tx.us/index.cfm?objectid=A0F9F7FA-9A92-4F11-2756AD3BBFF01D60

9. If proposed changes affect other unit(s), are letters of support attached? ☐ Yes ☑ No

IMPORTANT NOTE: Curriculum changes submitted through the approval process and fully approved by February (December-UCC/GC, January-Faculty Senate, February-President) will be effective in the next academic year. Changes requiring approval beyond the University should complete the internal approval process early in the fall semester whenever possible in order to ensure timely implementation.

Approval recommended by:
Gerard L. Cote

Chair, College Review Committee
Date 9/12/14

Questions regarding this form should be directed to Curricular Services at 845-3201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
New Program Request Form for Certificate Programs, Bachelor’s and Master’s Degrees

Directions: An institution shall use this form to propose a new bachelor’s or master’s degree program. In completing the form, the institution should refer to the document Standards for Bachelor’s and Master’s Programs, which prescribes specific requirements for new degree programs. Note: This form requires signatures of (1) the Chief Executive Officer, certifying adequacy of funding for the new program; (2) a member of the Board of Regents (or designee), certifying Board approval, and (3) if applicable, a member of the Board of Regents or (designee), certifying that criteria have been met for staff-level approval. NOTE: Preliminary authority is required for all engineering programs. An institution that does not have preliminary authority for a proposed engineering program shall submit a separate request for preliminary authority prior to submitting the degree program request form. That request shall address criteria set in Coordinating Board rules Section 5.24 (a).

Administrative Information

1. Institution: Texas A&M University

2. Program Name – Show how the program would appear on the Coordinating Board’s program inventory (e.g., Bachelor of Business Administration degree with a major in Accounting):
   Engineering Therapeutics Manufacturing Certificate


4. Brief Program Description – Describe the program and the educational objectives:
   Engineering Therapeutics Manufacturing Certificate is intended to meet the requirements of industry by educating engineering BS graduates how to economically, ecologically, and safely design and operate equipment used for the production and separation of biological materials. By the end of the certificate program, students will be able to: (1) Understand the processing of biological materials; (2) Analyze functions and properties of biological materials; (3) Understand the impact of the use/misuse of biological materials; (4) Understand the life cycle and evolution of biological materials; and (5) Design, operate and optimize biological process units.

   Number of Semester Credit Hours Required 12 hours

5. Administrative Unit – Identify where the program would fit within the organizational structure of the university (e.g., The Department of Electrical Engineering within the College of Engineering):
   College of Engineering, NCTM

6. Proposed Implementation Date – Report the first semester and year that students would enter the program:
   Fall semester of Academic Year 2013

7. Contact Person – Provide contact information for the person who can answer specific questions about the program:

Updated 06.07.2010
I. Need

Note: Complete IA and IB only if preliminary authority for the program was granted more than four years ago. This includes programs for which the institution was granted broad preliminary authority for the discipline.

A. Job Market Need – Provide short- and long-term evidence of the need for graduates in the job market.

Because of its favorable business and regulatory environments, world-class biomedical R&D, presence of premier universities, access to input materials and availability of industrial processes, Texas is poised to experience extensive growth in biotechnology jobs. The Texas Workforce Commission’s Labor Market & Career Information Department reports that, of all Texas manufacturing industries, pharmaceutical and medicine manufacturing is expected to undergo the greatest increase in growth – 23 percent – during this decade. In order to meet the needs of this potential growth, Texas must respond to industry demands for a workforce that is able to keep pace with emerging technologies. Nationally, Texas ranks 3rd in bioscience R&D expenditures, which have increased by 23 percent since 2004, to $2.45 billion in 2008. Yet Texas only employs 3.5 percent of the nation’s therapeutics manufacturing workforce, proof of a significant gap in our commercialization efforts. Because early research is not transitioned into development, production and commercialization, Texas is missing an opportunity to build a large commercial therapeutics manufacturing base and suffering the economic consequences thereof.

In Texas, there is a gap in workforce development in the scientific and regulatory knowledge and advanced technologies manufacturing expertise that is required to make a science lab discovery into a commercialized drug or device. Because Texas has not enriched its talent pool with these skilled workers, all too often the initial discoveries of Texas researchers are either licensed to companies out-of-state, or the Texas firm relocates altogether. To address this critical gap in our state’s workforce, this proposal for Engineering Therapeutics Manufacturing Certificate is being submitted.

B. Student Demand – Provide short- and long-term evidence of demand for the program.
Industry and government agencies will benefit from the proposed Engineering Therapeutics Manufacturing Certificate by being able to hire graduating engineers who can fit more easily and readily into biotech and pharmaceutical companies in Texas and the U.S. and who have the knowledge and skills to enable pharmaceutical and biotechnology firms that are commercializing new products and services in Texas and the U.S. to be competitive. These graduates will be more valuable to employers; therefore, the proposed certificate program will add value to industry.

Engineering graduates will benefit from the proposed Engineering Therapeutics Manufacturing Certificate by being able to work more effectively in biotech and pharmaceutical companies immediately after graduation. This program will increase employment prospects for engineering students.

C. **Enrollment Projections** — Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. (*Include majors only and consider attrition and graduation.*)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Headcount</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
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<tr>
<td>FTSE</td>
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</table>

II. **Quality**

A. **Certificate and Degree Requirements** — Use this table to show the certificate and degree requirements of the program. (*Modify the table as needed; if necessary, replicate the table for more than one option.*)

<table>
<thead>
<tr>
<th>Category</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Core Curriculum <em>(bachelor’s degree only)</em></td>
<td>9</td>
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<tr>
<td>Required Courses</td>
<td>9</td>
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<tr>
<td>Prescribed Electives</td>
<td>0</td>
</tr>
<tr>
<td>Free Electives</td>
<td>0</td>
</tr>
<tr>
<td>Other <em>(Specify, e.g., internships, clinical work)</em> <em>(if not included above)</em></td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12</td>
</tr>
</tbody>
</table>

*Updated 06.07.2010*
### Required Courses: (Choose One)

<table>
<thead>
<tr>
<th>X</th>
<th>Course Number</th>
<th>Course Name</th>
<th>Semester Taken</th>
<th>Grade Received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAEN 302</td>
<td>Biological and Ag Engineering Fundamental II (OR equivalent)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>BAEN 601</td>
<td>Advanced Agriculture Systems Analysis</td>
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<td></td>
<td>CHEN 382</td>
<td>Bioproduct Engineering</td>
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<td>CHEN 651</td>
<td>Biochemical Engineering</td>
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<tr>
<td></td>
<td>ISEN 360</td>
<td>Lean Thinking and Lean Engineering in Process Industries</td>
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<td></td>
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<tr>
<td></td>
<td>ISEN 645</td>
<td>Lean Thinking and Lean Manufacturing</td>
<td></td>
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<tr>
<td></td>
<td>VTPP 435</td>
<td>Physiology for Biomedical Engineers II</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Prescribed Elective Courses: (Choose Three)

<table>
<thead>
<tr>
<th>X</th>
<th>Course Number</th>
<th>Course Name</th>
<th>Semester Taken</th>
<th>Grade Received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAEN 471</td>
<td>Bioreactor Engineering</td>
<td></td>
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<tr>
<td></td>
<td>BAEN 479</td>
<td>Biological and Agricultural Engineering Design I</td>
<td></td>
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<td></td>
<td>BAEN 489</td>
<td>Introduction to Separations</td>
<td></td>
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<tr>
<td></td>
<td>BAEN 631</td>
<td>Bioprocesses and Separations in Biotechnology</td>
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<tr>
<td></td>
<td>BAEN 653</td>
<td>Bioreactor Design</td>
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<tr>
<td></td>
<td>BMEN 430</td>
<td>Medical Device Regulation</td>
<td></td>
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<tr>
<td></td>
<td>BMEN 440</td>
<td>Design of Medical Devices</td>
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<tr>
<td></td>
<td>BMEN 486</td>
<td>Biomedical Nanotechnology</td>
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<td></td>
<td>BMEN 487</td>
<td>Drug Delivery</td>
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<tr>
<td></td>
<td>BMEN 630</td>
<td>Medical Device Regulation</td>
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<tr>
<td></td>
<td>BMEN 640</td>
<td>Design of Medical Devices</td>
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<tr>
<td></td>
<td>BMEN 686</td>
<td>Biomedical Nanotechnology</td>
<td></td>
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<tr>
<td></td>
<td>BMEN 687</td>
<td>Drug Delivery</td>
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<tr>
<td></td>
<td>CHEN 440</td>
<td>Introduction to Transport Phenomena</td>
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<tr>
<td></td>
<td>CHEN 463</td>
<td>Systems Biology</td>
<td></td>
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<tr>
<td></td>
<td>CHEN 471</td>
<td>Introduction to Biochemical Engineering</td>
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<td>CHEN 489</td>
<td>Bioprocess Control</td>
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<td>CHEN 489</td>
<td>Bioreactor Design</td>
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<td></td>
<td>CHEN 489</td>
<td>Introduction to Bioseparation</td>
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<tr>
<td></td>
<td>CHEN 489</td>
<td>Safety in Pharmaceutical and Biotechnology Industries</td>
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<tr>
<td></td>
<td>CHEN 489</td>
<td>Designing for Flexibility</td>
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<tr>
<td></td>
<td>CHEN 614</td>
<td>Advanced Transport Phenomena I</td>
<td></td>
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<tr>
<td></td>
<td>CHEN 624</td>
<td>Chemical Engineering Kinetics and Reactor Design</td>
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<tr>
<td></td>
<td>CHEN 629</td>
<td>Transport Phenomena</td>
<td></td>
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<tr>
<td></td>
<td>CHEN 631</td>
<td>Process Dynamics and Advanced Process Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEN 651</td>
<td>Biochemical Engineering</td>
<td></td>
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<tr>
<td></td>
<td>CHEN 655</td>
<td>Process Safety Engineering</td>
<td></td>
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<tr>
<td></td>
<td>CHEN 663</td>
<td>Systems Biology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISEN 303</td>
<td>Engineering Economic Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISEN 613</td>
<td>Engineering Data Analysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Engineering Therapeutics Manufacturing Certificate
Worksheet

(Please type all information. Handwritten worksheets may not be accepted.)

Student Name: ___________________________ Date: ___________ UIN: ___________
Email: ________________________________

To earn the Therapeutics Manufacturing Certificate, a student must complete a minimum of 12
semester credit hours selected from the list below:

### Required Courses (8)*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Taken</th>
<th>Grade Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEN 360</td>
<td>Lean Thinking and Lean Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in Process Industries</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Choose One of the Following:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAEN 302</td>
<td>Biological and Ag Engineering Fundamentals II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEN 382</td>
<td>Bioprocess Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEN 282</td>
<td>Engineering Biology</td>
<td></td>
<td></td>
</tr>
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</table>

### Approved Elective Courses (Choose 3):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Taken</th>
<th>Grade Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEN 430</td>
<td>Medical Device Regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMEN 440</td>
<td>Design of Medical Devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMEN 486</td>
<td>Biomedical Nanotechnology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMEN 489</td>
<td>Drug Delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEN 463</td>
<td>Systems Biology</td>
<td></td>
<td></td>
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<tr>
<td>CHEN 471</td>
<td>Introduction to Biochemical Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEN 489</td>
<td>Safety in Pharmaceutical and Biotechnology Industries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISEN 303</td>
<td>Engineering Economic Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEN 489</td>
<td>Introduction to Bioseparations</td>
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<tr>
<td>CHEN 489</td>
<td>Bioreactor Design</td>
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<td>CHEN 489</td>
<td>Bioprocess Control</td>
<td></td>
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</tr>
<tr>
<td>CHEN 489</td>
<td>Designing for Flexibility</td>
<td></td>
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</tr>
<tr>
<td>BMEN 471</td>
<td>Bioprocess Engg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: CHEN 222 Organic and Biological Chemistry/or CHEN 227 is a prerequisite for BAEN 302, CHEN 382 and
BMEN 282.

Notes: This form will be verified and approval given upon verification of requirements by the Program
Coordinator.

For Engineering Therapeutics Manufacturing Administrators:
Verified by:

*New Courses:

- CHEN 440 - Intro to Transport Phenomena
- BAEN 479 - BAEN Design II
- BAEN 489 - Intro to Separations
- CHEN 489 - Safety in Pharm. & BioTech
B. **Curriculum** — Use these tables to identify the required courses and prescribed electives of the program, and curriculum as it will appear in the undergraduate and graduate catalog. Note with an asterisk (*) courses that would be added if the program is approved. *(Add and delete rows as needed. If applicable, replicate the tables for different tracks/options as shown in the undergraduate catalog.)*

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Required Courses</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAEN 302</td>
<td>Biological and Ag Engineering Fundamentals II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>CHEN 382</td>
<td>Bioprocess Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>BMEN 282</td>
<td>Engineering Biology</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 360</td>
<td>Lean Thinking and Lean Engineering in Process Industries</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Prescribed Elective Courses. Choose 2 courses</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEN 440</td>
<td>Introduction to Transport Phenomena</td>
<td>3</td>
</tr>
<tr>
<td>CHEN 463</td>
<td>Systems Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEN 471/BAEN 471</td>
<td>Introduction to Biochemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHEN 489</td>
<td>Safety in Pharmaceutical and Biotechnology Industries</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 303</td>
<td>Engineering Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEN 489/BAEN 489</td>
<td>Introduction to Bioseparations</td>
<td>3</td>
</tr>
<tr>
<td>CHEN 489/BAEN 489</td>
<td>Bioreactor Design</td>
<td>3</td>
</tr>
<tr>
<td>CHEN 489</td>
<td>Bioprocess Control</td>
<td>3</td>
</tr>
<tr>
<td>CHEN 489</td>
<td>Designing for Flexibility</td>
<td>3</td>
</tr>
</tbody>
</table>

|                  | TOTAL SCH                                           | 12  |
C. **Faculty** — Use these tables to provide information about **Core** and **Support** faculty. Add an asterisk (\*) before the name of the individual who will have direct administrative responsibilities for the program. *(Add and delete rows as needed.)*

<table>
<thead>
<tr>
<th>Name of <strong>Core</strong> Faculty and Faculty Rank</th>
<th>Highest Degree and Awarding Institution</th>
<th>Courses Assigned in Program</th>
<th>% Time Assigned To Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pishko, M., Professor</em></td>
<td>PhD in Chemical Engineering from University of Texas - Austin</td>
<td>CHEN 489/BAEN 489</td>
<td>15%</td>
</tr>
<tr>
<td>Nikolov, Z., Professor</td>
<td>PhD in Chemical Engineering from Iowa State University</td>
<td>CHEN 489/BAEN 489</td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of <strong>Support</strong> Faculty and Faculty Rank</th>
<th>Highest Degree and Awarding Institution</th>
<th>Courses Assigned in Program</th>
<th>% Time Assigned To Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>El-Halwagi, M., Professor</td>
<td>PhD in Chemical Engineering from University of California – Los Angeles</td>
<td>CHEN 489</td>
<td>15%</td>
</tr>
<tr>
<td>Mannan, S., Professor</td>
<td>PhD in Chemical Engineering from University of Oklahoma</td>
<td>CHEN 489</td>
<td>15%</td>
</tr>
<tr>
<td>Jayaraman, A., Associate Professor</td>
<td>PhD in Biochemical Engineering from University of California – Irvine</td>
<td>CHEN 489/BAEN 489</td>
<td>15%</td>
</tr>
<tr>
<td>Marty Wortman, Professor</td>
<td>PhD in Industrial Engineering from Virginia Polytechnic Institute and State University</td>
<td>ISEN 360</td>
<td>15%</td>
</tr>
<tr>
<td>Karthikeyan, R., Professor</td>
<td>PhD in Biological and Agricultural Engineering from Kansas State University</td>
<td>CHEN 489/BAEN 489</td>
<td>15%</td>
</tr>
</tbody>
</table>
D. **Students** – Describe general recruitment efforts and admission requirements. In accordance with the institution’s Uniform Recruitment and Retention Strategy, describe plans to recruit, retain, and graduate students from underrepresented groups for the program.

This program is open to science and engineering undergraduate students enrolled at TAMU. Interested students should consult with their academic advisors. One section of each course (30 students) will be offered at the beginning of the program. These sections will be assessed, and the number of sections available will then be increased.

National Center for Therapeutics Manufacturing will administer the program and manage records for those participating in the certificate program. NCTM faculty and program coordinator will serve as advisors to students and will approve all co-curricular activities. A program coordinator will be responsible for communicating with the registrar’s office when a student has successfully completed the certificate requirements.

E. **Library** – Provide the library director’s assessment of library resources necessary for the program. Describe plans to build the library holdings to support the program.

Current library holdings are sufficient.

F. **Facilities and Equipment** – Describe the availability and adequacy of facilities and equipment to support the program. Describe plans for facility and equipment improvements/additions.

No new facilities or equipment are required.

G. **Accreditation** – If the discipline has a national accrediting body, describe plans to obtain accreditation or provide a rationale for not pursuing accreditation.

Dwight Look College of Engineering courses are accredited by ABET, Inc. Engineering Therapeutics Manufacturing Certificate will be fully compatible with engineering program accreditations.

H. **Evaluation** – Describe the evaluation process that will be used to assess the quality and effectiveness of the new degree program.
Learning outcomes based assessment is required for accreditation of engineering courses and programs. The program will address this requirement through the use of direct measures (course exams) and indirect measures (exit student surveys and intern surveys). Assessment results will be reviewed every semester by our Certificate Program Committee.

III. Costs and Funding

Five-Year Costs and Funding Sources - Use this table to show five-year costs and sources of funding for the program.

<table>
<thead>
<tr>
<th>Five-Year Costs</th>
<th>Five-Year Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel</td>
<td>$0 Reallocated Funds</td>
</tr>
<tr>
<td>Facilities and Equipment</td>
<td>$0 Anticipated New Formula Funding³</td>
</tr>
<tr>
<td>Library, Supplies, and Materials</td>
<td>$0 Special Item Funding</td>
</tr>
<tr>
<td>Other¹</td>
<td>$0 Other⁴</td>
</tr>
<tr>
<td>Total Costs</td>
<td>$0 Total Funding</td>
</tr>
</tbody>
</table>

1. Report costs for new faculty hires, graduate assistants, and technical support personnel. For new faculty, prorate individual salaries as a percentage of the time assigned to the program. If existing faculty will contribute to program, include costs necessary to maintain existing programs (e.g., cost of adjunct to cover courses previously taught by faculty who would teach in new program).
2. Specify other costs here (e.g., administrative costs, travel).
3. Indicate formula funding for students new to the institution because of the program; formula funding should be included only for years three through five of the program and should reflect enrollment projections for years three through five.
4. Report other sources of funding here. In-hand grants, "likely" future grants, and designated tuition and fees can be included.

Updated 06.07.2010
Signature Page

1. **Adequacy of Funding** – The chief executive officer shall sign the following statement:

   *I certify that the institution has adequate funds to cover the costs of the new program. Furthermore, the new program will not reduce the effectiveness or quality of existing programs at the institution.*

   __________________________  __________________________
   Chief Executive Officer      Date

2. **Board of Regents or Designee Approval** – A member of the Board of Regents or designee shall sign the following statement:

   *On behalf of the Board of Regents, I approve the program.*

   __________________________  __________________________
   Board of Regents (Designee)  Date of Approval

3. **Board of Regents Certification of Criteria for Commissioner of Assistant Commissioner Approval** – For a program to be approved by the Commissioner or the Assistant Commissioner for Academic Affairs and Research, the Board of Regents or designee must certify that the new program meets the eight criteria under TAC Section 5.50 (b): The criteria stipulate that the program shall:

   (1) be within the institution’s current Table of Programs;
   (2) have a curriculum, faculty, resources, support services, and other components of a degree program that are comparable to those of high quality programs in the same or similar disciplines at other institutions;
   (3) have sufficient clinical or in-service sites, if applicable, to support the program;
   (4) be consistent with the standards of the Commission of Colleges of the Southern Association of Colleges and Schools and, if applicable, with the standards or discipline-specific accrediting agencies and licensing agencies;
   (5) attract students on a long-term basis and produce graduates who would have opportunities for employment; or the program is appropriate for the development of a well-rounded array of basic baccalaureate degree programs at the institution;
   (6) not unnecessarily duplicate existing programs at other institutions;
   (7) not be dependent on future Special Item funding
   (8) have new five-year costs that would not exceed $2 million.

