New Courses
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 Biological and Agricultural Engineering

2. Course prefix, number and complete title of course:
   BAEN 617 - Fundamentals of Nanoscale Biological Engineering

3. Catalog course description (not to exceed 50 words):
The course will primarily cover nanostructures, nanofabrication methods, instrumentation and applications pertinent to Biological, Food and Bioenergy systems and will provide students an opportunity to identify and utilize key tools available for fabricating, manipulating and analysis of nanostructures used in Biological Engineering applications.

4. Prerequisite(s):
   Cross-listed with: BAEN 417
   Stacked with:

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 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)
      BAEN, any engineering program

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)
   BAEN 617  FUND NANO SCALE BIO ENGR
   Lec. Lab SCH CIP and Local Code  Admun. Unit  Acad. Year  HIC Code
   0 3 0 0 0 3 1 4 0 3 0 1 0 0 0 6 0 4 3 3 1 3 - 1 4 0 0 3 6 3 2

   Approval recommended by:
   Stephen W. Searcy  Department Chair or Program Chair (Type Name & Sign)  Date
   David Reed  Chair, College Review Committee  Date
   David Reed  Chair, GC or SCC  Date

   Date  Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
BAEN 617, Fundamentals of Nanoscale Biological Engineering  
Fall 2012  
Biological and Agricultural Engineering

Instructor: Dr. Sandun Fernando

Lecture: Tuesday and Thursdays 2:20-3:35 PM, Scoates 215

Office: Room 303C Scoates Hall;

Office Hours: By Appointment

Phone: 979-845 9793

Email: sfenando@tamu.edu

Text: None. Handouts will be distributed at the beginning of each class

Laboratory: None

Technology: Students are encouraged to bring their laptops to each meeting

Prerequisites: Graduate classification in engineering

Catalog Description:
The course will primarily cover i) Nanostructures, ii) Nanofabrication methods, iii) Instrumentation and iv) Applications pertinent to Biological, Food and Bioenergy systems and will provide students an opportunity to identify and utilize key tools available for fabricating, manipulating and analysis of nanostructures used in Biological Engineering applications.

Course Objectives:
Engineers like you who deal with biological chemical systems need to have a basic understanding of contemporary technologies like nanoscience and nanotechnology. In a world where technology is changing at a fast pace, you should possess at least a basic understanding of how to engineer systems at a molecular level to solve problems as it pertains to your areas of research/interest. Nanotechnology is a fast growing discipline that is permeating to just about every discipline you can think of. As a result, you should possess an understanding on not only what this technology is all about, but also, the whole gamut of consequences that could arise as a result of widespread adoption of nanotechnology. Accordingly, the key objective of this course is to equip you with the basic tools necessary to manipulate systems at a molecular level (the how?) as well as give you a background of the fundamentals (the why?) behind selected technologies.

At the beginning of the course we will learn the fundamental concepts of nanoscience and nanotechnology. Then we will quickly delve in to learning more about specific applications pertinent to your specific area of research.

When you finish this course, my hope is that you will have a confident grasp of the major concepts of Nanoscale Biological and Energy Systems Engineering including fundamentals and applications. You will be able to answer questions like: What is nanotechnology? What are nanostructures? How do you
fabricate them? What instruments are used to analyze nanoscale systems? and where could you apply such nanotechnological tools?

Learning Outcomes: At the end of the course, you will develop the knowledge, be able to comprehend, apply, analyze, synthesize and evaluate key concepts of nanotechnology to solve a specific problem of your choice. More details on what you should be able to do are given below:

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define key nanotechnological concepts i.e., nanostructures, fabrication methods and analysis tools and identify when and where you could apply these concepts to solve a given technological problem.</td>
<td>Given the opportunity, you should be able to describe and summarize the underlying principles behind key nanoengineering concepts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>You should be able to use the knowledge gained in the class to solve real world problems.</td>
<td>Out of several possibilities, you should be able to compare and point out which tool would be most appropriate for a given situation/problem.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Synthesis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Given a problem, you should be able to plan and design a targeted solution using the knowledge you gathered during the course.</td>
<td>You should be able to appraise and make judgments on the feasibility of the proposed solution when applied to solve the targeted problem.</td>
</tr>
</tbody>
</table>

Learning is much more than listening to the instructor, reading a textbook, copying equations and solving them. It is about YOU acquiring necessary knowledge and skills to get a job done! So, a big part of this course falls onto your shoulder......LEARN. Be excited to learn. Nanotechnology primarily deals with penetrating to the root of the problem......manipulating systems at the molecular level. So, this is a concept that you will encounter nearly in any field. Though some concepts may seem abstract..... here is my bias..... it is FUN! I am looking forward to getting to know each of you this semester and working with you as we accomplish these objectives.

At the end, I expect that each of you will be able to identify and define a problem of your choice, perform a critical review of literature pertinent to the current status of that problem, establish the state of the art status of the technologies available, define research objectives, formulate sound research hypothesis, and design methodologies to test your hypothesis using available nanotechnological tools. You should be able to write a succinct research proposal and defend it in front of your peers.
Course Requirements and Grading

Written reports on assigned activities will be required. Reports should be double spaced and printed on one side of paper only. Formats will be described in class. A term-project will be given and will be due on the date of the final exam.

Grades for this course are based on ability to master specific skills, participation in individual and team projects, and learning fundamental principles required in engineering design and analysis. The different activities will be weighted as follows in determining semester grades:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (3)</td>
<td>45</td>
</tr>
<tr>
<td>Assignments (4)</td>
<td>20</td>
</tr>
<tr>
<td>Semester Project Proposal</td>
<td>25</td>
</tr>
<tr>
<td>Oral Presentation (1)</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Attendance:** Because most activities will be team activities, class participation is essential. For each unexcused lecture absence, 3 points will be deducted from your overall total. If you have an excused absence, please email the details to me prior to the absence if possible. If you have a short-term illness (one or two class days), you do not need to get a note from the doctor but you do need to notify me as soon as possible by email.

Final course grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100 % outstanding competence in the skills taught in the course and exceptional understanding of the applicability and limits of those skills</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89 % competence in the skills taught in the course, and good understanding of the applicability and limits of those skills</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79 % competence in most skills taught in the course and understanding of the applicability and limits of those skills</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69 % minimal competence in some skills taught in the course and limited understanding of the applicability and limits of those skills</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60 %</td>
</tr>
</tbody>
</table>
Additional Requirements for Graduate Students:

Graduate students are required to write a research proposal to a selected granting agency (such as the National Science Foundation, National Institute of Health, US Department of Agriculture etc.) on a selected topic. The proposal format should be Times New Roman 12 font single-spaced with one-inch margins and a minimum of six pages in length.

The proposal should, in general, contain following sections:

1. Abstract (1 page – written after the whole proposal is compiled)
2. Overview and objectives (overall objective(s), research hypothesis (or need)) section (=1 page) – Before writing this section have a clear idea about all the independent and dependent variables affecting your research problem. Clearly depict what variables you are planning to study and which ones you are planning to keep constant. Also, be sure to include controls to compare your data.
3. Rationale and Significance (= 0.5 page)
4. Literature Review (=1 pages)
5. Research Methods (=2 pages) – Do not forget to discuss characterization methods that will be used.
6. Expected outcomes (=0.5 page)

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, Disability Services in Room B118 of Cain Hall. The phone number is 845-1637. Also, as a courtesy, please advise me as soon as possible if you need accommodations for a disability.

