Syllabus, Physics 495, Mathematical Methods of Physics, 3 credits

Designation: Required for Engineering Physics majors.

Course Description: Applications of mathematics to experimental and theoretical physics. Topics selected from: complex variables; special functions; numerical analysis; Fourier series and transforms, Laplace transforms.

Prerequisite: None.

Required Text: Dennery and Krzywicki, Mathematics for Physicists, Dover.

Class Web Pages: A class webpage with the syllabus and other information maintained at http://physics.nmsu.edu/~pate/teaching/phys495.

Course Objectives: Students should become proficient at these advanced mathematical topics so that they will easily understand the interplay between the mathematical tools and physics concepts. The advanced mathematics should become an aid to understanding, and not a barrier.

Topics Covered: The complex plane; differential and integral calculus of functions of a complex variable; the calculus of residues; real and complex linear vector spaces; abstract function spaces; Hilbert space; properties of Hermitian operators and their eigenvalues and eigenvectors.

Class Schedule: Three 50 minute classes or two 75 minute classes per week; two hour final exam during exam week.

Contribution of Course to Professional Component: This course covers areas of mathematics that are needed for full understanding and easy application of the concepts covered in these upper-division physics core classes: Phys 461-462, Phys 451, and Phys 454-455. The course provides three credits of physics.

Relationship of Course to Program Outcomes: This course teaches students to:
- Apply knowledge of math, science and engineering.
- Identify, formulate and solve engineering and physics problems.
- Use techniques, skills and modern tools necessary for engineering and physics practice.
- Perform conceptual, theoretical and critical thinking.

Prepared by Dr. Stephen Pate, Spring 2005.
Course Information
Physics 495 (Spring 2005)

**Instructor:** Stephen Pate  
**Office:** Gardiner Hall 356  
**Office hours:** Monday 2:30-4:00  
**Phone:** 646-2135  
**Email:** pate@nmsu.edu

Phys 495 in Spring 2005 will cover three main themes: the calculus of functions of a complex variable, linear vector spaces, and abstract function spaces. These correspond roughly to the subject matter in the first three chapters of the textbook.

Your performance will be judged from two semester exams and one final exam, each of which will contribute to 1/3 of your grade.

I will distribute homework problems. These will not be collected or graded. They are for your use. You will find that consistent homework practice will be essential to your understanding of the class material and to doing well on the exams. I will distribute solutions to the homework.

If you have an excusable conflict with a homework assignment or test, please inform me as soon as possible so that we can make arrangements.

If you wish to meet with me outside of class, please visit me during my office hours, Monday 2:30-4:00 pm. If you cannot come by during that time, feel free to drop by at some other time, as I am often in my office outside of office hours. If I am busy when you come by, we can make an appointment for a later time.

Grade Disputes and Errors in Grading: If you detect a miscalculation in points received on a homework assignment or report, or believe that an absence should be excused, please report this matter immediately so that your grade may be adjusted. You must present your reasons for the disagreement within ONE WEEK of your receipt of this graded material with a copy of any paper in question. Your opportunity to appeal the grade on the assignment expires after that week has passed.
Completely obvious statements about student conduct:
  • Turn off cell phones and pagers while in class: if they ring, you will be removed from class.
  • Do not cheat on exams: if you do, you will receive a failing grade for the class.
  • Do not copy other student’s work: if you do, both students will be penalized.
For more information, see http://www.nmsu.edu/~vpss/03-04handbook.pdf.

Students with Disabilities: If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office for Services for Students with Disabilities, Garcia Annex 102 (phone: 646-6840). Appropriate accommodations may then be provided for you. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the coordinator of the Office for Services for Students with Disabilities. If you have general questions about the Americans with Disabilities Act (ADA), call the ADA Coordinator at 646-3635.

If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss any concerns with the instructor and/or Mr. Michael Armendariz, SSD Coordinator. Feel free to call Ms. Angela Velasco (Interim EEO/ADA and Employee Relations Director) at 646-3333 with any questions about the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act of 1973. All medical information will be treated confidentially.