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 [ ] Graduate [ ] First Professional
   [ ] DPS M.S. U.A. Plan D, D.I.A.

2. Request submitted by (Department or Program Name):
   Department of Materials Science and Engineering

3. Course prefix, number and complete title of course:
   MSEN 605, Field Theories in Materials Science

4. Catalog course description (not to exceed 50 words):
   Field theory concepts to understand and quantify a wide range of material behaviors, including transportable quantities; development of constitutive relations; linear response theory and Maxwell's equations; deformation and motion of a continuum, Brownian motion, self-assembly and patterning within reaction-diffusion formulations, thermal and ion/charge transport, acoustic waves in solids, Fourier's equations.

5. Prerequisite(s):
   Basic courses in materials science; 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
   [ ] P/E (CLMD)

10. How will this course be graded? [ ] Grade [ ] S/U

11. 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. Engr., M.S., Ph.D., Materials Science and Engineering

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)
MSEN    | 605     | Field Theories MATL SCIENCE

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>Other</th>
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<th>Admin. Unit</th>
<th>Year-Year</th>
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</table>

Approval recommended by:
Dr. Miladin Radovic 06/05/2015

Registered by: 7/2/15

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

Dean of College 7/2/15

Chair, DC or UCC 8-11-15

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
# Syllabus

## Field Theories in Materials Science

**MSEN 605**  
**Fall 2016**

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Dr. A. Amine Benzerga / Dr. Ramesh Talreja / Dr. Alan Needleman, 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>; 736A HRBB</td>
</tr>
<tr>
<td>Text</td>
<td>Book: Peter Hertel, 2012, &quot;Continuum Physics&quot;, 1st edition, Springer; Selected papers and handout notes</td>
</tr>
<tr>
<td>Course Description</td>
<td>Introduce a range of field theory concepts for MSEN students laying a foundation for understanding and quantifying a wide range of material behaviors. Present a comprehensive generic treatment of field theories for continuous media with a focus on materials. Introduce the concepts of fields and field variables beginning with transportable quantities (mass, electric charge, momentum, energy, etc.) and their balance equations. Develop constitutive relations (notably for elasticity, electromagnetism, diffusion and other transport phenomena). Introduce linear response theory and focus on examples such as Maxwell’s equations, deformation and motion of a continuum, Brownian motion, self-assembly and patterning within reaction-diffusion formulations, thermal and ion/charge transport, acoustic waves in solids, Fourier’s equations.</td>
</tr>
<tr>
<td>Prerequisite:</td>
<td>Basic courses in materials science; graduate classification.</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>Students will become familiar with the continuum concepts for describing physical phenomena of interest to materials scientists. They will learn how these phenomena are modeled at a macro level based on fundamental knowledge at the atomistic level.</td>
</tr>
<tr>
<td>Grading Assignments</td>
<td>The course letter grade will be based on homework assignments, and midterm and final exams. Homework will be assigned once a week, due the week after, and will carry 30%; the remaining weight will be midterm 30%, and final 40%.</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. |
<p>| Copyrights | The handouts used in this course are copyrighted. By &quot;handouts&quot; 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. |</p>
<table>
<thead>
<tr>
<th>Topics to be covered</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Mathematics preliminaries -- tensors.</td>
</tr>
<tr>
<td>Week 2</td>
<td>Balance equations</td>
</tr>
<tr>
<td>Week 3</td>
<td>Balance equations, contd.</td>
</tr>
<tr>
<td>Week 4</td>
<td>Constitutive equations -- general principles</td>
</tr>
<tr>
<td>Week 5</td>
<td>Constitutive equations -- viscous fluids, elastic solids</td>
</tr>
<tr>
<td>Week 6</td>
<td>Electromagnetism</td>
</tr>
<tr>
<td>Week 7</td>
<td>Midterm Examination (tentative)</td>
</tr>
<tr>
<td>Week 8</td>
<td>Electrostatics</td>
</tr>
<tr>
<td>Week 9</td>
<td>Stress and deformation</td>
</tr>
<tr>
<td>Week 10</td>
<td>Stress and deformation, contd.</td>
</tr>
<tr>
<td>Week 11</td>
<td>Nonlinear/time-dependent constitutive relations (plasticity/viscoelasticity/viscoplasticity)</td>
</tr>
<tr>
<td>Week 12</td>
<td>Transport (mass/thermal/charge)</td>
</tr>
<tr>
<td>Week 13</td>
<td>Selected applications</td>
</tr>
<tr>
<td>Week 14</td>
<td>Selected applications, cont.</td>
</tr>
</tbody>
</table>

**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 and Policy**

"An Aggie does not lie, cheat or steal, or tolerate those who do." For additional information, please visit: 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**

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 (http://student-rules.tamu.edu/rule07).
**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.

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 Materials Science and Engineering
   MSEN 617, Crystallography and Crystal Structure Determination

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

4. Catalog course description (not to exceed 50 words):
   Symmetry operations in point group and space group; reciprocal lattice and kinematical diffraction theory; crystal structure determination by X-ray diffraction and transmission electron microscopy (TEM).

5. Prerequisite(s):
   Knowledge of calculus and vector algebra; graduate classification.

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

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. Engr., M.S., Ph.D., Materials Science and Engineering

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>MSEN</th>
<th>617</th>
<th>CRYSTLGRPHY CRYSTL STRUC DET</th>
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<tr>
<td>Lec.</td>
<td>Lab</td>
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<td>3.00</td>
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Approval recommended by:

Dr. Miladin Radovic

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

Chair, College Review Committee Date

Dean of College Date

Chair, G.Enr or OCO 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
MSEN 617
Crystallography and Crystal Structure Determination
Spring 2016
Credits: 3

Instructor: Li Liu
Email: li.liu@tamu.edu
Office Phone: 979-458-1090
Meeting Time: TBD
Meeting Location: TBD
Office Hours: TBD
Office hour location: 227 Reed McDonald Building

Course Prerequisites: Knowledge in calculus and vector algebra; graduate classification.

