Course Change Requests
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
• Submit original form and attachments •
Department of Chemistry

1. Request submitted by (Department or Program Name):

2. Course prefix, number and complete title of course:
   CHEM 660

3. Change requested
   Attach a brief supporting statement for changes made to items 1a thru 1d, and 6 below.
   a. Prerequisite(s): From: ___________________________ To: ___________________________
   b. Withdrawal (reason): ___________________________
   c. Cross-list with: ___________________________

4. For informational purposes only, please indicate course number if this course will be stacked:

5. Complete current course title and current catalog course description:
   Nuclear Chemistry.
   Radioactive decay, nuclear models, nuclear spectroscopy, nuclear reactions, fission and other topics of current interest in nuclear chemical research. Laboratory work to emphasize modern nuclear chemical instrumentation.

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):
   Nuclear Chemistry.
   Radioactive decay, nuclear models, nuclear spectroscopy, nuclear reactions, fission and other topics of current interest in nuclear chemical research.

7. a. As currently in course inventory:
   Prefix Course # Title (excluding punctuation)
   CHEM 660 NUCLEAR CHEMISTRY
   Lect. Lab SCH CIP and Fund Code Admin. Unit FICE Code Level
   0 3 0 1 0 4 0 0 5 0 6 0 0 0 2 0 6 0 0 0 0 3 6 3 2 6
   b. Change to:
   Prefix Course # Title (excluding punctuation)
   CHEM 660 NUCLEAR CHEMISTRY
   Lect. Lab SCH CIP and Fund Code Admin. Unit Acad. Year FICE Code Level
   0 3 0 0 0 3 4 0 0 5 0 6 0 0 0 2 0 6 0 0 4 1 1 1 2 0 0 3 6 3 2

Approval recommended by:
David H. Russell
Department Head or Program Chair (Type Name & Sign) Date
11-30-10

Chair, College Review Committee
Mark J. Date
11-30-10
Dean of College
Mark J. Date
1/24/11
Chair, GC or UCC

Submitted to Coordinating Board by:

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 03/10

2 of 49 CC
Nuclear Chemistry
CHEM 660

Prof. Charles M. Folden III
Office: CYCL 208
Folden@comp.tamu.edu
979-845-1411
Office Hour: Wednesdays 11:00 A.M.-12:00 P.M. and by appointment

Course Description

This course will provide a rigorous study of the theoretical basis of modern nuclear chemistry. Topics will include alpha, beta, gamma, and fission decay, neutron-induced reactions, nuclear thermodynamics, electronic instrumentation, and current readings in nuclear chemistry. By the end of the semester you should have a strong foundation with these fundamental theories, allowing you to pursue research in a number of sub-fields of nuclear chemistry.

Textbook


An additional recommended textbook is Radiation Detection and Measurement by Glenn F. Knoll. Numerous editions are available, including the fourth edition released in 2010. Several lectures will be based on this textbook.

Exams

There will be two exams in addition to the final exam. All exams are closed-book and comprehensive.

Grading

Your grade will be comprised as follows: two exams worth 20% each, final exam 20%, homework 30%, and Capstone presentation 10%. All assignments are due on the date and time specified. The clarity of a solution will be a component of your grade, and assignments handed in are expected to be a final draft of your efforts. You must have the correct answer for the correct reason to receive full credit on any assignment. Incorrect or irrelevant information will negatively impact your grade.

Your score will decrease 10% for each day an assignment is late, and no work will be accepted that is more than one week late. Homework turned in on the day an assignment is due but after the time specified is considered one day late. Students may work together in groups but each student must turn in their own work. Copying solutions from another student will be considered a violation of the Aggie Honor Code (see below). If you want to turn in work outside of class then you may give it to the receptionist at the Cyclotron Institute.

Final grades in the course will be determined by the following scale:
Students are expected to be able to fit data and use the fits to determine various quantities. (Excel works well for this purpose and is available on the computers in the Open Access Labs). You are expected to have access to a PDF reader; Adobe's free viewer is available for many operating systems at get.adobe.com/reader. Students must also have a scientific calculator.

**Academic Honesty**

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

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. The Honor Code will apply to all work in the class even if the student is not required to write the statement above and sign it. Any assignment handed in for credit will be assumed to have been completed in accordance with the Honor Code. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. Please visit aggiehonor.tamu.edu for additional information.

**Students with Disabilities**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 979-845-1637. Please visit disability.tamu.edu for additional information. The Disability Services office is very busy at the beginning of the semester, so please make an appointment with them immediately if you feel you require assistance.

**Absences**

Attendance is expected at all lectures even though attendance will not be taken. You are responsible for all material presented in class and in the assigned readings, even if you are absent. If you miss an exam, you will be required to provide suitable documentation that your absence should be excused according to University rules and regulations (Student Rule 7). You should discuss any upcoming absences with the professor in advance.
### Schedule

<table>
<thead>
<tr>
<th>Date(s)</th>
<th>Topic(s)</th>
<th>Reading in Prussin (unless noted otherwise)</th>
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<tbody>
<tr>
<td>January 20</td>
<td>Counting Statistics</td>
<td>Chap. 3</td>
</tr>
<tr>
<td>January 25</td>
<td>Alpha Decay</td>
<td>Chap. 9</td>
</tr>
<tr>
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<td>Alpha Decay</td>
<td>Chap. 9</td>
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<td>Chap. 10</td>
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<tr>
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<td>Beta Decay</td>
<td>Chap. 10</td>
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<td>Gamma Decay</td>
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<td>February 15</td>
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<td>EXAM</td>
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<td>February 22</td>
<td>Fission</td>
<td>Chap. 12</td>
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<tr>
<td>February 24</td>
<td>Fission</td>
<td>Chap. 12</td>
</tr>
<tr>
<td>March 1</td>
<td>Neutron-Induced Reactions</td>
<td>Chap. 13</td>
</tr>
<tr>
<td>March 3</td>
<td>Neutron-Induced Reactions</td>
<td>Chap. 13</td>
</tr>
<tr>
<td>March 8</td>
<td>Low-Energy Heavy-Ion Reactions</td>
<td>Chap. 13</td>
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<tr>
<td>March 10</td>
<td>Low-Energy Heavy-Ion Reactions</td>
<td>Chap. 13</td>
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<td>March 15 and 17</td>
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<td>March 22</td>
<td>Nuclear Thermodynamics</td>
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<td>April 5</td>
<td>EXAM</td>
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<td>April 7</td>
<td>Pulse-Processing Electronics</td>
<td>Knoll Chaps. 4, 16</td>
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<tr>
<td>April 12</td>
<td>Semiconductor Detectors</td>
<td>Knoll Chap. 11</td>
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<tr>
<td>April 14</td>
<td>Scintillation Detectors</td>
<td>Knoll Chaps. 8-9</td>
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<td>Miscellaneous Detectors</td>
<td>Knoll Chap. 19</td>
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<td>Principles of Radiochemistry</td>
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<td>April 26</td>
<td>Principles of Radiochemistry</td>
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<td>April 28</td>
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<tr>
<td>May 6</td>
<td>FINAL EXAM</td>
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12:30-2:30 P.M.
Texas A&M University

Departmental Request for a Change in Course

Undergraduate + Graduate + Professional

• Submit original form and attachments •

Form Instructions

1. Request submitted by (Department or Program Name): Zachry Department of Civil Engineering

2. Course prefix, number and complete title of course: CVEN 654 Strategic Construction and Engineering Management

Attach a brief supporting statement for changes made to items 3a through 3d and 6 below.

