# PHYS 515: MATHEMATICAL PHYSICS I

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**1. Course Objectives:**

The purpose of the course is to introduce students to methods of mathematical physics and to develop required mathematical skills to solve problems in quantum mechanics, electrodynamics and other fields of theoretical physics.

Upon completion of the course, the student should be able to understand basic theory of:

- Vector and tensor analysis
- Functions of complex variables
- Elements of distribution theory
- Fourier Series

Successful students should be able to:

- Apply methods of functions of complex variables for calculations of integrals
- Expand functions in Taylor's Series
- Expand functions in Fourier Series
- Work with vectors
- Work with tensors

**2. Required textbook:** "Mathematical Methods for Physicists" by Arfken and Weber.

**3. Instructional delivery strategy**: The course will be taught using lectures followed up by homework assignments and periodic tests. Discussions of course topics during lectures are encouraged.

**4. Course Requirements and Grading scheme:**
Your overall score will be an average of all grades you have accumulated during the course, weighted as follows:

- Quizzes: 12%
- Homework/Project: 12%
- Each Examination: 21%
- Final Examination: 34%
- Project assignment (required for graduate students only)

Exams will be based on the material discussed in class, the material in homework assignments, the material in quizzes, and textbook.

Grading scale: A:88-100 B:76-87 C:63-75 D:50-62.

**5. Topical outline of content to be covered:**

- Determinants and Matrices (2 weeks)
- Vector analysis (2 weeks)
- Tensor analysis (3 weeks)
- Functions of Complex Variables (3 weeks)
- Taylor's and Laurent expansions (1 week)
- Fourier Series (2 weeks)

**6. Attendance policy:**

Students are expected to attend each scheduled class meeting, to be on time, and to be prepared for each class session. The University attendance policy specifies that students may miss up to 3 class meetings (10% of class time) without penalty. The 4th absence will result in a grade penalty of one letter grade. The 5th absence will result in a deduction of 2 letter grades. Quizzes and homework cannot be made up except in the case of extreme illness or loss.

**7.** Any student with a documented disability should contact the Office of Student Disability Services at 803-777-6142 to make arrangements for appropriate accommodations.