Course Description: This course focuses on crystal structure and its determination. Symmetry operations in point group and space group are introduced first, followed by the reciprocal lattice and the kinematical diffraction theory. The second part of the class will teach the structure determination by x-ray diffraction and transmission electron microscopy (TEM).

Course Schedule:
Week 1: Elements of crystals: Point group, unit cell, and crystal lattice
Week 2: Elements of crystals: Point group, unit cell, and crystal lattice
Week 3: Space group: symmetry and nomenclature in space group
Week 4: Space group: examples
Week 5: Space group: application in structure determination
Week 6: Basic x-ray Physics: Emission/Adsorption/Reflection of x-rays
Week 7: Reciprocal lattice; Midterm Examination (tentative)
Week 8: Kinematical theory of diffraction
Week 9: X-ray diffraction: powder diffraction
Week 10: X-Ray diffraction: structure determination by powder diffraction
Week 11: X-ray diffraction: single crystal diffraction
Week 12: Transmission electron microscopy: direct imaging
Week 13: Transmission electron microscopy: dynamics diffraction theory
Week 14: Transmission electron microscopy: imaging by diffraction

Reference Books:
Leonid V. Azaroff, Elements of X-Rays Crystallography, McGraw-Hill

The chosen chapters of the first textbook will be printed and handed out in the class since this book is not available for purchase. The second textbook can be downloaded from university library website.
The reference books are supplementary to the lecture note. The student is required to master the material in the notes and the related material in the text books.

**Examinations:** Midterm and comprehensive final examination.

**Problems:** Problem sheets will be assigned through emails.

**Communication:** Problem sheets and class notes will be sent to each student by e-mail. Questions on course material may be sent to Dr. Liu by e-mail.

**Grading:**

<table>
<thead>
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<th></th>
<th>points</th>
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<tr>
<td>Homework</td>
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<td>Midterm exam</td>
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<td>Final exam</td>
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</tr>
<tr>
<td>Total</td>
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A problem sheet will be assigned each week.

A 90-minute exam

A 120-minute exam

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 = 85; 75 ≤ B < 85; 65 ≤ C < 75; 55 ≤ D < 65; F ≤ 55

The grading will not be based on a curve or on a normal distribution.

**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 Disability Services, in room B118 Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

**Academic Integrity Statement**

**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 TAMU community from the requirements or the processes of the Honor System. See http://aggiehonor.tamu.edu for more information and for Honor Council.
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](http://student-rules.tamu.edu/rule07). Please come on time. Silence cell-phones and other electronic distractions.

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://student-rules.tamu.edu/rule07](http://student-rules.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](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](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.
9) Mandatory participation as a student-athlete in NCAA-sanctioned competition.
10) In accordance with Title IX of the Educational Amendments of 1972, Texas A&M University shall treat pregnancy (childbirth, false pregnancy, termination of pregnancy and recovery therefrom) and related conditions as a justification for an excused absence for so long a period of time as is deemed medically necessary by the student's physician. Requests for excused absence related to pregnancy should be directed to the instructor.

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.-

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 Nuclear Engineering
3. Course prefix, number and complete title of course: NUEN 608 FAST SPECTRUM SYSTEMS AND APPLICATIONS
4. Catalog course description (not to exceed 50 words):
   Design and analysis of nuclear systems and nuclear fuel cycles; data, methods, tools for advanced nuclear system modeling; systems analysis; sustainable development of nuclear energy, fast spectrum systems; partitioning & transmutation; hybrid systems; Advanced Fuel Cycle program; Generation IV fast reactors; design aspects of Advanced Fast Reactors – neutronics, heat removal, safety, materials, systems

5. Prerequisite(s): Graduate classification or approval of instructor
   Cross-listed with: □ Yes □ No
   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)
       None
    b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
       MS and PhD in Nuclear Engineering

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)
    NUEN  608  FST SPCTRM SYS

    Lec.  Lab  Other  SCH  CIP and Fund Code  Admin. Unit  Acad. Year  HCC Code
    3.00  0.00  0.00  3.00  1423010006  2090  16  17  0  0  3  6  3  2

    Approval recommended by:
    Yassin A. Hassan  6-18-15

    Chair, College Review Committee  7/21/15

    Chair, GC or UCC  8-11-15

    Submitted to Coordinating Board by:

    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: NUEN 608 FAST SPECTRUM SYSTEMS AND APPLICATIONS
Term (e.g., Fall 200X): Fall 2015
Meeting times and location: TBD

Course Description and Prerequisites

Elective course: for students enrolled in the M.S. and Ph.D. degree programs in nuclear engineering

Credits: NUEN 608(3-0) Fast Spectrum Systems and Applications. Credit 3

Description: design and analysis of nuclear systems and nuclear fuel cycles; data, methods and tools for advanced nuclear system modeling; systems analysis; sustainable development of nuclear energy and fast spectrum systems; partitioning & transmutation science and engineering in radioactive waste management; hybrid systems; Advanced Fuel Cycle program; design aspects of Advanced Fast Reactors – neutronics and heat removal, safety, materials, and systems.

Prerequisites: Graduate enrollment or approval by instructor

Learning Outcomes or Course Objectives

Course Objectives. NUEN 608, "Fast Spectrum Systems" is a 3-hour graduate course. It is intended to provide the graduate students with description of fast reactors and hybrid systems, Advanced Fuel Cycle program, nuclear fuel cycle concepts, partitioning & transmutation in radioactive waste management. The focus will be on the design principles, neutronics and heat removal, control, safety, materials, and systems, licensing aspects, and fuel cycle assessment for fast spectrum systems and their applications. The course will include the semester-long comprehensive design projects. The data, methods and tools for advanced nuclear system modeling will be introduced.

Learning Outcomes. Students who successfully complete this course should be able to:

1. Describe and discuss issues associated with nuclear fuel cycles including the radioactive waste management options and strategies.
2. Describe and discuss perspectives of sustainable development of nuclear energy and fast spectrum systems, partitioning & transmutation science and engineering in radioactive waste management.
3. Describe Advanced Fuel Cycle program and fast reactors.
4. Develop models and methodologies for designing and analyzing nuclear systems, nuclear fuel cycles and their safety characteristics accounting for specific applications including fast reactors and hybrid systems.
5. Design an advanced nuclear system and perform comprehensive analysis of its performance and safety characteristics.
6. Analyze nuclear systems and their fuel cycles including safety, radioactive waste management options and strategies including partitioning and transmutation technologies, and environmental impacts.
7. Design & analyze fast spectrum systems – fast reactors & hybrid fusion-fission systems
9. Describe licensing issues and safety potential of various advanced fast spectrum systems.