3. Change requested

   a. Prerequisite(s): From: Graduate classification To: Graduate classification or permission of instructor

   b. Withdrawal (reason):

   c. Cross-list with: ISEN 643

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

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course prefix, number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked:

5. Complete current course title and current catalog course description: Strategic Construction and Engineering Management. Strategic and systems perspectives are applied to construction and engineering management in projects, organizations, and industries. The system dynamics methodology is used to model construction and engineering systems to improve understanding of the drivers of performance and the use of feedback and high leverage points to improve performance.

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words): Strategic Construction and Engineering Management. Strategic and systems perspectives applied to construction and engineering management projects, organizations and industries; system dynamics methodology to model construction and engineering systems; understanding drivers of performance; feedback and high leverage points for performance improvement.

7. a. As currently in course inventory:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (excluding punctuation)</th>
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<tr>
<td>CVEN</td>
<td>654</td>
<td>STRATEGIC CONST ENGR MGMT</td>
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<th>Level</th>
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b. Change to:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (excluding punctuation)</th>
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<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>COP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
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<td></td>
<td></td>
<td>0</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

Approval recommended by:

Mark Burris
Department Head or Program Chair (Type Name & Sign) Date: 12/2/10

Brett A. Peters
Department Head or Program Chair (Type Name & Sign) Date: 11/29/2010

Robin Autenrieth
Chair College Review Committee Date: 12-8-10

Robin Autenrieth
Dean of College Date: 12-8-10

Chair, GC or UCC Date: 12/31/11

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 – 09/10
Brief Supporting Statement of Changes
CVEN 654. Strategic Construction and Engineering Management

The reasons for the changes are briefly listed below:

The prerequisite is changed so that the instructor can give permission to a good undergraduate student for taking the course.

This course will be taught in cooperation with the Industrial and Systems Engineering Department.

The change in description is editorial.
Number and Title of Course: CVEN 654 Strategic Construction and Engineering Management
Hours: Lecturer 3 Lab 0, Credits 3
Prerequisites: Graduate standing or permission of the instructor

Course Description: Strategic and systems perspectives applied to construction and engineering management projects, organizations, and industries; system dynamics methodology to model construction and engineering systems; understanding drivers of performance; feedback and high leverage points for performance improvement.

Learning Outcomes: Students successfully completing this course should (1) have been exposed to and explored issues in the strategic management of engineering enterprises, (2) developed skills in building models of engineering enterprises and using the strategic process and policy design and analysis for improvement, (3) gain experience in the combined use of research literature and computer simulation modelling to investigate a specific engineering management issue, and (4) gain experience in teamwork.

Course Instructor: David N. Ford
Telephone number: 845-3759 Email: davidford@tamu.edu
Office hours: 10-11 AM, Tues-Thurs Office location: 705D, CE/TTI Building


Grading Policy: Assignments and exercises 25%
Midterm Examination 40%
Term project: Presentation 10%
Report 25%

Project paper and presentation will be graded based on how good of a review you provide for your selected topic, how logical, innovative, and feasible your proposed idea is, and how well you present your work to the class. Grades will be calculated on the basis of total points earned. The points can be curved based on class average and may lower the following standard.
A 90-100
B 80-89
C 70-79
D 60-69
F 59 and lower

Course Outline by Major Topics and Approximate Time Assigned to Each:

1. Strategic engineering management issues 2
2. Experiencing the management of project dynamics 2
3. Conceptual modelling of dynamic engineering management systems 3
4. Formal modelling of engineering enterprises 2
5. Model validation, analysis, and use for strategic management 3
6. Project discussion and presentations 2

Total 14
**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.

**Academic Integrity Statement**

“Aggies do not lie, cheat, or steal, nor do they tolerate those who do.” 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. (Please see the Honor Council Rules and Procedures at http://www.tamu.edu/aggiehonor)
Texas A&M University

Departmental Request for a Change in Course

Undergraduate • Graduate • Professional

Submit original form and attachments

Form Instructions

1. Request submitted by (Department or Program Name): HISPANIC STUDIES
2. Course prefix, number and complete title of course: HISP 606 Spanish of the Southwest

Attach a brief supporting statement for changes made to items 3a through 3d and 6 below.

3. Change requested
   a. Prerequisite(s): From: HISP 602 or approval of instructor To: Graduate classification and proficiency in Spanish
   b. Withdrawal (reason): 
   c. Cross-list with: Cross-listed courses require the signature of both department heads.
   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6.
   e. Change in course prefix, number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked:

5. Complete current course title and current catalog course description: Spanish of the Southwest. Descriptive analysis of written varieties of southwest Spanish from Texas, New Mexico, and Arizona. Structure and variation of (a) the sound system, (b) grammatical patterns, and (c) the lexicon. Instruction to sociolinguistic issues relevant to southwest language studies.

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words): Spanish in the United States. In-depth description and analysis of Spanish varieties spoken in the United States, by both traditional and new immigrant populations, including New Mexico and Louisiana Spanish, Mexican, Cuban, Puerto Rican, Dominican, Central and South American dialects. Topics include accommodation, koinéization, borrowing, code-switching, attitudes and policies related to language maintenance and shift.

7. a. As currently in course inventory:

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<thead>
<tr>
<th>Prefix</th>
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<td>HIS</td>
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<td>SPANISH OF THE SOUTHWEST</td>
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<td>14 47</td>
<td>00 36 32</td>
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b. Change to:

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<th>Title (excluding punctuation)</th>
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<tbody>
<tr>
<td>HIS</td>
<td>606</td>
<td>SPANISH IN THE US</td>
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<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
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<th>Acad. Year</th>
<th>FICE Code</th>
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<td>16 09 05 00 01</td>
<td>14 47</td>
<td>1 1 2 0 3 6 3 2</td>
<td></td>
</tr>
</tbody>
</table>

Approval recommended by:

Dr. Alberto Moreiras
Department Head or Program Chair (Type Name & Sign) Date
Nov 10, 2010

Chair, College Review Committee
Date

Dr. Patricia A. Hudley
Department Head or Program Chair (Type Name & Sign) Date
Nov 10, 2010

Chair, GC or UCC
Date

Submitted to Coordinating Board by:

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services - 03/10
Justification for proposed change:

Spanish in the United States was originally a phenomenon of the Southwestern states, one of the linguistic consequences of the American expansion to the old Spanish-Mexican borderlands. However, in the course of the 20th century, new immigrant groups have arrived in the United States, bringing with them diverse new dialects. These linguistic varieties have taken root in a territory vastly larger than the original confines of the Southwest, where they are being shaped in novel ways by their contact with each other and with English. We believe that a true understanding of Spanish in the United States requires knowledge of both the traditional and the new dialects, since it is an inescapable fact of American life. Our students will benefit from the expanded course content.
HISP 606
SPANISH IN THE UNITED STATES

Instructor: María Irene Moyna
Office: ACAD 302B
Phone: 862-3282
Email: moyna@tamu.edu

Catalog description:

HISP 606. Spanish in the United States. Credit 3. In-depth description and analysis of Spanish varieties spoken in the United States by both traditional and new immigrant populations, including New Mexico and Louisiana Spanish, Mexican, Cuban, Puerto Rican, Dominican, Central and South American dialects; topics include accommodation, koinéization, borrowing, code-switching, attitudes, and policies related to language maintenance and shift.