   *On behalf of the Board of Regents, I certify that the new program meets the criteria specified under TAC Section 5.50 (b).*

   __________________________  __________________________
   Board of Regents (Designee)  Date

*Updated 06.07.2010*
Texas A&M University
Request for a Change in Curriculum
Undergraduate • Graduate • Professional

1. Program request type: ☑ Undergraduate ☑ Graduate ☐ First Professional (M.M., J.D., M.D., etc.)
2. Request change for: ☐ Degree Program ☐ Minor ☑ Certificate
3. Request submitted by (Department or Program Name): Biomedical Engineering
   Program Designation and Name: Certificate in Quality Engineering for Regulated Medical Technologies
4. (e.g., B.A. in History, Minor in History, Certificate in European Union)
5. Brief description of change:
   Change to primary contact for the certificate as well as adjustments and additions to the courses that can satisfy this requirement.

6. Rationale for change:
   Now that Dr. Criscione is the Dean of Graduate Programs, an updated contact was needed. We have also recently discovered some typos in the original submission as well as found additional courses that have content relevant to this certificate.

---

Use the checkboxes below to make sure that all information is included.

7. a. Proposed curriculum attached. ☑ Yes ☐ No
    b. Current catalog curriculum with handwritten edits attached. ☑ Yes ☐ No
    c. Current Howdy degree evaluation with handwritten edits attached. ☐ Yes ☑ No

Please make sure the attached proposed curriculum, catalog and Howdy degree evaluation match.

8. a. Will degree program hours change (increase/decrease) due to the proposed curriculum changes? ☐ Yes ☑ No
    b. If yes, degree program hours will change from: ___ to: ___
    c. If yes, is the Texas Higher Education Coordinating Board form attached? ☐ Yes ☑ No

http://www.thecb.state.tx.us/index.cfm?objectid=A0F9F7FA-9A92-4F11-2736AD3BBFF01D60

9. If proposed changes affect other unit(s), are letters of support attached? ☐ Yes ☑ No

IMPORTANT NOTE: Curriculum changes submitted through the approval process and fully approved by February (December-UCC/GC, January-Faculty Senate, February-President) will be effective in the next academic year. Changes requiring approval beyond the University should complete the internal approval process early in the fall semester whenever possible in order to ensure timely implementation.

Approval recommended by:
Gerard L. Cote
Department Head or Program Chair (Type Name & Sign) Date: 8/28/14
Date of College Date: 9/12/14
Chair, College Review Committee Date: 9/12/14
Chair, GC or UCC Date:

Questions regarding this form should be directed to Curricular Services at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
* Proposal Checklist *

Requested by the Department or Unit of: BMEN

Program Type, Level, Designation, Title, Description, Hours
Program Type Certificate Program ☒ Degree Program ☐
Program Level Undergrad Certificate ☒ Grad Certificate ☒ Bachelor ☐ Master ☐ Doctoral ☐
Degree Designation (i.e. BS, BA, MA, MS, MAg, Med, PhD, EdD, etc.)
Title of proposed program: Certificate of Quality Engineering for Regulated Medical Technologies
Proposed CIP Code (if known): 

Brief program description (provide a catalog description for undergraduate and graduate certificates):

Quality engineering principles are mandated by federal and state regulations for clinical facilities and for the design, testing, and manufacture of medical technologies (such as pharmaceuticals and imaging, diagnostic, and therapeutic devices). Completion of this certificate requires specific instruction in quality engineering and regulation of medical technologies; moreover, candidates must go beyond understanding concepts and demonstrate appropriate usage of quality engineering principles in a medically related internship. Given the challenging demands for both better outcomes and lower costs in medical care, candidates for this certificate are expected to be entering a high-growth job market for engineers.

Minimum program semester credit hours (SCH) Certificates - 12 hours* Bachelors - 120 hours Masters - 30 hours
Proposed program hours: 12

*12 hours minimum to appear on transcript

Off-Campus or Distance Delivery
% of Program a student can take off-campus or through Distance Education
☐ 25% Fall 2013 Notification Only
☐ 50% Approval Required 6 months before first day of program
☐ 80% Approval Required 6 months before first day of program
☐ 100% Approval Required 6 months before first day of program

**Notification letter arranged through the Vice Provost for Academic Affairs and sent by TAMU President.

Program Delivery Mode
☐ On-campus Location College Station
☐ Broadcast / TTVN
☐ Specific off-campus location***
☐ Distance Education / Internet In-State ☐ Out-of-State ☐ Start Date
☐ Out-of-Country Will this program be offered with another institution? Yes ☐ No ☐
If yes, contact the Vice Provost for Academic Affairs for additional reporting requirements.

***Is this an approved SACS location? Yes ☐ No ☐ If no, a program prospectus must be sent to SACS.
Approved locations as of September 2009: TAMU-Galveston, TAMU-Qatar, University Center-The Woodlands, Dubai (EMBA)

Program Funding
Has program funding been finalized at the department or college level? Yes ☒ No ☐
If no, explain or attach budget: 

Will new costs for the first five years of the program be under $2 million? Yes ☒ No ☐
If new costs exceed $2 million, coordinating board approval is required.
Submitted by (Contact Person):
John C. Criscione, MD, PhD

Name
Associate Professor of Biomedical Engineering
Title

JCCriscione@tamu.edu
Email
979-845-5428
Phone

Certification Statement
By signing below, the Dean of the College certifies the proposed program complies with coordinating board standards. If the program is delivered through Distance Education, the Dean of the College certifies that they are following the Principles of Good Practice for Academic Degree and Certificate Programs and Credit Courses Offered Electronically.

Use additional signature lines if program is between three or more departments or colleges.

<table>
<thead>
<tr>
<th>Signature, Department Head or Interdisciplinary</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Chair</td>
<td></td>
</tr>
<tr>
<td>Gerard Cote</td>
<td></td>
</tr>
</tbody>
</table>

Typed or Printed Name

<table>
<thead>
<tr>
<th>Signature, Department Head or Interdisciplinary</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Chair (if joint program)</td>
<td></td>
</tr>
<tr>
<td>Cesar Malave</td>
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</tbody>
</table>

Typed or Printed Name

<table>
<thead>
<tr>
<th>Chair, College Review Committee</th>
<th>Date</th>
</tr>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Chair, University Curriculum Committee or Graduate Council</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chair, College Review Committee
date

Dean of College
date

Chair, University Curriculum Committee or Graduate Council
date

Additional Approvals Required: Faculty Senate and President.
New Program Request Form for Certificate Programs, Bachelor’s and Master’s Degrees

Directions: An institution shall use this form to propose a new bachelor’s or master’s degree program. In completing the form, the institution should refer to the document Standards for Bachelor’s and Master’s Programs, which prescribes specific requirements for new degree programs. Note: This form requires signatures of (1) the Chief Executive Officer, certifying adequacy of funding for the new program; (2) a member of the Board of Regents (or designee), certifying Board approval, and (3) if applicable, a member of the Board of Regents or (designee), certifying that criteria have been met for staff-level approval. NOTE: Preliminary authority is required for all engineering programs. An institution that does not have preliminary authority for a proposed engineering program shall submit a separate request for preliminary authority prior to submitting the degree program request form. That request shall address criteria set in Coordinating Board rules Section 5.24(a).

Administrative Information

1. Institution: Texas A&M University

2. Program Name – Show how the program would appear on the Coordinating Board’s program inventory (e.g., Bachelor of Business Administration degree with a major in Accounting):

   Certificate of Quality Engineering for Regulated Medical Technologies

3. Proposed CIP Code:

4. Brief Program Description – Describe the program and the educational objectives:

   Quality engineering principles are mandated by federal and state regulations for clinical facilities and for the design, testing, and manufacture of medical technologies (such as pharmaceuticals and imaging, diagnostic, and therapeutic devices). Completion of this certificate requires completion of the following educational outcomes: 1) to know and apply principles of quality engineering, 2) to know and understand the governmental regulation of medical technologies, and 3) be able to go beyond understanding concepts and demonstrate appropriate usage of quality engineering principles in a medically related internship. Given the challenging demands for both better outcomes and lower costs in medical care, candidates for this certificate are expected to be entering a high-growth job market for engineers.

   Number of Semester Credit Hours Required: 12 hrs

5. Administrative Unit – Identify where the program would fit within the organizational structure of the university (e.g., The Department of Electrical Engineering within the College of Engineering):

   College of Engineering

6. Proposed Implementation Date – Report the first semester and year that students would enter the program:

   Fall of 2013

Updated 06.07.2010
7. Contact Person – Provide contact information for the person who can answer specific questions about the program:

Name: Alan Brewer
Title: Professor of Practice in Biomedical Engineering
E-mail: bmen@tamu.edu
Phone: 979-845-5532

Program Information

I. Need

Note: Complete LA and LB only if preliminary authority for the program was granted more than four years ago. This includes programs for which the institution was granted broad preliminary authority for the discipline.

A. Job Market Need – Provide short- and long-term evidence of the need for graduates in the job market.
   The industry advisory board for Biomedical Engineering identified a need for more thorough training in the engineering specific, quality requirements that arise from the regulation of medical technologies. This deficiency is a national problem in biomedical engineering programs, and the advisory board recommended with highest priority that we launch a certificate program to give our graduates an opportunity to be highly visible and employable to the medical industry.

B. Student Demand – Provide short- and long-term evidence of demand for the program.
   The regulatory affairs classes for the BMEN department are elective and yet full every year (40+ students), and similarly for the quality courses in ISEN. Employers are in need of engineers with training in quality systems and in regulatory affairs, and hence students are also seeking these skills.

C. Enrollment Projections – Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. (Include majors only and consider attrition and graduation.)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headcount</td>
<td>10</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>FTSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Updated 06.07.2010
II. Q uality

A. **Certificate and Degree Requirements** – Use this table to show the certificate and degree requirements of the program. *(Modify the table as needed; if necessary, replicate the table for more than one option.)*

<table>
<thead>
<tr>
<th>Category</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Core Curriculum <em>(bachelor's degree only)</em></td>
<td></td>
</tr>
<tr>
<td>Required Courses</td>
<td>9</td>
</tr>
<tr>
<td>Prescribed Electives</td>
<td>3</td>
</tr>
<tr>
<td>Free Electives</td>
<td></td>
</tr>
<tr>
<td>Other <em>(Specify, e.g., internships, clinical work)</em> (if not included above)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>12</td>
</tr>
</tbody>
</table>

B. **Use the Curriculum** – these tables to identify required courses and prescribed electives of program, and curriculum as it will appear in the undergraduate and graduate catalog. Note with an asterisk (*) courses that would be added if the program is approved. *(Add and delete rows as needed. If applicable, replicate the tables for different tracks/options as shown in the undergraduate catalog.)*

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Required Course in Regulatory Affairs</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEN 440</td>
<td>Design and Manufacture of Medical Devices</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 640</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>BMEN 404</td>
<td>Design and Manufacture of Medical Devices</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 604</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>BMEN 430</td>
<td>Medical Device Testing</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 630</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>BMEN 430</td>
<td>Medical Device Regulation</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 630</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>Prefix and Number</td>
<td>Required Course in Quality</td>
<td>SCH</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>ISEN 314</td>
<td>Statistical Quality Control</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>OR</strong></td>
<td></td>
</tr>
<tr>
<td>ISEN 414</td>
<td>Total Quality Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>OR</strong></td>
<td></td>
</tr>
<tr>
<td>ISEN 614</td>
<td>Advanced Quality Control</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Required Internship</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXEN 485</td>
<td>Internship (position must be approved by certificate faculty to meet experience needs)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>OR</strong></td>
<td></td>
</tr>
<tr>
<td>XXEN 684</td>
<td>Internship (position must be approved by certificate faculty to meet experience needs)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Prescribed Elective Courses, Choose 1 (Choice cannot be a course used to satisfy the required courses, and both the undergrad and grad versions of the same course cannot be used, e.g. BMEN 404 and 604 cannot both count towards fulfilling requirements)</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEN 404</td>
<td>Medical Device Testing</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 604</td>
<td>Medical Device Testing</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 407</td>
<td>Clinical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 607</td>
<td>Clinical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 430</td>
<td>Medical Device Regulation</td>
<td>3</td>
</tr>
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<td>Medical Device Regulation</td>
<td>3</td>
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<td>BMEN 440</td>
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<td>3</td>
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</tr>
<tr>
<td>ENTC 418</td>
<td>Medical Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 314</td>
<td>Statistical Quality Control</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 614</td>
<td>Total Quality Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

*Updated 06.07.2010*
C. **Faculty** – Use these tables to provide information about Core and Support faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program. *(Add and delete rows as needed.)*

<table>
<thead>
<tr>
<th>Name of <strong>Core</strong> Faculty and Faculty Rank</th>
<th>Highest Degree and Awarding Institution</th>
<th>Courses Assigned in Program</th>
<th>% Time Assigned To Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewer, Alan Professor of Practice</td>
<td>BS in Biomedical Engineering, Texas A&amp;M University</td>
<td>BMEN Courses</td>
<td>15%</td>
</tr>
<tr>
<td>Pishko, Michael Professor</td>
<td>PhD in Chemical Engineering University of Texas-Austin</td>
<td>BMEN Courses</td>
<td>10%</td>
</tr>
<tr>
<td>Ding, Yu Professor</td>
<td>PhD in Mechanical Engrng University of Michigan</td>
<td>ISEN Courses</td>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of <strong>Support</strong> Faculty and Faculty Rank</th>
<th>Highest Degree and Awarding Institution</th>
<th>Courses Assigned in Program</th>
<th>% Time Assigned To Program</th>
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</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

D. **Students** – Describe general recruitment efforts and admission requirements. In accordance with the institution’s Uniform Recruitment and Retention Strategy,
Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
• Proposal Checklist •

Requested by the Department or Unit of: BMEN

Program Type, Level, Designation, Title, Description, Hours
Program Type Certificate Program ☒ Degree Program ☐
Program Level Undergrad Certificate ☒ Grad Certificate ☒ Bachelor ☐ Master ☐ Doctoral ☐
Degree Designation (i.e., BS, BA, MA, MS, MAg, Med, PhD, EdD, etc.)

Title of proposed program: Certificate of Quality Engineering for Regulated Medical Technologies

Proposed CIP Code (if known):

Brief program description (provide a catalog description for undergraduate and graduate certificates):
Quality engineering principles are mandated by federal and state regulations for clinical facilities and for the design, testing, and manufacture of medical technologies (such as pharmaceuticals and imaging, diagnostic, and therapeutic devices). Completion of this certificate requires specific instruction in quality engineering and regulation of medical technologies; moreover, candidates must go beyond understanding concepts and demonstrate appropriate usage of quality engineering principles in a medically related internship. Given the challenging demands for both better outcomes and lower costs in medical care, candidates for this certificate are expected to be entering a high-growth job market for engineers.

Minimum program semester credit hours (SCH) Certificates - 12 hours* Bachelors - 120 hours Masters - 30 hours

Proposed program hours: 12

*12 hours minimum to appear on transcript

Off-Campus or Distance Delivery
% of Program a student can take off-campus or through Distance Education
- ☒ 25%
- ☐ 50%
- ☐ 80%
- ☐ 100%

Program Start Date SACS Approval** When Provost needs to inform SACS
- Fall 2013 Notification Only 

☐ 6 months before first day of program

**Notification letter arranged through the Vice Provost for Academic Affairs and sent by TAMU President.

Program Delivery Mode
Location
- ☒ On-campus College Station
- ☐ Broadcast / TTVN
- ☐ Specific off-campus location***
- ☐ Distance Education / Internet In-State ☐ Out-of-State ☐ Start Date 
- ☐ Out-of-Country

Will this program be offered with another institution? Yes ☐ No ☐ If yes, contact the Vice Provost for Academic Affairs for additional reporting requirements.

***Is this an approved SACS location? Yes ☐ No ☐ If no, a program prospectus must be sent to SACS.
Approved locations as of September 2009: TAMU-Galveston, TAMU-Qatar, University Center-The Woodlands, Dubai (EMBA)

Program Funding
Has program funding been finalized at the department or college level? Yes ☒ No ☐
If no, explain or attach budget:

Will new costs for the first five years of the program be under $2 million? Yes ☒ No ☐
If new costs exceed $2 million, coordinating board approval is required.
Submitted by (Contact Person):
John C. Cricione, MD, PhD

Name
Associate Professor of Biomedical Engineering

Title

Email
JCCricione@tamu.edu

Phone
979-845-5428

Certification Statement
By signing below, the Dean of the College certifies the proposed program complies with coordinating board standards. If the program is delivered through Distance Education, the Dean of the College certifies that they are following the Principles of Good Practice for Academic Degree and Certificate Programs and Credit Courses Offered Electronically.

Use additional signature lines if program is between three or more departments or colleges.

Signature, Department Head or Interdisciplinary Program Chair
Gerard Cote'
Typed or Printed Name

Date

Signature, Department Head or Interdisciplinary Program Chair (if joint program)
Cesar Malave'
Typed or Printed Name

Date

Chair, College Review Committee

Date

Dean of College

Date

Chair, University Curriculum Committee or Graduate Council

Date

Additional Approvals Required: Faculty Senate and President.

New Contact Person:
Alan Brewer
Professor of Practice
bmen@tamu.edu
979-845-5532
New Program Request Form for Certificate Programs, Bachelor’s and Master’s Degrees

Directions: An institution shall use this form to propose a new bachelor's or master’s degree program. In completing the form, the institution should refer to the document ‘Standards for Bachelor’s and Master’s Programs,’ which prescribes specific requirements for new degree programs. Note: This form requires signatures of: (1) the Chief Executive Officer, certifying adequacy of funding for the new program, (2) a member of the Board of Regents (or designee), certifying board approval; and (3) if applicable, a member of the Board of Regents (or designee), certifying that criteria have been met for staff-level approval. NOTE: Preliminary authority is required for all engineering programs. An institution that does not have preliminary authority for a proposed engineering program shall submit a separate request for preliminary authority prior to submitting the degree program request form. That request shall address criteria set in Coordinating Board rules Section 5.24(e).

Administrative Information

1. Institution: Texas A&M University

2. Program Name – Show how the program would appear on the Coordinating Board’s program inventory (e.g., Bachelor of Business Administration degree with a major in Accounting):

Certificate of Quality Engineering for Regulated Medical Technologies

3. Proposed CIP Code:

4. Brief Program Description – Describe the program and the educational objectives:

Quality engineering principles are mandated by federal and state regulations for clinical facilities and for the design, testing, and manufacture of medical technologies (such as pharmaceuticals and imaging, diagnostic, and therapeutic devices). Completion of this certificate requires completion of the following educational outcomes: 1) to know and apply principles of quality engineering, 2) to know and understand the governmental regulation of medical technologies, and 3) be able to go beyond understanding concepts and demonstrate appropriate usage of quality engineering principles in a medically related internship. Given the challenging demands for both better outcomes and lower costs in medical care, candidates for this certificate are expected to be entering a high-growth job market for engineers.

Number of Semester Credit Hours Required: 12 hrs

5. Administrative Unit – Identify where the program would fit within the organizational structure of the university (e.g., The Department of Electrical Engineering within the College of Engineering):

College of Engineering

6. Proposed Implementation Date – Report the first semester and year that students would enter the program:

Fall of 2013

Updated 06.07.2010
Program Information

I. Need

Note: Complete I.A and I.B only if preliminary authority for the program was granted more than four years ago. This includes programs for which the institution was granted broad preliminary authority for the discipline.

A. Job Market Need – Provide short- and long-term evidence of the need for graduates in the job market.

The industry advisory board for Biomedical Engineering identified a need for more thorough training in the engineering specific, quality requirements that arise from the regulation of medical technologies. This deficiency is a national problem in biomedical engineering programs, and the advisory board recommended with highest priority that we launch a certificate program to give our graduates an opportunity to be highly visible and employable to the medical industry.

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The regulatory affairs classes for the BMEN department are elective and yet full every year (40+ students), and similarly for the quality courses in ISEN. Employers are in needs of engineers with training in quality systems and in regulatory affairs, and hence students are also seeking these skills.

C. Enrollment Projections – Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. (Include majors only and consider attrition and graduation.)

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</thead>
<tbody>
<tr>
<td>Headcount</td>
<td>10</td>
<td>20</td>
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<td>30</td>
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</tr>
<tr>
<td>FTSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Updated 06.07.2019
II. Quality

A. Certificate and Degree Requirements – Use this table to show the certificate and degree requirements of the program. (Modify the table as needed; if necessary, replicate the table for more than one option.)