Instructor Information

Name: Dr. Pavel V. Tsvetkov
Telephone Number: (979) 845-7078
Email address: tsvetkov@tamu.edu
Office Hours: open door policy
Office Location: Bizzell, 255

Textbook and/or Resource Materials
Assignments (HW solution sets and FSSDP report):

- **Preparation** (grade penalty up to a full assignment worth for not following the guidelines):
  
  Each HW solution set: (1) give assignment number and attach assignment as a cover, (2) use only front side of each page, (3) provide brief problem statements, (4) be neat and legible and present work logically to allow easy follow-up, (5) if asked for a numerical result, give formula and number with units, (6) staple your set

  FSSDP report and materials: (1) **50 pages (no handwriting) recommended** including contents, lists of figures and tables, introduction, problem description, model development, results, conclusions, references, etc., (2) if you created auxiliary materials – list them in the Appendix and E-mail actual materials (including your project presentations), (3) provide the list of references at the end of your report

- **Submission of the HW solution sets and the FSSDP reports and materials:**

  HW solution sets, FSSDP report and materials: Work together is encouraged. The participating classmates must be listed on the first page. However, the final submitted assignments must be individual work efforts. **If blatant copying occurred, zero-score for all students involved!**

  ALL assignments are due at the start of class on the due date!

  NO late assignments accepted without university excused absence.

  NO assignments will be accepted after the last day of classes! (except for university excused absence)

  **LATE SUBMISSION (1 WEEK TO EXPLAIN AND ASK FOR A NEW DUE DATE):**

  If a student cannot submit his work by the due date, he has 1 week after the due date to explain the reasons for the delay and ask for a new due date. Depending on the provided explanation and the assignment submission history of a student, the new due date will be assigned or denied (the delayed work will not be accepted in this case). NO GRADE PENALTY.

- **Re-submission of HW sets:** If you re-do your assignment, you can increase your grade by at least 10% of the original worth (up to 100% depending on the originality). **ONLY ONE RESUBMISSION OF EACH ASSIGNMENT IS PERMITTED.**
Structure of final course score:

<table>
<thead>
<tr>
<th>Course Element</th>
<th>Element Score</th>
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<tbody>
<tr>
<td>Homework Problem Sets</td>
<td>30%</td>
</tr>
<tr>
<td>Midterm Examination 1</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm Examination 2</td>
<td>15%</td>
</tr>
<tr>
<td>Fast Spectrum System Design Project – Presentation, Series 1 (Initial)</td>
<td>5</td>
</tr>
<tr>
<td>Fast Spectrum System Design Project – Presentation, Series 2 (Progress)</td>
<td>5</td>
</tr>
<tr>
<td>Fast Spectrum System Design Project – Presentation, Series 3 (Final)</td>
<td>10</td>
</tr>
<tr>
<td><strong>TOTAL Final Course Score</strong></td>
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Final course grade ranges:

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<td>70 - 79.9%</td>
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<td>60 - 69.9%</td>
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Course Topics, Calendar of Activities, Major Assignment Dates

**Topics Covered**

1. Fundamentals of nuclear systems, mathematical description of physical phenomena
2. Nuclear data and cross section processing
3. Sensitivity and uncertainty analysis and its applications for nuclear system development
4. Advanced nuclear system modeling: data, methods, tools
5. Design and analysis of nuclear systems and fuel cycles, reactor and nuclear plant design principles: neutronics & heat removal, control, safety, materials, nuclear energy system, safety analysis, licensing of advanced nuclear systems, economics analysis
6. Systems analysis – integrated model application
7. Design aspects of advanced nuclear systems
8. Sustainable development of nuclear energy, nuclear systems and nuclear fuel cycles, fast spectrum systems
9. Partitioning and transmutation science and engineering in radioactive waste management
10. Fast reactors
   - Neutronics (nuclear design, dynamics, control requirements)
   - Systems (core materials, fuel pin and assembly design, fuel pin thermal performance, core thermal hydraulics)
   - Safety (protected and unprotected transients, containment considerations)
   - Sodium-cooled Fast Reactors, Lead-cooled Fast Reactors, Gas-cooled Fast Reactors
   - Advanced Burner Reactors (ABR)
11. Hybrid fast spectrum systems
12. Advanced Fuel Cycle (AFC) program, Generation IV nuclear energy systems and fuel cycles

**Prerequisites by Topic**

1. Nuclear physics as applied to nuclear engineering, cross-section data, evaluated nuclear data files
2. Reactor physics analysis principles and reactor design
3. Systems of linear equations, eigenvalues, eigenvectors, partial differential equations
4. Nuclear engineering systems and design