Course description:

Spanish is not a new language in the territory of the present-day United States. In fact, it was the first European language spoken in the Southwest, and in some parts of the country, varieties related to those spoken by the early settlers can still be found. However, in the past century, the Spanish-speaking presence in the United States has become larger, more diverse and more complex, as new waves of immigrants from many different countries have settled here. It is now estimated that over 30 million people speak Spanish in the United States, making it the second most widely spoken language. This course explores the present-day diversity of this linguistic community as well as the history of the Spanish presence in the United States, from colonial times until the present. We will define what is meant by Spanish in the United States, the names that have been given to these language varieties, and their main linguistic features. We will then discuss the dialectal subgroups of Spanish speakers, including Mexicans, Puerto Ricans, Cubans, and Central and South Americans. We will also discuss the historical varieties of Spanish of New Mexico, Louisiana, Texas, and California. The data will come from large-scale tools such as the US Census, linguistic atlases, and dictionaries, and from the direct consultation of written and oral data.

Mandatory text:

Readings:
A complete bibliography for this course appears at the end of the syllabus and is available through e-reserves.

Learning outcomes:
At the end of the course, students will be able to:
- Describe the main historical events responsible for the presence of Spanish speakers in the United States and explain how these affect the relative status of each linguistic group.
- Define, describe, and identify the main common linguistic features of Spanish varieties in the US.
• Define, describe, and identify the main distinguishing features of the varieties spoken by people of various national origins.
• Evaluate the impact of different political and social measures on minority language use, with special reference to Spanish.
• Successfully search and retrieve relevant academic bibliography from databases.
• Produce a publishable paper related to the field of Spanish in the US, using scientifically sound argumentation, appropriate methodology, style, and format.
• Identify conferences where the paper could be presented, write and evaluate conference abstracts, present papers professionally, and prepare a manuscript for publication.

Prerequisites:
Graduate classification and proficiency in Spanish.

Further information: This course will be taught in its entirety through the medium of Spanish, and students are expected to express themselves competently in this language. There will also be readings in English, so excellent reading comprehension in English is required.

Course format:
The course will be taught as a seminar, with constant student participation. In general, each weekly session will be divided into three sections. In the first part, the topic of the day will be introduced with the help of Powerpoint presentations. This will allow students to have copies of the slides before class (posted on WebCT). The second part will be a discussion or exercises of topics raised in class. Finally, the third part will be based on discussions led by the students and it will deal with the readings from the reading packet that was assigned for that week.

Attendance policy:
Please do your best to attend class and arrive on time, for your own good and for the benefit of your classmates. Two unjustified absences will result in the loss of half a point in the final grade. Valid justifications are listed in the student academic rules (http://student-rules.tamu.edu/rule7.htm) and must be documented in writing.

Grading scale:


<table>
<thead>
<tr>
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<tbody>
<tr>
<td>100 – 90%</td>
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<td>A</td>
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<td>79 – 70%</td>
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<td>C</td>
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<td>59% or less</td>
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<table>
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<tr>
<th>Grade breakdown:</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Article discussions (2)</td>
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<tr>
<td>Final project</td>
<td>30%</td>
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<tr>
<td>Final project presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Homework assignments</td>
<td>15%</td>
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<tr>
<td>Portfolio</td>
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<tr>
<td>Participation</td>
<td>10%</td>
</tr>
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</table>

Article discussions
Throughout the semester, and starting on week five, each student will be in charge of leading two discussions about the articles assigned for that week. The dates for those discussions will be assigned on the second week of classes; please come prepared to choose a date. If several people want to present on the same day, dates will be given through a lottery. Before your discussion, talk to the instructor about what you would like to do. Discussions should last approximately 20 minutes. More details will be provided in due course.

**Final project and presentation**

Students will demonstrate their ability to carry out original research in the field. For that they will gather original data on some variety of Spanish in the US. They will interpret these data based on a theoretical model and they will present them in two different ways. First, they will do an oral presentation, which will be on the day of the final exam. Second, they will write a research paper of approximately 15 pages. More details will be provided about the format of the research and the paper. The project will be divided into several tasks, each one of which must be completed by a given date (see calendar). It will be assigned a partial grade as follows:

<table>
<thead>
<tr>
<th>Abstract</th>
<th>2%</th>
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<tbody>
<tr>
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<td>Annotated bibliography</td>
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<td>First draft</td>
<td>8%</td>
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<tr>
<td>Final draft</td>
<td>12%</td>
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As soon as possible, students must define a research topic of their interest for the final project and discuss it with the instructor. It can involve any Spanish-speaking community in the United States.

**Exercises and assignments**

The best way to confirm understanding of a topic is through exercises and practical applications. Every class session we will do exercises, view videos, and the like; some work may be assigned for homework. Students are expected to read the bibliography before coming to class and to participate fully if discussion threads are organized through WebCT. The most interesting ideas from these discussions will be taken up in class.

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Instead of in-class tests, each student will have to complete a portfolio with individualized assignments. Three tasks will be chosen from a list of five, based on a self-evaluation of perceived needs. These tasks may include the development of oral or written skills in Spanish, review of basic linguistic notions, or experimental design. The portfolio will be collected three times in the semester.

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<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignment/Evaluation</th>
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<tbody>
<tr>
<td>1</td>
<td>Preliminaries: Course description</td>
<td>Hand in personal information page. Internet search: websites on Spanish in the US.</td>
</tr>
<tr>
<td></td>
<td>Presentation of students</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discussion of information found on the internet.</td>
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<tr>
<td>2</td>
<td>The importance of Spanish in the United States (Lipski, Chapter 1)</td>
<td>Portfolio diagnostic</td>
</tr>
<tr>
<td>Page</td>
<td>Discussion/Activity</td>
<td>Details</td>
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<tr>
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</tbody>
</table>
| 3    | Overview of scholarship (L 2) | Discussion: Espinosa (1911-12), Post (1931), Sánchez (1972), Bills & Ornstein (1976)  
Video: The Bronze Screen (selections) |
| 4    | Spanish, English, or “Spanglish”? (L 3) | Portfolio # 1  
Census data analysis: Spanish in Texas. |
| 5    | Mexican Spanish in the US (L 4) | Final paper abstracts due.  
Discussion: Green (1986), Hidalgo (2001)  
Video: Oaxaca in California. The Mixtecs. |
| 6    | Cuban Spanish in the US (L 5) | Final paper bibliography due.  
Census data analysis: Spanish in Florida. |
| 7    | Puerto Rican and Dominican Spanish in the US (L 5, 6) |  
Census data analysis: Spanish in the Northeast. |
| 8    | Central American Spanish in the US (Salvadoran) (L 8, 9) | Portfolio # 2  
Census data analysis: Spanish in Los Angeles and Washington D.C. |
| 9    | Central American Spanish in the US (Nicaraguan) (L 10) |  
Census data: Where are the Central Americans? |
| 10   | Central American Spanish in the US (Guatemalan, Honduran) (L 11) | Annotated bibliography due.  
<table>
<thead>
<tr>
<th>11</th>
<th><strong>Video: El Norte (selections)</strong></th>
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<tbody>
<tr>
<td></td>
<td><em>South American Spanish in the US (Colombian, Peruvian, Southern Cone)</em></td>
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<tr>
<td></td>
<td>Report: Locating minority Hispanic communities</td>
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<tr>
<td></td>
<td><strong>Portfolio # 3</strong></td>
</tr>
<tr>
<td>12</td>
<td><strong>Accommodation and koinéization in US Spanish</strong></td>
</tr>
<tr>
<td></td>
<td>Discussion: Ghosh Johnson (2005), Otheguy et al. (2007)</td>
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<tr>
<td></td>
<td>Group work: Questionnaire discussion</td>
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<td></td>
<td><strong>Final paper draft due</strong></td>
</tr>
<tr>
<td>13</td>
<td><strong>Traditional Varieties: New Mexico and Louisiana Spanish (L 12)</strong></td>
</tr>
<tr>
<td></td>
<td>Discussion of data from the Atlas of New Mexico and Southern Colorado.</td>
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<tr>
<td>14</td>
<td><strong>Final paper presentations</strong></td>
</tr>
<tr>
<td>15</td>
<td><strong>Final paper due</strong></td>
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Bibliography


Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
- Submit original form and attachments -

Form Instructions

1. Request submitted by (Department or Program Name): HISPANIC STUDIES

2. Course prefix, number and complete title of course: HISP 614 Hispanic Dialectology

3. Change requested
   a. Prerequisite(s): From: Graduate classification To: Graduate classification and proficiency in Spanish
   b. Withdrawal (reason):
   c. Cross-list with:

   Cross-listed courses require the signature of both department heads.
   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6.
   e. Change in course prefix, number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked:

5. Complete current course title and current catalog course description: HISP 614 Hispanic Dialectology. Topics include varieties of Spanish spoken throughout the Americas. Spanish-speaking regions covered include South America, the Caribbean, Central America, and North America, including the southwestern United States. The course covers historical background, structural linguistics, and sociolinguistic issues (social and stylistic variation).

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words): HISP 614 Spanish Dialectology Analysis of regional linguistic variation from a synchronic and diachronic perspective; topics include varieties spoken in Spain, the Americas, and worldwide; dialect diversification, contact varieties, Spanish-based pidgins and creoles.

7. As currently in course inventory:

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<td>HISPANIC DIALECTOLOGY</td>
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Change to:

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<tbody>
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<td>SPANISH DIALECTOLOGY</td>
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Approval recommended by:

Dr. Alberto Moreiras
Department Head or Program Chair (Type Name & Sign) Date Nov 19, 2010

Patricia A. Hruby
Chair, College Review Committee Date 12/10/10

Department Head or Program Chair (Type Name & Sign) Date 1/24/11

Submitted to Coordinating Board by:

Sandra Williams
Chair, GC or UCC Date 3/23/10

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

Curricular Services – 03/10
Justification for proposed change:

The proposed change broadens the scope of the course from the Americas to the Spanish-speaking world more generally. This is felt to be necessary for several reasons. First, the regional varieties of Spain are of interest in themselves, and up until now they had not been included in any course in our graduate program. Moreover, these varieties are historically connected to much of the variation present in the dialects of the Americas and the rest of the world. In sum, a thorough understanding of regional variation must be inclusive of all regions of the Spanish-speaking world.
HISP 614
Spanish Dialectology

Instructor: María Irene Moyna
Office: ACAD 302B
Phone: 862-3282
Email: moyna@tamu.edu

Catalog description:

HISP 614 Spanish Dialectology. Credit 3. Analysis of regional linguistic variation from a synchronic and diachronic perspective; topics include varieties spoken in Spain, the Americas, and worldwide; dialect diversification, contact varieties, Spanish-based pidgins and creoles.

Course description:

Any native speaker of Spanish who comes in contact with speakers from other areas immediately notices differences in the pronunciation, vocabulary, and even structures employed. In general, these differences do not impede communication too drastically, but they can result in misunderstandings and are often a source of hilarity in movies, literature, and everyday life. To a point, all native speakers of Spanish are dialectologists, since they use linguistic features to identify the social and regional groups to which other speakers belong.

In this course we will go beyond the anecdotal, to provide a systematic analysis of dialect variation in Spanish. We will answer some general questions such as the following: When can we say that two varieties are different dialects of the same language? How different do they have to be to be considered different languages? Why do the speech patterns of different groups become increasingly different as these groups lose contact? What influence does it have on a given variety that some of its speakers are bilingual? We will discuss basic notions such as language and dialect, dialect continuum, variation and change. We will consider different data gathering methods used in dialectology (questionnaires, dialectal maps, glossaries, etc.), applying them to the specific context of Spanish in the world. The course will end with an individual paper where students will analyze a topic of their own choice.

Required texts:

Reading packet:
The full bibliography that appears on the last page of this syllabus is available through e-reserves.

Learning outcomes:
At the end of the course, students will be able to:

- Define, explain, and exemplify the basic notions of dialectology
• Use the standard data collection tools of the field (interviews, surveys, dialect atlases) and interpret them correctly
• Identify and provide brief descriptions of the main Peninsular and American dialects on the basis of their phonological, morphosyntactic, and lexical features
• Evaluate the influence of various internal and external factors on dialect diversification
• Summarize what they have learned in a scientific paper about a given feature of a Spanish dialect, using scientific argumentation strategies and appropriate style and format.
• Identify appropriate conferences for their work, write and evaluate conference abstracts, make professional quality presentations and prepare a manuscript for publication.

Prerequisites:
Graduate classification and proficiency in Spanish.

Further information: This course will be taught in its entirety through the medium of Spanish, and students are expected to express themselves competently in this language. There will also be readings in English, so excellent reading comprehension in English is required.

Course format:
The course will be taught as a seminar, with constant student participation. In general, each weekly session will be divided into three sections. In the first part, the topic of the day will be introduced with the help of Powerpoint presentations. This will allow students to have copies of the slides before class (posted on WebCT). The second part will be a discussion or exercises of topics raised in class. Finally, the third part will be based on discussions led by the students and it will deal with the readings from the reading packet that was assigned for that week.

Attendance policy:
Please do your best to attend class and arrive on time, for your own good and for the benefit of your classmates. Two unjustified absences will result in the loss of half a point in the final grade. Valid justifications are listed in the student academic rules (http://student-rules.tamu.edu/rule7.htm) and must be documented in writing.

Grading scale:

<table>
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<th>Grade</th>
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<tr>
<td>100 – 90%</td>
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<td>79 – 70%</td>
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<td>69 – 60%</td>
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<td>59% or less</td>
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<tr>
<td>Homework assignments</td>
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<td>Portfolio</td>
<td>20%</td>
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<tr>
<td>Participation</td>
<td>10%</td>
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**Article discussions**

Throughout the semester, and starting on week three, each student will be in charge of leading three discussions about the articles assigned for that week. The dates for those discussions will be assigned on the second week of classes; please come prepared to choose a date. If several people want to present on the same day, dates will be given through a lottery. Before your discussion, talk to the instructor about what you would like to do. Discussions should last approximately 20 minutes. More details will be provided in due course.

**Final project and presentation**

Students will demonstrate their ability to carry out original research in the field. For that they will gather original data on some specific variety or use data obtained by other researchers and interpret them appropriately. Although it is possible to use written data, it is preferable to use data obtained directly through interviews with native speakers of the dialect in question. The research will be presented in two different ways: (a) in an oral presentation, which will be done instead of the final exam, and (b) in writing, as a research paper of approximately 15 pages, to be handed in after the oral presentation. The project will be divided into several stages, and each one will be due on a specific date (see calendar) and will be assigned a partial grade as follows:

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<th>Component</th>
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<td>Final draft</td>
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As soon as possible, students must define a research topic of their interest for the final project and discuss it with the instructor. It can involve any aspect related to Spanish dialectology, Peninsular or American. Details will be forthcoming about the format of the paper and the research.

**Exercises and assignments**

The best way to confirm understanding of a topic is through exercises and practical applications. Every class session we will do exercises, view videos, and the like; some work may be assigned for homework. Students are expected to read the bibliography before coming to class and to participate fully if discussion threads are organized through WebCT. The most interesting ideas from these discussions will be taken up in class.