<table>
<thead>
<tr>
<th>Category</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>General Education Core Curriculum (bachelor's degree only)</td>
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<td>Required Courses</td>
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</tr>
<tr>
<td>Prescribed Electives</td>
<td>3</td>
</tr>
<tr>
<td>Free Electives</td>
<td></td>
</tr>
<tr>
<td>Other (Specify, e.g., internships, clinical work)</td>
<td>(if not included above)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12</td>
</tr>
</tbody>
</table>

B. Use the the the Curriculum – these tables to identify required courses and prescribed electives of program, and curriculum as it will appear in the undergraduate and graduate catalog. Note with an asterisk (*) courses that would be added if the program is approved. (Add and delete rows as needed. If applicable, replicate the tables for different tracks/options as shown in the undergraduate catalog.)

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<thead>
<tr>
<th>Prefix and Number</th>
<th>Required Course in Regulatory Affairs</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEN 440</td>
<td>Design and Manufacture of Medical Devices OR</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 60440</td>
<td>Design and Manufacture of Medical Devices OR</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 404</td>
<td>Medical Device Testing OR</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 604</td>
<td>Medical Device Testing OR</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 430</td>
<td>Medical Device Regulation OR</td>
<td>3</td>
</tr>
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<td>BMEN 630</td>
<td>Medical Device Regulation OR</td>
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</table>

Updated 06.07.2010
### Required Course in Quality

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Required Course in Quality</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEN 314</td>
<td>Statistical Quality Control</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>ISEN 414</td>
<td>Total Quality Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>ISEN 614</td>
<td>Advanced Quality Control</td>
<td>3</td>
</tr>
</tbody>
</table>

### Required Internship

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Required Internship</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXEN 485</td>
<td>Internship (position must be approved by certificate faculty to meet experience needs)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>XXEN 485</td>
<td>Internship (position must be approved by certificate faculty to meet experience needs)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Prescribed Elective Courses, Choose 1 (Choice cannot be a course used to satisfy the required courses, and both the undergrad and grad versions of the same course cannot be used, e.g. BMEN 404 and 604 cannot both count towards fulfilling requirements)

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Prescribed Elective Courses</th>
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<tbody>
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<td>Total Quality Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 614</td>
<td>Advanced Quality Control</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 616</td>
<td>Design and Analysis of Industrial Experiments</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 407</td>
<td>Clinical Engineering</td>
<td></td>
</tr>
<tr>
<td>BMEN 407</td>
<td>Laboratory Quality Systems</td>
<td></td>
</tr>
<tr>
<td>BMEN 407</td>
<td>Medical Manufacturing</td>
<td></td>
</tr>
<tr>
<td>VTMI 4121</td>
<td>Laboratory Quality Systems</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 418</td>
<td>Medical Manufacturing</td>
<td></td>
</tr>
</tbody>
</table>

Updated 06.07.2019
C. **Faculty** – Use these tables to provide information about *Core* and *Support* faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program. *(Add and delete rows as needed.)*

<table>
<thead>
<tr>
<th>Name of Core Faculty and Faculty Rank</th>
<th>Highest Degree and Awarding Institution</th>
<th>Courses Assigned in Program</th>
<th>% Time Assigned To Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criscione, John Assistant Professor</td>
<td>MD, PhD in Biomedical Engineering, Johns Hopkins</td>
<td>BMEN Courses</td>
<td>15%</td>
</tr>
<tr>
<td>Pishko, Michael Professor</td>
<td>PhD in Chemical Engineering University of Texas-Austin</td>
<td>BMEN Courses</td>
<td>10%</td>
</tr>
<tr>
<td>Ding, Yu Professor</td>
<td>PhD in Mechanical Engrng University of Michigan</td>
<td>ISEN Courses</td>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Support Faculty and Faculty Rank</th>
<th>Highest Degree and Awarding Institution</th>
<th>Courses Assigned in Program</th>
<th>% Time Assigned To Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alan Brewer, Professor of Practice</td>
<td>BS, Texas A&amp;M University</td>
<td>BMEN Courses</td>
<td>15%</td>
</tr>
</tbody>
</table>

D. **Students** – Describe general recruitment efforts and admission requirements. In accordance with the institution’s Uniform Recruitment and Retention Strategy, describe plans to recruit, retain, and graduate students from underrepresented groups for the program.

This program is open to students enrolled in graduate or undergraduate programs at TAMU. However, the courses are upper level engineering courses, and hence, students outside of engineering may have difficulty enrolling in certificate courses—approval of instructor is often needed for non engineering majors to take upper level engineering courses. This certificate program will be used by engineering departments to better recruit students who, during their careers, plan to make an impact in healthcare through technological innovation.

*Updated 06.07.2010*
Special Consideration
Items
September 16, 2014

MEMORANDUM

TO:        Mark Zoran  
           Chair, Graduate Council

FROM:      Dr. John Criscione  
           Assistant Dean for Graduate Programs

SUBJECT:   Administrative change proposal for the Master of Science degree in 
           Engineering Systems Management (ENSM)

The Department of Industrial & Systems Engineering desires that the ENSM 
program be administered as a graduate offering of the Industrial and Systems Engineering 
Department and that the responsibility for the ENSM program be solely with the ISEN 
Department Head. The program will thus be managed along with the remainder of our 
graduate programs by the Graduate Program Director of the ISEN Department.
August 1, 2014

James R. Hallmark, Ph.D.
Vice Chancellor for Academic Affairs
The Texas A&M University System
301 Tarrow, 7th Floor
College Station, Texas 77840

Dear Dr. Hallmark:

Attached is an administrative change proposal for the Master of Science degree in Engineering Systems Management (ENSM).

The Department of Industrial & Systems Engineering desires that the ENSM program be administered as a graduate offering of the Industrial and Systems Engineering Department and that the responsibility for the ENSM program be solely with the ISEN Department Head. The program will thus be managed along with the remainder of our graduate programs by the Graduate Program Director of the ISEN Department.

The background of the ENSM program and the rationale of this proposed change are attached for your review.

Respectfully submitted,

César O. Malave, Ph.D.
Department Head of ISEN
Professor and holder of the Sugar and Mike Barnes
Department Head Chair

Approval Recommended:

James R. Hallmark, Ph.D.
Vice Chancellor for Academic Affairs
Administrative Change Request for Academic Reorganization of the Engineering Systems Management Program

EXECUTIVE SUMMARY

Proposed Administrative Change

The Department of Industrial & Systems Engineering requests permission to let the ENSM program be administered as a graduate offering of the Industrial and Systems Engineering Department and that the responsibility for the ENSM program be solely with the ISEN Department Head. The program will thus be managed along with the remainder of our graduate programs by the Graduate Program Director of the ISEN Department.

The current Graduate Catalog does not accurately reflect the nature or administration of the ENSM program. ISEN requests the Graduate Catalog be changed from the current description (page 153, 2012-13 version):

“The Degree of Master of Science in Engineering Systems Management

Through the departments of Industrial and Systems Engineering and Information and Operations Management, the Master of Science – Engineering Systems Management (MS) degree is offered under the joint auspices of the Dwight Look College of Engineering and the Mays Business School. The program is non-thesis, interdisciplinary and jointly administrated by the Engineering and Business faculty to provide a student with comprehensive assemblage of manufacturing management skill.”

to the following description:

“The Degree of Master of Science in Engineering Systems Management

Through its Department of Industrial and Systems Engineering, the Dwight Look College of Engineering offers a non-thesis program leading to the degree of Master of Science – Engineering Systems Management. It is intended to provide a student with a comprehensive assemblage of systems, modeling and management skills.”

Rationale:

In the late 1990’s an online distance learning M.S. degree program in Life Cycle Engineering and Operations Management was established and jointly administrated by the Department of
Industrial Engineering (Dwight Look College of Engineering) and the Department of Information and Operations Management (Mays Business School). Several years after the establishment of the program, the co-director from the Mays School (Dr. Robert Davis) left the University, and administration of the program was transferred solely to the Department of Industrial Engineering. By 2000, all formal ties with the Mays School has been abandoned, Dr. Don Smith (ISEN) was first named director of the program. After 2011, the program was managed by the Graduate Program Director of ISEN (initially Dr. Guy Curry and now Dr. Yu Ding). All core courses were taught by Department of Industrial and Systems Engineering Faculty. In this time frame, the program was renamed the M.S. degree program in Engineering Systems Management (ENSM). Thus for at least 15 years, the program has not been an interdisciplinary program.

Cost Implications

The ENSM program has been de facto administrated solely by ISEN for fifteen years. After this proposed change, no addition cost will incur.

Effective Date:

January 1, 2015
Administrative Change Request Form
Modification of Administrative Unit

**Directions:** An institution shall use this form to propose the creation of or a change to an academic unit such as a department, school, or college that administers certificate and/or degree program(s). All sections should be completed unless noted otherwise.

**Information:** Contact the System Office of Academic Affairs at 979-458-6072 for more information.

---

**Administrative Information**

1. **Institution** – Department of Industrial & Systems Engineering

2. **Description** – The Department of Industrial & Systems Engineering requests that the Master of Science degree in Engineering Systems Management (ENSM) program be administered as a graduate offering of the Industrial and Systems Engineering Department and that the responsibility for the ENSM program be solely with the ISEN Department Head. The program will thus be managed along with the remainder of our graduate programs by the Graduate Program Director of the ISEN Department.

3. **Reason for Change** – In the late 1990’s an online distance learning M.S. degree program in Life Cycle Engineering and Operations Management was established and jointly administered by the Department of Industrial Engineering (Dwight Look College of Engineering) and the Department of Information and Operations Management (Mays Business School). Several years after the establishment of the program, the co-director from the Mays School (Dr. Robert Davis) left the University, and administration of the program was transferred solely to the Department of Industrial Engineering. By 2000, all formal ties with the Mays School has been abandoned, Dr. Don Smith (ISEN) was first named director of the program. After 2011, the program was managed by the Graduate Program Director of ISEN (initially Dr. Guy Curry and now Dr. Yu Ding). All core courses were taught by Department of Industrial and Systems Engineering Faculty. In this time frame, the program was renamed the M.S. degree program in Engineering Systems Management (ENSM). Thus for at least 15 years, the program has not been an interdisciplinary program.

4. **Program Inventory** – Show how the change would appear on the Coordinating Board’s Program Inventory. Include all degree programs and corresponding Texas CIP codes affected by the change but do not include proposed administrative unit codes for the new academic unit(s). Board staff will assign the new administrative unit codes.

   The Texas CIP for the ENSM program is 14.3501.00 (Industrial Engineering). After the proposed change, the program’s Texas CIP code remains the same.

5. **Proposed Implementation Date** – Report the date that the change would go into effect.

   January 1, 2015.

6. **Contact Person** – Provide contact information for the person who can answer specific questions about the administrative change.

   Name: Dr. Yu Ding
<table>
<thead>
<tr>
<th>Title: Director of Graduate Program, ISEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email: <a href="mailto:yuding@iemail.tamu.edu">yuding@iemail.tamu.edu</a></td>
</tr>
<tr>
<td>Telephone: 979-458-2343</td>
</tr>
</tbody>
</table>
I. **Impact**

A. **Role and Mission** – Describe how the change would affect the role and mission of the institution.

The proposed change does not affect the role and mission of the institution.

B. **Program Support and Development**

1. Describe how the change would affect existing degree programs and plans for new degree programs.
2. Indicate how many students and faculty there would be in the proposed administrative unit, by level and by degree program.
3. Describe how the proposed administrative unit would compare to existing administrative units at the same level (e.g., department, college, school, etc.) in terms of cost and number of students and faculty supported.

The ENSM program has been *de facto* managed solely by ISEN for the past fifteen years. All core courses were taught by the ISEN faculty. The proposed change does not affect existing degree program or plans for new degree programs.

Currently, ISEN has about 50 students in the ENSM program and 19 tenured/tenure-track faculty members.

C. **Accreditation** – Explain how the change would affect accreditation or re-accreditation.

The proposed change does not affect accreditation or re-accreditation.

D. **Resources** – Describe how the change would affect resources (e.g., number of employees, salaries of key administrators and faculty, the course inventory, facilities, and equipment) for the next five years.

The proposed change does not affect resources, as it will be administrated as it has been in the past fifteen years.

II. **Costs and Funding**

**Five-year Costs and Funding Sources** – Use this table to show five-year costs and sources of funding for the change. (New five-year costs that equal or exceed $2 million must be approved by the Coordinating Board at one of its quarterly meetings.)

The proposed change does not add new costs nor request new sources of funding, as it has been managed by the ISEN faculty for the past fifteen years, and will continue the same way of administration and offering.

<p>| Five-Year Costs | Five-Year Funding |</p>
<table>
<thead>
<tr>
<th></th>
<th>$0</th>
<th>Reallocated Funds&lt;sup&gt;3&lt;/sup&gt;</th>
<th>$0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities and Equipment</td>
<td>$0</td>
<td>Anticipated New Formula Funding&lt;sup&gt;4&lt;/sup&gt;</td>
<td>$0</td>
</tr>
<tr>
<td>Library, Supplies, and Materials</td>
<td>$0</td>
<td>Special Item Funding</td>
<td>$0</td>
</tr>
<tr>
<td>Other&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$0</td>
<td>Other&lt;sup&gt;5&lt;/sup&gt;</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td><strong>$0</strong></td>
<td><strong>Total Funding</strong></td>
<td><strong>$0</strong></td>
</tr>
</tbody>
</table>

1. Report costs for new administrative positions and new support staff. For new faculty, prorate individual salaries as a percentage of the time assigned to administer the new academic unit and any new programs under that unit. If existing faculty and support staff will be reassigned to administer the academic unit, include personnel costs necessary to maintain existing administrative efforts and existing programs. (e.g., costs of adjuncts to cover courses previously taught by faculty who would now administer a new academic unit.)

2. Report other administrative costs here (e.g., new accreditation costs, travel directly related to administrative unit.)

3. If existing funding would be used to support the new administrative unit, indicate the funding sources and how the reallocation of funds would affect existing administrative units and programs.

4. Not generally applicable to administrative change requests. Show formula funding for students new to the institution in tables of costs and funding for new degree programs.

5. Report other sources of funding such as debt service, gifts, in-hand grants, and likely future grants that would directly support the new administrative unit.
Signature Page

1. **Adequacy of Funding** – The chief executive officer shall sign the following statement:

   I certify that the institution has adequate funds to complete the administrative change and to support any new or reorganized academic unit(s). Furthermore, the change will not reduce the effectiveness or quality of existing programs, departments, schools, or colleges.

   ________________________________ Date
   Chief Executive Officer

2. **System Office of Academic Affairs Approval**

   On behalf of the A&M System, I certify that the Office of Academic Affairs has approved the administrative unit.

   ________________________________ Date
   James R. Hallmark, Ph.D.
Certification Form for Program Revisions  
Texas Higher Education Coordinating Board

Directions: An institution shall use this form to request an administrative change that meets all criteria for automatic approval in Coordinating Board Rules, Chapter 5, Subchapter C, Section 5.44: (a) The administrative change has institutional and board of regents approval, (b) the institution certifies that adequate funds are available to cover the costs of the administrative change, (c) new costs during the first five years would not exceed $2 million, and (d) the administrative change meets all other criteria in Section 5.47 of Board Rules (relating to Criteria for Administrative Change Requests).

If an administrative change does not meet the criteria above, an institution must submit a request using the Administrative Change Request Form.

An institution may also use this form to report the creation or change to a unit that does not administer a certificate or degree program (e.g., a research center) to update the Program Inventory.

Information: Contact the Division of Academic Affairs and Research at 512/427-6200 for more information.

Administrative Information

1. Institution: Department of Industrial & Systems Engineering

2. Description of Administrative Change: (e.g., create a new Department of Sociology; merge existing College of Science and College of Liberals Arts into a new College of Arts and Science, etc.)

   The Department of Industrial & Systems Engineering requests that the Master of Science degree in Engineering Systems Management (ENSM) program be administered as a graduate offering of the Industrial and Systems Engineering Department and that the responsibility for the ENSM program be solely with the ISEN Department Head. The program will thus be managed along with the remainder of our graduate programs by the Graduate Program Director of the ISEN Department.

3. Program Inventory – Show how the change would appear on the Coordinating Board’s Program Inventory. Include all degree programs and corresponding Texas CIP codes affected by the change but do not include proposed administrative unit codes for the new academic unit(s). Board staff will assign the new administrative unit codes.

   The Texas CIP for the ENSM program is 14.3501.00 (Industrial Engineering). After the proposed change, the program’s Texas CIP code remains the same.

4. Implementation Date:

   January 1, 2015.

5. Contact Person: Provide contact information for the person who can answer specific questions about the program.

   Name: Dr. Yu Ding

   Title: Director of Graduate Program, ISEN
Signature Page

I hereby certify that all of the following criteria have been met in accordance with the procedures outlined in Coordinating Board Rules, Chapter 5, Subchapter C, Section 5.44:

(a) The administrative change has institutional approval.

(b) The institution certifies that adequate funds are available to cover the costs of the administrative change.

(c) New costs during the first five years would not exceed $2 million.

(d) The administrative change meets all other criteria in Section 5.47 of Board Rules (relating to Criteria for Administrative Change Requests):

(1) The administrative overhead of universities and health-related institutions should be kept low to insure that most of the funds appropriated for higher education go toward the costs of instruction.

(2) The administrative costs of new academic units, particularly colleges and schools, should not be so high as to detract from the quality of the programs the administrative unit contains.

I understand that the Coordinating Board will update the program inventory of the institution to reflect the administrative change if no objections to the proposed administrative change are received during the 30-day public comment period.

__________________________________________  _________________________
Chief Executive Officer                          Date

2. TAMUS Office of Academic Affairs Approval

On behalf of the A&M System, I certify that the Office of Academic Affairs has approved the administrative unit.

__________________________________________  _________________________
James R. Hallmark, Ph.D.                            Date
MEMORANDUM

TO: Cesare Malave  
ISEN Department Head, Look College of Engineering

FROM: Rich Metters  
INFO Department Head, Mays Business School  
4217 TAMU

DATE: August 1, 2014

SUBJECT: Support for ISEN to be the sole administering body for the MS-Engineering Systems Management degree

The INFO Department supports the move by the College of Engineering to have sole responsibility for the MS-ENSM degree.

[Signature]
MEMORANDUM

TO: Dr. Mark Zoran
   Graduate Council Chair
   Texas A&M University

THROUGH: Dr. M. Katherine Banks
   Vice Chancellor and Dean of Engineering
   Director, Texas A&M Engineering Experiment Station

THROUGH: N. K. Anand
   Executive Associate Dean
   College of Engineering

THROUGH: Dr. Valerie Taylor
   Senior Associate Dean for Academic Affairs
   College of Engineering

THROUGH: Dr. John Criscione
   Assistant Dean for Graduate Programs
   College of Engineering

FROM: Yassin A. Hassan
   Head
   Department of Nuclear Engineering

SUBJECT: Elimination of the Master of Science degree in Health Physics

The Department of Nuclear Engineering is requesting the elimination of the Master of Science in Health Physics. This request comes from the faculty within the department, and was voted and agreed upon at the February 7, 2014, departmental faculty meeting. A decision was made to create a Health Physics specialization in the Master of Science in Nuclear Engineering’s degree program.

The Teach-Out Plan for the Master of Science in Health Physics is attached.
Teach-out Plan

MS in Health Physics
Nuclear Engineering
College of Engineering
Texas A&M University

Adapted from the Southern Association of Colleges and Schools Commission on Colleges Substantive Change for Accredited Institutions of the Commission of Colleges.

1. Date of program closure. Fall 2015

2. An explanation of how affected parties (students, faculty, staff) will be informed of the impending closure.

   Departmental faculty discussed the state of the MS Health Physics degree at a routine meeting. The Faculty took a vote and decided to eliminate the program.

   Students in the program were called to a meeting to discuss the future of the Health Physics program. The Department Head, Graduate Faculty Advisor, Graduate Program Coordinator, and several faculty members were present at the student meeting. The students were reassured from the DH that the department is committed to this program and to seeing that they have the available resources to complete their degree.

   The decision was made this year to not admit any new students into the program for the Fall 2014 semester. Prospective students who demonstrated interest in this field were informed about the elimination of our MS Health Physics degree, but that they may instead pursue a MS Nuclear Engineering degree and specialize in Health Physics. Also, students were informed that stand alone HP courses would not be offered past the next academic year, but instead individual NUEN courses will modify their current curriculum to include HP material.

3. An explanation of how students will be helped to complete their programs of study with minimal disruption or additional expense. The department did an assessment of the remaining courses for the students in this degree program. Over the next academic year, the department will offer any remaining courses for the students to complete their degree plans.