**Course Structure**

1. **Lecture and lecture notes** will cover the course topics and will be made as self-sufficient as reasonably achievable
2. **Homework problem (HW) sets** will be assigned and graded periodically (4 assignments).
3. **Two midterm examinations** will be administered in a take-home format. The time allocation to complete each examination is 2 weeks.
4. **Fast spectrum system design project (FSSDP)** will be assigned in addition to the regular homework assignments. The project will facilitate familiarization with the course topics. Project reports and oral
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<tr>
<td>1.1</td>
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<tr>
<td>1.2</td>
<td>Principles of nuclear reactors, nuclear power</td>
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<td>2. FUNDAMENTALS OF NUCLEAR SYSTEMS</td>
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<td>2.1</td>
<td>Characteristics of the fission reaction, neutron moderation, practical fuels</td>
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<td>2.2</td>
<td>Reactor power, fuel burnup, and fuel consumption</td>
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<td>2.3</td>
<td>Neutron chain-reacting systems</td>
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<td>Homogeneous and heterogeneous cores, reflectors</td>
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<td>2.5</td>
<td>Reactor kinetics and dynamics, reactivity feedback</td>
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<td>2.6</td>
<td>Core composition changes during reactor operation, nuclear system lifetime</td>
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<td>3. MATHEMATICAL DESCRIPTION OF PHYSICAL PHENOMENA</td>
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<td>3.1</td>
<td>General considerations about reactor physics, engineering requirements</td>
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<td>3.2</td>
<td>Description of the neutron distribution</td>
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<td>3.3</td>
<td>Nuclear data, cross sections, and reaction rates</td>
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<td>3.4</td>
<td>Basic scheme of nuclear system modeling methods</td>
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<td>4. NUCLEAR DATA AND CROSS SECTION PROCESSING</td>
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<td>Cross-section data</td>
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<td>4.2</td>
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<td>4.3</td>
<td>Nuclear data needs for future nuclear systems and technologies</td>
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<td>5. SENSITIVITY AND UNCERTAINTY ANALYSIS</td>
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<td>5.1</td>
<td>Views of uncertainty, uncertainty analysis – determination of uncertainties</td>
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<td>Statistics and analysis of uncertainty</td>
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<td>Optimizing advanced power system designs under uncertainty</td>
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<td>6. SUSTAINABLE DEVELOPMENT OF NUCLEAR ENERGY</td>
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<td>Nuclear energy</td>
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<td>Nuclear fuel cycle, reprocessing, partitioning &amp; transmutation</td>
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<td>6.3</td>
<td>Radioactive waste management, motivation for partitioning &amp; transmutation</td>
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<td>6.4</td>
<td>Modern analysis methods and codes, nuclear fuel cycle modeling</td>
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<td>7. NUCLEAR SYSTEMS AND NUCLEAR FUEL CYCLES</td>
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<td>7.2</td>
<td>Nuclear fuel cycle problems and challenges</td>
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<td>Principal actinide transmutation strategies</td>
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<td>Fission product transmutation</td>
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<td>Plutonium recycling - light water reactor MOX, fast reactor MOX</td>
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<td>Plutonium and minor actinide recycling (light water reactors, fast reactors, and accelerator driven systems)</td>
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<td>Closed fuel cycle - consequences for geologic disposal</td>
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<td>Nuclear data uncertainties and transmutation</td>
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<td>Sensitivity, uncertainty and target accuracy for future nuclear systems</td>
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<td>Nuclide production-destruction equations, adiabatic fuel depletion modeling</td>
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<td>Reactivity effects of fuel composition changes, core management</td>
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<td>Reactor properties over life</td>
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<td>Neutronics and thermal-hydraulics coupling</td>
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<td>Fuel cycle optimization: linear and non-linear reactivity models, optimum equilibrium cycles</td>
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<td>9. ADVANCED NUCLEAR SYSTEM MODELING: DATA, METHODS, TOOLS</td>
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<td>Basic data needs</td>
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<td>Perturbation method for pointwise depletion modeling</td>
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<td>Parallelized higher-order generalized depletion perturbation theory</td>
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<td>Modeling of subcritical systems with external sources</td>
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<td>10. SYSTEMS ANALYSIS – INTEGRATED MODEL APPLICATION</td>
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<td>10.2. Uncertainty analysis of advanced fuel cycles</td>
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<td>10.3. Analysis of innovative nuclear systems and fuel cycles</td>
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<td>FAST SPECTRUM SYSTEM DESIGN PROJECT – PRESENTATIONS, SERIES 1</td>
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<td>FSSDP1</td>
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<td>11. SUSTAINABLE DEVELOPMENT AND FAST SPECTRUM SYSTEMS</td>
<td>11/23</td>
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<td>11.1. Spent fuel - light water reactor, light water reactor MOX, fast reactor MOX</td>
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<td>11.2. Radiotoxicity of fission products</td>
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<td>11.3. Advanced conditioning of minor actinides</td>
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<td>11.4. Transmutation of minor actinides</td>
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<td>12. PARTITIONING AND TRANSFORMATION SCIENCE AND ENGINEERING IN RADIOACTIVE WASTE MANAGEMENT</td>
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<td>12.1. Aqueous and pyrochemical reprocessing technologies and recycling of transuranic elements and fission products</td>
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<td>13. TRANSMUTATION</td>
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<td>13.1. Physics of transmutation, transmutation efficiency</td>
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<td>13.5. Transmutation issues of long-lived fission products</td>
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<td>13.7. Transmutation potential of various nuclear systems including dedicated cores</td>
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<td>14. FAST REACTORS</td>
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<td>14.2. Design considerations: materials, neutronics, heat transfer, and systems</td>
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<td>14.3. Fast reactors for actinide transmutation</td>
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<td>15.3. Practical systems</td>
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<td>15.5. Accelerator driven systems – international trends in research and development</td>
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<td>16. ANALYSIS OF DIFFERENT TRANSFORMATION CONCEPTS</td>
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<td>16.1. Nuclear fuel cycle strategies</td>
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<td>16.3. Consequences of transmutation on the fuel cycle</td>
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<td>16.4. International approach to transmutation</td>
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<td>17.8. Systems analysis – integrated model application</td>
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<td>17.9. Status of the Advanced Fuel Cycle (AFC) research &amp; development activities,</td>
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<td>18. GENERATION IV NUCLEAR ENERGY SYSTEMS AND FUEL CYCLES, GENERATION IV FAST REACTORS</td>
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<td>18.5. Generation IV nuclear energy systems, transmutation impacts</td>
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<td>18.6. Concept-specific recycle technologies including partitioning &amp; transmutation</td>
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<td>18.8. Status of Generation IV research – integrated model application</td>
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<td>18.9. Generation IV fast reactors</td>
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**19. GLOBAL NUCLEAR ENERGY**

  19.1. National energy policy and nuclear power
  19.2. Impact of partitioning and transmutation on nuclear non-proliferation
  19.3. Proliferation resistant partitioning and transmutation
  19.4. Global Nuclear Energy trends and the role for fast spectrum
  19.5. Spent fuel management
  19.6. U.S. Generation IV implementation
  19.7. Advanced burner trends
  19.8. Advanced breeder trends
  19.9. Status of the partitioning and transmutation program

