CAL POLY

September 2011

Mathematics 520, 521 Applied Analysis I, II

1. Catalog Description

Math 520, 521 Applied Analysis I, II (4) (4)

Advanced mathematical methods of analysis in science and engineering, integrated with modeling of physical phenomena. Topics include applications of complex analysis, Fourier analysis, ordinary and partial differential equations. Additional topics to be drawn from perturbation methods, asymptotic analysis, dynamical systems, numerical methods, optimization, and the calculus of variations. 4 lectures. **MATH 520** prerequisite: MATH 408, MATH 412 and graduate standing, or consent of the instructor. Recommended: MATH 418. **MATH 521** prerequisite: MATH 520.

2. Required Background or Experience

Math 408, Math 412 and graduate standing. Math 418 recommended.

3. Learning Objectives

The student should:

a) Be able to model the behavior of physical systems using differential equations and the methods of applied mathematics, especially those of Fourier and complex analysis.
b) Understand the asymptotic behavior of time dependent and independent systems, with particular attention to stability.

4. Text and References

Text to be specified by instructor.

5. Minimum Student Materials

Paper, pencils and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use.

7. Content and Method

A. Required Topics:
   1. Complex analysis
   2. Fourier analysis
   3. Ordinary differential equations
   4. Partial differential equations
   5. Applications of the above topics

B. Additional Topics to be Chosen From:
   1. Dynamical systems
   2. Perturbation methods
   3. Calculus of variations
   4. Theory of integral equations
   5. Discrete time systems
   6. Numerical analysis

8. Methods of Assessment

Homework and examinations.