4. Signed copies of teach-out agreements with other institutions, if any. N/A

5. How faculty and staff will be redeployed or helped to find new employment N/A

6. If closing an institution, arrangement for the storing of student records, disposition of final financial resources and other assets. N/A

7. Please provide the following additional information:
   a. How many students are currently enrolled in the program? Total of 14 students
   b. Projected graduation date for the last student(s) in the program? Fall 2015

NOTE: If students will not be moved to another program, you will need to extend the program closure date in order to continue to award degrees to current students under the existing program.
Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
Undergraduate • Graduate • Professional
• Proposal Checklist •

Program request type: ☐ Undergraduate □ Graduate ☐ First Professional (e.g., DVM, JD, MD, etc.)
Requested by the Department or Unit of: Texas A&M Energy Institute

**Program Type, Level, Designation, Title, Description, Hours**
Program Type: ☐ Certificate Program □ Degree Program
Program Level: ☐ UG Certificate ☐ Grad Certificate ☐ Bachelor □ Master ☐ Doctoral ☐ Professional
Degree Designation (i.e., BS, BA, MA, MS, MAg, MEd, PhD, EdD, etc.) Executive Master of Science in Energy
Title of proposed program: Executive Master of Science in Energy Degree Program
Proposed CIP Code (if known): ____

**Brief program description (provide a catalog description for undergraduate and graduate certificates):**
The “Executive Master of Science in Energy” program is designed to introduce students/professionals to the multiple interdisciplinary facets of energy that range from overview of energy technologies (fossil-based, renewable, and non-fossil based), to multi-scale energy systems engineering methods, to materials for energy, to economics and finance, to business, to entrepreneurship, to law, and their interactions. The students/professionals will be exposed to (a) important energy challenges and opportunities, and (b) advances in theory, methods, technologies, and applications delivered by energy leaders from academia, industry, and government, through a module-based structure and a distinguished seminar series. Emphasis will be placed on creating the new generation of energy educated students and professionals who will be broadly educated on all components of energy through quantitative analytical methods and multi-scale systems based approaches.

Minimum program semester credit hours (SCH) Certificates - 12 hours* Bachelors - 120 hours Masters - 30 hours
Proposed program hours: ____ ____ 32

*12 hours minimum to appear on transcript

Certificate Programs □ Embedded □ Standalone
Students take coursework that will result in a degree and certificate being earned at the same time. Non-degree seeking students take coursework to earn a certificate only (no degrees are awarded).

**Off-Campus or Distance Delivery**
% of Program a student can take off-campus or through Distance Education: □ 25% □ 50% □ 80% □ 100%
Program Start Date: Fall 2015
SACSCOC Approval**: □ Notification Only □ Approval Required
When Provost needs to inform SACSCOC: 6 months before first day of program

**Notification letter arranged through the Vice Provost for Academic Affairs and sent by TAMU President.**

**Program Delivery Mode**
Location: Texas A&M University, College Station Campus

☐ On-campus
☐ Broadcast / TTVN
☐ Specific off-campus location***
☐ Distance Education / Internet □ In-State □ Out-of-State Start Date Fall 2015
☐ Out-of-Country
Will this program be offered with another institution? □ Yes ☐ No
If yes, contact the Vice Provost for Academic Affairs for additional reporting requirements.
Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
Undergraduate • Graduate • Professional
• Proposal Checklist •

***Is this an approved SACSCOC location?  ☐ Yes  ☐ No  If no, a program prospectus must be sent to SACSCOC. Approved locations as of March 2012: TAMU-Galveston, TAMU-Qatar, University Center-The Woodlands, CityCentre-Houston, Dubai and Saudi Arabia.

Program Funding
Has program funding been finalized at the department or college level?  ☒ Yes  ☐ No
If no, explain or attach budget: 

Will new costs for the first five years of the program be under $2 million?  ☒ Yes  ☐ No
If new costs exceed $2 million, coordinating board approval is required.
Submitted by (Contact Person):

Dr. Costas N. Georgiades

Name

Interim Director of Texas A&M University Energy Institute

Title

glorhiades@tamu.edu

Email

979-845-7408

Phone

Certification Statement

By signing below, the Dean of the College certifies the proposed program complies with coordinating board standards. If the program is delivered through Distance Education, the Dean of the College certifies that they are following the Principles of Good Practice for Academic Degree and Certificate Programs and Credit Courses Offered Electronically.

Use additional signature lines if program is between three or more departments or colleges.

Signature, Department Head or Interdisciplinary Program Chair
Dr. Costas N. Georgiades

Typed or Printed Name

9/22/14

Chair, College Review Committee

Date

Dean of College

Date

Chair, University Curriculum Committee or Graduate Council

Date

Additional Approvals Required: Faculty Senate and President.
Proposal for the Creation of

“Inter-disciplinary Curricular Program in Energy”, (ICPE)
Graduate Curriculum: “Executive Master of Science in Energy” (Master of Science Degree and Certificate))

And

“Courses for the Graduate Curriculum of the
“Executive Master of Science in Energy”
(Master of Science Degree and Certificate)"

Professor Christodoulous A. Floudas
September 14, 2014

Part 1: “Inter-disciplinary Curricular Program in Energy”, (ICPE)

1. Rationale for the creation of (ICPE)

The proposed “Interdisciplinary Curricular Program in Energy”, (ICPE), led by the Texas A&M Energy Institute, aims at creating new educational initiatives and enhancing existing efforts towards meeting the challenges in the Energy domain. A primary goal of the Texas A&M Energy Institute and its proposed (ICPE) is to create innovative and interdisciplinary educational initiatives which will generate naturally synergistic efforts that will benefit the University. The proposed educational initiatives aim at addressing all facets of the Energy challenges that include (i) fossil-based, renewable, and non-fossil-based technologies for energy, (ii) materials for energy, (iii) multi-scale energy systems engineering, and (iv) economics, law, and policy for energy. As such, the proposed educational initiatives will involve faculty members from the whole Texas A&M University spanning the spectrum of (a) the College of Agriculture and Life Sciences; (b) the College of Engineering, (c) the College of Geosciences; (d) the College of Sciences; (e) the Bush School of Government and Public Policy; (f) the Mays Business School; (g) the College of Liberal Arts; and (h) the Law School.

1.1 Mission Statement of (ICPE)

The proposed “Interdisciplinary Curricular Program in Energy”, (ICPE), led by the Texas A&M Energy Institute, aims at creating transformative and integrative interdisciplinary educational initiatives that will address important Energy challenges.
1.2 Membership Criteria of (ICPE)

All faculty members of Texas A&M University who have educational interests in Energy will be welcome to participate in the (ICPE). As the Director of the Texas A&M Energy Institute, I will extend invitations to all such faculty members.

1.3 Executive Committee, (EC), of (ICPE)

The Executive Committee (EC) of the (ICPE) will consist of the Vice President for Research (VPR), the Deans of College of Agriculture & Life Sciences; College of Engineering; College of Geosciences; and College of Sciences, the Director of the Texas A&M Energy Institute and its Associate Director for External Relations. The Texas A&M Energy Institute and the proposed (ICPE) report to the VPR and the aforementioned Deans.

1.4 Leadership of (ICPE)

The leadership of the (ICPE) will be Professor C.A. Floudas (Director of Texas A&M Energy Institute, (EI); effective February 1, 2015) and Professor E.N. Pistikopoulos (Associate Director for External Relations of Texas A&M Energy Institute; effective February 1, 2015). Professors C.A. Floudas and E.N. Pistikopoulos have been working on all components of the proposed (ICPE) which includes the educational initiative “Executive MSc in Energy”. Professors C.A. Floudas, E.N. Pistikopoulos, and N. Karim (Head of Chemical Engineering) constitute the current graduate curriculum committee. The aforementioned educational initiative will offer (a) a “Certificate in Energy”, and (b) an “Executive MSc in Energy Degree”. During the 2014 summer, all course material for the proposed “Executive MSc in Energy” program will be prepared and will be presented subsequently to the Graduate Curriculum Council. During the 2014 Fall semester Professor C.A. Floudas will be visiting Texas A&M every two weeks to discuss, prepare material, and address any issues. Professor E.N. Pistikopoulos will join Texas A&M in early November 2014.

2. Sponsoring Entities of (ICPE)

The advocates for the proposed (ICPE) are: (a) the College of Agriculture and Life Sciences; (b) the College of Engineering, (c) the College of Geosciences; (d) the College of Sciences; and (e) the Vice President for Research (VPR).

3. Administrative Unit

The proposed administrative unit is the Texas A&M Energy Institute.

The Advisory and Evaluation Committee, (A&EC) will consist of the Vice President for Research, VPR, the Deans of the College of Agriculture & Life Sciences; College of Engineering; College of Geosciences; and College of Sciences, as well as External Assessors to be selected. Annually, one of the Deans/VPR will be selected to serve as the Lead of the A&EC.

5. Educational Aims of the Graduate Curricular Program

The proposed “Executive Master of Science in Energy” program will be run by the “Interdisciplinary Curricular Program in Energy”, (ICPE), led by the Texas A&M Energy Institute. It will involve faculty members from various departments and colleges that include (a) the College of Agriculture and Life Sciences; (b) the College of Engineering, (c) the College of Geosciences; (d) the College of Sciences; (e) the Bush School of Government and Public Policy; (f) the Mays Business School; (g) the College of Liberal Arts; and (h) the Law School.

The “Executive Master of Science in Energy” program is designed to introduce students/professionals to the multiple interdisciplinary facets of energy that range from overview of energy technologies (fossil-based, renewable, and non-fossil based), to multi-scale energy systems engineering methods, to materials for energy, to economics and finance, to business, to entrepreneurship, to law, and their interactions. The students/professionals will be exposed to (a) important energy challenges and opportunities, and (b) advances in theory, methods, technologies, and applications delivered by energy leaders from academia, industry, and government, through a module-based structure and a distinguished seminar series. Emphasis will be placed on creating the new generation of energy educated students and professionals who will be broadly educated on all components of energy through quantitative analytical methods and multi-scale systems based approaches.

The aims of the “Executive Master of Science in Energy” program are:

1. Educate students/professionals with the broad spectrum of important energy issues, energy technologies based on fossil and non-fossil resources, sustainable energy technologies, and their interactions with energy economics, entrepreneurship, law, and policy.

2. Enhance the quantitative skills and knowledge of students/professionals for the analysis, simulation, and optimization of energy systems, and prepare them for practical applications.
3. Develop and enhance students’ skills for independent research in energy.
4. Educate and train the new generation of “energy experts” to leading and impactful careers in the multi-faceted energy industry, the energy business domain, the law sector, the public policy sector, and the government.
5. Integrate and synergize educational efforts in energy from all parts of Texas A&M University that include (a) the College of Agriculture and Life Sciences; (b) the College of Engineering, (c) the College of Geosciences; (d) the College of Sciences; (e) the Bush School of Government and Public Policy; (f) the Mays Business School; (g) the College of Liberal Arts; and (h) the Law School.

6. Structure of the Graduate Curricular Program

The “Executive Master of Science in Energy” program will grant (a) an “Executive Master of Science in Energy Degree”, and/or (b) a “Certificate in Energy”.

The “Executive Master of Science in Energy Degree” will be offered at two tracks. Track 1 will be with research thesis, and Track 2 will be with only course work (i.e., without research thesis). The duration of Track 1 will be 10 months (i.e., September 1 – June 30), while the duration of Track 2 will be of two semesters (i.e., Fall and Spring semester).

Track 1 will typically require students to be in residence and work in research with Faculty Members affiliated with the Texas A&M Energy Institute. Track 2 will be offered to researchers/executives who may be in residence or take it on-line (distance learning).

The structure of the “Executive Master of Science in Energy” program will be based on (a) non-overlapping modules, (b) distinguished seminar series, and (c) research thesis (note that (c) is only for Track 1). A module will be of 1.5 weeks duration and have 5 teaching days. A module will have a total of 22hrs of lecture/lab material (22 contact hours) with 4.4hrs of lectures per teaching day. Hence, two weekly modules will be equivalent to a traditional course, and they correspond to 3.0 credits (i.e., a module will be equivalent to 1.5 credits, SCH). Seminars will be delivered by distinguished energy experts from academia, industry, and government. Research thesis topics will be provided and supervised by faculty members affiliated with the Texas A&M Energy Institute and its (ICPE) and (IRPE).

The Fall semester structure of Track 1 will have 8 modules, the distinguished seminar series, and research thesis work. The Spring semester structure of Track 1 will consist of 8 modules and research thesis work. The additional 2 months will be devoted towards the completion and defense of the research thesis work. The total number of credits will be 32 (i.e., 24 for the 16 modules, 2 for the seminars, and 6 for the research thesis work).
The Fall semester structure of Track 2 will have 10 modules and the distinguished seminars. The Spring semester structure of Track 2 will consist of 10 modules. The total number of credits will be 32 (i.e., 30 for the 20 modules, and 2 for the seminars).

The “Certificate in Energy” will be offered by taking 10 modules of the “Executive MSc in Energy” degree program either in residence or on-line. Seven modules will be from the required/foundational module list and three from the prescribed elective/specialized module list.

7. Target Audience

The target audience for the “Executive Master of Science in Energy” program can be classified into three broad categories. Category 1 consists of graduating seniors from diverse educational backgrounds (e.g., sciences, engineering, social sciences, business) and domestic and international institutions (e.g., US and Canada, Central and South America, Europe, Middle East, and Asia). Category 2 consists of recent graduates/professionals who have been in industry and/or government for less than 3-5-10+ years. Category 3 will be executive professionals.

8. Content of Modules

The proposed modules for the Graduate Curriculum (see attached titles, names of instructors, descriptions, and syllabi) will address both the foundational components of the “Executive Master of Science in Energy” program, as well as introduce specialized components that address the wide spectrum of energy challenges along with its impact on economics, law and public policy.

**Foundational Modules – Instructors - Semester**

1. **Environmental Issues of Energy Systems**: Professor Akbulut (Fall)
2. **Reservoir Characterization and Modeling**: Professors Datta-Gupta and King (Fall)
3. **Bioenergy**: Professors Holtzapple and Capareda (Fall)
4. **Energy Systems Engineering I**: Professors Floudas and Pistikopoulos (Fall)
5. **Energy Systems Engineering II**: Professors Pistikopoulos and Floudas (Spring)
6. **Introduction to Optimization**: Professor Butenko (Fall)
7. **Energy Finance and Economics**: Professor Deer (Fall)
8. **Beyond Science and Technology: The Role of Policy in the Future of Energy in the US**: Professor Vedlitz (Fall)
9. **Introduction to U.S. Energy Law & Policy**: Professor Warren (Spring)
10. **The Global Energy Future**: Professors Eckstein and Warren (Spring)
11. **Economics of Energy**: Professor McCarl (Spring)
12. Entrepreneurship in Energy: Professor Lester (Spring)
14. CO2 Sequestration: Professor Gibson (Spring)

Specialized Modules – Instructors -Semester

15. Smart Grid Fundamentals: Professors Kezunovic, Singh, Xie, and Balog (Fall)
17. Gas Separations for Energy: Fundamentals, Applications and New Directions: Professor Wilhite (Fall)
18. Carbon Capture, Utilization, and Storage: Professor Hasan (Fall)
19. Nanomaterials Engineering and Energy Storage: Professors Lutkenhaus and Green (Spring)
20. Thermoelectric Materials and Devices: Professor Vaddiraju (Fall)
21. Thermoelectrics: Fundamentals of Electronic and Thermal Transport: Professor Yu (Spring)
22. Energy Efficiency in Buildings: Professors Claridge and Culp (Spring)
23. Water-Energy-Food Nexus: Professor Mohtar (Spring)
24. Energy-Water Nexus: Professor El-Halwagi (Fall)
25. Integrated Risk Management for Exploration and Production Projects: Professors Damnjanovic and Medina-Cetina (Spring)
26. Safety in Energy Systems: Professor Mannan (Spring)
27. Interfacial Phenomena of Energy Systems: Professor Akbulut (Spring)
28. Multi-physics Geomechanics for Energy Applications (CO2, fracking, nuclear waste), Professor Sanchez (Fall)
Part 2: “Executive Master of Science in Energy” Degree

Request Form for “Executive Master of Science in Energy” Degree

In the subsequent sections I, II, and III, we provide the material for a new master’s degree program (i.e., “Executive Master of Science in Energy”). Note that the same material also applies for the “Certificate in Energy”.

I. Need

A. Job Market Need: The proposed “Executive Master of Science in Energy” program is highly innovative and unique (i.e., there is no such program in the US) and it is designed to introduce students/professionals to the multiple interdisciplinary facets of energy that range from overview of energy technologies (fossil-based, renewable, and non-fossil based), to multi-scale energy systems engineering methods, to materials for energy, to economics and finance, to business, to entrepreneurship, to law, to policy, and their interactions. Emphasis will be placed on creating the new generation of energy educated students and professionals who will be broadly educated on all components of energy through quantitative analytical methods and multi-scale systems based approaches.

The energy sector has received the most prominent attention in both industry and academia. The explosive growth of shale gas, the increased production of petroleum, and the elevated interest in renewable energy sources, represent very strong emerging markets that promise to deliver many new job opportunities in the US and aim at making the US energy independent. The majority of advertised positions available for industrial, government positions, as well as for academic positions are for individuals with proper energy related background. Hence, the proposed “Executive Master of Science in Energy” program will enhance educational opportunities currently unavailable to students and prepare the new class of leaders in energy.

B. Student Demand: The student demand for enhanced education in the energy domain has been monotonically increasing in all academic institutions worldwide. The interests of incoming graduate students are primarily energy related and health related. Also, the interest of undergraduate students in energy related applications is enhanced. As a typical example of MSc programs in Energy, Imperial College has introduced a MSc in
Sustainable Energy Futures program that has experienced significant interest and has reached a steady level of incoming class of over 80-100 students while it receives many applications for admission.

