SYLLABUS for MAE105
Introduction to Mathematical Physics
Spring 2015

Instructor: Prof. David Saintillan, Office: Room 345G, SME Building, E-mail: dstn@ucsd.edu

Teaching Assistant: Gregory Wagner, Email: gfwagner@ucsd.edu

Lectures: 12:30-1:50pm, Tuesdays and Thursdays, HSS 1330

Problem Solving Sessions: 2:00-2:50pm, Wednesdays, HSS 1330

Office Hours:
- Instructor office hours: TBA
- TA office hours: TBA

Academic Prerequisites: Admission to the major and grade C- or better in Phys 2A-2B, Math 20D or 21D

Prerequisites by Topic: elementary mechanics, elementary electricity and magnetism, differential and integral calculus, elementary ordinary differential equations


Course website: http://stokeslet.ucsd.edu/mae105.html (homework, solutions)

Piazza website: You should direct all your questions (outside of lectures and office hours) to the Piazza website: https://piazza.com/ucsd/fall2015/mae105/home

Ted website: Grades will be posted on: http://ted.ucsd.edu

Topics covered:
- Classification of partial differential equations (PDEs) in terms of their physical applications
- Parabolic PDE: diffusion phenomena
- Elliptic PDE: Electrostatics, torsion, etc
- Hyperbolic PDE: wave motion, vibrations, etc
- Initial boundary value problems: heat conduction
- Method of separation of variables
- Diffusion equation
- Laplace’s equation
- Wave equation
- Fourier series
- Vibrating strings and membranes
- Sturm-Liouville eigenvalue problem
- PDE with three independent variables
- Non-homogeneous problems
- Infinite domains: Fourier transform solutions of PDEs
- Method of characteristics
Course grade:
• The final course grade will be based on the maximum of the following two grading options:
  Option 1: homework assignments (20%), two mid-term exams (40%), and final (40%).
  Option 2: final exam (100%)
• Weekly homework assignments (~6-7 total)
• The date of the 1st midterm exam: October 20, Tuesday, 12:30-1:50 pm
• The date of the 2nd midterm exam: November 10, Tuesday, 12:30-1:50 pm
• The date of the final exam: December 11, Friday, 11:30 am – 2:30 pm (place TBA)

Course policy and Academic integrity:
• Homework assignments and solutions are available on the class website:
  http://stokeslet.ucsd.edu/mae105.html
• All students are expected to adhere to the UCSD Policy on Integrity of Scholarship. You may
  discuss homework problems, but must prepare and submit homework reports on your own.
• Homework must be written clearly and neatly. The homework assignments are to be left after the
  lecture is over (not during the lecture) in class on the due date. No late homework will be accepted.
• All graded assignments will be placed in the box outside SME 345G a week after the assignment is
  due. It is your responsibility to retrieve your graded assignment in a timely manner.
• Questions regarding your grade on the homework assignments or midterms will be accepted only
  within 48 hours after the grade is released. Partial credit given for any unsolved problem cannot be
  changed.
• Neither the Instructor nor the Teaching Assistant will reply to emails unless it is an emergency.
  Please use the office hours or the Piazza website for any questions you might have.
• There will be no make-up exams (midterms or final). If you anticipate that you will not be able to be
  present for the midterms or the final, you should drop the class and take it at a later date.
• You are very encouraged to ask questions during the lectures.

MAE Math Open House: If you have various math-related questions or feel like you are struggling with
and/or need extra tutoring on mathematical concepts, you are strongly encouraged to attend the MAE Math
Open House:  http://sites.google.com/a/eng.ucsd.edu/mae-math-open-house/