KINGDOM OF SAUDI ARABIA
AL-IMAM UNIVERSITY
FACULTY OF SCIENCES

المملكة العربية السعودية
جامعة الإمام محمد بن سعود
الإسلامية
كلية العلوم

Department of Physics

Course Code	Course Number	Course Name	Credit Hours	Lecture	Lab	Tut	Prerequisites
PHY	334	Mathematical Physics (2)	3	3	0	1	Math 203

Instructor	Dr. Ali Eid
Office	
Phone	
Office Hours	

Course Materials

Textbook:

Title	
Authors	
Publisher	
Edition/Year	

Useful Resources:

1- Mathematical Methods for Physicists: A Concise Introduction, T. Chow, Cambridge University Press, 2000.
2- Mathematical Methods for Physics and Engineering, K.F. Riley, M.P. Hobson and S.J. Bence, 3th edition, Cambridge University Press, 2006.
3- Mathematical Methods for Physicists, George B. Arfken and Hans J. Weber, Academic Press; 6 edition, 2005.
4- Advanced Engineering Mathematics, E. Kreyszig, John Wiley & Sons , INC 8th ed (1998).
5- Methods of Mathematical Physics, R. Courant & D. Hilbert, Wiley- Interscience; 1st ed (1989).
6- Mathematics of Physics and Modern Engineering, I. Sokolnikoff & R. Redheffer, McGraw-Hill College; 2nd ed. (1966).
7- Mathematics of Physics I, M. Stone, Pimander-Casaubon Press, London, 2002.
8- Elementary Differential Equations and Boundary Value Problems, William E. Boyce and Richard C. DiPrima, John Wiley & Sons, Inc., 2001.

Course Objectives:

- To teach students some important applied mathematical tools.
- To let students be familiar with the complex variables and functions.
- To let students be familiar with the boundary value problem.
- To let students be familiar with integral equations and some of its important applications

Other Requirements:

Exams: There will be three exams (mid term 1, mid term 2, and final). Examinations include short answers, and problems. These will be similar in type and content to class discussions. They are designed to test your comprehension of the course.

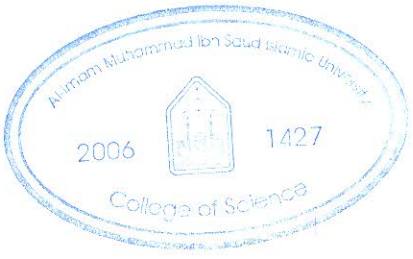
Classroom Participation: You are expected to participate in the classroom discussion by answering questions by asking good questions, raising issues, and making observations. No comment is considered "bad" as long as it makes a constructive class contribution. The instructor believes that a good learning environment is a safe environment—one in which all feel free to question and discuss. A sense of humor is always welcome!

Penalty For Dishonesty: Each student is expected to do his own work on all of the course material. Each person is expected to contribute equally on the class project and each team is expected to do their own work (not collaborate with others outside the team), otherwise each person involved will be subject to the University Dishonesty Policy.

Attendance: Attendance will be taken at the beginning of the class period. If you are late for a class, it is your responsibility to advise me at the end of the class that you were present. Failure to do so on the day in question will result in you being marked absent for that class. Mobile is not allowed to be used in class at all. Therefore, please keep it off during class time.

Grading:

Midterm 1: 20% Date: end of the 6th week
Midterm 2: 20% Date: end of the 12th week
Class Room Participation, Quiz, Research and Homework: 20%
Final Exam: 40% Date: end of the semester



Course Code	Course Number	Course Name	Credit Hours	Lecture	Lab	Tut	Prerequisites
PHY	334	Mathematical Physics (2)	3	3	0	1	phys333

Course Contents

Week	Topics to be covered	Hours
2	**Partial differentiation:** Definitions, Exact and inexact differentials, Useful theorems, Change of variables, Taylor's theorem for many variable function, Thermodynamics notation, Differential of integrals.	8
4	**Applications on partial diff. equations:** General form and particular solution, Linear second order PDEs, Classification of PDEs. Separation of variables: solution of : Laplace equation – the wave equation- Poisson's equation, Inhomogeneous problems, Integral transform methods. **Boundary Value Problems.**	16
5	**Complex Variables**: Definitions and functions of complex variable, Cauchy-Riemann relations, Power series, Some elementary functions, Complex integrals, Cauchy's theorem, Cauchy's integral formula, Taylor and Laurent series, Residue theorem. Application: Complex potential	20
3	**Special Functions:** *Gamma and Beta functions*: Definitions- Simple properties; *Bessel functions*: Bessel function for integer and non-integer- Properties of Bessel function- Spherical Bessel function; *Green function*: Definitions- Simple properties.	12