C. Enrollment Projections

For the proposed "Executive Master of Science in Energy" program, a student needs to meet the requirement of 32 SCH. Given that 24 SCH equals 1 FTSE, then for one student we have 32/24 = 1.333 FTSE,

<table>
<thead>
<tr>
<th>Year</th>
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<th>Attrition</th>
<th>Graduation</th>
<th>Cumulative Headcount</th>
<th>Cumulative FTSE</th>
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<td>66.67</td>
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</table>

II. Quality

A. Degree Requirements: The proposed "Executive Master of Science in Energy" program has the following degree requirements ( note that the lecture and lab hours is equal to the contact hours):

<table>
<thead>
<tr>
<th></th>
<th>Non-thesis SCH</th>
<th>Thesis SCH</th>
<th>Contact Hours</th>
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<tr>
<td>ICPE-601: Environmental Issues of Energy Systems</td>
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<td>1.5</td>
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<tr>
<td>ICPE-602: Reservoir Characterization and Modeling</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
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<tr>
<td>ICPE-603: Bioenergy</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-604: Energy Systems Engineering I</td>
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<td>1.5</td>
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</tr>
<tr>
<td>ICPE-605: Energy Systems Engineering II</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-606: Introduction to Optimization</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-607: Energy Finance and Economics</td>
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<td>1.5</td>
<td>22</td>
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<tr>
<td>ICPE-608: Beyond Science and Technology: The Role of Policy in the Future of Energy in the US</td>
<td>1.5</td>
<td>1.5</td>
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<td>ICPE-609: Introduction to U.S. Energy Law &amp; Policy</td>
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<td>1.5</td>
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</tbody>
</table>
ICPE-610: The Global Energy Future  
ICPE-611: Economics of Energy  
ICPE-612: Entrepreneurship in Energy  
ICPE-613: Natural and Shale Gas Monetization: Technologies, Fundamentals, Economics, and Applications  
ICPE-614: CO2 Sequestration

### b. Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Credits</th>
<th>Quarter</th>
</tr>
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<td>ICPE-601: Environmental Issues of Energy Systems</td>
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<tr>
<td>ICPE-602: Reservoir Characterization and Modeling</td>
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<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-604: Energy Systems Engineering I</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-605: Energy Systems Engineering II</td>
<td>1.5</td>
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<td>ICPE-606: Introduction to Optimization</td>
<td>1.5</td>
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<td>1.5</td>
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<tr>
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<td>1.5</td>
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<tr>
<td>ICPE-610: The Global Energy Future</td>
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</tr>
<tr>
<td>ICPE-611: Economics of Energy</td>
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<td>22</td>
</tr>
<tr>
<td>ICPE-612: Entrepreneurship in Energy</td>
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<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-613: Natural and Shale Gas Monetization: Technologies, Fundamentals, Economics, and Applications</td>
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</tr>
<tr>
<td>ICPE-614: CO2 Sequestration</td>
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<td>1.5</td>
<td>22</td>
</tr>
</tbody>
</table>

### c. Prescribed Elective Courses

(select 6 for non-thesis track; select 2 for thesis track)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Credits</th>
<th>Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICPE-615: Smart Grid Fundamentals</td>
<td>1.5</td>
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</tr>
<tr>
<td>ICPE-616: Multi-functional Materials for Energy Conversion</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
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<tr>
<td>ICPE-617: Gas Separations for Energy: Fundamentals, Applications and New Directions</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-618: Carbon Capture, Utilization, and Storage</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-619: Nanomaterials Engineering and Energy Storage</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-620: Thermoelectric Materials and Devices</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-621: Thermoelectrics: Fundamentals of Electronic and Thermal Transport</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-622: Energy Efficiency in Buildings</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
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<tr>
<td>ICPE-623: Water-Energy-Food Nexus</td>
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<tr>
<td>ICPE-624: Energy-Water Nexus</td>
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<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>ICPE-625: Integrated Risk Management for Exploration and Production Projects</td>
<td>1.5</td>
<td>1.5</td>
<td>22</td>
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<tr>
<td>ICPE-626: Safety in Energy Systems</td>
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<tr>
<td>ICPE-627: Interfacial Phenomena of Energy Systems</td>
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<tr>
<td>ICPE-628: Multi-physics Geomechanics for Energy Applications</td>
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d. Thesis
ICPE-650: Thesis-Fall Semester 3.0
ICPE-651: Thesis-Spring Semester+ 3.0

e. Seminars
ICPE-670: Seminars 2.0

Total SCH Requirements 32 32

8. Curriculum
The required and prescribed elective courses and their respective SCH are:

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>Required Courses</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICPE-601</td>
<td>Environmental Issues of Energy Systems</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-602</td>
<td>Reservoir Characterization and Modeling</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-603</td>
<td>Bioenergy</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-604</td>
<td>Energy Systems Engineering I</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-605</td>
<td>Energy Systems Engineering II</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-606</td>
<td>Introduction to Optimization</td>
<td>1.5</td>
</tr>
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<td>ICPE-607</td>
<td>Energy Finance and Economics</td>
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<tr>
<td>ICPE-608</td>
<td>Beyond Science and Technology:</td>
<td></td>
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<tr>
<td></td>
<td>The Role of Policy in the Future of Energy in the US</td>
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<tr>
<td>ICPE-609</td>
<td>Introduction to U.S. Energy Law &amp; Policy</td>
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</tr>
<tr>
<td>ICPE-610</td>
<td>The Global Energy Future</td>
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<tr>
<td>ICPE-611</td>
<td>Economics of Energy</td>
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<td>Entrepreneurship in Energy</td>
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<tr>
<td>ICPE-613</td>
<td>Natural and Shale Gas Monetization: Technologies,</td>
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<td></td>
<td>Fundamentals, Economics, and Applications</td>
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<tr>
<td>ICPE-614</td>
<td>CO2 Sequestration</td>
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<tr>
<td>ICPE-670</td>
<td>Seminars</td>
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<tr>
<td>ICPE-650</td>
<td>Thesis – Fall semester</td>
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<tr>
<td>ICPE-651</td>
<td>Thesis – Spring semester+</td>
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</table>

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>Prescribed Elective Courses</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
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<td>ICPE-615</td>
<td>Smart Grid Fundamentals</td>
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<td>ICPE-616</td>
<td>Multi-functional Materials for Energy Conversion</td>
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<tr>
<td>ICPE-617</td>
<td>Gas Separations for Energy: Fundamentals,</td>
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<td></td>
<td>Applications and New Directions</td>
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<tr>
<td>ICPE-618</td>
<td>Carbon Capture, Utilization, and Storage</td>
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<td>ICPE-619</td>
<td>Nanomaterials Engineering and Energy Storage</td>
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<td>Thermoelectric Materials and Devices</td>
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<td>ICPE-623</td>
<td>Water-Energy-Food Nexus</td>
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<td>ICPE-624</td>
<td>Energy-Water Nexus</td>
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### Faculty

<table>
<thead>
<tr>
<th>Faculty Name &amp; Rank</th>
<th>Highest Degree &amp; Awarding Institution</th>
<th>Module Assigned</th>
<th>%Time</th>
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<tr>
<td>Akbulut, Mustafa</td>
<td>PhD Chemical Engineering; UCSB</td>
<td>ICPE-601 &amp; 627</td>
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<tr>
<td>Datta-Gupta, Akhil</td>
<td>PhD Petroleum Engineering; UT Austin</td>
<td>ICPE-602</td>
<td>5</td>
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<tr>
<td>King, Michael</td>
<td>PhD Physics; Syracuse University</td>
<td>ICPE-602</td>
<td>5</td>
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<tr>
<td>Holtzapple, Mark</td>
<td>PhD Chemical Engineering; U. Pennsylvania</td>
<td>ICPE-603</td>
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<td>Capareda, Sergio</td>
<td>PhD Agricultural Engineering; Texas A&amp;M</td>
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<td>Floudas, Christodoulou</td>
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<tr>
<td>Pistikopoulos, Efstratiou</td>
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<td>Butenko, Sergiy</td>
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<td>Deer, Shannon</td>
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<td>Vedlitz, Arnold</td>
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<td>Wilhite, Benjamin</td>
<td>PhD Chemical Engineering, Notre Dame</td>
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<td>Hasan, M.M. Faruque</td>
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<td>Lutkenhaus, Jodie</td>
<td>PhD Chemical Engineering, MIT</td>
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<td>Green, Micah</td>
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<td>Vaddiraju, Sreeram</td>
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<td>Yu, Choongho</td>
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<td>Claridge, David</td>
<td>PhD Physics, Stanford University</td>
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<td>Culp, Charles</td>
<td>PhD Solid State Physics, Iowa State University</td>
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<td>Mohtar, Rabi</td>
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<td>Sanchez, Marcelo</td>
<td>PhD Civil Engineering, U. Polit. de Catalunya</td>
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D. Students

The “Executive Master of Science in Energy” program targets three broad categories. Category 1 consists of graduating seniors from diverse educational backgrounds (e.g., sciences, engineering, social sciences, business) and domestic and international institutions (e.g., US and Canada, Central and South America, Europe, Middle East, and Asia). Category 2 consists of recent graduates/professionals who have been in industry and/or government for less than 3-5-10+ years. Category 3 will be executive professionals.

We will aim for a diverse, dynamic, and high quality student body. To attain this goal, we will advertise the proposed innovative “Executive Master of Science in Energy” program through the Energy Institute website, departmental websites, colleges’ websites, and the University website. In addition, we will provide material and ask all the department heads to assist us in advertising the program on campus, as well as provide material to many universities in the US, South America, Europe, Middle East and Asia.

E. Library

The library needs for the “Executive Master of Science in Energy” program are standard and do not require any special resources.

F. Facilities and Equipment

A few (i.e., 2-3) classrooms with capabilities for distance learning (e.g., video recording and conferencing) will be required for the program.

G. Accreditation

No accreditation from a national accrediting body is needed.

H. Evaluation

The Advisory and Evaluation Committee, (A&EC) will consist of the Vice President for Research, VPR, the Deans of the College of Agriculture & Life Sciences; College of Engineering; College of Geosciences; and College of Sciences, as well as External Assessors to be selected. Annually, one of the Deans/VPR will be selected to serve as the Lead of the A&EC.

The Texas A&M Energy Institute will develop an appropriate annual or biannual review process to evaluate the impact of the “Executive Master of Science in Energy” program. The review will include evaluations of graduate recruitment, retention, curriculum, research, and faculty teaching assessments. The annual or biannual review of the program will be conducted in a timely fashion to assure proper assessment of prior activities and appropriate feedback mechanism for improvement.
III. Costs and Funding

The proposed (ICPE) of the Texas A&M Energy Institute will require funds for the development of the "Executive Master of Science in Energy" program. At the beginning, funds will be utilized from the resources provided by the Vice President for Research to the Energy Institute.

The "Executive Master of Science in Energy" program will grant (a) an "Executive Master of Science in Energy Degree", and (b) a "Certificate in Energy".

The "Executive Master of Science in Energy" degree will be offered at two tracks. Track 1 will have course work (10 courses=20 modules out of which 2 courses=4 modules will be dedicated to research and thesis work; seminars) and a thesis requirement. Track 1 will last for 10 months (e.g., September 1-June 30). Track 2 will have only course work (10 courses=20 modules; seminars) and will last for 2 semesters (i.e., Fall and Spring semester; e.g., September -May ). A course is equivalent to 2 modules and will be of 3 credits (i.e., each module will be 1.5 credits). The seminars will be of 2 credits. Both Track 1 and Track 2 will consist of 32 credits. Track 1 will typically require students to be in residence and work in research with Faculty Members affiliated with the Texas A&M Energy Institute. Track 2 will be offered to researchers/executives who may be in residence or take it on-line (distance learning). The "Certificate in Energy" will be offered by taking 10 modules (i.e., the equivalent of 5 courses) of the "Executive Master of Science in Energy" degree program either in residence or on-line.

The support and budget for the "Executive Master of Science in Energy" program will address (i) honorarium/unrestricted funds for the faculty members who will teach a module; (ii) funds for the "Distinguished Seminar Series: Energy Matters"; (iii) funds for course materials including the preparation of an "Executive Master of Science in Energy Handbook" and a "Student Information Packet"; (iv) funds for invited/outside researchers who will teach a module; (v) funds for preparation of on-line (distance learning) material (e.g., access to course notes, lecture slides; course work assignments) ; (vi) funds for support of a dedicated "Executive Master of Science in Energy" administrator; and (vii) availability of dedicated classroom(s) with distance learning capabilities, as well as a space for the "Executive Master of Science in Energy" students with desks, PCs, and kitchen facilities (e.g., MSc lounge).

The "Executive Master of Science in Energy" degree will charge (a) 2-semester tuition fee (state/out of state: to be split 50% to TAMU and 50% to the Energy Institute), and (b) a program fee (100% to the Energy Institute). The "Energy Certificate" will charge (a) 1-semester tuition fee (in state/out of state: to be split 50% to TAMU and 50% to the Energy Institute), and (b) a program fee (100% to the Energy Institute).

It is expected that the aforementioned charge structure will make the "Executive Master of Science in Energy" degree program self-sustained after the initial period.

In the initial period we expect about 20 students to enroll with a target of 50+ students in years 4+.
Five-Year Costs - Executive Master of Science in Energy Degree

Personnel
- Faculty $600,000 (each year: 24 modules x $5,000 honorarium/module)
- Administration $250,000
- Graduate Assistants 0
- Other Personnel 0

Facilities, Equipment & IT $75,000
Supplies & Materials $75,000
Library 0
Other (seminars) $100,000 (each year: 6-8 speakers with honorarium, travel &
  accommodation expenses)

Total Costs $1,100,000

Five Year Funding/Income – Executive Master of Science in Energy Degree

Tuition and Program fee for in state students= $30,000
Tuition and Program fee for out of state students= $40,000

Year 1 (20 students): (a) funds for the honoraria will be provided by the Energy Institute;
(b) income from tuition and program fees= $700,000 (assuming equal
  number of in state and out of state students).

Year 2 (30 students): (a) funds for the honoraria will be provided by the Energy Institute;
(b) income from tuition and program fees= $1,050,000 (assuming equal
  number of in state and out of state students).

Year 3 (40 students): (a) funds for the honoraria will be provided by the Energy Institute;
(b) income from tuition and program fees= $1,400,000 (assuming equal
  number of in state and out of state students).

Year 4 (50 students): (a) funds for the honoraria will be provided by the Energy Institute;
(b) income from tuition and program fees= $1,750,000 (assuming equal
  number of in state and out of state students).

Year 5 (50 students): (a) funds for the honoraria will be provided by the Energy Institute;
(b) income from tuition and program fees= $1,750,000 (assuming equal
  number of in state and out of state students).
August 12, 2014

MEMORANDUM

TO: Dr. Tim Scott, Chair
    Undergraduate Curriculum Committee
    Dr. Mark Zoran, Chair
    Graduate Council

THROUGH: Dr. Kim Dooley, Associate Dean for Academic Operations
         College of Agriculture and Life Sciences

         Dr. David Reed, Associate Dean for Graduate Programs and Faculty Development
         College of Agriculture and Life Sciences

FROM: Dr. C. Parr Rosson III, Professor and Head
      Department of Agricultural Economics

This memorandum confirms that the Department of Agricultural Economics fully and enthusiastically supports the establishment of a joint degree between the Department of Agricultural Economics and the Bush School of Government and Public Service. Students enrolled in this program would receive their Bachelor of Science degree in Agricultural Economics (B.S. in AGEC) and a Master's of Public Service and Administration (MPSA) degree in five years. The program includes a total of 151 hours with 17 hours being applied toward both their B.S. in AGEC and their MPSA.

We feel that this program will provide an enriching educational opportunity and promising professional development to highly motivated students at Texas A&M University. The Department of Agricultural Economics shares many complementary interests such as public policy analysis and natural resource concerns with the Bush School of Government and Public Service. In addition to providing this opportunity to students at Texas A&M University, the program will encourage collaboration between the two faculties that is consistent with the mission of the university and the needs of Texas and the nation.
July 30, 2014

MEMORANDUM

TO: Dr. Mark Zoran
   Graduate Council Chair

   Dr. Tim Scott
   Undergraduate Curriculum Committee Chair

THROUGH: Amb. Ryan Crocker
          Dean of The Bush School of Government and Public Service

FROM: Dr. William P. West
       Director of Master of Public Service and Administration Program
       The Bush School of Government and Public Service

SUBJECT: Statement of Support for Establishment of Joint Degree Program

This memorandum affirms that the Bush School of Government and Public Service fully supports the establishment of a joint degree program between the Public Service and Administration Department and the Agricultural Economics Department. Students enrolled in this program would receive their Bachelor of Science degree in Agricultural Economics and a Master's of Public Service and Administration (MPSA) degree in five years. We believe that this program will open an intellectually exciting and promising career path for a select group of Texas A&M students. The Agricultural Economics Department and the Bush School have complementary interests, moreover, and this program will encourage collaboration between the two faculties that is consistent with the mission of the university and the needs of Texas and the nation. The Bush School is enthusiastic about this arrangement for these reasons.
PROPOSAL FOR A FIVE-YEAR JOINT DEGREE PROGRAM

The Department of Agricultural Economics and the Bush School of Government and Public Service propose a joint degree program that would allow agricultural economics majors to enter the Bush School at the beginning of their fourth year at Texas A&M. These students would receive their Bachelor of Science degree in Agricultural Economics and a Master’s of Public Service and Administration (MPSA) degree in five years.

DESCRIPTION

Students admitted to the proposed joint-degree program will have completed 103 hours of the 120 hours of course work required to receive their Bachelor’s degree. These courses must include all of the specific prerequisites for a Bachelor of Science degree in Agricultural Economics and by Texas A&M University for an undergraduate degree.

Major Coursework – 43 hours total (3 hours of major coursework would apply for Bush School Credit)

- AGEC 105 – 3 hours
- AGEC 217 – 3 hours
- AGEC 314 – 3 hours
- AGEC 317 – 3 hours
- AGEC 330 – 3 hours
- AGEC 340 – 3 hours
- AGEC 350 – 3 hours
- AGEC 429 – 3 hours
- AGEC 452 or AGEC 453 – 3 hours
- AGEC 430 or ECON 311 – 3 hours
- AGEC 344 – 3 hours
- AGEC 481 – 1 hour
- AGEC elective (Select from any 300 or 400 level AGEC course that is not already required)
- AGEC elective (Select from any 300 or 400 level AGEC course that is not already required)
- AGEC elective – 3 hours (Select from the following would also count as MPSA electives)
  - AGEC 604 – Natural Resource Economics – 3 hours (prereq ECON 323 and cross-listed with BUSH 663)
  - AGEC 606 – Water Resource Economics – 3 hours (prereq MATH 142)
  - AGEC 607 – Research Methodology – 3 hours (prereq MS or PhD graduate classification)
  - AGEC 610 – Economics of Biosecurity – 3 hours (prereq graduate classification)
  - AGEC 614 – Global Food and Agribusiness Policy (prereq AGEC 619 or ECON 607 and MATH 142)
  - AGEC 633 – Sustainability in World Development (prereq ECON 607 or equivalent)
  - AGEC 652 – International Agribusiness Trade Analysis (prereq ECON 607 and MATH 142)

Supporting Coursework – 24 hours

- ECON 202 – 3 hours
- ECON 203 – 3 hours
• ACCT 209 – 3 hours
• ACCT 210 – 3 hours
• STAT 303/302/301 – 3 hours
• ECON 323 – 3 hours
• Non-AGEC elective – 6 hours Select from the following
  ECMT 461 – Economic Data Analysis
  ECON 433 – Energy Markets and Policy
  ESSM 406 – Natural Resources Policy
  FSTC 444 – Fundamentals of Food Laws
  GEOG 330 – Resources and the Environment
  GEOG 430 – Environmental Justice
  GEOS 430 – Global Science and Policy Making
  MKTG 409 – Principles of Marketing
  POLS 340 – Introduction to Public Administration
  POLS 364 – Global Political Thought
  POLS 412 – International Political Economy
  POLS 415 – Contemporary Issues in American Foreign Policy
  POLS 439 – Foreign Policy Decision Making
  POLS 440 – Public Policies and Policymaking
  POLS 447 – National Security Policy
  POLS 475 – Government and the Economy
  URPN 360 – Issues in Environmental Quality
  WGST 430 – Employment Discrimination Law

Core Requirements – 39 hours

• Social and Behavioral Sciences (met with required AGEC 105 which is included in Major Coursework)
• Communication – 6 hours (ENGL 103 or 104 required plus 3 additional hours)
• Math – 6 hours (MATH 141 and MATH 142)
• Life and Physical Sciences – 9 hours
• Language, Philosophy & Culture – 3 hours
• Creative Arts – 3 hours
• American History – 6 hours
• Government / Political Science – 6 hours

General Electives – 14 hours. These hours would be filled with courses used to meet the MSPA degree requirements.

A total of 17 hours would apply toward both the B.S. degree in AGEC and MPSA degree. (14 hours general electives and 3 hours of 600 level AGEC coursework)

Students admitted into the five-year program (having completed a minimum of 103 credit hours toward their bachelor’s degree) will be enrolled in Bush School graduate courses with an undergraduate classification (U4) for the fall of their fourth year and will be reclassified as degree-seeking master’s degree students (G7) upon completing 116 credit hours. This will normally occur at the beginning of the spring semester of their fourth year.
Students in the five-year program will be required to complete the same two-year, 48 hour curriculum as other students admitted to the MPSA program. The curriculum combines nine core courses in public management, policy analysis, economics and research methods with seven electives, one of which must be selected from the following specific list of courses:

- AGE 604 – Natural Resource Economics – 3 hours (prereq ECON 323 and cross-listed with PSAA 663)
- AGE 606 – Water Resource Economics – 3 hours (prereq MATH 142)
- AGE 607 – Research Methodology – 3 hours (prereq MS or PhD graduate classification)
- AGE 610 - Economics of Biosecurity – 3 hours (prereq graduate classification)
- AGE 614 - Global Food and Agribusiness Policy (prereq AGE 619 or ECON 607 and MATH 142)
- AGE 633 – Sustainability in World Development (prereq ECON 607 or equivalent)
- AGE 652 – International Agribusiness

A professional internship is also required and must be completed in the summer between the first and second years at the Bush School for those without substantive professional experience.

**First Year**

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<tr>
<th>Fall</th>
<th>Spring</th>
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<tr>
<td>PSAA 601: Foundations of Public Service*</td>
<td>PSAA 611: Public Policy Formation</td>
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<td>PSAA 621: Economic Analysis or ECON 607: Microeconomic Analysis*</td>
<td>PSAA 622: Public Finance*</td>
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<tr>
<td>BUSH 631: Quantitative Methods*</td>
<td>BUSH 635: Quantitative Methods II*</td>
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<tr>
<td>One approved PSAA elective</td>
<td>Elective: One chosen from AGEC courses listed above**</td>
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**Summer**

Professional internship required for those without substantive professional experience.