**Individual portfolio**

Instead of in-class tests, each student will have to complete a portfolio with individualized assignments. Three tasks will be chosen from a list of five, based on a self-evaluation of perceived needs. These tasks may include the development of oral or written skills in Spanish, review of basic linguistic notions, or experimental design. The portfolio will be collected three times in the semester.

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Tentative calendar

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<tr>
<td>1</td>
<td>Video: <em>Los Méxicos de México</em>.</td>
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<td>10</td>
<td>Discussion: (L) Bolivia, Ecuador, Paraguay, and Peru. Video: Features of Andean and Paraguayan Spanish.</td>
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<tr>
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<td>Discussion: (L) Costa Rica, Mexico, El Salvador, Guatemala, Honduras, Nicaragua.</td>
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<td>12</td>
<td>Discussion: (L) Colombia, Cuba, Dominican Republic, Panama, Puerto Rico, Venezuela</td>
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<td>Video: La raiz perdida.</td>
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<td>13</td>
<td>Discussion: (L) Chile, Argentina, Uruguay Video: Features of Southern Cone dialects.</td>
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<td>Presentation of final projects.</td>
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Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
• Submit original form and attachments •

1. Request submitted by (Department or Program Name): Department of Nuclear Engineering

2. Course prefix, number and complete title of course: NUEN 618 - Nuclear Control Systems

3. Change requested
   a. Prerequisite(s): From: MATH 609 and NUEN 605 or registration therein To: MATH 609 and NUEN 602
   b. Withdrawal (reason): not applicable
   c. Cross-list with: not applicable

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

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course prefix, number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked: not applicable

5. Complete current course title and current catalog course description:

   Nuclear Control Systems.
   Reactor kinetics and fundamentals of servo-control developed and applied to nuclear reactors. Safety aspects of reactor control and operational problems

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

   Multiphysics computations in nuclear science and engineering.
   Tightly coupled multiphysics simulation techniques and application to typical problems arising in nuclear science and engineering (reactor dynamics and safety transients, conjugate heat transfer, radiative transfer, fluid structure interaction).

7. a. As currently in course inventory:

   Prefix Course # Title (excluding punctuation)
   NUEN 618 NUCL CONTROL SYSTEMS

   Lect. Lab SCH CIP and Fund Code Admin. Unit FICE Code Level
   0 3 0 0 3 1 4 2 3 0 1 0 0 6 2 0 9 0 0 0 3 6 3 2 6

   b. Change to:

   Prefix Course # Title (excluding punctuation)
   NUEN 618 MULTIPHYS COMP NUCL SCI

   Lect. Lab SCH CIP and Fund Code Admin. Unit Acad. Year FICE Code Level
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   Approval recommended by:

   Raymond J. Jurajna
   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 Date

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

   Curricular Services – 09/10
Course title and Number: NUEN 618 - Multiphysics computations in nuclear science and engineering.
Term (e.g., Fall 200x): Fall 2011
Meeting times and location: TBD (3 credit-hours)

Course Description and Prerequisites

This course introduces tightly coupled multiphysic simulation techniques and their application to typical problems arising in nuclear science and engineering (e.g., reactor dynamics and safety transients, conjugate heat transfer, radiative transfer, fluid structure interaction).

Most of the numerical methods currently in use in nuclear reactor safety analysis, for instance, trace back to the late 1970’s through the late 1980’s. At that time, multiphysics phenomena were computed and analyzed through a “divide and conquer”, whereby each physic component was treated using mono-disciplinary codes and coupling among the intertwined physical processes was weak and often done a priori using envelope values. With advances in computer software and hardware (e.g., the message passing interface paradigm from the mid 1990’s), computer codes have been increasingly coupled to one another, so as to model reality with a higher degree of fidelity. However, this coupling was performed in an explicit fashion, whereby some physic components was lagged in time, a mathematical approach known as operator-splitting that resulted inconsistent coupling schemes. Over the last decade, a new approach, based on a monolithic view of the whole multiphysics problem, has successfully been applied to a wide range of problems, from plasma physics to hemodynamics. These techniques, based on a derivative-free approach to Newton’s method, are now being applied to problem of interest in nuclear science and engineering.

This course focuses on advanced numerical techniques for nonlinear coupled multiphysics applications: this includes a review of operator-splitting technique and their advantages and drawbacks, a presentation of derivative-free Newton’s technique for a monolithic approach to multiphysics simulations, a description of recent trends and issues in multiphysics code development.

Multiphysics examples treated in class or as homework will include: nuclear reactor transients and accidents (such as rod ejections and loss of pump flow), radiative transfer, conjugate heat transfer, and nuclear fuel swelling and deformation. All of these applications include several physic components and are examples where an accurate treatment of the multiphysic coupling is required. The various physic component include: neutronics, thermal-hydraulics, heat conduction, mechanics of stress and deformation.
This course is intended for second-year Master students and Ph.D. students who wish to pursue a career in computational physics and/or reactor coupled neutronics/thermal-hydraulics analyses.

The course pre-requisites are MATH 609 and NUEN 602. A brief list of the knowledge and tools acquired in the two pre-requisite courses (and their pre-requisites) is given below, for informational purposes:

1. Neutronics/thermal-hydraulics:
   a. Neutron balance equation, delayed neutrons;
   b. Point Reactor Kinetics Equations (PRKEs), in-hour equation, some simple approximations to the PRKEs such as constant delayed source, prompt jump, etc...
   c. Heat conduction in a fuel pellet;
   d. Convective heat exchange;
   e. Conservation laws of thermal-hydraulics (mass, momentum, energy);

2. Numerical analysis:
   a. Laplace transforms;
   b. solving a system of linear equations (i.e., how to invert a matrix using Gaussian elimination, LU decomposition or any iterative methods);
   c. solving a system nonlinear equations using Newton's method;
   d. time-dependent ODEs and simple time discretizations (explicit Euler, implicit Euler, Crank-Nicholson, explicit Runge-Kutta methods);
   e. knowledge of spatial discretization schemes (e.g., finite differences);
   f. knowledge of eigenproblems.

Learning Outcomes or Course Objectives

The students will be introduced to state-of-the-art modeling of multiphysic methods development and their applications to nuclear science and engineering.

Class time will be divided between:

- understanding of the mathematical aspects of multiphysics simulation techniques,
- understanding the various physical phenomena taking place in various multiphysics applications typically found in nuclear science and engineering.

Upon completion of this course, students will be equipped with the necessary tools to continue education and pursue a career as a computational physicist, with a solid knowledge of current trends in multiphysic simulation techniques and depth in understanding coupled phenomena occurring in nuclear applications.

Instructor Information

Name: Dr. Jean C. Ragusa
Telephone Number: 979-862-2033
Email address: ragusa@ne.tamu.edu
Office Hours: TBA
Office Location: Zachry, 122-A

Textbook and/or Resource Materials

No textbooks are required for this class. Class notes will be distributed and posted on the instructor's webpage. Recent research articles will also be given to review some of the mathematical techniques for multiphysics simulations and present some current applications of these techniques.

Supplementary Reactors Physics Texts:
• G. Keepin, “Physics of nuclear kinetics”, Addison Wesley, 1965
• K. Ott and W. Bezella, "Introductory Nuclear Reactor Statics", ANS, 1989

Supplementary Numerical Methods Texts:
• W. Hackbrusch, "Iterative Solution of Large Sparse Systems of Equations", Springer-Verlag, 1994

Also note that (1) our library (http://library.tamu.edu/) has many reactor physics/numerical methods books and (2) we have access to online journals, such a Elsevier (http://www.sciencedirect.com/).