For additional information visit http://disability.tamu.edu

Academic Integrity Statement

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

http://aggiehonor.tamu.edu
<table>
<thead>
<tr>
<th>Topic</th>
<th>Sub-topic</th>
<th>Meeting</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nanomaterials</td>
<td>Aerogels, Carbon Nanotubes</td>
<td>Meeting 1</td>
<td>Assign: 1</td>
</tr>
<tr>
<td></td>
<td>Dendrimers, Metallic Nanoparticles,</td>
<td>Meeting 2</td>
<td></td>
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<tr>
<td></td>
<td>Zeolites, Nanoclays,</td>
<td>Meeting 3</td>
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<tr>
<td></td>
<td>Nanowires</td>
<td>Meeting 4</td>
<td>Assign: 2</td>
</tr>
<tr>
<td>Nanophysics</td>
<td>Particle Shape, Surface and Volume</td>
<td>Meeting 5</td>
<td></td>
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<tr>
<td></td>
<td>Atomic Structure</td>
<td>Meeting 6</td>
<td></td>
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<tr>
<td></td>
<td>Surface energy</td>
<td>meeting 7</td>
<td></td>
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<tr>
<td></td>
<td>Exam 1</td>
<td>Meeting 8</td>
<td></td>
</tr>
<tr>
<td>Nano-measurement</td>
<td>Atomic force microscopy, Scanning tunneling microscopy, EFM, MFM, KFM</td>
<td>Meeting 9</td>
<td>Assign: 3</td>
</tr>
<tr>
<td>Tools</td>
<td>Scanning electron microscopy</td>
<td>Meeting 10</td>
<td></td>
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<tr>
<td></td>
<td>Transmission electron microscopy, AFM</td>
<td>Meeting 11</td>
<td></td>
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<tr>
<td></td>
<td>GC, GCMS, Zetasizer</td>
<td>Meeting 12</td>
<td></td>
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<tr>
<td>Nanofabrication</td>
<td>Electron beam lithography, Nanoimprint lithography, Chemical Vapor deposition</td>
<td>Meeting 13</td>
<td>Assign: 4</td>
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<td></td>
<td>Exam 2</td>
<td>Meeting 14</td>
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<tr>
<td>Nanochemistry and Applications pertinent to Energy, Food and Biological Systems</td>
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<tr>
<td>Surface Interactions - Self Assembly Principles (for Engineering Biological Fuel Cells/Biosensors)</td>
<td>Meeting 15</td>
<td>Assign. 5</td>
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<tr>
<td>Surface Interactions - Self Assembly Principles (for Engineering Biological Fuel Cells/Biosensors)</td>
<td>Meeting 16</td>
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<tr>
<td>Surface Interactions - Self Assembly Principles (for Engineering Biological Fuel Cells/Biosensors)</td>
<td>Meeting 17</td>
<td></td>
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<tr>
<td>Surface Interactions – Micelles, Bilayers, Vesicles, Biological Membranes (Energy and Food Applications)</td>
<td>Meeting 18</td>
<td>Assign: 6</td>
<td></td>
</tr>
<tr>
<td>Surface Interactions – Micelles, Bilayers, Vesicles, Biological Membranes (Energy and Food Applications)</td>
<td>Meeting 19</td>
<td></td>
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<tr>
<td>Surface Interactions - Molecular Recognition/Fuel cell (Demonstration)</td>
<td>Meeting 20</td>
<td></td>
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<tr>
<td>Surface Interactions – Catalysis (hydrogen production)</td>
<td>Meeting 21</td>
<td>Assign: 7</td>
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<tr>
<td>Surface Interactions – Catalysis (biomass to fuels)</td>
<td>Meeting 22</td>
<td></td>
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<tr>
<td>Surface Interactions – Catalysis (biodiesel)</td>
<td>Meeting 23</td>
<td></td>
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<tr>
<td>Surface Interactions – Algae Bioseparation using nanoagents (Demonstration)</td>
<td>Meeting 24</td>
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<tr>
<td>Exam 3</td>
<td>Meeting 25</td>
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<tr>
<td>Project Presentations</td>
<td>Meeting 26-28</td>
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</tbody>
</table>
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 Biomedical Engineering

2. Course prefix, number and complete title of course: BMEN 672 Introduction to Diagnostic Radiology Physics

3. Catalog course description (not to exceed 50 words):
This course presents the concepts of radiation physics used in diagnostic radiology by providing an introduction to the theory behind the different imaging modalities as it relates to mammography, planar X-ray imaging, computed tomography (CT), single photon emission tomography (SPECT), and positron emission tomography (PET).

4. Prerequisite(s): NUEN 611, NUEN 613 or approval from academic advisor

Cross-listed with: NUEN 672

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)

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

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)

<table>
<thead>
<tr>
<th>BMEN</th>
<th>672</th>
<th>DIAG</th>
<th>RAD</th>
<th>IOLOGY</th>
<th>PHYSICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lect.</td>
<td>Lab</td>
<td>SCH</td>
<td>CHP</td>
<td>Fund Code</td>
<td>Admin. Unit</td>
</tr>
<tr>
<td>02</td>
<td>03</td>
<td>03</td>
<td>1405010006</td>
<td>04501314</td>
<td>003632</td>
</tr>
</tbody>
</table>

Approval recommended by:

Gerard Cole
Department Head or Program Chair (Type Name & Sign) Date 8/16/12

Chair, College Review Committee
Date

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

Dean of College
Date 10/24/12

Chair, GC or USC
Date

115

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 – 3/10
Course title and Number: BMEN 672-600 Introduction to Diagnostic Radiology Physics
Term: Fall 2012
Meeting times and location: Texas A&M Institute for Preclinical Studies (TIPS),
Tuesdays and Thursdays, 3:00 PM to 5:00 PM

Course Description and Prerequisites

This course presents the concepts of radiation physics used in diagnostic radiology by providing an introduction to the theory behind the different imaging modalities as it relates to mammography, planar X-ray imaging, computed tomography (CT), single photon emission tomography (SPECT), and positron emission tomography (PET).

Prerequisites: NUEN 611 and NUEN 613 and/or approval from course instructor.

Learning Outcomes or Course Objectives

1. The course objective is to apply the basic principles of radiation physics in radiological imaging.
2. To assess the design characteristics of diagnostic radiology equipment for the safe and effective use in radiological imaging.
3. To demonstrate the importance of dosimetry and equipment calibration and quality control within diagnostic radiology and implications in image quality, disease diagnosis, and long-term risk for secondary cancers.
4. To develop an understanding of the basic principles used in quality control using current AAPM and ACR standards.
5. To examine current advances in equipment design and hybrid imaging modalities.
6. To allow the student to use this knowledge to work effectively within a professional team responsible for the safe and effective use of radiological equipment.
7. To understand the environment of a radiology facility, its workflow and radiation safety aspects.