**Second Year**

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<td>PSAA 675: Capstone Seminar I</td>
<td>BUSH 676: Capstone Seminar II</td>
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<tr>
<td>PSAA 615: Policy Analysis</td>
<td>Three electives chosen in consultation with advisor</td>
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<tr>
<td>Two approved elective: Chosen in consultation with advisor</td>
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*Bush School courses double-counted as AGEC general electives
**AGEC course double-counted as AGEC major course

As indicated above, students will double-count courses taken in the Bush School as credit towards their MPSA degree and as substitutes for some of the agricultural economics electives and some of the general electives required for their bachelor's degree.
Agricultural Economics majors who have at least a 3.25 GPA and who will have completed all of their prerequisite courses and otherwise completed 103 hours by the fall of their fourth year will be eligible to apply for the five-year program during their junior year. Applicants to the five-year program will submit the same materials (including GRE scores) as other MPSA applicants, and those whose records are judged to be competitive by the mid-January deadline will be invited to attend the GBS Interview Conference Weekend in late February/early March. The admissions criteria for the five-year program will be the same as for other MPSA students.

Students who choose not to finish the MPSA degree after being admitted to the five-year program may exit the program at any time. Completed MPSA courses will be applied to their bachelor’s degree in Agricultural Economics, and students will select the Agricultural Economics option area that is most appropriate for their interest. Failure to complete the MPSA program will in no way impede their ability to attain a bachelor’s degree in Agricultural Economics when the requirements for that degree are completed.

Advising for the five-year program will involve a coordinated effort by the Undergraduate Program Office in the Department of Agricultural Economics and the Director of the MPSA program in the Bush School. Advising by the Department of Agricultural Economics will help ensure that interested students have satisfied the prerequisite course requirements for their bachelor’s degree by the beginning of their senior year. The MPSA director and GBS director of recruiting will also be available for agricultural economics students who wish to set up appointments to talk individually about the MPSA program’s curriculum and career opportunities available to its graduates.
### Agricultural Economic - Bush School of Government and Public Service - Joint Degree

#### Freshman Year: Fall
- AGEC 105: 3 hours
- ENGL 104: 3 hours
- MATH 141: 3 hours
- Amer. Hist. Req.: 3 hours
- Life and Physical Science: 3 hours

#### Freshman Year: Spring
- COMM Req.: 3 hours
- MATH 142: 3 hours
- Amer. Hist. Req.: 3 hours
- Life and Physical Science: 3 hours
- Creative Arts: 3 hours

#### Summer: End of Fresh YR

#### Sophomore Year: Fall
- ECON 202: 3 hours
- AGEC 217: 3 hours
- ACCT 210: 3 hours
- GOVT/POLS requirement: 3 hours
- Lang, Phil, and Culture: 3 hours

#### Sophomore Year: Spring
- ECON 203: 3 hours
- ACCT 210: 3 hours
- GOVT/POLS requirement: 3 hours
- Life and Physical Science: 3 hours
- STAT 303/3002/301: 3 hours

#### Summer: End of Soph YR
- AGEC 314: 3 hours
- Non-AGEC Elective: 3 hours

#### Junior Year: Fall
- ECON 323: 3 hours
- AGEC 340: 3 hours
- AGEC 330: 3 hours
- AGEC 452 or 453: 3 hours
- AGEC 429: 3 hours
- AGEC elective: 3 hours

#### Junior Year: Spring
- AGEC 317: 3 hours
- AGEC 350: 3 hours
- AGEC 344: 3 hours
- AGEC 430 or Econ 311: 3 hours
- AGEC 481: 1 hour
- AGEC elective: 3 hours

#### Summer: End of JR YR
- Non-AGEC Elective: 3 hours

#### Senior Year: Fall
- PSAA 601*: 3 hours
- PSAA 621 or ECON 607*: 3 hours
- PSAA 631*: 3 hours
- One Approved PSAA elective: 3 hours

#### Senior Year: Spring
- PSAA 611: 3 hours
- PSAA 622*: 3 hours
- BUSH 635*: 3 hours
- AGEC Elective - 600-level**: 3 hours

#### Summer: End of SR YR
- Professional Internship

#### Fifth Year: Fall
- PSAA 675: 3 hours
- PSAA 615: 3 hours
- Elective - 600-level: 3 hours
- Elective - 600-level: 3 hours

#### Fifth Year: Spring
- BUSH 676: 3 hours
- Elective - 600-level: 3 hours
- Elective - 600-level: 3 hours
- Elective - 600-level: 3 hours

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* 14 hours Bush School MPSA coursework double-counted as general electives for the B.S. degree in AGEC.

** AGEC 600 elective course double-counted as Bush School credit
Detail Requirements

Information for Degree Evaluation

This is NOT an official evaluation.

Program Evaluation

Limitation Correspondence: No more than 12 hours of correspondence earned through an accredited institution may be used for an undergraduate degree.
Limitation Combination: Maximum combination of 18 hours of 481, 482, 485 and/or 491 courses may be used for an undergraduate degree.

Program : BS AGEC - Policy & Economics
Campus : College Station
College : Agriculture & Life Sciences
Degree : Bachelor of Science
Level : Undergraduate
Majors : Agricultural Economics
Departments : Agricultural Economics

Catalog Term : Fall 2014 - College Station
Evaluation Term : Summer 2014 - College Station
Expected Graduation Date :
Request Number : 2014-0117
Results as of : Aug 06, 2014
Minors :
Concentrations :

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This is NOT an official evaluation.

Area : Major Coursework (43.000 credits) - Not Met

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<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>No</td>
<td>AND</td>
<td>L.</td>
<td>AGE 484</td>
<td>Directed AGEC Elect</td>
<td>6 hrs</td>
<td>120.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>No</td>
<td>AND</td>
<td>M.</td>
<td>AGE 491</td>
<td>Economics Elective</td>
<td>3 hrs</td>
<td>120.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

N. AGEC Elect 3 hrs select from AGEC 604, 606, 607, 610, 614, 623 or 652.

unofficial evaluation
### Area: Supporting Coursework (15,000 credits) - Not Met

| Met Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses |
|---|---|---|---|---|---|---|---|
| No | A. | AGLS 101, 1 hr | | | | | |
| No AND | B. | Technical Ag Elect 3hrs | | | | | |


Total Credits and GPA 0.000

unofficial evaluation

### Area: Directed Non-AGEC Electives (6,000 credits) - Not Met

| Met Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses |
|---|---|---|---|---|---|---|---|
| No | A. | Directed Non-AGEC Elect 6hrs | | | | | |


Total Credits and GPA 0.000

unofficial evaluation

### Area: Communication (6,000 credits) - Not Met

| Met Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses |
|---|---|---|---|---|---|---|---|

ECMT 461; ECON 433; ESSM 406; FSTC 444; GEOG 330, 430; GEOS 430; MKTG 409; POLS 340, 364, 412, 415, 439, 440, 447 or 475; URBN 360; WGST 430.

unofficial evaluation
### Credits Courses

<table>
<thead>
<tr>
<th>No</th>
<th>Credits</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>No AND</td>
<td>A. ENGL 103 or ENGL 104</td>
<td></td>
</tr>
<tr>
<td>No AND</td>
<td>B. Communication Rqmt 3hrs</td>
<td>Select any course with the Communication attribute [KCOM].</td>
</tr>
</tbody>
</table>

**Total Credits and GPA**: 0.000

---

**unofficial evaluation**

### Mathematics (9.000 credits) - Not Met

| Met | Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses |
|-----|-----------------------------------------------|---------------|
| No  | A. STAT 303 | |
| No AND | B. MATH 141 | |
| No AND | C. MATH 142 | |

**Total Credits and GPA**: 0.000

---

**unofficial evaluation**

### Life and Physical Sciences (9.000 credits) - Not Met

| Met | Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses |
|-----|-----------------------------------------------|---------------|
| No  | A. Life/Physical Sciences 9hrs | Select 9 hours from any courses with the Life and Physical Sciences attribute [KIP]. |

**Total Credits and GPA**: 0.000

---

**unofficial evaluation**

### Language, Philosophy & Culture (3.000 credits) - Not Met

| Met | Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses |
|-----|---------------------------------------------------------------|---------------|
| No  | A. Lang, Phil, Culture Rqmt 3hrs | Select any course with the Language, Philosophy and Culture attribute [KLP]. |

**Total Credits and GPA**: 0.000

---

**unofficial evaluation**

### Creative Arts (3.000 credits) - Not Met

| Met | Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses |
|-----|---------------------------------------------------------------|---------------|
| No  | A. Creative Arts Requirement | Select three hours from any course with the Creative Arts attribute [KCA]. |

**Total Credits and GPA**: 0.000

---

**unofficial evaluation**
Area: Citizenship (12.000 credits) - Not Met

Description: Completion of 4 semesters of Upper-Level ROTC may be substituted for 3 hours of American History and 3 hours of Political Science.

Met: Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute C

Credits Courses

No A. American History Rqmt 6hrs
Select from any course with the [KHS] attribute.

No AND B. Political Science Rqmt 6hrs
Take POLS 206 and POLS 207.

Total Credits and GPA

unofficial evaluation

Area: General Electives (12.000 credits) - Not Met

Met: Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses

No A. General Electives 12hrs
Select from any course not used elsewhere (except KINS 190)
PSAA 601, 621, 622, 635; BUSH 631.

Total Credits and GPA 0.000

unofficial evaluation

Area: Work Not Applied - Met

Description: See advisor for acceptable substitutions.

Met: Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses

No A. Courses not applied

Total Credits and GPA

unofficial evaluation

Area: University Writing Requirement - Not Met

Met: Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses

No A. Writing Requirement
Two courses required.
Only sections of AGEC 217, 429 with the Writing attribute [UWRT] may be used to satisfy this requirement.

Total Credits and GPA 0.000

unofficial evaluation

Area: Int'l & Cult Diversity - Not Met

Met: Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses

No A. Int'l & Cultural Diversity 6hrs
Select from courses with the International and Cultural Diversity attribute [UICD] (except sections of BUSN 289 with
unofficial evaluation

<table>
<thead>
<tr>
<th>Area: Foreign Language - Not Met</th>
<th>Met Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>A. Foreign Language Reqmt Complete one of the following: 1. Two years of the same foreign language in High School. 2. A two semester sequence of the same foreign language for University credit.</td>
</tr>
<tr>
<td>Total Credits and GPA</td>
<td>0.000</td>
</tr>
</tbody>
</table>

unofficial evaluation

<table>
<thead>
<tr>
<th>Area: Residence Requirement - Not Met</th>
<th>Met Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: A minimum of 36 hours of 300-400 level coursework must be completed at Texas A&amp;M University. 12 hours must be in the major field</td>
<td>No A. Residence - Major 12hrs  Select from AGEC 300-499.  No AND B. Residence 300-499 24hrs  Select from any 300-400 level course at Texas A&amp;M.</td>
</tr>
<tr>
<td>Total Credits and GPA</td>
<td></td>
</tr>
</tbody>
</table>

unofficial evaluation

<table>
<thead>
<tr>
<th>Area: GPR-Major - Not Met</th>
<th>Met Condition Rule Subject Attribute Low High Required Required Term Subject Course Title Attribute Credits Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: A minimum GPR of 2.000 is required in all major field of studies courses.</td>
<td>No A. Major GPR 28+hrs  Includes AGEC 100-499 (except AGEC 400); ECON 311, 410; PHIL 316.</td>
</tr>
<tr>
<td>Total Credits and GPA</td>
<td></td>
</tr>
</tbody>
</table>

unofficial evaluation

Back to Display Options

Print
Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
Undergraduate • Graduate • Professional
• Proposal Checklist •

Program request type: □ Undergraduate  ☑ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)
Requested by the Department or Unit of: Texas A&M Energy Institute

Program Type, Level, Designation, Title, Description, Hours
Program Type:  ☑ Certificate Program  □ Degree Program
Program Level: □ UG Certificate  ☑ Grad Certificate  □ Bachelor  □ Master  □ Doctoral  □ Professional
Degree Designation (i.e., BS, BA, MA, MS, MAg, MED, PhD, EdD, etc.)
Title of proposed program: Certificate in Energy
Proposed CIP Code (if known):

Brief program description (provide a catalog description for undergraduate and graduate certificates):
The “Certificate in Energy” program, through 10 modules of the Executive Masters of Science in Energy program, is designed to introduce students/professionals to fundamentals and state of the art advances in the multiple interdisciplinary facets of energy.

Minimum program semester credit hours (SCH)  Certificates - 12 hours*  Bachelors - 120 hours  Masters - 30 hours
Proposed program hours:  15

*12 hours minimum to appear on transcript

Certificate Programs  □ Embedded  ☑ Standalone

Students take coursework that will result in a degree and certificate being earned at the same time. Non-degree seeking students take coursework to earn a certificate only (no degrees are awarded).

Off-Campus or Distance Delivery
% of Program a student can take off-campus or through Distance Education  Program Start Date  SACSCOC Approval**  When Provost needs to inform SACSCOC
☑ 25%  Fall 2015  Notification Only  ————
□ 50%  _____ Approval Required  6 months before first day of program
□ 80%  _____ Approval Required  6 months before first day of program
□ 100%  _____ Approval Required  6 months before first day of program

**Notification letter arranged through the Vice Provost for Academic Affairs and sent by TAMU President.

Program Delivery Mode
监察
☑ On-campus  Texas A&M University, College Station Campus
□ Broadcast / TTVN  _____
□ Specific off-campus location***  _____
☑ Distance Education / Internet  ☑ In-State  ☑ Out-of-State  Start Date  Fall 2015
□ Out-of-Country

Will this program be offered with another institution? □ Yes  ☑ No
If yes, contact the Vice Provost for Academic Affairs for additional reporting requirements.

***Is this an approved SACSCOC location? □ Yes  □ No  If no, a program prospectus must be sent to SACSCOC. Approved locations as of March 2012: TAMU-Galveston, TAMU-Qatar, University Center-The Woodlands, CityCentre-Houston, Dubai and Saudi Arabia.

Program Funding
Has program funding been finalized at the department or college level? □ Yes  ☑ No
If no, explain or attach budget: _____

Page 1  Revised 04.11.2014
Will new costs for the first five years of the program be under $2 million?  
If new costs exceed $2 million, coordinating board approval is required.  
☑ Yes  □ No
**Submitted by (Contact Person):**

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Costas N. Georgiades</td>
<td><a href="mailto:georghiades@tamu.edu">georghiades@tamu.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Title</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interim Director of Texas A&amp;M Energy Institute</td>
<td>979-845-7408</td>
</tr>
</tbody>
</table>

**Certification Statement**

By signing below, the Dean of the College certifies the proposed program complies with coordinating board standards. If the program is delivered through Distance Education, the Dean of the College certifies that they are following the Principles of Good Practice for Academic Degree and Certificate Programs and Credit Courses Offered Electronically.

<table>
<thead>
<tr>
<th>Signature, Department Head or Interdisciplinary Program Chair</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Costas N. Georgiades</td>
<td>3/22/14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Typed or Printed Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9/22/14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chair, College Review Committee</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9/22/14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dean of College</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9/22/11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chair, University Curriculum Committee or Graduate Council</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Approvals Required: Faculty Senate and President.
New Program Request Form for Certificate Programs

Directions: An institution shall use this form to propose a new bachelor’s or master’s degree program. In completing the form, the institution should refer to the document Standards for Bachelor’s and Master’s Programs, which prescribes specific requirements for new degree programs. Note: This form requires signatures of (1) the Chief Executive Officer, certifying adequacy of funding for the new program; (2) a member of the Board of Regents (or designee), certifying Board approval, and (3) if applicable, a member of the Board of Regents or (designee), certifying that criteria have been met for staff-level approval. NOTE: Preliminary authority is required for all engineering programs. An institution that does not have preliminary authority for a proposed engineering program shall submit a separate request for preliminary authority prior to submitting the degree program request form. That request shall address criteria set in Coordinating Board rules Section 5.24 (a).

Administrative Information

1. Institution: Texas A&M University

2. Program Name – Show how the program would appear on the Coordinating Board’s program inventory (e.g., Bachelor of Business Administration degree with a major in Accounting):

Certificate in Energy

3. Proposed CIP Code: TBD

4. Brief Program Description – Describe the program and the educational objectives:

The “Certificate in Energy” program is designed to introduce students/professionals to the multiple interdisciplinary facets of energy that range from overview of energy technologies (fossil-based, renewable, and non-fossil based), to multi-scale energy systems engineering methods, to materials for energy, to economics and finance, to business, to entrepreneurship, to law, and their interactions.

The educational objectives of the “Certificate in Energy” program are:

1. Educate students/professionals with the broad spectrum of important energy issues, energy technologies based on fossil and non-fossil resources, sustainable energy technologies, and their interactions with energy economics, entrepreneurship, law, and policy.
2. Enhance the quantitative skills and knowledge of students/professionals for the analysis, simulation, and optimization of energy systems, and prepare them for practical applications.

Number of Semester Credit Hours Required  15

5. Administrative Unit – Identify where the program would fit within the organizational structure of the university (e.g., The Department of Electrical Engineering within the College of Engineering):

Texas A&M Energy Institute

Revised 01.14.2014
6. **Proposed Implementation Date** – Report the first semester and year that students would enter the program:

   *Fall 2015*

7. **Contact Person** – Provide contact information for the person who can answer specific questions about the program:

   Name: Dr. Costas N. Georgiades

   Title: Interim Director, Texas A&M Energy Institute

   E-mail: georghiades@tamu.edu

   Phone: 979-845-7408

   AND

   Name: Dr. Christodoulos A. Floudas

   Title: Director of Texas A&M Energy Institute (Effective: February 1, 2015)

   E-mail: floudas@princeton.edu, floudas@tamu.edu

   Phone: 609-258-4595

---

**Program Information**

I. **Need**

   *Note: Complete I.A and I.B only if preliminary authority for the program was granted more than four years ago. This includes programs for which the institution was granted broad preliminary authority for the discipline.*

A. **Job Market Need** – Provide short- and long-term evidence of the need for graduates in the job market.
   
   *Not Applicable; preliminary approval was not granted more than four years ago.*

B. **Student Demand** – Provide short- and long-term evidence of demand for the program.
   
   *Not Applicable; preliminary approval was not granted more than four years ago.*
C. **Enrollment Projections** – Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. *(Include majors only and consider attrition and graduation.)*

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headcount</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>FTSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

II. **Quality**

A. **Certificate and Degree Requirements** – Use this table to show the certificate and degree requirements of the program. *(Modify the table as needed; if necessary, replicate the table for more than one option.)*

<table>
<thead>
<tr>
<th>Category</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Core Curriculum (bachelor’s degree only)</td>
<td></td>
</tr>
<tr>
<td>Required Courses (Modules) One Module 1 is equal to 1.5 SCH</td>
<td>10.5</td>
</tr>
<tr>
<td>Prescribed Electives (Module) One Module 1 is equal to 1.5 SCH</td>
<td>4.5</td>
</tr>
<tr>
<td>Free Electives</td>
<td></td>
</tr>
<tr>
<td>Other (Specify, e.g., internships, clinical work)</td>
<td>(if not included above)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15</td>
</tr>
</tbody>
</table>

B. **Curriculum** – Use these tables to identify the required courses and prescribed electives of the program, and curriculum as it will appear in the undergraduate and graduate catalog. Note with an asterisk (*) courses that would be added if the program is approved. *(Add and delete rows as needed. If applicable, replicate the tables for different tracks/options as shown in the undergraduate catalog.)*

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>Required Courses</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICPE-601</td>
<td>Environmental Issues of Energy Systems</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-602</td>
<td>Reservoir Characterization and Modeling</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-603</td>
<td>Bioenergy</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-604</td>
<td>Energy Systems Engineering I</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-607</td>
<td>Energy Finance and Economics</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-608</td>
<td>Beyond Science and Technology:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Role of Policy in the Future of Energy in the US</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-609</td>
<td>Introduction to U.S. Energy Law &amp; Policy</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Revised 01.14.2014*
### Prescribed Elective Courses