Grading Policies

Homework assignments will be assigned every week or every other week. Homework assignments will be due at the beginning of class on their due date. The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. (see university approved list of excused absences). Late homework will be deducted 10% per day.
after the due date (in portion of 24 hours). The Aggie Honor Code will be strictly enforced: "An Aggie does not lie, cheat, or steal or tolerate those who do." The Code forbids the following:
- Cheating: Attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise.
- Fabrication: Making up data or results; submitting fabricated documents.
- Falsification: Manipulating results such that research is not accurately represented in the research record.
- Multiple Submissions: Submitting substantial portions of the same work (including oral reports) for credit more than once without authorization from instructors.
- Plagiarism: Using another person's ideas, work, processes, results, writings, words, etc. without giving appropriate credit.
- Complicity: Intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty.

Exams: One mid-term exam will be scheduled (in early November). A take-home final project will be given in lieu of a final exam.

The grades will be determined on the usual scale:

\[
\begin{align*}
A & \geq 90 \\
80 \leq B < 90 \\
70 \leq C < 80 \\
60 \leq D < 70 \\
F & < 60
\end{align*}
\]

Grades will be computed according to the weight distribution given below.

- Assignments 50%
- Mid-term 20%
- Final 20%

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | 1. course overview,  
      | 2. examples of multiphysics problem sin nuclear engineering,  
      | 3. review of neutron balance equations (transport, diffusion, energy-dependent, multigroup, eigenvalue problem, extraneous source problem),  
      | 4. review of heat conduction and single-phase fluid conservation laws |
| 2    | 1. Adjoint neutronic equations,  
      | 2. Heuristic derivation of the PRKEs,  
      | 3. physical basis of neutron kinetics and control (fission principle, delayed neutrons precursors, delayed neutrons, Doppler effect, moderator effect) |
| 3 | 1. Exact derivation of the PRKEs from the space-time equations,  
   2. Choice of weighting function and flux factorization,  
   3. The two notations for PRKEs,  
   4. Analytical solutions of the PRKEs w/o feedback (Nordheim equation, Laplace transforms) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1. Approximate solutions of the PRKEs w/o feedback (Constant precursors approx., small reactivity linearization, Prompt jump. Ramps. Periodic variations)</td>
</tr>
</tbody>
</table>
| 5 | 1. Amplitude and shape equations, quasi-statics methods,  
   2. Feedback effects in the PRKEs and the space-time settings |
| 6 | 1. Numerical techniques for initial value problems (IVPs)  
   2. Mono- and multi steps methods,  
   3. Error analysis, step size control |
| 7 | 1. Feedback physics, Doppler effect, temperature coefficients, types of reactors  
   2. Analytical and numerical solution of the PRKEs w/ feedback |
| 8 | 1. Numerical methods for nonlinear system of equations and nonlinear IVPs  
   2. Jacobian-free Newton Krylov techniques for non linear systems |
| 9 | 1. Coupled neutronics/heat conduction |
| 10 | 1. Conjugate heat transfer |
| 11 | 1. Radiative heat transfer |
| 12 | 1. Fuel deformation and swelling |
| 13 | 1. Space-time kinetics for reactor accidents |
| 14 | 1. Fluid structure interaction |
| 15 | 1. Review, help with the final take home exam, and wrap-up |

**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."
MEMORANDUM

TO:        University Curriculum Committee

THROUGH:   Dr. Robin Autenrieth
            Associate Dean for Graduate Programs

THROUGH:   Dr. Raymond J. Juzaitis
            Department Head

FROM:      Dr. Jean Ragusa
            Associate Professor

SUBJECT:   Request for Change in Course – NUEN 618

November 5, 2010

I kindly request a change in title and course description for NUEN 618 (Nuclear Control Systems).

The current title and description date back from the late 1980's, when Dr. Parlos taught the course. Since then, Dr. Parlos has left the nuclear engineering department and several lecturers and visiting professors have taught that course. At that time, the topics of the course shifted to focus on numerical methods for space/time reactor kinetics without feedback (i.e., the time evolution of neutrons in a nuclear system, without accounting for feedback due changes in temperatures and geometries). This was a very narrow topic and when I taught the course for the first time in 2004, I started to remodel it to include a more complete and up-to-date picture by adding at the core of the course multiphysics simulation techniques.

Multiphysic simulations are a challenging and interdisciplinary field, with numerous examples found in nuclear science and engineering: coupled neutronics with thermal-hydraulic feedback (an important theme for the high-fidelity simulation of nuclear reactor transients and accidents), radiative transfer (in industrial ovens and stellar atmospheres), nuclear fuel deformation and swelling, conjugate heat transfer between the reactor coolant and the nuclear fuel rods, ...

In order to reflect these changes in the contents of NUEN 618, I kindly request that the title and the catalog course description be modified, as described in the attached forms.
Texas A&M University  
Departmental Request for a Change in Course  
Undergraduate • Graduate • Professional  
• Submit original form and attachments •

1. Request submitted by (Department or Program Name):  
   Department of Nuclear Engineering

2. Course prefix, number and complete title of course:  
   NUEN 630 Monte Carlo Methods for Particle Transport

3. Change requested  
   Attach a brief supporting statement for changes made to items 3a thru 3d and 6 below.
   a. Prerequisite(s):  From:  
   b. Withdrawal (reason):  not applicable
   c. Cross-list with:  not applicable

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

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.
   e. Change in course prefix, number, contact hours (lab & lecture), and semester credit hours. Complete item 7. Attach a course syllabus.

4. For informational purposes only, please indicate course number if this course will be stacked:  not applicable

5. Complete current course title and current catalog course description:
   Computational Methods for Particle Transport Problems. (4-0). Credit 4. Key properties of linear Boltzmann equation, including analytic solution of model problems, discretization methods; analysis of how well discretization methods reproduce important characteristics of exact solution; assessment of which properties are most important in various application.

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):
   Monte Carlo Methods for Particle Transport. (2-2). Credit 3. Principles of Monte Carlo method; random number generation; random variable sampling; particle tracking; statistical error estimation; ACE format cross-sections; introduction to MCNP code; MCNP applied to radiation shielding, criticality safety, reactor physics and detector modeling; MCNP output analysis, statistical tests, and tallying procedures; variance reduction techniques; Monte Carlo algorithm development.

7. a. As currently in course inventory:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (excluding punctuation)</th>
<th>Lect.</th>
<th>Lab</th>
<th>SCI</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>FICE Code</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUEN</td>
<td>630</td>
<td>COMPUTATIONAL TRANSPORT</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>04000414230100062090003632</td>
<td>6</td>
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<td></td>
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</table>

b. Change to:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (excluding punctuation)</th>
<th>Lect.</th>
<th>Lab</th>
<th>SCI</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUEN</td>
<td>630</td>
<td>MONTE CARLO TRANSPORT</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>020201423010006209011-12003632</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approval recommended by:  
Raymond J. Juzelius  
Chair, College Review Committee  
Robin Autenrieth  
Dean of College  
Robin Autenrieth  
Chair, GC or UCC  
Sandra Williams  
Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.  
Curricular Services – 09/10  
41 of 49 CC
Course title and Number: “Monte Carlo Methods for Particle Transport” NUEN 630

Term (e.g., Fall 200X): Fall 2011
Meeting times and location: Mon, Wed 1:50pm to 2:40pm, Computer Lab to be determined
Fri 1:50pm to 3:50pm, Computer Lab to be determined

Course Description and Prerequisites

Credits: NUEN 630 (2 hrs. lecture - 2 hrs. lab) "Monte Carlo Methods for Particle Transport"
Credit 3.