Instructor Information

Name: Gamal Akabani, PhD / Mark W. Lenox, PhD
Telephone Number: 979-458-1699
Email address: akabani@tamu.edu / markwlenox@tamu.edu
Office Hours: Monday through Friday, 9:00 AM to 5:00 PM by appointment only
Office Location: Texas A&M Institute for Preclinical Studies

Electronic Textbooks and/or Resource Materials


<table>
<thead>
<tr>
<th>Grading Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Assignments</td>
</tr>
<tr>
<td>Practicum</td>
</tr>
</tbody>
</table>

A≥90%
90%≥B≥80%
80%≥C≥70%
70%≥D≥60%
60%≥F
Course Topics, Calendar of Activities, Major Assignment Dates

Weekly Lectures:

**Basic Concepts**

Homework Assignment 1 (September 2nd).
1. Introduction to Medical Imaging (August 28th).
2. Computers in Medical Imaging (August 30th).
3. Digital Imaging and Communications in Medicine (DICOM) (September 4th).

**Diagnostic Radiological Imaging**

Homework Assignment 2
4. X-ray Production, Tubes, Generators and Emission Spectra (September 6th).
5. Screen Film Radiography (September 11th).
6. Mammography (September 13th).
7. Fluoroscopy (September 21th).
8. Image Quality and AAPM Standards (September 23rd).
10. Computed Tomography, Quality Control and Standards (October 9th and 11th).

**Nuclear Medicine Imaging**

Homework Assignment 6
12. Radionuclide Production and Radiopharmaceuticals (October 23rd).
15. Imaging Theory and Statistics in Nuclear Medicine (November 1st).
17. Positron Emission Tomography (PET) and PET-CT (November 13th and 15th).
18. Review (December 4th).

**Laboratories:**

1. Basic Diagnostic Radiology Laboratory, DICOM (October 2nd and 4th).
2. Computed Tomography Laboratory (October 16th and 18th).
3. Radiopharmacy Laboratory (November 8th).
4. PET/CT Imaging Laboratory (November 20th, 27th and November 29th).

**Other Pertinent Course Information**

The student is expected to have knowledge of a high-level computer programming such as C++, or FORTRAN 95, 2003, and operating system such as UNIX or LINUX environment.

**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://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor)

"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. Request submitted by (Department or Program Name):  
   Department of Electrical and Computer Engineering  
   ECEN 751 Computational Methods for Integrated System Design

2. Course prefix, number and complete title of course:  
   ECEN454, ECEN 474 or equivalent

3. Catalog course description (not to exceed 50 words):  
   Integrated circuit and system design in a computational standpoint; VLSI circuit simulation, interconnect modeling and analysis, design and analysis of IC subsystems, parallel computing techniques for complex system design.

4. Prerequisite(s):  
   Cross-listed with:  
   Stacked with:  
   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 ✓  
   Will this course be repeated within the same semester?  
   Yes □ No ✓
   If yes, this course may be taken _____ times.

7. 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. in Computer Engineering, Electrical Engineering, Computer Science.

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)  
   ECEN 751 Computational Methods for Integrated System Design

   Lec. Lab SCh CIP and Fund Code Admin. Unit Acad. Year HCE Code
   0 3 0 0 0 3 1 4 1 0 0 1 0 0 6 0 9 3 6 1 3 - 1 4 0 0 3 6 3 2

   Approval recommended by:  
   Dr. C. Singh 10/18/12  
   Department Head or Program Chair (Type Name & Sign)  
   Date

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

   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 – 3/10
Course title and number  ECEN 751: Computational Methods for Integrated System Design
Term (e.g., Fall 200X)  TBA
Meeting times and location  TBA

Course Description and Prerequisites

Integrated circuit and system design in a computational standpoint; VLSI circuit simulation, interconnect modeling and analysis, design and analysis of IC subsystems, parallel computing techniques for complex system design.

Learning Outcomes or Course Objectives

Upon the complete of this course, students are expected to get exposed to a broad introduction of advanced computational techniques and algorithms that may be used to analyze and design complex integrated circuits and systems. Students will be trained on basic theoretical principles, algorithm design and hands-on implementations.

Instructor Information

Name  Peng Li
Telephone number  5-1612
Email address  pli@tamu.edu
Office hours  TBA
Office location  333M WERC

Textbook and/or Resource Material

Relevant research papers and texts
Grading Policies

Grade assignment and weighting:

Assignments: 30%
Midterm exam: 25%
Final class project: 45%

Late assignment submission:
There will be an exception for university excused absences.
20% penalty per day (tentative)

Attendance:

"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."

Letter Grading Scale (will be adjusted according to student performance distribution):

A = 85-100
B = 75-84
C = 70-74
D = 60-69
F = <60

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
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<tr>
<td>2</td>
<td>Basic circuit analysis</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Introduction to fundamental numerical methods</td>
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<tr>
<td>4</td>
<td>Device modeling in integrated circuit analysis</td>
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<tr>
<td>5</td>
<td>Circuit simulation</td>
<td></td>
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<tr>
<td>6</td>
<td>Circuit simulation</td>
<td></td>
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<tr>
<td>7</td>
<td>Interconnect modeling</td>
<td></td>
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<tr>
<td>8</td>
<td>Model order reduction</td>
<td></td>
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<tr>
<td>9</td>
<td>Design and analysis of IC subsystems</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Process variation and manufacturability</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Introduction to parallel computing</td>
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<tr>
<td>11</td>
<td>Introduction to parallel programming</td>
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</tr>
<tr>
<td>12</td>
<td>Parallel VLSI CAD applications</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Modeling and computational techniques for biological applications</td>
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</tbody>
</table>
Other Pertinent Course Information

N/A

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://www.tamu.edu/aggiehonor

“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

1. This request is submitted by the Department of Electrical and Computer Engineering

   ECEN 752 Advances in VLSI Circuit Design

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

3. Catalog course description (not to exceed 50 words):
   Gate and wire delays, CMOS transistors, DC and AC characteristics, VLSI fabrication, Static, Dynamic, Pass-gate and PLA implementation styles, SOI and GaAs technology, DRAM, SRAM and FLASH memory design, leakage and dynamic power, sub-threshold computation, clocking, transmission lines, packaging, off-chip IO, process variation and compensation, radiation tolerance.

4. Prerequisite(s):

   Cross-listed with:
   [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)
   [E]
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
   [C]

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)

   ECEN 752       ADVANCED VLSI CIRCUIT DESIGN

   Lec. Lab SCI CIP and Fund Code
   0 3 0 0 0 3 1 4 1 0 1 0 0 0 6 0 9 3 6 1 3 - 1 4 0 0 3 6 3 2

   Approval recommended by:
   Dr. C. Singh
   Department Head - Type Name & Sign
   Date

   Chair, College Review Committee
   Date

   Dean of College
   Date

   Dean 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 – 3/09
Course title and number  Advances in VLSI Circuit Design, ECEN 752
Term (e.g., Fall 200X)  Fall 2013
Meeting times and location  2 times a week (MW preferred)

Course Description and Prerequisites

This course covers several aspects of digital circuit design. Starting with device equations, we will delve into several areas of digital circuit design, including recent changes in circuit design styles and future trends in digital circuit design. These recent developments stem from IC fabrication limitations that are being faced in the industry today. The focus is on custom digital VLSI design. Specific topics include: Gate and wire delays, CMOS transistors, DC and AC characteristics, VLSI fabrication, Static, Dynamic, Pass-gate and PLA implementation styles, SOI and GaAs technology, DRAM, SRAM and FLASH memory design, leakage and dynamic power, sub-threshold computation, clocking, transmission lines, packaging, off-chip IO, process variation and compensation, radiation tolerance.