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>Prescribed Elective Courses</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICPE-605</td>
<td>Energy Systems Engineering II</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-606</td>
<td>Introduction to Optimization</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-610</td>
<td>The Global Energy Future</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-611</td>
<td>Economics of Energy</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-612</td>
<td>Entrepreneurship in Energy</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-613</td>
<td>Natural and Shale Gas Monetization: Technologies, Fundamentals, Economics, and Applications</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-614</td>
<td>CO2 Sequestration</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-615</td>
<td>Smart Grid Fundamentals</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-616</td>
<td>Multi-functional Materials for Energy Conversion</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-617</td>
<td>Gas Separations for Energy: Fundamentals, Applications and New Directions</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-618</td>
<td>Carbon Capture, Utilization, and Storage</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-619</td>
<td>Nanomaterials Engineering and Energy Storage</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-620</td>
<td>Thermoelectric Materials and Devices</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-621</td>
<td>Thermoelectrics: Fundamentals of Electronic and Thermal Transport</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-622</td>
<td>Energy Efficiency in Buildings</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-623</td>
<td>Water-Energy-Food Nexus</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-624</td>
<td>Energy-Water Nexus</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-625</td>
<td>Integrated Risk Management for Exploration and Production Projects</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-626</td>
<td>Safety in Energy Systems</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-627</td>
<td>Interfacial Phenomena of Energy Systems</td>
<td>1.5</td>
</tr>
<tr>
<td>ICPE-628</td>
<td>Multi-physics Geomechanics for Energy Applications</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Faculty

C. Faculty – Use these tables to provide information about Core and Support faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program. *(Add and delete rows as needed.)*

<table>
<thead>
<tr>
<th>Faculty Name &amp; Rank</th>
<th>Highest Degree &amp; Awarding Institution</th>
<th>Module Assigned</th>
<th>%Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akbulut, Mustafa</td>
<td>PhD Chemical Engineering; UCSB</td>
<td>ICPE-601 &amp; 627</td>
<td>10</td>
</tr>
<tr>
<td>Datta-Gupta, Akhil</td>
<td>PhD Petroleum Engineering; UT Austin</td>
<td>ICPE-602</td>
<td>5</td>
</tr>
<tr>
<td>King, Michael</td>
<td>PhD Physics; Syracuse University</td>
<td>ICPE-602</td>
<td>5</td>
</tr>
<tr>
<td>Holtzapple, Mark</td>
<td>PhD Chemical Engineering; U. Pennsylvania</td>
<td>ICPE-603</td>
<td>5</td>
</tr>
<tr>
<td>Capareda, Sergio</td>
<td>PhD Agricultural Engineering; Texas A&amp;M</td>
<td>ICPE-603</td>
<td>5</td>
</tr>
<tr>
<td>Floudas, Christodoulos</td>
<td>PHD Chemical Engineering; Carnegie Mellon</td>
<td>ICPE-604 &amp; 605</td>
<td>10</td>
</tr>
<tr>
<td>Pistikopoulos, Efstratios</td>
<td>PhD Chemical Engineering; Carnegie Mellon</td>
<td>ICPE-604 &amp; 605</td>
<td>10</td>
</tr>
<tr>
<td>Butenko, Sergiy</td>
<td>PhD Industrial Engineering; U. Florida</td>
<td>ICPE-606</td>
<td>5</td>
</tr>
<tr>
<td>Deer, Shannon</td>
<td>MSC Finance; Texas A&amp;M</td>
<td>ICPE-607</td>
<td>5</td>
</tr>
<tr>
<td>Vedlitz, Arnold</td>
<td>PhD Political Science; U. Houston</td>
<td>ICPE-608</td>
<td>5</td>
</tr>
<tr>
<td>Warren, Gina</td>
<td>JD Law; Rutgers University</td>
<td>ICPE-609</td>
<td>5</td>
</tr>
</tbody>
</table>

Revised 01.14.2014
Eckstein, Gabriel  
JD, LLM Law; American University  
ICPE-610  

McCarl, Bruce  
PhD Management Science; Penn State Univ.  
ICPE-611  

Lester, Richard  
PhD Strategic Management; Texas A&M  
ICPE-612  

Elbashir, Nimir  
PhD Chemical Engineering; Auburn Univ.  
ICPE-613  

El-Halwagi, Mahmoud  
PhD Chemical Engineering; UCLA  
ICPE-613 & 624  

Gibson, Richard  
PhD Geophysics, MIT  
ICPE-614  

Kezunovic, Mladen  
PhD Electrical Engineering, U. Kansas  
ICPE-615  

Singh, Chanan  
PhD Electrical Engineering, U. Saskatchewan  
ICPE-615  

Xie, Le  
PhD Electrical & Computing Eng, Carnegie Mellon  ICPE-615  

Balog, Robert  
PhD Electrical Engineering, U. Illinois, Urbana  
ICPE-615  

Boyd, Jim  
PhD Aerospace Engineering, Texas A&M  
ICPE-616  

Lagoudas, Dimitris  
PhD Applied Mathematics, Lehigh University  
ICPE-616  

Arroyave, Raymundo  
PhD Materials Science, MIT  
ICPE-616  

Wilhite, Benjamin  
PhD Chemical Engineering, Notre Dame  
ICPE-617  

Hasan, M.M. Faruque  
PhD Chemical Engineering, National U. Singapore  ICPE-618  

Lutkenhaus, Jodie  
PhD Chemical Engineering, MIT  
ICPE-619  

Green, Micah  
PhD Chemical Engineering, MIT  
ICPE-619  

Vaddiraju, Sreeram  
PhD Chemical Engineering, U. Louisville  
ICPE-620  

Yu, Choongho  
PhD Mechanical Engineering, U. Texas Austin  
ICPE-621  

Claridge, David  
PhD Physics, Stanford University  
ICPE-622  

Culp, Charles  
PhD Solid State Physics, Iowa State University  
ICPE-622  

Mohtar, Rabi  
PhD Agricultural Technology, Michigan State U.  ICPE-623  

Damnjanovic, Ivan  
PhD Civil Engineering, U. Texas Austin  
ICPE-625  

Medica-Cetina, Zenon  
PhD Stochastic Mechanics, Johns Hopkins U.  ICPE-625  

Mannan, Sam  
PhD Chemical Engineering, U. Oklahoma  ICPE-626  

Sanchez, Marcelo  
PhD Civil Engineering, U. Polit. de Catalunya  ICPE-628  

D. **Students** – Describe general recruitment efforts and admission requirements. How will students be accepted into the program? In accordance with the institution’s Uniform Recruitment and Retention Strategy, describe plans to recruit, retain, and graduate students from underrepresented groups for the program.

The “Certificate in Energy” program targets three broad categories. Category 1 consists of graduating seniors from diverse educational backgrounds (e.g., sciences, engineering, social sciences, business) and domestic and international institutions (e.g., US and Canada, Central and South America, Europe, Middle East, and Asia). Category 2 consists of recent graduates/professionals who have been in industry and/or government for less than 3-5-10+ years. Category 3 will be executive professionals.

We will aim for a diverse, dynamic, and high quality student body. To attain this goal, we will advertise the proposed innovative “Certificate in Energy” program through the Energy Institute website, departmental websites, colleges’ websites, and the University website. In addition, we will provide material and ask all the department heads to assist us in advertising the program on campus, as well as provide material to many universities in the US, South America, Europe, Middle East and Asia.
E. Library – Provide the library director’s assessment of library resources necessary for the program. Describe plans to build the library holdings to support the program.

*The library needs for the “Certificate in Energy” program are standard and do not require any special resources. Current library holdings are sufficient.*

F. Facilities and Equipment – Describe the availability and adequacy of facilities and equipment to support the program. Describe plans for facility and equipment improvements/additions.

*A few (i.e., 2-3) classrooms with capabilities for distance learning (e.g., video recording and conferencing) will be required for the program.*

G. Accreditation – If the discipline has a national accrediting body, describe plans to obtain accreditation or provide a rationale for not pursuing accreditation.

*No accreditation from a national accrediting body is needed.*

H. Evaluation – Describe the evaluation process that will be used to assess the quality and effectiveness of the new degree program.

The Advisory and Evaluation Committee, (A&EC) will consist of the Vice President for Research, VPR, the Deans of the College of Agriculture & Life Sciences; College of Engineering; College of Geosciences; and College of Sciences, as well as External Assessors to be selected. Annually, one of the Deans/VPR will be selected to serve as the Lead of the A&EC.

The Texas A&M Energy Institute will develop an appropriate annual or biannual review process to evaluate the impact of the “Certificate in Energy” program. The review will include evaluations of graduate recruitment, retention, curriculum, research, and faculty teaching assessments. The annual or biannual review of the program will be conducted in a timely fashion to assure proper assessment of prior activities and appropriate feedback mechanism for improvement.

I. Administration of Program – Describe how the program will be administered. Where will the program be administered (i.e., department, college)?

*The program will be administered by the Texas A&M Energy Institute.*
III. Costs and Funding

Five-Year Costs and Funding Sources - Use this table to show five-year costs and sources of funding for the program.

### Five-Year Costs

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
<td>Faculty</td>
<td>$150,000 (honoraria for faculty)</td>
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<tr>
<td>Administration</td>
<td>$50,000</td>
</tr>
<tr>
<td>Graduate Assistants</td>
<td>0</td>
</tr>
<tr>
<td>Other Personnel</td>
<td>0</td>
</tr>
<tr>
<td>Facilities, Equipment &amp; IT</td>
<td>$25,000</td>
</tr>
<tr>
<td>Supplies &amp; Materials</td>
<td>$25,000</td>
</tr>
<tr>
<td>Library</td>
<td>0</td>
</tr>
<tr>
<td>Other (seminars)</td>
<td>$25,000 (travel &amp; accommodation expenses for seminars)</td>
</tr>
</tbody>
</table>

**Total Five Year Costs** = $275,000

### Five year Funding/Income

Tuition and Program fee = $20,000

- **Year 1 (5 students):** income from tuition and program fees = $100,000
- **Year 2 (10 students):** income from tuition and program fees = $200,000
- **Year 3 (15 students):** income from tuition and program fees = $300,000
- **Year 4 (20 students):** income from tuition and program fees = $400,000
- **Year 5 (20 students):** income from tuition and program fees = $400,000

**Total Five Year Income** = $1,400,000

Revised 01.14.2014
Signature Page

1. **Adequacy of Funding** – The chief executive officer shall sign the following statement:

   I certify that the institution has adequate funds to cover the costs of the new program. Furthermore, the new program will not reduce the effectiveness or quality of existing programs at the institution.

   _______________________________  ________________________
   Chief Executive Officer            Date

2. **Board of Regents or Designee Approval** – A member of the Board of Regents or designee shall sign the following statement:

   On behalf of the Board of Regents, I approve the program.

   _______________________________  ________________________
   Board of Regents (Designee)        Date of Approval

3. **Board of Regents Certification of Criteria for Commissioner of Assistant Commissioner Approval** – For a program to be approved by the Commissioner or the Assistant Commissioner for Academic Affairs and Research, the Board of Regents or designee must certify that the new program meets the eight criteria under TAC Section 5.50 (b): The criteria stipulate that the program shall:

   (1) be within the institution’s current Table of Programs;
   (2) have a curriculum, faculty, resources, support services, and other components of a degree program that are comparable to those of high quality programs in the same or similar disciplines at other institutions;
   (3) have sufficient clinical or in-service sites, if applicable, to support the program;
   (4) be consistent with the standards of the Commission of Colleges of the Southern Association of Colleges and Schools and, if applicable, with the standards or discipline-specific accrediting agencies and licensing agencies;
   (5) attract students on a long-term basis and produce graduates who would have opportunities for employment; or the program is appropriate for the development of a well-rounded array of basic baccalaureate degree programs at the institution;
   (6) not unnecessarily duplicate existing programs at other institutions;
   (7) not be dependent on future Special Item funding
   (8) have new five-year costs that would not exceed $2 million.

   On behalf of the Board of Regents, I certify that the new program meets the criteria specified under TAC Section 5.50 (b).

   _______________________________  ________________________
   Board of Regents (Designee)        Date
Memorandum

Date: February 11, 2014

To: Jorge Vanegas, Dean
    College of Architecture

Through: Leslie Feigenbaum, Assistant Dean for Academic Affairs
         College of Architecture

From: Forster Ndubisi, Department Head
      Department of Landscape Architecture and Urban Planning

Subject: Graduate Certificate in Transportation Planning – Add Focus Area

This memo is to respectfully request an additional focus area to an already approved Graduate Certificate in Transportation Planning. The Certificate currently has three focus areas which are Multimodal Systems Planning, Transportation and Urban Design and Transportation Planning and Public Policy. The Department would like to request adding a Transit Management focus area to the certificate. This focus is designed to meet critical professional needs within the transportation community, and is tailored towards securing the student’s placement in specific transportation-related agencies and organizations.

If you should have any questions or concerns, please feel free to contact me at 979-845-1019.

Langford Architecture Center
3137 TAMU
College Station, TX 77843-3137

Tel. 979.845.1019 Fax 979.862.1784
http://iaup.arch.tamu.edu/
DATE: May 25, 2012

TO: Matt Sandidge – Texas Transportation Institute

THROUGH: Dr. Samuel A. Kirkpatrick
Executive Associate Dean, Bush School of Government and Public Service

FROM: Dr. Jeryl Mumpower
MPSA Program Director, Bush School of Government and Public Service

REF: Inclusion of Bush School Coursework in Certificate in Transportation Planning Curriculum

The Bush School of Government and Public Service fully supports the new focus area “Transit Management” for the Graduate Certificate in Transportation Planning (CTP), based in the College of Architecture. The Bush School currently has coursework included in other focus areas of the CTP curriculum and endorses inclusion of five elective courses in the new transit management focus area curriculum. The courses include the following:

- PSAA 611: Public Policy Formation
- PSAA 622: Public Finance
- PSAA 634: Public Management
- PSAA 636: Grant and Contract Management
- PSAA 648: Performance Management in the Public and Nonprofit Sectors

We welcome students from other departments pursuing the CTP in its current format to enroll in the Bush School courses listed above. We foresee no issues with students pursuing the transit management focus area also taking these courses.
DATE: May 21, 2012
TO: Matt Sandidge – Texas Transportation Institute
FROM: Mays Business School – Department of Management
RE: Inclusion of Coursework in Certificate in Transportation Planning Curriculum

The Department of Management of Mays Business School received information regarding the new focus area "Transit Management" for the Graduate Certificate in Transportation Planning (CTP), based in the College of Architecture. The Department of Management does not object to the inclusion of five courses in the focus area curriculum. The five courses include the following:

- MGMT 630: Behavior and Organizations
- MGMT 639: Negotiations in Competitive Environments
- MGMT 655: Survey of Management
- MGMT 658: Managing Projects
- MGMT 675: Leadership in Organizations

We welcome students from other departments pursuing the CTP to enroll in the courses listed above from our department. Further, we see no issues with students pursuing the transit management focus area to take these courses.

Agreed

[Signature]
Assistant Dean Head Management
THE GRADUATE CERTIFICATE
IN TRANSPORTATION PLANNING

Program Description
and Degree Requirements

REVISED DRAFT: February 2014
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<td></td>
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</tr>
<tr>
<td></td>
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</tbody>
</table>
The Certificate Program
The Certificate is to be awarded after completion of a prescribed program of study, and must be signed by the head of the student’s academic department and the dean of the college. The certificate contains the seal of the university and appropriate text. It will normally be presented at college ceremonies prior to the official university graduation exercises.

PART II: Criteria and Course Requirements
The College of Architecture will award the Certificate to students meeting the criteria listed below:

1. All students should declare intent to seek the Certificate at the time of filing a Degree Plan, but in any event must submit an application as soon as possible after filing a Degree Plan. Application forms are available in the Graduate Programs Office in the College of Architecture, and are also available at the Hazard Reduction & Recovery Center and the Certificate Program Coordinator.

2. The student must complete a minimum of fifteen (15) credit hours of course work in transportation planning. This 15-credit sequence of courses is comprised of a foundational course in transportation planning (Foundation: 3 credits), a course providing a foundation in the student’s area of focus (Focused Foundation: 3 Credits), two electives in the student’s chosen area of focus (6 credits), and an applied studio course that provide a comprehensive, multidisciplinary application of the skills and knowledge gained during the completion of the certification program (Capstone Course: 3 Credits). The courses must be applicable toward a graduate degree in the College of Architecture, but may not necessarily be included on the student’s degree plan. At least three (3) credit hours of course work with transportation content must be from outside the student’s major department.

3. The student must complete a professional study, thesis, or dissertation with a transportation focus approved by the CTP Council if this is required by the student’s major program.

4. On completion of all the requirements for the graduate degree, the student will receive “the Certificate” signed by the Dean and the appropriate Department Head.

The student’s Graduate Advisory Committee remains the primary body for recommending the degree plan content. Courses required or intended for the Certificate
may be used in the degree plan with the concurrence of the Graduate Advisory Committee. Students also may add courses beyond their normal degree requirements in order to fulfill the Certificate requirements. Students are encouraged to consult with their Graduate Advisory Committee and the Coordinator of the Certificate as they develop their degree plans.

PART III-A: Approved Courses for the Certificate

The CTP Council will pre-approve a list of courses that meet the requirements for transportation planning content. The list, together with associated syllabi and names of instructors, will be on file in the Transportation Planning Certificate Program Office, which is located in the LAUP Office. The list will be available also in the Hazard Reduction & Recovery Center Office.

Students who identify a course not on the list of pre-approved courses, or who wish to transfer courses from another institution, must submit a written statement that clearly describes how a course lacking prior approval is related to the student’s course of study in transportation planning. This written statement, supported by a copy of the course syllabus, will be reviewed by the CTP Council. Where a course has a generic topic (for example a design studio in architecture, or a capstone studio course in land development or planning), the written statement of the transportation planning content and the student’s specific role in working with that content must be co-signed by the course instructor. Courses that are not acceptable for use toward a graduate degree at Texas A&M University will not be approved under any circumstances. The CTP Council may seek input from faculty concerning course content and/or the specific contribution of a student in a course with team activity.

Where the CTP Council makes a negative finding as to applicability of a course, or a final project, the finding will be made in writing with copies to the student, student file, and chair of the student’s Graduate Advisory Committee. Appeals against findings of the CTP Council will be made to the academic dean of the College of Architecture.