Description: Principles of Monte Carlo method; Statistical methods in Monte Carlo; Random number
generation; Sampling methods for physical processes represented by Boltzmann
transport equation; Particle tracking in combinatorial geometry; ACE format cross-
sections; Introduction to MCNP code; MCNP applied to radiation shielding, criticality
safety, reactor physics and detector modeling problems; MCNP output analysis; MCNP
statistical tests; MCNP tailing procedures; Variance reduction techniques; Introduction to
develop Monte Carlo algorithms.

Prerequisites: Approval of instructor, MCNP/MCNPX code single user license from RSICC, ORNL,
USA.

Learning Outcomes or Course Objectives

NUEN 630 is a graduate level course, also open to NUEN undergraduate seniors. Particle
(neutron/photon/electron...) transport simulations based on Monte Carlo principles should be an
inevitable part of graduate curriculum, both for nuclear engineering and radiological health
engineering degrees because they are widely used now in research and industry. Monte Carlo
transport code helps to develop realistic models for analyzing problems in reactor physics,
radiation shielding, medical physics, etc. There are state-of-art computer codes available vis-à-
vis MCNP/MCNPX, KENO, EGS and GEANT to meet these challenges. These codes are now
made more attractive to students with the provision of graphical interfaces, but are vulnerable to
abuse, when used as black boxes.

The objective of this course is to educate on the underlying principles of Monte Carlo method, its
statistical behavior, random number generation, variance reduction schemes, sampling methods
to simulate physical process of the linear Boltzmann transport equation, combinatorial geometry
modeling, forward/adjoint capabilities, interaction cross section formats, etc. Hands-on computer
lab training will be provided on the use of MCNP code through model development and analyses
of international benchmark exercises. In addition, a flavor to code Monte Carlo algorithms will
be taught, so as to appreciate the basic ideas of MCNP code.

Successful completion of the course would provide the students in depth knowledge on the
theory and principles of Monte Carlo transport simulations. This should facilitate them to
independently handle transport simulations and analyses envisaged in reactor core physics,
criticality safety, radiation shielding, radiation detector modeling, medical physics, etc., which
are amenable by Monte Carlo methods. Also, students would have acquired insight to develop
Monte Carlo algorithms and coding.
Instructor Information

Name: Dr. Sunil S. Chirayath  
Telephone Number: (979) 862-2616  
Email address: sunil@ne.tamu.edu  
Office Hours: M-F 8am to 5pm (appointment to meet)  
Office Location: Room No. 325C, Teague Research Center  
Texas A&M University, College Station  
TX-77843-3473, USA

Textbook and/or Resource Materials

1. Notes: Lecture notes on "Principles of Monte Carlo particle transport with specific reference to MCNP code"


X-5 Monte Carlo Team, LANL Criticality calculations with MCNP5: A primer, Second edition, LANL report LA-UR-04-0294


http://mcnp-green.lanl.gov/index.html

Grading Policies

1. 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.

2. Home Assignments: Each assignment work will be prepared with an assignment number, student name, date of submission, course number on a cover sheet along with assignment description and your workout in the subsequent pages. Your assignment work should look neat and legible with a logical presentation. Handwritten or typed pages are acceptable. Group efforts are encouraged in submitting the assignments with the listing of participating course-mates on the cover sheet. However, individual
contributions should be made visible in the final submitted assignments. No score will be assigned, if instructor observes copying of other’s assignment workouts.

All assignments are due at the start of the class on the due date. No late assignments are accepted without creditable excuse/explanation for the delay. No assignments will be accepted after the last day of classes (See course schedule provided in this syllabus).

Late Submission (1 week to explain and ask for a new due date):

The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. (see university approved list of excused absences).

If a student cannot submit the assignment workout by the due date, he/she has 1 week after the due date to explain the reasons for no-submission and ask for a new due date. At the discretion of the instructor and based on the reasons explained for the delay, a new date may be assigned without grade penalty or denied. If denied, late assignment submissions will not be accepted. If the student fails to contact the instructor within 1 week after the due date, the delayed work will not be accepted. No exceptions. Re-submission of assignments with corrections indicated by the instructor can fetch you at the most 70% of the maximum score assigned to each of the assignments. And, only one re-submission is permitted.

3. Structure of final course score:

<table>
<thead>
<tr>
<th>Course Element</th>
<th>Element Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class attendance and participations</td>
<td>5%</td>
</tr>
<tr>
<td>Home assignments</td>
<td>30%</td>
</tr>
<tr>
<td>Weekly summarizing</td>
<td>5%</td>
</tr>
<tr>
<td>Midterm written examination</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm oral examination</td>
<td>10%</td>
</tr>
<tr>
<td>Final written examination</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total final score</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

4. Final course grade ranges:

<table>
<thead>
<tr>
<th>Final Course Score</th>
<th>Final Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90% and above</td>
<td>A</td>
</tr>
<tr>
<td>80% to &lt; 90%</td>
<td>B</td>
</tr>
<tr>
<td>70% to &lt; 80%</td>
<td>C</td>
</tr>
<tr>
<td>60% to &lt; 70%</td>
<td>D</td>
</tr>
</tbody>
</table>

Course Topics, Calendar of Activities, Major Assignment Dates

(Dates and topics are subject to change, but will be informed in advance)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Lecture - Date</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/15</td>
<td>1. Principles of Monte Carlo method</td>
<td>1/40 - 08/30/10 (M)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Course overview</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Particle transport &amp; random walk</td>
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<tr>
<td></td>
<td>• Random number generator</td>
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<td></td>
<td>• Law of large numbers</td>
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<td></td>
<td>• Central limit theorem</td>
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<td></td>
<td>• Means, variances, standard deviation and relative error</td>
<td>2/40 - 09/01/10 (W)</td>
<td>-</td>
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<tr>
<td></td>
<td>• Walk to Gaussian distribution</td>
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<tr>
<td></td>
<td>• Confidence intervals</td>
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<td></td>
<td>• Precision and accuracy</td>
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<tr>
<td>Date</td>
<td>Activities</td>
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<tr>
<td>2/15</td>
<td>2. <strong>Physical processes sampling methods</strong>&lt;br&gt;• Monte Carlo transport simulation, a process of integration&lt;br&gt;• Metropolis&lt;br&gt;• Table lookup&lt;br&gt;• Rejection method&lt;br&gt;• Importance Sampling&lt;br&gt;• Path length selection&lt;br&gt;• Direction cosines&lt;br&gt;• Neutron elastic scattering&lt;br&gt;• Compton scattering&lt;br&gt;• Fission spectrum energy sampling&lt;br&gt;• Collision nuclide selection&lt;br&gt;• Next reaction selection</td>
<td></td>
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<tr>
<td>3/15</td>
<td>3. <strong>Particle tracking in 3D combinatorial geometry</strong>&lt;br&gt;• General quadratic equation&lt;br&gt;• Surface equations&lt;br&gt;• Macro bodies (RPP, RCC, ARB, )&lt;br&gt;• Geometry cell (INTERSECTION, UNION and NOT operation)&lt;br&gt;• Particle tracking method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/15</td>
<td>4. <strong>Monte Carlo Algorithms Coding</strong>&lt;br&gt;• Particles traversing a slab&lt;br&gt;• Storage of interaction CXS&lt;br&gt;• Scattering probability bins&lt;br&gt;• Source definition&lt;br&gt;• Tallying (output) procedure</td>
<td></td>
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</tr>
<tr>
<td>5/15</td>
<td>5. <strong>Monte Carlo Vs. Deterministic</strong>&lt;br&gt;• Point CXS&lt;br&gt;• Angular binning&lt;br&gt;• 3D geometry&lt;br&gt;• Error estimate</td>
<td></td>
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<tr>
<td>5/15</td>
<td>6. <strong>Introduction to MCNP</strong>&lt;br&gt;• MCNP installation&lt;br&gt;• ACE CXS formats&lt;br&gt;• Reaction IDs&lt;br&gt;• Materials IDs&lt;br&gt;• CXS IDs&lt;br&gt;• Input structure&lt;br&gt;• Input verification: geometry plot &amp; details from output&lt;br&gt;• Output structure</td>
<td></td>
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</tbody>
</table>

