Mathematical Physics (PHYS 2502)

Course Syllabus Spring 2015

1 Instructor Information

Name: Dr. Tsvetelin D. Tsankov
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Office Hours: Tuesday, Thursday 2:00 PM-5:00 PM

2 Times and Places

Lectures: Tuesday and Thursday, 9:30 AM-10:50 AM, Barton Hall BB409
Lab: Wednesday, 2:00 PM-4:50 PM, Pearson and McGonigle Halls P220

3 Course Description

The course introduces students to a basic set of mathematical methods used in Physics. The lab component of the course is conducted using the integrated computing environment *Mathematica*. The emphasis is on building practical skills.

4 Textbook

Title: **Mathematical Methods for Physics and Engineering: A Comprehensive Guide** 3rd edition, May 2006
Authors: K. F. Riley, M. P. Hobson and S. J. Bence
Publisher: Cambridge University Press
ISBN-10: 0521679710
ISBN-13: 978-0521679718

Title: **Schaum's Outline of Mathematical Handbook of Formulas and Tables**, 4th Edition (Schaum's Outline Series)
Authors: S. Lipschutz, M. Spiegel, J. Liu
Publisher: McGraw Hill
ISBN-10: 0071795375
ISBN-13: 978-0071795371

5 Course Material

The following topics will be discussed in lectures and labs:

1. Numbers.

2. Infinite Series.

3. Matrices. Linear Algebra. Linear Vector Spaces.

4. Basic Topology. Introduction to Group Theory. Symmetry.

5. Fourier Analysis.

6. Differentiation and Integration.

7. Vector Analysis.

8. Ordinary Differential Equations.

9. Special Functions.

10. Partial Differential Equations.

6 Assessment

6.1 Homework Assignments

Homework will be assigned on a regular basis, typically weekly. Each assignment will consist of 4 problems and students will have a week to complete it. The solutions to all homework problems will be posted on Blackboard, once the homework is graded.

All homeworks contribute a total of 30% of the course grade.

6.2 Midterm Exam

There will be one midterm exam, scheduled for Week #9, Thursday, March 12. The exam will be based on the material covered in weeks 1-7. It will consist of 4 problems, and it is open-book, meaning that students can use their lecture notes, the textbook and the Schaum's Outlines handbook. The solution of the exam will be posted on Blackboard, once all the exams are graded. The exam contributes 20% of the course grade.

6.3 Lab Assignments

Lab assignments will be assigned on a regular basis, typically weekly. Each assignment will be based on a computational task that the student must perform, using *Mathematica.*

Lab Assignment submission instructions:
The completed lab assignments must be submitted electronically (via E-mail)

in a Mathematica notebook format. The file name should contain your name and the lab assignment number ($LA\#$), for example JohnSmith-LA1.nb. The heading of each notebook must contain your name, the title of the lab assignment and the date, for example:

<div align="center">
Your Name

Mathematical Physics Laboratory

Assignment #1

February 4, 2015
</div>

After you have completed the problem and saved the notebook containing your solution, quit the kernel, then restart it and evaluate the notebook. If your work is correct, your notebook/file should execute smoothly. Edit out any trivial error messages (Click on the cell bracket and enter Alt+7 to start a text mode). Similarly, omit any intermediate output of no interest. You can suppress the output line by placing a semicolon (;) at the end of the input line. If you have followed these instructions, your input and output lines should be numbered sequentially, starting from "In[1]:=" and "Out[1]=". If not, quit, restart the kernel, and execute the notebook again. Do not submit your work until all lines are numbered sequentially starting from 1 with no gaps.

All lab assignments contribute a total of 20% of the course grade.

6.4   Lab Exam

A lab exam is scheduled during the last lab session of the semester. Students are supposed to complete a short set of simple computational tasks using *Mathematica*, relying only on the online help available in *Mathematica* (no books or notes!).

The lab exam will count as an extra credit and contributes up to 10% of the course grade.

6.5   Final Exam

The Final Exam will consist of 5 problems. The exam is open-book - students can use their lecture notes, the textbook and Schaum's Outlines handbook.

The exam will be held on Thursday, April 30, 8:00 AM - 10:00 AM in BB409 (the lecture room). The final exam contributes 30% to your final grade.

7   Grading

Grade contribution of the different types of assessment tools:

- Homework 30%

- Midterm Exam 20%

- Lab Assignments 20%

- Final Exam 30%

Letter grade assignment:

A	100%...90%
A-	89%...86%
B+	85%...80%
B	79%...75%
B-	74%...70%
C+	69%...67%
C	66%...60%
C-	59%...55%
D	54%...46%
F	45%...0%

Last day to drop the course: Monday, January 26.
Last day to withdraw: Tuesday, March 17.