Prerequisites: Graduate classification or Instructor approval

Learning Outcomes or Course Objectives

[Recommended]

The goal of the class is to take the student through a tour of the issues a typical deep sub-micron circuit designer in industry deals with, and the design techniques they utilize. At the end of this class, the
student would have at their disposal an understanding of the analysis techniques and tools that are required for a VLSI circuit designer to effectively function in today's industry. In particular, a student will become familiar with the custom circuit design of digital VLSI circuits, and learn about different circuit design styles for combinational and sequential circuits, memories and clocking circuits. The student will learn about radiation and variation resilient circuit design approaches as well.

Instructor Information

Name: Prof. Sunil P Khatri
Telephone number: (979) 845-8371
Email address: sunilkhatri@tamu.edu
Office hours: MW 10am – 11am
Office location: WERC 333F

Textbook and/or Resource Material

No textbook will be used. Class notes will be available on the course website. The notes are synthesized from various contemporary sources such as textbooks and research papers. The class website is http://www.ece.tamu.edu/~sunil/courses/ee689-circuit

Grading Policies

The weighting of the different parts of the course is as follows:

Homework assignments: 20%
2 midterm exams: 40%
Class project: 40%

The letter grade will be assigned according to the following standard:

A: 90-100%
B: 80-89%
C: 70-79%
D: 60-69%
F: below 60%

Late assignments will be penalized 50%, and will receive no credit if late by more than one week past the due date. There will be exceptions for university excused absences. Attendance will not be taken during the lectures. A student may make up an exam if they have official supporting documentation to indicate the reason they could not attend the regular exam.

Course Topics, Calendar of Activities, Major Assignment Dates

Each lecture below is 1.5 hrs long. There are 30 lectures listed below, resulting in a total of 45 lecture hours. The lecture units are listed in chronological order below. The number of lectures for each topic are indicated in parentheses.

Gate and wire delays and their shift in importance (2)
Overview of CMOS device fundamentals (5)
   DC Characteristics
   AC Characteristics
   Processing overview
Different circuit design styles (5)
   NMOS
   Static CMOS
   Dynamic CMOS
   Pass Transistor design
   PLAs
   SOI implications
GaAs implications

Memory design fundamentals (3)
  Types of memory cells
  Design considerations for memory
  3-Dimensional capacitive parasitics.

Leakage and Power (4)
  Leakage control approaches
  Computing with leakage currents

Transmission lines and their modeling (2)
  On-chip clock nets
  Board nets

Packaging issues (3)
  Inductive effects
  Different packaging technologies.
  Economic considerations of different package styles

Off-chip I/O drivers design considerations (2)

On-chip clock distribution schemes. (2)
  H-tree clock distribution
  Dynamic de-skewing of a clock network

Processing variations and their control (2)
  On-the-fly variation compensation

Other Pertinent Course Information

The course will have a final project. Students will be given a list of class projects 45 days before the end
of the semester. Each student will choose one project from this list, and this will serve as their final class project.

**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."
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 Landscape Architecture and Urban Planning

2. Course prefix, number and complete title of course: LAND 635 Concepts in Ecological Planning and Design

3. Catalog course description (not to exceed 50 words):
Reviews selected ecological concepts and explores integration into ecological/landscape planning, design using a historical perspective; historical and contemporary approach to provide an in-depth understanding of how they can better mediate between human actions and natural process.

4. Prerequisite(s):
Cross-listed with: PLAN 635
Stacked with:

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 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)
any

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):
LAND 635 CONCEPTS OF ECO PLAN DSN

<table>
<thead>
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<th>Lect</th>
<th>Lab</th>
<th>SCH</th>
<th>CHG and Fund Code</th>
<th>Admin. Unit</th>
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Approval recommended by:

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

Chair, College Review Committee Date

Dean of College Date

Chair, OS or UCC Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 545-2821 or sandra.williams@tamu.edu
Curricular Services – 3/10
LAND 635/PLAN 635  Concepts in Ecological Planning and Design
Spring, 2011
Tuesday/Thursday, 3:55-5:10 ARCA 303.
Dr. Forster Ndubisi

Course Description
Ecological concepts and their integration into ecological/landscape planning and design; historical and contemporary approaches to ecological planning; understanding the mediation between human actions and natural processes.

Introduction and Course Objective
As an interface between natural and human processes, the landscape reflects the dialogue that occurred between these processes overtime. Landscapes change overtime as people mold natural processes, sometimes in tune with the rhythms of natural processes and other times altering them. Insights regarding how we design, plan, and manage landscapes to be in tune with the rhythms of natural processes can be gleaned from Alexander Pope's advice: "to consult the genius of place" or the character of the landscape.

Of all the natural and social sciences, the science of ecology provides one of the most beneficial insights into understanding the character of the landscape. It deals with the reciprocal relationship of all living things to each other [including humans] and to their physical and biological environments. But ecological knowledge has to be supplemented with an understanding of aesthetic form to truly appreciate, understand, and create landscapes that work and are sustainable.

Course Objectives
This course reviews selected ecological concepts and explores their integration into ecological/landscape planning and design using a historical perspective. Additionally, historical and contemporary approaches to ecological planning will be studied to provide students with the opportunity to develop an in-depth understanding of how they can better mediate between human actions and natural processes. The following themes will be explored in this course:

- Historical trends in ecological planning
- Emerging paradigms in landscape architecture and planning
- Overview of selected ecology concepts (ecosystem structure and function, population ecology, and landscape succession)
- Ecological planning approaches (Landscape Suitability, Applied Ecosystem, Applied Landscape Ecology, Landscape Perception and Values)
- Contemporary ecological design and planning issues
- Ecology, Aesthetics, and Planning: Integration?

Course Structure and Requirements
This course will be achieved through a combination of lectures, assigned readings, field trips, and critique of designed environments especially in landscape architecture. Assignments will involve both team and individual projects. All students are expected to attend all lectures, participate in workshops and discussions, and complete all assignments satisfactorily. There will be weekly lectures and presentations by the instructor and students.

Evaluation
Final course grade will be based on the satisfactory completion of all phases of the courses. Grades for various components of the courses are allotted tentatively as follows:
Assigned readings focused on ecological concepts, integration of ecological concepts into planning and design, as well as on historic and contemporary approaches to ecological/landscape planning (30%);

- Paper on ecological concepts (15%);
- Critiques of ecological planning approaches and important executed works in ecological design and planning (40%);
- Participation and professionalism: Strict regular attendance, active participation in class discussions, and mastery of the subject matter (15%).