**20. DESIGN ASPECTS OF ADVANCED BURNER REACTORS (ABR) – NEUTRONICS & HEAT REMOVAL, SAFETY, MATERIALS, AND SYSTEMS**

  20.1. Actinide burner reactors, Advanced Liquid Metal Reactor (ALMR)
  20.2. Advanced Burner Reactor (ABR) design approach
  20.3. Influence of design parameters on actinide burning
  20.4. Metallic- and oxide-fueled ABR designs
  20.5. Transuranic element processing
  20.6. Fission product processing
  20.7. Improved reprocessing, waste management and disposal
  20.8. Environment, transportation, reprocessing safety
  20.9. Economics

**21. STATUS OF THE FAST REACTOR TECHNOLOGY WORLDWIDE**

  21.1. Fast spectrum research reactors
  21.2. Commercial fast reactors and prototypes of commercial reactors

**22. FAST REACTOR ECONOMICS**

  22.1. Options
  22.2. Criteria
  22.3. Question hierarchy – technology, cost, business plan

**23. INTRINSICALLY PROTECTED NUCLEAR POWER**

  23.1. Concerns
  23.2. Protection by design
  23.3. Development stage
  23.4. Maturity and termination stage
  23.5. Intrinsically protected nuclear power

FAST SPECTRUM SYSTEM DESIGN PROJECT – PRESENTATIONS, SERIES 3
Other Pertinent Course Information

Computer Usage
Appropriate use of engineering software and compilers will be encouraged. Justified use of relevant nuclear engineering codes will also be supported.

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

ATTENDANCE POLICY

The university views class attendance as an individual student responsibility. Students are expected to attend class and to complete all assignments. In all such cases for University Excused absences, a student will be expected to submit a "Texas A&M University Explanatory Statement for Absence from Class" form available at http://student-rules.tamu.edu/rule07.

Religious Holidays

If you are a member of a religious faith that has one or more holidays which require you to be absent from any class listed above, please tell your instructor at least two weeks in advance of your absence and make arrangements to make-up the class.

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.

Academic Integrity

All students at Texas A&M University are bound by the Aggie Honor Code:

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

For more information, the student is referred to the Honor Council Rules and Procedures on the web at 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."

Professional Behavior

An important attribute of your professional development is that you act and speak in a manner that will not offend others giving particular care to diversity issues.
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 Oceanography

2. Course prefix, number and complete title of course: OCNG 661 Advanced Oceanographic Data Analysis and Communication

3. Catalog course description (not to exceed 50 words): Project design and planning for oceanographers; oceanographic data organization and analysis; synthesis and interpretation of data analysis; technical report writing and presentation.

4. Prerequisite(s): OCNG 603, OCNG 604, OCNG 608, and OCNG 657, or permission of the instructor.

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)
      Master of Ocean Science and Technology
   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 Oceanography

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 Id Title (excluding punctuation) Data Analy & OCN GL
   Lect Lab SCH CIP and Fund Code
   0 3 0 0 0 3 4 0 6 0 7 0 0 0 2
   Approval recommended by:

   Debbie Thomas  [Signature]  12/3/14
   Department Head or Program Chair (Type Name & Sign) Date

   Eric Riggs  [Signature]  12/11/14
   Chair, College Review Committee Date

   Kate Miller  [Signature]  12/10/14
   Dean of College Date

   Submitted to Coordinating Board by:

   Chair, GC or UCC  8-11-15 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 – 3/10
Course title and number: OCNG 661 Advanced Oceanographic Data Analysis and Communication
Term: Spring 2017
Meeting times & location: Tuesday & Thursday, 9:35 to 10:50 am. O&M Building, room 303

Course Description and Prerequisites

Project design and planning for oceanographers; oceanographic data organization and analysis; synthesis and interpretation of data analysis; technical report writing and presentation.

Prerequisites are OCNG 603 Communicating Ocean Science, OCNG 604 Ocean Observing, OCNG 608 Physical Oceanography, and OCNG 657 Data Methods and Graphical Representation in Oceanography. These prerequisites are required for all students in the Master of Ocean Sciences and Technology program (MOST). Non-MOST students may take the course with permission of the instructor.

The objective of this course is to apply oceanographic knowledge and data analysis skills to conduct an analysis of a real world oceanographic dataset. Over the course of one semester, students will identify a dataset, conduct a comprehensive data analysis, and produce final products in the form of a Final Technical report and an oral presentation.

Learning Outcomes

On completion of OCNG 661, students will be able to:

1. Plan, manage and organize a data analysis and writing project lasting several weeks.
2. Define a set of project objectives.
3. Explore and analyze a complex oceanographic dataset to meet defined objectives
4. Draw inferences and conclusions based on analysis of data
5. Write a comprehensive technical report.

Instructor Information

Name: Daniel C. O. Thornton
Telephone number: 979-845-4092
Email address: dthornton@ocean.tamu.edu
Office hours: Monday 3:00 to 4:00 pm or by appointment
Office location: O&M Building 518BA (enter via laboratory 521)

Textbook and/or Resource Material

There are no assigned textbooks or reading for OCNG 661.

Grading Policies

There will be no final or midterm exams for OCNG 661. Your grade will be based on coursework and attendance. Coursework during the semester will contribute to a semester long project culminating in a Final Technical Report and an oral presentation. The following assignments will be given during the semester:
Proposal – Once you have identified a dataset to work on for your Final Technical Report, you will write a short proposal outlining what your dataset is, the objectives of your project, and the analytical approaches you will use to achieve you objectives.

Exploratory data analysis and description - A report summarizing exploratory analysis of your data, addressing issues such as data quality, limitations of the dataset, summary statistics, and what advanced approaches you will use to analyze the data.

Final Technical report – This will be the major product of your project, a comprehensive analysis and write up of your dataset. Note that first drafts of different sections of the report will be due throughout the semester, giving you the opportunity to revise and refine your Final Technical Report before you hand it in for grading.

Oral presentation – You will give a 20 minute presentation at the end of the semester summarizing your data analysis project.

