Physics 50: Mathematical Methods in the Physical Sciences
Summer 2010

Class Meeting Information
This course meets online from Aug 2 to Sept. 8. THERE ARE NO IN-CLASS MEETINGS EXCEPT FOR THE FINAL. Everything is ONLINE!

Instructor Information
Name: Michael Dennin
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Office hours: Email responses Mon./Wed. evening or in person by appointment

As a Professor of Physics at UC Irvine, I have taught physics courses at all levels from introductory courses to graduate level courses. One of my interests is integrating technological advances into the mathematical preparation of Physics students. This course has many of those elements.

TA Information
Name: TBD

Prerequisites — Classes or Knowledge Required for this Course
Introductory sequences in mathematics, including Calculus of single and multi-variables, basic series, linear algebra, and differential equations.

Course Objectives

This course is a lower-division "capstone" course for the Physics major at UCI. The main goal of the course is to prepare students for the core courses at the junior level. The primary audience for the online summer version is transfer students who have not met the complete UCI lower division math requirements. After completing this course, the student will be able to:

- Use mathematical methods from linear algebra, complex numbers, and vector/tensor fields to describe physical situations.
- Use basic Mathematica commands to solve problems.
- Explain the connections between linear vector spaces, Fourier series, and solving differential equations.
- Explain the role of series expansions in physics and use series approximations to solve problems.
- (other objectives TBD)

Course Text or Online Resources

The course uses Mathematical Methods in the Physical Sciences, Boas 3rd edition, Mathematica, Student Edition,

Course Outline: TBD

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Series</th>
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<tbody>
<tr>
<td>Topics/Reading</td>
<td>Read Chapter 1 of textbook</td>
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<tr>
<td>Objectives</td>
<td>✓</td>
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<tr>
<td>Assignments Due</td>
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Evaluation and Grading

The exact breakdown of grading remains TBD, but it will be approximately as follows:

<table>
<thead>
<tr>
<th>Part</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Participation in class discussions (Forums)</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
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<tr>
<td>Homework</td>
<td>30%</td>
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<tr>
<td>Exams (final exam)</td>
<td>45%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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The FINAL EXAM will be an in-class proctored exam that can be taken either at UCI or at a remote location. For those taking it at UCI, the exam will be at the same time and room as the scheduled discussion during the last week of instruction. For those taking it at an approved testing center, alternate instructions will be available during the course.

Details on how the various assignments will be graded will be provided with each assignment.

Grading Scale

- A = 85 % – 100 %
- B = 70 % – 84 %
- C = 55 % – 69 %
- D = 45 % – 54 %

Types of Communication

In an online course, the majority of our communication takes place in the course forums. However, when we have a need for communication that is private, whether personal, interpersonal, or professional, we will use individual email or telephone.

As with any course, we encourage students to interact with each other and discuss the readings, assignments, etc.. There are four basic methods for students to interact with each other.

- **Required Forums**: Each week there are 1 – 2 forums that require student participation as part of the grade. You will be assigned a group of 15 – 20 students that forms your FORUM GROUP. During the week, you will interact with these students. At the end of the week, you will be able to view all forum discussions.
- **General Course Questions Forum**: This is a place for students to initiate forums to discuss any aspect of the course. These forums are open to ALL students in the course.
- **Student initiated chat session**: Students can initiate a chat session on a topic. Again, these sessions are open to all students in the course. An important feature of the chat sessions – THEY ARE NOT ARCHIVED.
- **Student initiated STUDY GROUPS**: For most courses, students find it useful to form study groups. In fact, that is encouraged for this course. However, being an online course, we want to provide for online study groups. If you wish to form a study group, email the instructor the names of all students in the group and a private forum will be created for the study group.

Code of Conduct
All participants in the course are bound by the University of California Code of Conduct, found at http://www.ucop.edu/ucophome/coordrev/ucpolicies/aos/uc100.html.

**Netiquette**

In an online classroom, our primary means of communication is written. The written language has many advantages: more opportunity for reasoned thought, more ability to go in-depth, and more time to think through an issue before posting a comment. However, written communication also has certain disadvantages, such a lack of the face-to-face signaling that occurs through body language, intonation, pausing, facial expressions, and gestures. As a result, please be aware of the possibility of miscommunication and compose your comments in a positive, supportive, and constructive manner.

**WEBLINKS**

As part of the lessons and in various places on the course website, you will find links to websites, articles, and video clips. A few of these you will be required to go to for an assignment and comment on specifically. We will do our best to ensure that these links are all working links! The rest of the links are provided as an extra element of the course. We do not guarantee that all of these will work. Also, their presence in the course does not imply any support for the material at the website. It is merely provided as an interesting website to analyze in the context of the lessons in this course.
Course Policies

Expectations of students

This course contains many different components that are designed to maximize the experience of the students. A critical feature of the course is a strong level of interaction between the students. The main avenue for this is the online forums that will exist each week of the course. To receive a passing grade in the course, the students must write a substantial response to each forum question and respond to at least one other student's posted answer **EVEN IF IT IS NOT SPECIFICALLY MENTIONED IN THE INSTRUCTIONS FOR THAT PARTICULAR FORUM!** (Some assignments will require additional responses for full credit, so please read the instructions for each assignment carefully.) In addition to the public discussions on the forums, the students will be required to keep a journal. This will be the main form of communication between the professor and the students.

Because this course will involve analysis of many real-world issues, the students are encouraged to research the topics and discuss the issues with each other through the forums. During forum discussions, students should provide sufficient information on any sources used (books, articles, websites), that the other students can reference the sources as well.

The following assignments will have specific guidelines that must be followed. However, a summary of the main issues is provided here.

1) quizzes: all quizzes must be taken without reference to any materials or communication with other individuals.
2) Individual projects: all individual projects must have any sources properly referenced and must adhere to standards of academic honesty
3) Group Projects: Each group project must contain a statement of the role/contribution of each group member.

EMAIL GUIDELINES: When sending an email to the TA of Professor make sure that the subject line starts with “Physics 21:”. If it does not have that starting point, we cannot guarantee that the email will be noticed.

The students MUST regularly check the “Instructor Announcement” portion of the course. Students are responsible for any information posted there.

Expectations of the instructor

This course has many components, and as the instructor I will be sure to monitor all aspects of the course. The most important element each week is the online forums, or threaded discussions. Either the TA or I will actively monitor these by logging on and responding to the discussion at least once every 48 hours. **HOWEVER, I will only respond to Forums during the week for which they are assigned. This is defined as Monday to Sunday. The forums will remain active during the entire course for students to continue their discussions if they are interested.** If there is any reason that I will be out of internet contact for a time period that prevents this, I will make sure all students are aware of the situation and make alternate arrangements.

For all graded assignments, the work will be graded and returned within 5 days of the due date.

I welcome individual email requests where necessary. In most cases, I will reply to email the same day it is received to at least acknowledge receipt of the email. Depending on the content and request, a reply may not occur until my online office hours. Online office hours will take place Monday and Wednesday evenings for the professor and TBD for the TA, unless otherwise announced. During this time and I will respond to any emails that I did not get to during the week.

For those students who can make it to campus, I will be available for office hours in person by appointment.