Course Title	Course Code	Number of Study Hours			Year	Level	Prerequisites
		Theoretical	Laboratory	Credit			
Mathematical Physics	252PHYS	3	----	3	2nd	4th	201MATH

(1) Brief Course Description

The objective of this course is to provide the students with necessary mathematical tools for formulating physics problems. Acquiring these tools is a must for any physics students.

(2) Course Objectives

This course is designed to provide students with:

- The fundamental of the complex numbers including;
- The essential concepts of linear algebra including;
- The basic concepts of Fourier series and Fourier transforms.
- An introduction to special functions such as the Gamma and Beta functions.

(3) Course Contents

- **Complex numbers:** Complex plane, Complex algebra, Complex conjugate and absolute value of complex numbers, Complex equations, Graphs and physical applications of complex numbers, Elementary functions of complex numbers, and Exponential and trigonometric functions.
- **Linear Algebra**: The fundamental operation of matrices, Relation between matrices and linear equations, Cramer's rule, Vectors, lines and planes, Linear combination, linear functions and linear operators, Eigenvalue and eigenvector of a transformations.
- **Fourier series and Fourier integrals**: Periodic and non-periodic functions, Average value of a function, Fourier series, Complex form of Fourier series, Even and odd functions, Fourier transforms and Laplace transforms.
- **Special functions:** The factorial function, The Gamma function and recursion relation., The Beta function, and The relation between the Gamma and Beta functions.

(4) Assessment Criteria

- Periodic Exams: 30%
- Oral, student activity and Essay: 20%
- Final Exam: 50%

(5) Course Teaching Strategies

- Lectures, Reports and Essay Assignments, Homework, and Web-based Assignments.

(6) Text Book

- Mary L. Boas (2006) Mathematical Methods in the Physical Sciences; 3rd edition, John Wiley& Sons, USA.

(7) Reference Books

- G. B.Arfken and H.J.Weber (2001),"Mathematical Methods For Physicists"Academic Press, Oxford.
- Chaun Wan Wong (1991),"Introduction to Mathematical Physics";Oxford University Press, Oxford.