Grading scale
Grading Scale
A=90%-100%
B=80%-89%
C=70%-79%
D=60%-69%
F= 59% and below

Text and Readings

Required


Selected References

Selected articles from key journals


ADA and Academic Integrity Statements

- **Americans with Disabilities Act (ADA) Policy Statement**

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- **Academic Integrity Statement and Policy**

  "An Aggie does not lie, cheat or steal, or tolerate those who do." For additional information, please visit: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor)
TAMU Code of Honor

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

Upon accepting admission to Texas A & M University, as 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. Student 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 of the processes of the Honor System. For additional information please visit: www.tamu.edu/aggiehonor/

On all course work, assignments, and examinations at Texas A & M University, the following Honor Pledge shall be preprinted and signed by the student:

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."
LAND/PLAN 635  
Concepts in Ecological Design and Planning  
Course Schedule

Week 1:  
Jan 19, 21  
Introduction

Week 2:  
Jan 26, 28  
History of Ecological Planning and Design

Week 3:  
Feb. 2, 4  
Contemporary Exemplary Papers/Works in Ecological Planning

Week 4:  
Feb. 9, 11  
Ecological Concepts

Week 5:  
Feb. 16, 18  
Ecological Concepts  
Assignment #1: Literature Review on contemporary ecological planning papers/ works

Week 6:  
Feb. 23, 25  
Ecological Concepts

Week 7:  
March 2, 4  
Ecological Concepts/Assignment #1 due: Presentations

Week 8:  
March 9, 11  
March 8: Mid semester grade due  
Case Study and Term paper assignments

Spring Break:  March 15-19

Week 9:  
March 23, 25  
Landscape Suitability I

Week 10:  
March 30, April 1  
Landscape Suitability II

Week 11:  
April 6, 8  
Applied Ecosystem

Week 12:  
April 13, 15  
Applied Landscape Ecology  
Term Paper due

Week 13:  
April 20, 22  
Climate Change  
Work on Case study

Week 14:  
April 27, 29  
Landscape perception  
Case Study due

Week 15:  
May 2, 6  
Presentations
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 Nuclear Engineering

2. Course prefix, number and complete title of course: NUEN 672 Introduction to Diagnostic Radiology Physics

3. Catalog course description (not to exceed 50 words):
   This course presents the concepts of radiation physics used in diagnostic radiology by providing an introduction to the theory behind the different imaging modalities as it relates to mammography, planar X-ray imaging, computed tomography (CT), single photon emission tomography (SPECT), and positron emission tomography (PET).

4. Prerequisite(s):
   NUEN 611, NUEN 613 or approval from academic advisor

5. Is this a variable credit course? ☑ No
   If yes, from _______ to _______

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

7. 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. in nuclear engineering or health physics

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)

<table>
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<tr>
<th>NUEN</th>
<th>672</th>
<th>DIAGRADYLOGYPHYSICS</th>
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Approval recommended by:
Yassin Hassan
Department Head or Program Chair (Type Name & Sign) Date 09/12/12

Gerard Cote
Department Head or Program Chair (Type Name & Sign) Date 09/12/12

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 – 3/10
Course title and Number: BMEN 672-600 Introduction to Diagnostic Radiology Physics
Term: Fall 2012
Meeting times and location: Texas A&M Institute for Preclinical Studies (TIPS),
Tuesdays and Thursdays, 3:00 PM to 5:00 PM

Course Description and Prerequisites

This course presents the concepts of radiation physics used in diagnostic radiology by providing an introduction to the theory behind the different imaging modalities as it relates to mammography, planar X-ray imaging, computed tomography (CT), single photon emission tomography (SPECT), and positron emission tomography (PET).

Prerequisites: NUEN 611 and NUEN 613 and/or approval from course instructor.

Learning Outcomes or Course Objectives

1. The course objective is to apply the basic principles of radiation physics in radiological imaging.
2. To assess the design characteristics of diagnostic radiology equipment for the safe and effective use in radiological imaging.
3. To demonstrate the importance of dosimetry and equipment calibration and quality control within diagnostic radiology and implications in image quality, disease diagnosis, and long-term risk for secondary cancers.
4. To develop an understanding of the basic principles used in quality control using current AAPM and ACR standards.
5. To examine current advances in equipment design and hybrid imaging modalities.
6. To allow the student to use this knowledge to work effectively within a professional team responsible for the safe and effective use of radiological equipment.
7. To understand the environment of a radiology facility, its workflow and radiation safety aspects.

Instructor Information

Name: Gamal Akabani, PhD / Mark W. Lenox, PhD
Telephone Number: 979-458-1699
Email address: akabani@tamu.edu / markwlenox@tamu.edu
Office Hours: Monday through Friday, 9:00 AM to 5:00 PM by appointment only
Office Location: Texas A&M Institute for Preclinical Studies

Electronic Textbooks and/or Resource Materials

Grading Policies

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<th>Assignment</th>
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A ≥ 90%
90% > B ≥ 80%
80% > C ≥ 70%
70% > D ≥ 60%
60% > F
Course Topics, Calendar of Activities, Major Assignment Dates

Weekly Lectures:

Basic Concepts
Homework Assignment 1 (September 2\textsuperscript{nd}).
1. Introduction to Medical Imaging (August 28\textsuperscript{th}).
2. Computers in Medical Imaging (August 30\textsuperscript{th}).
3. Digital Imaging and Communications in Medicine (DICOM) (September 4\textsuperscript{th}).

Diagnostic Radiological Imaging
Homework Assignment 2
4. X-ray Production, Tubes, Generators and Emission Spectra (September 6\textsuperscript{th}).
5. Screen Film Radiography (September 11\textsuperscript{th}).
Homework Assignment 3
6. Mammography (September 13\textsuperscript{th}).
7. Fluoroscopy (September 21\textsuperscript{th}).
Homework Assignment 4
8. Image Quality and AAPM Standards (September 23\textsuperscript{rd}).
9. Digital Radiography (September 25\textsuperscript{th} and 27\textsuperscript{th}).
Homework Assignment 5
10. Computed Tomography, Quality Control and Standards (October 9\textsuperscript{th} and 11\textsuperscript{th}).

Nuclear Medicine Imaging
Homework Assignment 6
12. Radionuclide Production and Radiopharmaceuticals (October 23\textsuperscript{rd}).
13. Radiation Detection and Measurements in Nuclear Medicine (October 25\textsuperscript{th}).
Homework Assignment 7
14. Basic Physics of Radionuclide Imaging (October 30\textsuperscript{th}).
15. Imaging Theory and Statistics in Nuclear Medicine (November 1\textsuperscript{st}).
Homework Assignment 8
16. Single Photon Emission Computed Tomography (SPECT) (November 6\textsuperscript{th}).
17. Positron Emission Tomography (PET) and PET-CT (November 13\textsuperscript{th} and 15\textsuperscript{th}).
18. Review (December 4\textsuperscript{th}).

