

PHYSICS 434 / 534 METHODS OF MATHEMATICAL PHYSICS – Winter 2014

Instructor: Andy Martwick, andy.martwick@intel.com, 503-333-8285 (cell)

Office Hours: By arrangement

Class time: MW

Course Description –This class is a survey of methods of applied mathematics used in modern physics, to include: vectors, matrices, operators, and eigenvalues; tensors; complex variables and complex analysis; Delta function and Green's function; Fourier series; and Fourier transform. The theme of this class could be summarized as a study of complex orthogonal vector spaces.

Required Textbook: Mathematical Methods in the Physical Sciences, Mary Boas

Homework: There will be 6 homework assignments. Assignments will be sent by email as a PDF. They are due one to two weeks after they are assigned at the beginning of class. Some problems may require outside physics reference material. You will not find answers to the HW online. ALL homework counts.

Late Homework: Unless previously arranged, late homework (turned in the following class) will be marked off 25%. After one day the HW will NOT be accepted. Absolutely no exceptions.

Exams: Exams will be open book, closed note. One page (8 ½ x 11) two side notes is allowed. There will be no make-up exams. No calculators allowed. No cell phones.

Grading

Homework 40% Midterm 30% Final 30%

Pre-requisites:

Physics 201–203/211–213: General physics

Physics 311-312: Modern physics

Mathematics 251–253: Calculus I-III

Mathematics 256: Differential equations and multivariate calculus

Mathematics 261: Linear Algebra

The ability to numerically graph functions using a software package of your choice.

Absence due to sickness –You will not be penalized for illness-related absences or unforeseen emergencies. If this occurs contact me via email, text or call me as soon as practical.

Expectations:

You are expected to be able to plan your course load correctly. If you are working full time and taking 20 units you have most likely planned for failure. I am not sympathetic to “I signed up for more than I can take and am falling behind, so would like to turn in the HW late”.

Course Outline (subject to random fluctuations) -

Chapter 3 - Linear Algebra

Chapter 6 – Vector Analysis

Chapter 10 - Tensors

Chapter 1 – Series Expansions

Chapter 2 - Complex Numbers

Midterm

Chapter 14 – Complex analysis

Chapter 7 – Fourier Series and Transforms

Chapter 7 – More transforms

Chapter 8.11 & 8.12 – Delta Function & Greens functions

Final