Administration

Class times: Lectures are from 3:30pm to 4:50pm on Tuesdays and Thursdays. Recitation is from 5:00pm to 6:00pm on Thursdays.

Instructor: Bill Young. My office is Room 353 in the Keck building and email is wryoung@ucsd.edu. I won’t enter into extended electronic correspondence. But for a quick question please feel free to email me. This is particularly useful if you suspect there is a misprint in class notes, or if you’re stuck on an apparently insoluble homework problem.

Homework: I’ll set five or six assignments with a few hand-in problems. Answers to the hand-in problems should be presented in latex or an equivalent mathematical typesetting program — I’ll distribute a latex template via email. The assignments will be discussed during the recitation section. Recitations will be conducted as recitations: you’ll be expected to come to the board and present the answers.

Collaboration: Discussing and working the assignments with your colleagues is encouraged. But please write-up your own hand-in answers.

Website: I’ll set-up a class website where you’ll find assignments, the pdf notes and copies of past exams. There are misprints and mistakes in the notes. If something is confusing or screwy it may be a mistake, and you should ask.

Assessment: The mid-term is in-class on Tuesday, May 3rd from 3:30pm to 4:50pm. The final is in-class on Thursday June 2nd from 3:30pm to 6:00pm. I’ll grade the hand-in problems and give some credit for completion of those. Exam questions will be very similar to the assigned problems. The exams are closed book with no computers, calculators or iphones. Exams are “open notes” — you can being in any amount of hand written (or hand typed) material.

Advice: The only way to learn the material in this class is to solve problems — lots of them. In past years I’ve distributed answers to many of these problems, and I’ll do that again this year. No doubt you’ll be able to get advance answer sheets from your colleagues who’ve taken this class in 2014 and 2015. You should resist that temptation. It is a waste of our time to hand-in work you’ve copied from last year’s answer sheets.
Prerequisites

I’ll assume that you’re familiar with the material covered by Stefan Llewellyn Smith in MAE294B/SIO203A&B. Stefan used the gigantic book

Mathematical Methods for Scientists and Engineers by Riley, Hobson & Bence (hereafter RHB).

From part A you should be familiar with the material on partial and ordinary differential equations in chapters 12, 14, 15, 17, 20 and 21 of RHB. From part B you should have a working knowledge of complex analysis and integral transforms. This material is in RHB chapters 13, 24 and the first half of RHB chapter 25.

Textbook and other references

My notes will be on the class website. I learnt much of this material from

Advanced Mathematical Methods for Scientists and Engineers by C. M. Bender and S.A.Orszag (BO).

The class notes strongly reflect that experience. I also like parts of

Perturbation Methods by E.J. Hinch (H).

Hinch has the advantage of brevity (perhaps too much so in places). We’ll incidentally use some special functions. Special functions are covered in chapter 18 of RHB, and very nicely in

Special Functions and Their Applications by N.N. Lebedev.

I also draw your attention to the NIST Digital Library of Mathematical Functions (DLMF) at dlmf.nist.gov. Other useful references for the material in this class are:

Introduction to Perturbation Methods by Mark H. Holmes;

Multiple Scale and Singular Perturbation Methods by J. Kevorkian and J.D. Cole;

Asymptotics and Special Functions by Frank W. J. Olver;

Perturbation Methods by Ali H. Nayfeh.