Laboratories:
1. Basic Diagnostic Radiology Laboratory, DICOM (October 2\textsuperscript{nd} and 4\textsuperscript{th}).
2. Computed Tomography Laboratory (October 16\textsuperscript{th} and 18\textsuperscript{th}).
3. Radiopharmacy Laboratory (November 8\textsuperscript{th}).
4. PET/CT Imaging Laboratory (November 26\textsuperscript{th}, 27\textsuperscript{th} and November 29\textsuperscript{th}).

Other Pertinent Course Information

The student is expected to have knowledge of a high-level computer programming such as C++, or FORTRAN 95, 2003, and operating system such as UNIX or LINUX environment.

Americans with Disabilities Act (ADA)

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Academic Integrity

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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. Request submitted by (Department or Program Name): Department of Landscape Architecture and Urban Planning
2. Course prefix, number and complete title of course: PLAN 635 Concepts in Ecological Planning and Design

3. Catalog course description (not to exceed 50 words):
Reviews selected ecological concepts and explores integration into ecological/landscape planning, design using a historical perspective; historical and contemporary approach to provide an in-depth understanding of how they can better mediate between human actions and natural process.

4. Prerequisite(s):
   Graduate Standing
   Cross-listed with: LAND 635

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

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)
   PLAN 635  Concepts of Ecological Planning

   Lecture  Lab  SCH  GP and Fund Code  Admin. Unit  Acc. Year  HFL Code
   0 3 0 0 0 0 3 0 4 0 3 0 1 0 0 0 6 1 6 9 4 1 2 1 3 0 0 3 6 3 2

   Approval recommended by: Forster Ndubisi
   Chair, College Review Committee  Date  9/2/12
   Dean of College  Date  10/26/12
   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 – 3/10
LAND 635/PLAN 635  Concepts in Ecological Planning and Design
Spring, 2011
Tuesday/Thursday, 3:55-5:10 ARCA 303.
Dr. Forster Ndubisi

Course Description
Ecological concepts and their integration into ecological/landscape planning and design; historical and contemporary approaches to ecological planning; understanding the mediation between human actions and natural processes.

Introduction and Course Objective
As an interface between natural and human processes, the landscape reflects the dialogue that occurred between these processes over time. Landscapes change over time as people mold natural processes, sometimes in tune with the rhythms of natural processes and other times altering them. Insights regarding how we design, plan, and manage landscapes to be in tune with the rhythms of natural processes can be gleaned from Alexander Pope’s advice: "to consult the genius of place" or the character of the landscape.

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Course Objectives
This course reviews selected ecological concepts and explores their integration into ecological/landscape planning and design using a historical perspective. Additionally, historical and contemporary approaches to ecological planning will be studied to provide students with the opportunity to develop an in-depth understanding of how they can better mediate between human actions and natural processes. The following themes will be explored in this course:

- Historical trends in ecological planning
- Emerging paradigms in landscape architecture and planning
- Overview of selected ecology concepts (ecosystem structure and function, population ecology, and landscape succession)
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- Contemporary ecological design and planning issues
- Ecology, Aesthetics, and Planning: Integration?

Course Structure and Requirements
This course will be achieved through a combination of lectures, assigned readings, field trips, and critique of designed environments especially in landscape architecture. Assignments will involve both team and individual projects. All students are expected to attend all lectures, participate in workshops and discussions, and complete all assignments satisfactorily. There will be weekly lectures and presentations by the instructor and students.

Evaluation
Final course grade will be based on the satisfactory completion of all phases of the courses. Grades for various components of the courses are allotted tentatively as follows:
- Assigned readings focused on ecological concepts, integration of ecological concepts into planning and design, as well as on historic and contemporary approaches to ecological/ landscape planning (30%);
- Paper on ecological concepts (15%);
- Critiques of ecological planning approaches and important executed works in ecological design and planning (40%);
- Participation and professionalism: Strict regular attendance, active participation in class discussions, and mastery of the subject matter (15%).

Grading scale
Grading Scale
A=90%-100%
B=80%-89%
C=70%-79%
D=60%-69%
F= 59% and below

Text and Readings

Required

Selected References
Selected articles from key journals

ADA and Academic Integrity Statements

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TAMU Code of Honor

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

Upon accepting admission to Texas A & M University, as 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. Student 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 of the processes of the Honor System. For additional information please visit: www.tamu.edu/aggiehonor/

On all course work, assignments, and examinations at Texas A & M University, the following Honor Pledge shall be preprinted and signed by the student:

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."
LAND/PLAN 635
Concepts in Ecological Design and Planning
Course Schedule

**Week 1:**  
Jan 19, 21  
Introduction

**Week 2:**  
Jan 26, 28  
History of Ecological Planning and Design

**Week 3:**  
Feb. 2, 4  
Contemporary Exemplary Papers/Works in Ecological Planning

**Week 4:**  
Feb. 9, 11  
Ecological Concepts

**Week 5:**  
Feb. 16, 18  
Ecological Concepts  
Assignment #1: Literature Review on contemporary ecological planning papers/works

**Week 6:**  
Feb. 23, 25  
Ecological Concepts

**Week 7:**  
March 2, 4  
Ecological Concepts/Assignment #1 due: Presentations

**Week 8:**  
March 9, 11  
March 8: Mid semester grade due  
Case Study and Term paper assignments

**Spring Break:**  
March 15-19

**Week 9:**  
March 23, 25  
Landscape Suitability I

**Week 10:**  
March 30, April 1  
Landscape Suitability II

**Week 11:**  
April 6, 8  
Applied Ecosystem

**Week 12:**  
April 13, 15  
Applied Landscape Ecology  
Term Paper due

**Week 13:**  
April 20, 22  
Climate Change  
Work on Case study

**Week 14:**  
April 27, 29  
Landscape perception  
Case Study due

**Week 15:**  
May 2, 6  
Presentations
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 Recreation, Park and Tourism Sciences

2. Course prefix, number and complete title of course:
   RPTS 655 - Applied Biodiversity Science I

3. Catalog course description (not to exceed 50 words):
   Students will study in the areas of Conservation genetics, metapopulations, landscape ecology, and ecosystem management.

4. Prerequisite(s):
   WFSC 655

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

   M.S., Ph.D. in RPTS and WFSC departments

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)
    RPTS 655   Applied Biodiversity Science I

   Lect.   Lab   SCH   CIP and Fund Code   Admin. Unit   Acad. Year   FICE Code
   03 00 03 01 10 03 01 25 02 13 - 14 00 3 6 3 2

   Approval recommended by:
   Dr. Gary Ellis
   Date: 7/30/12

   Chair, College Review Committee
   Date: 9/7/12

   Dean of College
   Date: 9/7/12

   Chair, GC or SACC
   Date: 10/26/12

   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 – 3/10
APPLIED BIODIVERSITY SCIENCE I
RPTS 655/WFSC 655

Dr. Amanda Stronza
astronza@tamu.edu
600 John Kimbrough Boulevard, 410
(979) 845-8931

Dr. Lee Fitzgerald
lfitzgerald@tamu.edu
210 Nagle Hall
(979) 845-5777

"Conservation cannot be achieved without the soundest information from the natural and social sciences." Jose Sarukhan, Institute of Ecology, National University of Mexico

OVERVIEW
Efforts to halt the loss of biodiversity must be based on integration between science and practice. Linking theory with conservation requires the engagement of many different actors, including biologists and social scientists, universities and museums, governments and nongovernmental organizations, industries, interest groups, and communities. Such collaboration is critical for establishing conservation priorities, developing ecologically and socially acceptable management plans, building local capacity for stewardship, and guiding effective policy. Currently, a great deal of conservation research is based in universities with few linkages between scientists and practitioners, or between theory and on-the-ground work. Moreover, research on patterns and processes that underlie the loss of biodiversity are often conceptual and discipline specific, with few lessons shared among researchers from diverse disciplines.