**Dates and Locations:**
- 3/40 – 09/03/10 (F) Computer Lab
- 4/40 – 09/06/10 (M) Assignment #1
- 5/40 – 09/08/10 (W) -
- 6/40 – 09/10/10 (F) Computer Lab
- 7/40 – 09/13/10 (M) Assignment #2
- 8/40 – 09/15/10(W) -
- 9/40 – 09/17/10 (F) Computer Lab
- 10/40 – 09/20/10 (M) Assignment #3
- 11/40 – 09/22/09 (W) -
- 12/40 – 09/24/09 (F) Computer Lab
- 13/40 – 09/27/10 (M) Assignment #4
- 14/40 – 09/29/10 (W) -
- 15/40 – 10/01/10 (F) Computer Lab
### 7. MCNP Source Descriptions (SDEF)
- Running mode: n, p, e or coupled
- Point source
- Surface source
- Volume source: spherical, cylindrical, cartesian, etc.
- Criticality source (KCODE)

<table>
<thead>
<tr>
<th>Date</th>
<th>Assignment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/15</td>
<td>Assignment #5</td>
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<tr>
<td>16/40</td>
<td>10/04/10</td>
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<td>(M)</td>
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<tr>
<td>17/40</td>
<td>10/06/10</td>
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<tr>
<td>(W)</td>
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<tr>
<td>18/40</td>
<td>10/08/10</td>
<td>Mid-term written exam review</td>
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<td>(F)</td>
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</tbody>
</table>

### Mid-term written examination October 11, 2010 (Monday)

### 8. MCNP Tallies (F cards)
- Surface current, F1
- Surface flux, F2
- Cell Flux, F4
- Point Flux (deterministic tally), F5
- Pulse height tallies, F8
- Special tallies, F6 & F7
- Criticality source tally
  - Tallying in energy bins
- Tally units
- Tally multipliers
- Foil reaction rates, Dose rates, etc., Tally special treatments

<table>
<thead>
<tr>
<th>Date</th>
<th>Assignment</th>
<th>Notes</th>
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<tbody>
<tr>
<td>7/15</td>
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<tr>
<td>19/40</td>
<td>10/13/10</td>
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<tr>
<td>(W)</td>
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<tr>
<td>20/40</td>
<td>10/15/10</td>
<td>Computer Lab</td>
</tr>
<tr>
<td>(F)</td>
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</tbody>
</table>

### 9. MCNP Statistical Tests on Tallies
- Mean (1 test)
- Variance (relative error – 3 tests)
- Variance of variance (3 tests)
- Slope (Pareto fit – 1 test)
- Figure of merit (2 tests)

<table>
<thead>
<tr>
<th>Date</th>
<th>Assignment</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>8/15</td>
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<tr>
<td>21/40</td>
<td>10/18/10</td>
<td>Assignment #6</td>
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### 10. MCNP Statistical Tests on Tallies
- Mean (1 test)
- Variance (relative error – 3 tests)
- Variance of variance (3 tests)
- Slope (Pareto fit – 1 test)
- Figure of merit (2 tests)

<table>
<thead>
<tr>
<th>Date</th>
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<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/15</td>
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<td>22/40</td>
<td>10/20/10</td>
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<tr>
<td>(W)</td>
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<tr>
<td>23/40</td>
<td>10/22/10</td>
<td>Computer Lab</td>
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<tr>
<td>(F)</td>
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</tbody>
</table>

### 11. Variance Reduction Methods
- Particle attributes: position co-ordinates (x, y, z), direction cosines (u, v, w), energy (E) and Monte Carlo specialty, weight (w)
- Importance sampling
- Splitting & Russian roulette

<table>
<thead>
<tr>
<th>Date</th>
<th>Assignment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>24/40</td>
<td>10/25/10</td>
<td>Assignment #7</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Details</td>
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<td>Energy splitting</td>
<td>25/40 – 10/27/10 (W)</td>
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<td>Trimming to problem domain</td>
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<td>Biasing for population control</td>
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<td>Source transforms</td>
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<td>BBREMO, bremsstrahlung option</td>
<td>26/40 – 10/29/10 (F)</td>
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<td>Weight window generation</td>
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<td>Multi-group CXS option in MCNP</td>
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<td>Bulk shielding benchmarks</td>
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<td>Radiation streaming model</td>
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<td>Benchmark Models using MCNP</td>
<td>30/40 – 11/08/10 (M)</td>
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<td>Reactor benchmarks</td>
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<td>Lattices and Universes</td>
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<td>Criticality safety benchmarks</td>
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<td>12/15</td>
<td>Detector response model: HPGe, NaI gamma spectrometry with Gaussian broadening feature</td>
<td>34/40 – 11/17/10 (W)</td>
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<td>35/40 – 11/19/10 (F)</td>
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<td>Oral Exam Review</td>
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<td>13/15</td>
<td>Oral Exam: November 22 (Monday) 2010</td>
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<td>Neutron coincidence counting using MCNPX</td>
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<td>Medical LINAC beam characterization</td>
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<td>Brachy-therapy modeling</td>
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<td>MCNP &amp; other codes</td>
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<td>ORIGEN/MONTEBURNS coupler</td>
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Other Pertinent Course Information

Desirable Background Knowledge:

- Basics of nuclear physics
- Basics of coordinate geometry
- Knowledge in any scientific computer programming

Course Structure:

The academic elements of the course along with their purpose and content are listed below:

1. Lecture and lecture notes:
   Lectures and stand alone lecture notes provided will suffice to cover the theoretical portion of the course.

2. Computer lab:
   Hands on training on the use of MCNP code through simulations of the benchmark exercises is vital and will provide a better understanding of Monte Carlo principles and applications.

3. Home assignments:
   Out of class assignments will be given and graded weekly. Note the Course Policy, Assignment Submission Guidelines and Grading Policy defined later in this syllabus.

4. Weekly Summary:
   Each week one/two of the students will summarize (open book) what was taught and everyone will do it at least once in the semester.

5. One to one performance assessment:
   Instructor will individually meet with each student to assess their performance in meeting the course requirements. In these meetings students will get an opportunity to discuss their progress with instructor, share concerns and suggestions about the course. A detailed performance report and instructor feedbacks will be made available to each student. It is mandatory to attend the performance assessment meeting.

6. Midterm examinations:
   In the midst of the semester, students will undergo one written and one 30 minutes oral examination, both of them mandatory. Both the examinations will be closed book, closed notes and with no calculators. The examinations will be conducted based on the course material, homework assignments and lab exercises completed till the end of first term of the semester. Oral examination will be conducted by a committee with more than one professor from the department with instructor chairing the committee. See the midterm examination schedule embedded in course timetable.

7. Final written examination:
   The mandatory final written examination (closed book, closed notes and no calculators) will be based on the entire course materials, homework assignments and lab exercises.

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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
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**Academic Integrity**

For additional information please visit: http://www.tamu.edu/agglehonor

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