Grading Scale
A percentage grade will be calculated based on your total points out of the 500 possible points ((50 points attendance) + (50 points proposal) + (50 points exploratory data analysis) + (250 final technical report) + (100 presentation) = 500 points).

The grading divisions will be: A (90 -100 %), B (80 - 89 %), C (70 – 79 %), D (60 – 69 %) and F (0 – 59 %). There will be no extra credit. Grades may be curved at the end of the semester. If the grades are curved, they will only be curved upwards with the same curve applied to all students.

Attendance and Make-up Policies
The university views class attendance as an individual student responsibility. Students are expected to attend class and to complete all assignments. See: http://student-rules.tamu.edu/rule07.

Although you will conduct much of the work for OCNG 661 on your own, class attendance is strongly encouraged to ensure that you are making sufficient progress towards your final project goals. Consequently, attendance will contribute to your final grade. If you attend > 85 % of class sessions over the semester then you will receive 50 points towards your final grade, whereas 50 points will be deducted from your final grade if you attend < 85 % of class sessions. University approved excuses or documented participation in oceanographic fieldwork or other professional development will not count as absences.

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

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

As commonly defined, plagiarism consists of passing off as one’s own ideas, words, writing, etc., which belong to another. On 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 academics, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.
**Course Topics, Calendar of Activities, Major Assignment Dates**

This table shows the class schedule for OCNG 661. In the unlikely event that major changes need to be made to the schedule you will be notified by email and by postings on eCampus as soon as possible.

**Bold text** indicates that the activity contributes directly to your final grade. **Italics** indicate when drafts of the different sections of your final report should be handed in to the instructor for comments and feedback. Based on this feedback, you will be expected to revise your writing prior to handing in your final report.

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction, technical writing, project design</td>
<td></td>
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<tr>
<td></td>
<td>Identify and acquire a dataset for analysis</td>
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<tr>
<td>Week 2</td>
<td>Identify and acquire a dataset for analysis</td>
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<tr>
<td>Week 3</td>
<td>Proposal writing – scope of work, objectives and/or hypotheses, analytical approaches</td>
<td>Proposal due by Friday @ 5 pm</td>
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<td>Week 4</td>
<td>Exploratory data analysis</td>
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<td>Week 5</td>
<td>Exploratory data analysis</td>
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<tr>
<td>Week 6</td>
<td>Exploratory data analysis</td>
<td>Exploratory data analysis and description due by Friday @ 5 pm</td>
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<td>Week 7</td>
<td>Introduction and data analysis</td>
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<td>Week 8</td>
<td>Introduction and data analysis</td>
<td>Draft of final report introduction due by Friday @ 5 pm</td>
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<tr>
<td>Week 9</td>
<td>Data analysis and synthesis</td>
<td>Draft of final report data analysis methods section due by Friday @ 5 pm</td>
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<tr>
<td>Week 10</td>
<td>Data analysis and synthesis</td>
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<tr>
<td></td>
<td>Discussion and conclusions</td>
<td>Draft of final report results section due by Friday @ 5 pm</td>
</tr>
<tr>
<td>Week 11</td>
<td>Discussion and conclusions</td>
<td>Draft of final report discussion/ conclusion section due by Friday @ 5 pm</td>
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<td>Week 12</td>
<td>Individual presentations during class</td>
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<td>Week 13</td>
<td>Individual presentations during class</td>
<td>Final report due by Friday @ 5 pm</td>
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<tr>
<td>Week 14</td>
<td>No final exam for OCNG 661</td>
<td>Finals</td>
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<tr>
<td>Week 15</td>
<td>No final exam for OCNG 661</td>
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Other Pertinent Course Information

You must have a NetID so you can access your email and eCampus through the Howdy portal.

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
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

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  

6. Is this a variable credit course?  
   [ ] Yes  
   [x] No

7. If yes, from _____ to _____

8. Is this a repeatable course?  
   [ ] Yes  
   [x] No

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

10. If yes, this course may be taken _____ times.

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

12. 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)

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

14. [ ] 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).

15. Prefix | Course # | Title (excluding punctuation)
-----------|-----------|----------------------------------------
SCSC       | 640       | INTELL PROP PLNT SCI

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<th>Acad. Year</th>
<th>FICE Code</th>
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Approval recommended by:

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

Chair, College Review Committee  
Date

Dean of College  
Date

Chair, Co. 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
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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<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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<tr>
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<th>Maximum Points</th>
<th>Grading Scale</th>
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<td>Exam 2</td>
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<td>400 to 449</td>
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<td>Exam 3</td>
<td>100</td>
<td>350 to 399</td>
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<tr>
<td>Mock Exercises</td>
<td>100</td>
<td>300 to 349</td>
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<tr>
<td>Quizzes</td>
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<td>Below 300</td>
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<tr>
<td>Total</td>
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</table>

**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. *

Form Instructions
1. Course request type: [ ] Undergraduate    [ ] Graduate    [ ] First Professional (DDS, MD, JD, PharmD, DVM)
2. Request submitted by (Department or Program Name): Educational Psychology
   SPED 626: Meta-Analysis in Single-case Research
3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Steps of conducting a meta-analysis of single-case research studies.

5. Prerequisite(s):
   Doctoral classification; Approval of instructor;
   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)
       Special Education PHD students.
    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)
   SPED 626 Meta analysis in SCR

<table>
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<th>Lect.</th>
<th>Lab</th>
<th>Other</th>
<th>SCH</th>
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Approval recommended by:
Victor Wilson, Ph.D.
Department Head or Program Chair (Type Name & Sign)   Date

George Cunningham, Ph.D.
Chair, College Review Committee   Date

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

Chair, GC or UCC   Date

Submit 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 – 07/14
SPED 626: META-ANALYSIS IN SINGLE-CASE RESEARCH
Special Education Program
Department of Educational Psychology
College of Education & Human Development
Summer 2015
MW 9-12
EDCT (Harrington Tower) 717

Instructor: Jennifer B. Ganz, Ph.D., BCBA-D
Email: jeniganz@tamu.edu
Office Address: Harrington 637G
Office Hours: By appointment at mutually convenient time (in person, by phone, or online) – email to set an appointment

DESCRIPTION
Students will complete the steps of conducting a meta-analysis of single-case research studies.
Prerequisites: This course is intended for doctoral-level students, whose emphasis is applied behavior analysis; approval of instructor.