PART III-B: Curriculum

The curriculum for the Certificate is represented graphically in Figure 1.
1. Foundations of Transportation Practice (3 Credit Hours)

Students pursuing the Certificate will begin their study by taking PLAN 612: Transportation in City Planning, which provides a comprehensive overview of the role of transportation in society. Required Course:

- PLAN 612: Transportation in City Planning

2. Focus Area (9 Credit Hours)

The second step in the completion of the Certificate is the completion of courses in one of four specific areas of professional focus. Students will be required to complete nine (9) credits for the following focus areas: Multimodal Systems Planning, Transportation and Urban Design, Transportation and Public Policy, and Transit Management. Each of the four focus areas is designed to meet critical needs within the transportation profession, and is tailored towards securing the student’s placement in appropriate transportation-related agencies and organizations.

a. Multimodal Systems Planning

The focus area in Multimodal Systems Planning is intended for students seeking to address regional-level transportation issues. This focus area builds upon the foundational curriculum by providing an in-depth examination of multimodal solutions for addressing regional mobility, as well as providing students with instruction on the tools and methods used for designing and aligning regional-level transportation system investments. Students focusing on Multimodal Systems Planning will have the educational background needed for successful employment in metropolitan planning organizations (MPOs), Regional Councils of Governments (COGs), as well as the diverse array of private consulting firms who provide support for the activities of these agencies. Courses for students focusing on Multimodal Systems Planning are:

Required: Focused Foundation in Multimodal Systems Planning (3 Credits)
- PLAN 670: Urban Public Transportation Planning*
- PLAN 673: Design for Sustainable Transportation

Electives: Multimodal Systems Planning (6 Credits)
- CVEN 618: Traffic Engineering: Operations
- CVEN 672: Engineering and Planning Urban Transportation Systems
- PLAN 626: Advanced GIS in Landscape Architecture and Urban Planning**
- PLAN 650: Disaster Response Planning
- PLAN 673: Design for Sustainable Transportation
- PLAN 674: Transportation Systems Analysis
- PLAN 676: Transportation Investment Decisions

* Students are advised to take PLAN 670 if available, but PLAN 673 will also satisfy this requirement.
** Prerequisite: PLAN 625: Geographic Information Systems in Landscape Architecture and Urban Planning, or an approved substitute.
b. Transportation and Urban Design

The focus area in Transportation and Urban Design seeks to address the growing demand for transportation professionals who can balance conventional mobility concerns with the needs of the built and natural environments. Despite the call from industry leaders such as the Federal Highway Administration (FHWA), the Institute of Transportation Engineers (ITE), and the Transportation Research Board (TRB) for a more “context-sensitive” approach to transportation planning and design, few, if any, University programs provide specific instruction in this area. The focus area in Transportation and Urban Design seeks to build upon TAMU’s reputation as a leader in transportation education by providing specialized instruction aimed at addressing this critical professional need. Students focusing in Transportation and Urban Design will typically find employment in the growing number of private firms providing specialized transportation design services to both local governments and state departments of transportation (DOTs), as well in staff positions in public-sector agencies. Courses for students focusing in Transportation and Urban Design are:

Required: Focused Foundation in Transportation and Urban Design (3 Credits)
- PLAN 673: Design for Sustainable Transportation

Electives: Transportation and Urban Design (6 Credits):
- CVEN 617: Traffic Engineering – Characteristics
- CVEN 618: Traffic Engineering: Operations
- CVEN 635: Street and Highway Design
- CVEN 672: Engineering and Urban Transportation Systems
- LAND 661: Visual Quality for Design and Planning
- PLAN 670: Urban Public Transportation Planning
- PLAN 672: Transportation and the Environment
- PLAN 674: Transportation Systems Analysis
- PLAN 676: Transportation Investment Decisions

c. Transportation and Public Policy

Total public expenditures in transportation infrastructure total more than $170 billion per year,\(^1\) with many public funding programs tied to specific program grants that direct how transportation system investments are made. The Transportation and Public Policy focus area is intended to develop policy

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innovators who are able to tailor public policy and finance to address emerging transportation needs. Students focusing in this area will have the educational background needed to assume policy and managerial positions in public-sector entities responsible for transportation planning and investments, such as state and local departments of transportation (DOTs), as well as in the Federal agencies tasked with oversight over the nation’s transportation system, such as the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), among others. Proposed courses for this focus area include:

Required: Focused Foundation in Transportation and Public Policy (3 Credits)

- PLAN 676: Transportation Investment Decisions

Electives: Transportation and Public Policy (6 Credits)

- PSAA 611: Public Policy Formation
- PSAA 616: Public Organization in a Pluralistic Society
- PSAA 617: State and Local Government Policy
- PSAA 622: Public Finance
- PSAA 634: Public Management
- PLAN 650: Disaster Response Planning

d. Transit Management

The focus area in Transit Management seeks to address the growing demand for highly qualified and well-trained professionals in the public transit industry. In the state of Texas alone, there are over 70 urban and rural transit systems, in addition to more than 135 operators providing transit services to the elderly and individuals with disabilities. According to the American Public Transportation Association (APTA), more than half of the transit workforce will retire by 2020, highlighting the need to train the next generation of public transit professionals. While the need for new professionals in the public transit industry is great, very few university programs offer specific instruction in transit management and operations. The focus area in Transit Management seeks to address this gap by providing students with skills and knowledge in transit operations, management techniques, and critical analysis aimed at addressing this important professional need. Students focusing in Transit Management will have the necessary skills to pursue careers in the public transit industry, and will typically find employment with federal agencies such as the Federal Transit Administration (FTA), regional and metropolitan transit agencies such as Dallas Area Rapid Transit (DART) and
Houston METRO, small town and rural transit agencies, and specialized transit agencies providing demand response and paratransit services.

Students choosing the Transit Management focus area are strongly encouraged to pursue an internship involving work in transit management and planning. Efforts will be made to provide resources and information about internship opportunities and to help place students in transit management internships.

Required: Focused Foundation in Transit Management (3 Credits)
- PLAN 670: Urban Public Transportation Planning*
- PLAN 673: Design for Sustainable Transportation

Electives: Transit Management (9 Credits)**

*Planning and Civil Engineering
- CVEN 618: Traffic Engineering: Operations
- CVEN 632: Engineering Economics
- CVEN 672: Engineering and Planning Urban Transportation Systems
- PLAN 674: Transportation Systems Analysis

*Management, Policy and Finance
- MGMT 630: Behavior and Organizations
- MGMT 639: Negotiations in Competitive Environments
- MGMT 655: Survey of Management
- MGMT 658: Managing Projects
- MGMT 675: Leadership in Organizations
- PLAN 676: Transportation Investment Decisions
- PSAA 611: Public Policy Formation
- PSAA 622: Public Finance
- PSAA 634: Public Management
- PSAA 636: Grant and Contract Management
- PSAA 648: Performance Management in the Public and Nonprofit Sectors

* Students are advised to take PLAN 670 if available, but PLAN 673 will also satisfy this requirement.
** Students will be required to take one course under Planning and Civil Engineering and two courses under Management, Policy and Finance.
3. Capstone Course (3 Credit Hours)

The Certificate in Transportation will culminate in a second-year capstone course that synthesizes the knowledge obtained during the course of the certificate program. As envisioned, the Capstone Course will require students from each of the four focus areas to work collaboratively to develop comprehensive real-world solutions to transportation problems at the local and regional scales. As growth and demand in individual focus areas permits, additional capstone courses may be added that are tailored towards students in specific focus areas.

- PLAN 678: Applied Transportation Studio

PART III-C: Program Faculty

The following faculty members have special expertise appropriate to Transportation Planning and should be considered for inclusion on Guidance Committees:

- Ann Bowman, Bush School of Government and Public Service
- Elise Bright, Landscape Architecture and Urban Planning
- Mark Burris, Civil Engineering
- Bill Eisele, Texas A&M Transportation Institute, Landscape Architecture and Urban Planning
- David Ellis, Texas A&M Transportation Institute, Landscape Architecture and Urban Planning
- Gene Hawkins, Civil Engineering
- Kenneth Joh, Landscape Architecture and Urban Planning
- Chanam Lee, Landscape Architecture and Urban Planning
- Ming-Han Li, Landscape Architecture and Urban Planning
- Wei Li, Landscape Architecture and Urban Planning
- Michael Lindell, Landscape Architecture and Urban Planning
- Eric Lindquist, Bush School of Government and Public Service
- Tim Lomax, Texas A&M Transportation Institute, Landscape Architecture and Urban Planning
- Forster Ndubisi, Landscape Architecture and Urban Planning
- Dennis Perkinson, Texas A&M Transportation Institute, Landscape Architecture and Urban Planning
- Luca Quadrifoglio, Civil Engineering
- Katherine Turnbull, Texas A&M Transportation Institute, Landscape Architecture and Urban Planning
- Douglas Wunneburger, Landscape Architecture and Urban Planning
- Arnold Vedlitz, Bush School of Government and Public Service
### Part III-D: Model Degree Plan for Master of Urban Planning Students*

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester I</strong></td>
<td>PLAN 601: Introduction to Urban Planning</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>PLAN 604: Planning Methods I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 610: Structure and Function of Settlements</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 625: GIS for LAUP</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 661: Communications in Planning</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td><strong>Spring Semester I</strong></td>
<td>PLAN 613: Planning Methods II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 664: Planning History and Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><em>PLAN 673: Design for Sustainable Transportation</em></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><em>PLAN 676: Transportation Investment Decisions</em></td>
<td>12</td>
</tr>
<tr>
<td><strong>Fall Semester II</strong></td>
<td><em>PLAN 612: Transportation in City Planning</em></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 662: Applied Planning I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><em>PLAN 674: Transportation Systems Analysis</em></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 684: Professional Internship</td>
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</tr>
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<td>2</td>
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<tr>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td><strong>Spring Semester II</strong></td>
<td>PLAN 663: Applied Planning II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><em>PLAN 678: Applied Transportation Studio</em></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 693: Professional Study</td>
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<tr>
<td><strong>Minimum Hours Standard Degree</strong></td>
<td></td>
<td>48</td>
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</tbody>
</table>

* CTP classes in *italics*

*Note: Specific course sequences may vary given the focus area selected by the individual student. The above sequence represents the anticipated schedule for a student pursuing a Master of Urban Planning Degree that is focusing on Multimodal Systems Planning.*
### Part III-E: Model Degree Plan for Master of Landscape Architecture Students

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester I</strong></td>
<td>LAND 620: Open Space Development I</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>LAND 640: Research Methods in Landscape Arch.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>RLEM 602: Ecology and Land Uses</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><em>PLAN 612: Transportation in City Planning</em></td>
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<td><strong>14</strong></td>
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<tr>
<td><strong>Spring Semester I</strong></td>
<td>LAND 621: Open Space Development II</td>
<td>5</td>
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<tr>
<td></td>
<td>LAND 681: Seminar</td>
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<tr>
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<td><em>PLAN 673: Design for Sustainable Transportation</em></td>
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<tr>
<td></td>
<td><em>PLAN 676: Transportation Investment Decisions</em></td>
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<td></td>
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<tr>
<td><strong>Summer Semester I</strong></td>
<td>LAND 684: Professional Internship</td>
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<tr>
<td><strong>Fall Semester II</strong></td>
<td>LAND 646: Professional Practice</td>
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<td>LAND 693: Professional Study</td>
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</tr>
<tr>
<td></td>
<td><em>PLAN 674: Transportation Systems Analysis</em></td>
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</tr>
<tr>
<td></td>
<td>Elective</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td><strong>12</strong></td>
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<tr>
<td><strong>Spring Semester II</strong></td>
<td>LAND 646: Professional Practice</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>LAND 693: Professional Study</td>
<td>4</td>
</tr>
<tr>
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<td><em>PLAN 678: Applied Transportation Studio</em></td>
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</tr>
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<td></td>
<td></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

**Minimum Hours Standard Degree**

|                                                          | 48 |

* CTP classes in *italics*

*Note: Specific course sequences may vary given the focus area selected by the individual student. The above sequence represents the anticipated schedule for a student pursuing a Master of Landscape Architecture Degree that is focusing on Transportation and Urban Design.*
**Part III-F: Model Degree Plan for Master of Architecture Students***

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Hours</th>
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<tbody>
<tr>
<td><strong>Fall Semester I</strong></td>
<td>ARCH 605: Design I</td>
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<td>ARCH 631: Structure Elements III</td>
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<td>ARCH 633: Environmental Systems 3</td>
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<tr>
<td><strong>Spring Semester I</strong></td>
<td>ARCH 606: Design II</td>
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<tr>
<td></td>
<td>ARCH 638/9: Architectural History</td>
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<td>PLAN 673: Design for Sustainable Transportation</td>
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</tr>
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<tr>
<td><strong>Summer Semester I</strong></td>
<td>ARCH: Architecture Elective</td>
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<tr>
<td><strong>Fall Semester II</strong></td>
<td>ARCH 607: Design III</td>
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<td></td>
<td>PLAN 612: Transportation in City Planning</td>
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<td></td>
<td>PLAN 674: Transportation Systems Analysis</td>
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<td></td>
<td>ARCH 685: Final Study Prep</td>
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<td><strong>Spring Semester II</strong></td>
<td>ARCH: Professional Practice</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>LAND 693: Professional Study</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PLAN 676: Transportation Investment Decisions</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 678: Applied Transportation Studio</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Minimum Hours Standard Degree** 53

* CTP classes in *italics*

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*Note: Specific course sequences may vary given the focus area selected by the individual student. The above sequence represents the anticipated schedule for a student pursuing a Master of Architecture Degree that is focusing on Transportation and Urban Design.*
### Part III-G: Model Degree Plan for Master of Science in Civil Engineering Students

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester I</td>
<td>CVEN 617: Traffic Engineering-Characteristics</td>
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<td>CVEN 672: Engineering and Urban Transportation</td>
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<td>PLAN 612: Transportation in City Planning</td>
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<td>Spring Semester I</td>
<td>CVEN 618: Traffic Engineering- Operations</td>
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<td>CVEN 681: Seminar in Transportation</td>
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</tr>
<tr>
<td></td>
<td>PLAN 676: Transportation Investment Decisions</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PLAN 678: Applied Transportation Studio</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
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<tr>
<td>Summer Semester I</td>
<td>Research Hours</td>
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<td>Fall Semester II</td>
<td>CVEN 635: Street and Highway Design</td>
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<tr>
<td></td>
<td>Research Hours</td>
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<td></td>
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</tbody>
</table>

**Minimum Hours Standard Degree** 34

* CTP classes in *italics*

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*Note: Specific course sequences may vary given the focus area selected by the individual student. The above sequence represents the anticipated schedule for a student pursuing a Master of Science in Civil Engineering degree that is focusing on Transportation and Public Policy.*
<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
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<td>Fall Semester I</td>
<td>BUSH 601: Leadership and Public Administration</td>
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<td>PSAA 621: Economic Analysis</td>
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<td></td>
<td>BUSH 631: Quantitative Methods in Public Mgmt I</td>
<td>3</td>
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<td></td>
<td>PSAA 611: Public Policy Formation</td>
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<tr>
<td>Spring Semester I</td>
<td>BUSH 632: Quantitative Methods in Public Mgmt II</td>
<td>3</td>
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<tr>
<td></td>
<td>PSAA 622: Public Finance OR PSAA 634: Public Management</td>
<td>3</td>
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<td></td>
<td>PLAN 676: Transportation Investment Decisions</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective</td>
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<td></td>
<td></td>
<td>12</td>
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<tr>
<td>Summer Semester I</td>
<td>Professional Internship</td>
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</tr>
<tr>
<td>Fall Semester II</td>
<td>PSAA 675: Capstone I</td>
<td>3</td>
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<tr>
<td></td>
<td>PSAA 615: Policy Analysis OR PSAA 623: Budgeting in Public Service</td>
<td>3</td>
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<tr>
<td></td>
<td>PLAN 612: Transportation in City Planning</td>
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<tr>
<td></td>
<td>Elective</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Spring Semester II</td>
<td>PSAA 676: Capstone II</td>
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<td>PLAN 678: Applied Transportation Studio</td>
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<td>Elective</td>
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<td>Elective</td>
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<td></td>
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<td>12</td>
</tr>
</tbody>
</table>

Minimum Hours Standard Degree 48

* CTP classes in *italics*

*Note: Specific course sequences may vary given the focus area selected by the individual student. The above sequence represents the anticipated schedule for a student pursuing a Master of Public Service and Administration degree that is focusing on Transportation and Public Policy.*
Part IV: Summary of Steps Required Obtaining the Certificate

Students are strongly encouraged to meet with a member of the CTP Council (in particular, the Certificate Coordinator) prior to filing an application and completing a degree plan.

**Step One: Initial Application for the Certificate.** At the time a degree plan is filed, the student will complete an Initial Application for the Certificate and attach to it a copy of the Degree Plan signed by the student’s Graduate Advisory Committee and the head of the student’s department. The CTP Council will review the Initial Application for compliance with the requirements for content. Initial Applications for the Certificate submitted after filing a degree plan can usually be expected to require a revision of the degree plan and may delay timely progress toward degree completion.

**Step Two: Review of the Final Application.** Master’s level students must provide the CTP Council with an abstract and any supporting justification as may be required to evaluate the topical relevance of transportation planning to their professional study, professional paper, or thesis, if such a product is required in their degree program. This information must be submitted after the manuscript has been approved by the student’s Graduate Advisory Committee. Doctoral students must provide the CTP Council with an abstract and any supporting justification as may be required to evaluate the topical relevance to transportation planning to their dissertation. This information must be submitted after the defense of the dissertation proposal. The CTP Council will review the Final Application for compliance with the requirements for content and forward its recommendation to the Graduate Programs Office.

**Step Three: Issue of the Certificate.** At the time the student is approved for receipt of a relevant graduate degree, the Graduate Programs Office in the College of Architecture (COA) will review the approved certificate courses and advise the Dean of the College of Architecture of successful completion. The Dean of the COA will then authorize the granting of the Certificate.
Part V: Policy for Maintaining Student Records

Official Graduate Transportation Planning Certificate Program records consist of the Application, a copy of the approved Degree Plan (and any subsequent Petitions that may impact the previously approved program), an Abstract of the final project topic, and any official correspondence. These records will be kept in the official student folders in the COA Graduate Programs Office. For reference purposes the COA Graduate Programs Office will create and maintain a database showing all students who have received, or are currently enrolled in the Certificate Program.

Name
Degree Program
Date of Application
Date of Actions For Each Step Above
Title of Project, Paper, Thesis, Or Dissertation
Name Of Chair Of Graduate Advisory Committee
Date of Degree/Certificate Awarded
Permanent/Current Address/E-Mail
Employment Data

This database will be accessible by the Transportation Planning Program Office and the HRRC, which also maintains hardcopy files for developing data on the career histories, addresses, email address, etc. of certificate holders and current students. Student grades will not be available outside the COA Graduate Programs Office, and personal data will not be released, except in accordance with state law and university guidelines.
APPLICATION FOR ADMISSION TO THE
GRADUATE CERTIFICATE IN TRANSPORTATION PLANNING PROGRAM

Submit this form to the Certificate Coordinator

Student Information:

Name: ____________________________ Student ID Number: ____________

Address: ____________________________________________________________

Phone(s): __________________________ Email: __________________________

Date of Application: __________________________

Degree Information:

Department: __________________________________________________________

Degree Program (please circle)

Doctoral Degree
Ph. D. (ARCH) Ph. D. (URSC) Ph. D. (Other)

Master’s Degree
M.ARCH MS(ARCH) MLA MSCE MUP MSLD MPSA

MA/MS (Other)

Chair of Graduate Advisory Committee: ________________________________

Expected completion date: ____________________________________________

Please attach a preliminary description or final abstract of dissertation, final study, thesis, or professional report or paper:
STUDENT DEGREE PLAN FOR THE
GRADUATE CERTIFICATE IN TRANSPORTATION PLANNING

List the courses you propose to meet the Transportation Planning Certificate requirements.

<table>
<thead>
<tr>
<th>Department Abbreviation</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</tbody>
</table>

_________________________  ______________________
Signature of Student      Date

Approval Recommended:

_________________________  ______________________
Certificate Coordinator   Date

Graduate Programs Office  CTP Program Office  Student  Chair, Student’s Graduate Advisory Committee
Attachment C

Certificate Structure and Credit Hour Requirement

The Transportation Certificate will involve a 15-credit sequence comprised of one required foundational course (3 credits), three focus area courses (9 credits), and a capstone course (3 credits) providing a comprehensive overview and application of the skills and techniques learned during the completion of the certificate program. A comprehensive examination may be substituted in lieu of the capstone course. The proposed program differs in three minor ways from the existing Certificate Program: First, the prospective student does not necessarily need to be enrolled in a graduate degree at the university to be enrolled in the Certificate since it is targeted to place-bound students. As such, students can enroll directly into the program similar to the way the Bush School enrolls students into the online certificates it offers. Second, the certificate does not need to be awarded concurrent with a graduate degree. Third, the courses will be delivered as appropriate in a condensed and flexible format to increase access as also done in the Bush School.

Figure 1 (next page), depicts the overall structure of the 15-credit certificate program, comprised of the following components:
Certificate in Transportation - Curriculum Structure
August 22, 2014

MEMORANDUM

TO: Dr. Mark Zoran
Graduate Council Chair

THROUGH: Amb. Ryan Crocker
Dean of The Bush School of Government and Public Service

THROUGH: Dr. Leonard Bright
Assistant Dean of Graduate Education and Graduate Instruction Committee Chair
The Bush School of Government and Public Service

THROUGH: Dr. Gregory Gause
Department Head, International Affairs Department

FROM: Dr. William F. West
Acting Department Head, Public Service and Administration Department
The Bush School of Government and Public Service

SUBJECT: Proposal for Course Prefix Changes to CHLS Courses

The Bush School of Government and Public Service’s Graduate Certificate in Homeland Security (CHLS) was formerly housed within the Master’s Program in International Affairs but will now be housed within the newly formed Public Service and Administration (PSAA) Department. The PSAA department would like to change the course prefix for the CHLS courses from INT A to PSAA to reflect the change in administrative structure effective with the 2015-16 graduate catalog.

The following table lists the current course prefixes for the CHLS classes and the corresponding changes we are requesting. The course titles, descriptions, prerequisites, credit hours, and CIP/funding codes will remain unchanged. Please note that no other changes will be made to any of these courses.
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Current Course Prefix</th>
<th>Proposed Course Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeland Security and Homeland Defense</td>
<td>INTA 602</td>
<td>PSAA 651</td>
</tr>
<tr>
<td>Protection of the Nation’s Critical Infrastructure</td>
<td>INTA 614</td>
<td>PSAA 652</td>
</tr>
<tr>
<td>Weapons of Mass Destruction</td>
<td>INTA 619</td>
<td>PSAA 653</td>
</tr>
<tr>
<td>Domestic Intelligence Operations: Legalities, Policies and Procedures</td>
<td>INTA 687</td>
<td>PSAA 655</td>
</tr>
<tr>
<td>Fundamentals of Homeland Security</td>
<td>INTA 656</td>
<td>PSAA 656</td>
</tr>
</tbody>
</table>