Our goal in this course is to build cross-disciplinary understanding of biodiversity science. We ask:

1) What is biodiversity? How is it perceived, valued, measured, monitored, and protected?
2) What are the main concerns surrounding biodiversity? Who voices these concerns and why?
3) What are current perspectives about biodiversity conservation from evolutionary and community ecology, conservation biology, environmental anthropology, and political ecology?
4) What can we learn from popular and academic case studies?

REQUIREMENTS
Participation (20 points): The class is a seminar, facilitated by an anthropologist and a biologist. We will draw on our disciplinary backgrounds as we discuss various conservation issues and paradigms. We are relative beginners in each other’s field. Each of you too will be a novice in some things, an expert in others. This is the nature of multidisciplinary collaboration. We encourage you to speak up about what you know well and listen carefully to the things that are new. Please prepare for each class by reading the assigned articles, taking notes, and bringing questions, analyses, and critiques.
Facilitation of discussion (30 points): Each of you will be responsible for facilitating one of the weekly topics. You will work in pairs. Preparation will include reading and synthesizing the main messages from that week’s readings, building a discussion plan, and guiding our conversation.

Team Project (50 points): We will assemble groups of 3-4 people to carry out a team project. The aim is to provide an academic response to a recent popular media piece on conservation. The project has three parts: a) White Paper, b) Presentation, and c) Reading Selection.

a) White Paper
- Please address the following questions in relation to the popular media piece:
  - What is the conservation concern or challenge?
  - What are the proposed solutions?
  - What is your informed perspective? What theoretical frameworks, scientific research, empirical data, and/or case studies can you bring to bear on this topic? You may include a conceptual framework, a literature review, data tables, and so forth.
  - What are the implications of your perspective for policy?
- Limited to 10 pages, double-spaced, not including literature cited.
- The series of “Working Papers” produced by the Wildlife Conservation Society may serve as a model for what you will write (http://archive.wcs.org/wcspubs/science.html) The first half of the following example may be especially useful: Casting for Conservation actors: people, partnerships and wildlife (http://archive.wcs.org/media/file/wcswp28.pdf)

b) Presentation
Each team has two class periods to cover the topic. You may devote some of the time to teaching the class about your conservation issue or presenting the topic generally. Be sure to allow enough time for seminar discussion as well.

c) Reading Selection
Two weeks before your team’s presentation, please provide the class with 2-3 articles we should read in preparation for the discussion.

Grading: A=90-100 points, B=80-89 points, C=70-79 points, D=60-69 points, F=below 60 points

REQUIRED TEXTS
- Additional journal articles, chapters, web links, and reports will be posted to website.
## SCHEDULE

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## TOPICS and READINGS

**APPLIED BIODIVERSITY SCIENCE** In the first week, we set the stage for our discussions about biodiversity, culture, ecology, governance, and conservation. We will discuss the intersections between ecosystems and social systems, and we will define as a group what we mean by Applied Biodiversity Science.

*Readings:*
- Schwartz, M. 2008. The importance of stupidity in scientific research
- Sutherland, W.J., et al. One Hundred Questions of Importance to the Conservation of Global Biological Diversity.

**DEFINING AND MEASURING BIODIVERSITY** Here we learn and discuss definitions of biodiversity, species diversity, and patterns of biological diversity (including species-area relationship, island biogeography, latitudinal gradient in species richness, local and regional richness, species-elevation relationship, and macroecological rules).

*Readings:*

CULTURAL DIVERSITY Relationships between humans and nature vary cross-culturally, over time, in different social and economic settings, and by ecosystem. This week, we explore the interface between human populations and ecosystems, viewing culture as something that influences the natural environment and is, in turn, shaped by it.

Readings:

FROM GENES TO LANDSCAPES: This week, we examine why genetic diversity became part of the foundation of conservation biology, how conservation genetics has changed, how genetic information has been useful (and useless) to on-the-ground conservation, and how genetic and phylogenetic approaches are being applied to integrative conservation issues today. We will focus on case studies of sea turtles, sand dune lizards, cheetahs, and others.

Readings:

POLITICAL ECOLOGY People make decisions about their environment in the context of many factors. These include policies and institutions, economic incentives, and social relations of power at different scales, from the local to the regional and the global. This week, we examine these dimensions of biodiversity loss and conservation with the help of an analytical framework known as political ecology.
Readings:

CRISIS OF LOSS: Throughout your careers you have been led to believe that our planet is experiencing the 6th major extinction event, equal in magnitude to the mass extinctions in the geologic past. The 6th extinction is caused by human activities. To understand something so important at a scientific level, we will review the processes that result in the generation of biodiversity and some causes of extinction. We will take a scientific look at the logic and evidence for the extinction crisis.

Readings:

QUESTIONING THE COMMONS: How should society manage resources like water, air, wildlife, and fish that belong to everyone? In 1968, Garrett Hardin addressed this question in an essay that became one of Science's most popular articles. Hardin argued that humans seek to maximize their individual gains and thus deplete the common resources on which everyone depends. He called this the "tragedy of the commons." Hardin's article spawned a great deal of policy, controversy, new theory, and research on "common property resource management." This week, we read the original essay and ideas that emerged in subsequent years about sustainable governance of common resources.

Readings:

SETTING PRIORITIES Ideally, conservationists would have the wherewithal to protect all biodiversity everywhere effectively and with high levels of investment and effort. Of course, this is impossible as political, economic, and social capital for conservation is limited. Thus
priorities must be established to determine where to focus first and most intensively. The identification of biodiversity “hotspots” has been one approach to prioritization. This week, we examine how “hotspots” have been defined and critiqued, and we discuss the implications for conservation.

Readings:
- Orme et al. 2005. …hotspots not congruent with endemism or threat. *Nature.* (includes news and views feature by Possingham and Wilson)

**CONSERVATION: POPULAR AND ACADEMIC**

| 1 | New York Times  
In Brazil, Paying Farmers to Let the Trees Stand  
by Elisabeth Rosenthal  
|---|---|
| 2 | Time Magazine  
Vanishing Act: How Climate Change is Causing a New Age of Extinction  
by Bryan Walsh  
http://www.time.com/time/covers/0,16641,20090413,00.html |
| 3 | National Public Radio (NPR)  
African Mammals May Immigrate to North America, Interview with Josh Donlan  
by Robert Siegel  
| 4 | MediaStorm.com  
Project: Black Market  
by Patrick Brown  
http://www.mediasmorm.com/0015.htm |

**MARKET-BASED CONSERVATION** From the certified sustainable wood on the shelves at Home Depot, to the certified organic, shade grown coffee served at the local Starbucks, market-based conservation strategies have become the latest panacea for the globe’s environmental woes. Combining the trend in environmental management towards social sustainability and the trend in global economic management towards free-market liberalism, these programs attempt to address both conservation and development goals. This week, we discuss the basic principles behind market-based conservation, its environmental and social impacts and some critiques against it.