REQUIRED READINGS


Additional readings assigned by instructor.

EXPECTATIONS AND POLICIES

1. Appropriate Language

Students are expected to use appropriate language in both verbal communications and written work. People with disabilities are just that: people who happen to have physical, sensory, behavioral, learning, or intellectual disabilities. Please avoid terms like "the handicapped", "ED kids" etc. Instead, you will be expected to communicate in a way that puts "people first". For example, "the student with antisocial behaviors", "a student with an emotional and behavioral disorder", "students with a learning disability". This small change emphasizes the humanity and the individuality of the person and clarifies that a disability is only one of many characteristics (and not necessarily the most important) that a person can possess.

2. Diversity

Effective teaching involves understanding and acceptance of the diverse backgrounds and contexts of students, families, and educators. Efforts at cultural sensitivity should be stressed and expected in all interactions with other students and instructors for this course.

3. Due Dates

All assignments should be submitted ON or BEFORE THE ASSIGNED DUE DATE except in cases of excused absences. While understanding that everyone is busy with school and work, your decision to register for this course is an indication that you have made it a high priority. Therefore, assignments past the due date will not be accepted without documented, reasonable justification. Obviously, crises take place (e.g., death in the family, child who is sick, etc.) that can reasonably result in missed deadlines. Examples of unreasonable extensions for an assignment include: frequent computer malfunctions, outside class-work, or job responsibilities that inhibit meeting the required deadlines. If you anticipate missing a deadline on an assignment, you should send an email (before the deadline) with the following information:

(a) The circumstances that require that you miss the assignment.
(b) A copy of documentation of the issue.

Whether an extension is allowed will be at the instructor's discretion.

4. Assignments

All assignments must be typed, double-spaced, and in 12 point font with no more than 1” margins on all sides. You are encouraged to check your papers for spelling and grammar. Papers that are not typed will not be accepted. You will turn in all assignments online, using the Turnitin tool. When turning in assignments, please begin your file name with your last name, your first name, then the assignment name. Include a title page with:
Your full, official name (according to current TAMU records)
Date
Course number
Instructor's name
Honor pledge:

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

__________________________
Signature of Student [Type your name in lieu of your signature on items turned in electronically.]

5. Plagiarism

While collaboration is encouraged, plagiarism will result in sanctions. Plagiarism is defined as an attempt to "steal and pass off as one's own the ideas or words of another" (Webster, 1967, p. 646). Examples of plagiarism are turning in copies of other student's assignments as your own and copying words, even just three in a row, from an article without appropriately citing the work. Please paraphrase others' work when you are citing it. That it, put the information completely in your own words. Direct quotes tend to be overused and do not demonstrate that you understand the material. The Aggie Honor Code: "An Aggie does not lie, cheat or steal, or tolerate those who do."

Please review the Honor Council Rules and Procedures on the web: aggiehonor.tamu.edu You are responsible for their contents. I cannot stress enough: cite, cite, cite your sources.

6. Grading Concerns

Many times during the course of a semester students will have concerns regarding the assignment of a particular grade. Some of the grading is subjective (e.g., responses to guided reading questions) while other aspects are more objective (e.g., midterm and final). If you have concerns regarding a particular grade, then please set up an appointment to discuss your grade. In addition to setting up an appointment, you should submit your work with a typed memo indicating your concerns. Grades of "Incomplete" are strongly discouraged and will not be issued except in extraordinary circumstances.

7. Participation, Professionalism, and Student Conduct

In-class participation (i.e., asking thoughtful questions, working with groups on application assignments etc.) and professionalism (e.g., coming on time to class, being prepared, notifying the instructor of late assignments in advance, paying attention in class, following grading protocols, etc.) is expected. Please do not sleep in class, work on assignments for either this class or another class, browse the internet or access email, engage in discussions unrelated about class content, text message, or other related behaviors that are not consistent with professionalism and participation in the course. If student conduct is unacceptable (e.g., talking in class), an email or written notification will be sent to the student and his/her advisor identifying the problem behavior and asking that the student change his/her behavior to meet class expectations. If the problem behavior continues, a meeting between the student and his/her advisor will be made to discuss a plan of action to correct the problem behavior.

8. Absences

Attendance is required at all class meetings unless the student has an excused absence (e.g., illness that requires bed rest) that can be documented. Information presented and learning activities in each class are not available through any other means. If a class is missed, the student is responsible for all material covered in class including all handouts. Much of the information and materials given in class are only available in class. If you are absent, the instructor will not have extra copies of handouts when you return to class. If absent, do not ask the instructor what was missed. Instead, find a class contact person who will share information and notes/handouts that were missed.

For more information on attendance please review student rule 7: http://student-rules.tamu.edu/rule07

Class contact person: __________________________

Students are required to be familiar with the university student academic rules, which can be found here:
http://student-rules.tamu.edu/academicrules

To be excused the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance 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. This notification should include an explanation of why notice could not be sent prior to the
class. Accommodations sought for absences due to the observance of a religious holiday can be sought either prior or after the absence, but not later than two working days after the absence.

9. Recordings
No electronic recording of lectures or class sessions may be done without written prior permission of the instructor.

<table>
<thead>
<tr>
<th>CLASS ASSIGNMENTS</th>
<th>Percentage Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Activities, Attendance, &amp;</td>
<td>20%</td>
</tr>
<tr>
<td>Participation</td>
<td></td>
</tr>
<tr>
<td>Meta-Analysis Components &amp; Manuscript</td>
<td>Approximately 10% each for each of 8 components (see below)</td>
</tr>
</tbody>
</table>

Due dates are listed on the schedule.
*Please keep all coursework until you receive your final grade on your transcript.

