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.
   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.