Readings:

THANKSGIVING HOLIDAY
BOOK FORUM: Song of the Dodo and Conservation Refugees

EVALUATION

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 Room 126 of the Koldus Building or call 845-1637.

Academic Integrity
"An Aggie does not lie, cheat, or steal or tolerate those who do."
Know the Aggie Honor Code: http://www.tamu.edu/aggiehonor/.

Academic Misconduct
Texas A&M University student rules Section 20 outlines official policies on scholastic dishonesty and academic misconduct (http://www.tamu.edu/aggiehonor/). Section 20 declares, "It is the responsibility of students and instructors to help maintain scholastic integrity at the University by refusing to participate in or tolerate scholastic dishonesty." Further, Section 20 defines a variety of categories of academic misconduct. I strongly encourage you to read the rules and definitions; they are a good resource of critical information http://www.tamu.edu/aggiehonor/Student%20Rules/definitions.html). You are responsible for complying with them; ignorance of these rules is not an acceptable excuse for not doing so.
Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional

Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of Wildlife & Fisheries Sciences
2. Course prefix, number and complete title  WFSC 655 - Applied Biodiversity Science
3. Course description (not more than 50 words)  Students will study in the areas of Conservation genetics, metapopulations, landscape ecology, and ecosystem management.
4. Prerequisite(s) grade classification  Cross-listed with RPTS 655
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 the course be repeated within the same semester/term? ☐ Yes ☑ No
7. Has this course been taught as a 489/689? ☐ Yes ☑ No  If yes, how many times? 2  Indicate the number of students enrolled for each academic period it was taught. Fall 2008-10; Fall 2008-10
8. 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)
      MS WFSC, PhD WFSC, MS RPTS, PhD RPTS
9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
10. Prefix  Course #  Title (exclude punctuation)
    WFSC 655  APPLIED BIODIVERSITY SCI
    Lect.  Lab  Subject Matter Content Code  Admin. Unit  Acad. Year  FICE Code
    0 3 0 0 3 0 3 0 1 0 0 2 2 9 5 1 0 9 - 1 0 0 0 3 6 3 2
    Do not complete shaded area.

Approval recommended by:
Head of Department  Date  Chair, College Review Committee  Date
Head of Department (if cross-listed course)  Date  Dean of College  Date
Submitted to Coordinating Board by:
Director of Academic Support Services  Date  Effective Date

To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.
OAR/AS-5/04
"Conservation cannot be achieved without the soundest information from the natural and social sciences." Jose Sarukhan, Institute of Ecology, National University of Mexico

OVERVIEW
Efforts to halt the loss of biodiversity must be based on integration between science and practice.
Linking theory with conservation requires the engagement of many different actors, including biologists and social scientists, universities and museums, governments and nongovernmental organizations, industries, interest groups, and communities. Such collaboration is critical for establishing conservation priorities, developing ecologically and socially acceptable management plans, building local capacity for stewardship, and guiding effective policy. Currently, a great deal of conservation research is based in universities with few linkages between scientists and practitioners, or between theory and on-the-ground work. Moreover, research on patterns and processes that underlie the loss of biodiversity are often conceptual and discipline specific, with few lessons shared among researchers from diverse disciplines.

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4) What can we learn from popular and academic case studies?

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a) White Paper
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b) Presentation
Each team has two class periods to cover the topic. You may devote some of the time to teaching the class about your conservation issue or presenting the topic generally. Be sure to allow enough time for seminar discussion as well.

c) Reading Selection
Two weeks before your team’s presentation, please provide the class with 2-3 articles we should read in preparation for the discussion.

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**REQUIRED TEXTS**
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TOPICS and READINGS

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**Readings:**

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**Readings:**

- 4 -

**SETTING PRIORITIES** Ideally, conservationists would have the wherewithal to protect all biodiversity everywhere effectively and with high levels of investment and effort. Of course, this is impossible as political, economic, and social capital for conservation is limited. Thus priorities must be established to determine where to focus first and most intensively. The identification of biodiversity “hotspots” has been one approach to prioritization. This week, we examine how “hotspots” have been defined and critiqued, and we discuss the implications for conservation.

**Readings:**
• Jepson and Canney 2001. Hot for what?
• Kareiva and Marvier. 2003. Conserving Biodiversity Coldspots. *Am. Sci.* (Includes letter to editor and replies.)
• Orme et al. 2005. …hotspots not congruent with endemism or threat. *Nature.* (includes news and views feature by Possingham and Wilson)

**CONSERVATION: POPULAR AND ACADEMIC**

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<td><strong>Time Magazine</strong>&lt;br&gt;Vanishing Act: How Climate Change is Causing a New Age of Extinction&lt;br&gt;by Bryan Walsh&lt;br&gt;<a href="http://www.time.com/time/covers/0,16641,20090413,00.html">http://www.time.com/time/covers/0,16641,20090413,00.html</a></td>
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<td>3</td>
<td><strong>MediaStorm.com</strong>&lt;br&gt;Project: Black Market&lt;br&gt;by Patrick Brown&lt;br&gt;<a href="http://www.mediasmorm.com/0015.htm">http://www.mediasmorm.com/0015.htm</a></td>
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| 4 | **MARTKET-BASED CONSERVATION**

(special Guest Lecture by Elizabeth Shapiro) From the certified sustainable wood on the shelves at Home Depot, to the certified organic, shade grown coffee served at the local Starbucks, market-based conservation strategies have become the latest panacea for the globe’s environmental woes. Combining the trend in environmental management towards social sustainability and the trend in global economic management towards free-market liberalism, these programs attempt to address both conservation and development goals. This week, we discuss the basic principles behind market-based conservation, its environmental and social impacts and some critiques against it.

**Readings:**
• Economist (2005) Rescuing environmentalism. April 21, 2005
• GRAIN (2005) No, air, don't sell yourself... Seedling April: 34-41.

Further readings:

THANKSGIVING HOLIDAY

BOOK FORUM: Song of the Dodo and Conservation Refugees

EVALUATION

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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 Room 126 of the Koldus Building or call 845-1637.

Academic Integrity
“An Aggie does not lie, cheat, or steal or tolerate those who do.”
Know the Aggie Honor Code: http://www.tamu.edu/aggiehonor/.

Academic Misconduct
Texas A&M University student rules Section 20 outlines official policies on scholastic dishonesty and academic misconduct (http://www.tamu.edu/aggiehonor/). Section 20 declares, “It is the responsibility of students and instructors to help maintain scholastic integrity at the University by refusing to participate in or tolerate scholastic dishonesty.” Further, Section 20 defines a variety of categories of academic misconduct. I strongly encourage you to read the rules and definitions; they are a good resource of critical information (http://www.tamu.edu/aggiehonor/Student%20Rules/definitions.html). You are responsible for complying with them; ignorance of these rules is not an acceptable excuse for not doing so.