Grading scale:
A = 90-100%
B = 80-89%
C = 75-79%
D = 70-74%
F = less than 70%

Weekly Activities, Attendance, & Participation

In class activities:
About once a week, students will participate in individual or group activities in class. Handouts will be posted online prior to class. You are responsible for either printing the assignment in advance or bringing your laptop with the assignment downloaded. Every time a group or individual assignment is given during class time, you must turn in a written product. In-class activities will be due the day of class. These assignments will not be accepted at a later date. Students attending via distance sites may scan and email their assignments within 24 hours after class or type on a laptop during class and email them during class. Credit will be given for participation, effort, and correct/accurate responses.

Attendance and participation in this course are expected (see above).

Attendance expectations:
1. Absent only in the case of emergency
2. Punctual
3. Contacts peer to find out what transpired during absence and makes provisions to learn/know the material covered

Class participation expectations
1. Offers insights, comments and/or actively contributes to discussions
2. Contributions reflect understanding of reading and content from earlier classes
3. Uses effective speaking strategies (such as eye contact, appropriate language, tone, and volume)
4. Demonstrates positive interpersonal skills (encourages others, offers assistance to others, does not criticize others, builds upon positive contributions of others, displays a sense of humor)
5. Is respectful, does not interrupt or talk when others are talking, does not dominate conversation

Meta-Analysis Manuscript (due dates for multiple parts – see schedule)
The aim of this paper is to contribute to the current literature regarding the state of an evidence-based educational practice for individuals with autism spectrum disorders or others who engage in challenging behaviors. This will be accomplished by submitting a manuscript for publication to a peer-reviewed or professional journal.

The course will focus on conducting and writing up at least one meta-analysis. Each student will be graded according to his or her amount and quality of contribution to the following components of the manuscript:

- Table of documents found via search
- Table of included articles
- Table of coded articles
- Excel file with ES calculations (stats software printouts)
- First drafts of forest plots, intro, & methods
- First drafts of table, results, & discussion
- Second drafts of all documents
- Final drafts of all documents

The instructor will guide the class in completing each step of the process and will provide feedback to guide revisions of each written product.

Grading Criteria for Written Products:

- Thoroughness of content overall
- Thoroughness of literature/research
- Organization and flow
- Inclusion of all requirements
- Graduate level of writing and thought
- Correct APA format for headings, subheadings, in-text citations, and the reference list. Cite sources throughout your paper each time you report information that came from another source. Paraphrase – do not plagiarize or use words taken from your sources. Include the honor pledge on your title page.
- Grammar, spelling, and flow/organization
- Completion of each component on time
- Quality of revisions (final copy)

Submit your papers via eLearning by the due date and time.

There will be no opportunities for extra credit in this course.
# SPED 626: Meta-Analysis in Single-Case Research

**TENTATIVE AGENDA FOR CLASS MEETINGS AND TOPICS**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Guest Lecturer</th>
<th>Assignment Due</th>
</tr>
</thead>
</table>
| 1    | Intro to meta-analysis in SCR  
      Determine a topic  
      Conduct a preliminary literature search for depth of the literature and recent metas/lit reviews |                      | Table of documents found via search  
      Assignment due by the first day:  
      - Read the assigned metas  
        Bowman-Perrott, Ganz, Ninci).  
      Pay particular attention to the methods and results, but read the whole thing. Develop one outline of the steps needed in conducting and writing up a meta. |
| 2    | Determine search criteria  
      Conduct search  
      Make a table of all documents found in the searches | Reference librarian  | Read the two Kratochwill and the Maggin articles  
      For the selected autism intervention, come up with a list of key words you might use for the meta. |
| 3-4  | Determine inclusion/exclusion criteria  
      Judge all documents for inclusion/exclusion  
      IRR for inclusion/exclusion  
      Hand search of references for included documents |                      | Table of included articles |
| 5-6  | Determine moderators and columns for coding articles  
      Code all included articles  
      IRR for coding of articles | John Davis            | Table of coded articles |
| 7-8  | Determine what comparisons to make from graphs  
      Extract data from graphs | John Davis            | Read Parker article  
      Excel file with ES calculations (stats software printouts) |
| 9-10 | Calculate Tau-U effect sizes for moderators  
      Write introduction  
      Write methods | John Davis            |                                    |
| 11-12| Create table summarizing included articles  
      Review analyses, write results | John Davis            | First drafts of intro, & methods |
<table>
<thead>
<tr>
<th>(descriptive and ES results)</th>
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</thead>
<tbody>
<tr>
<td>Write discussion</td>
</tr>
<tr>
<td>Write abstract</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>13-14</th>
<th>Final revisions and submission</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Determine additional manuscripts (including quality indicators) to draft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final drafts of all documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readings: Quality Reviews</td>
</tr>
<tr>
<td>(Camargo, Hong)</td>
</tr>
</tbody>
</table>
**TAMU Statements**

**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)

**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 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”.

**Copyright Statement:** The materials used in this course 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.

**Scholastic Dishonesty:** Instances of scholastic dishonesty will be treated in accordance with Section 20 of the TAMU Student Rules. Please inform yourself on the student rules regarding cheating, plagiarism, fabrication of information, conspiracy at the new website [aggiehonor.tamu.edu](http://aggiehonor.tamu.edu)

**Academic Integrity:** "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 TAMU community from the requirements or the process of the Honor System. For additional information, please visit [aggiehonor.tamu.edu](http://aggiehonor.tamu.edu)

**Respect Statement:** The faculty of the College of Education and Human Development value and respect diversity and the uniqueness of each individual. The faculty affirms its dedication to non-discrimination in our teaching, programs, and services on the basis of race, color, religion, gender, age sexual orientation, domestic partner status, ethnic or national origin, veteran status, or disability. The College of Education and Human Development at Texas A & M University is an open and affirming organization that does not tolerate discrimination, vandalism, violence or hate crimes. We insist that appropriate action be taken against those who perpetrate such acts. Further, the College is committed to protecting the welfare, rights, and privileges of anyone who is a target of prejudice or bigotry. Our commitment to tolerance, respect, and action to promote and enforce these values embraces the entire university community. In the spirit of shared responsibility, each University unit, student organization, and community member is encouraged to help make our campus, and this class, a welcoming place for all. Should you have any concerns related to respect for diversity or feel that you (or any others) are being discriminated against, please contact your departmental Ombudsperson, or the Department Head, or the College Ombudsperson.