

BA 323 – Mathematics (5)

C O U R S E I N F O R M A T I O N

Course Title: Mathematics (5)

Code: BA 323

Contact Hours (hours/week): Lecture – 2 Hrs. Tutorial – 2 Hrs.
Credit – 3.

Prerequisite: BA 224

Course Coordinator: Dr. Abd El Rhim Abd Al Hamid

G R A D I N G

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

C O U R S E D E S C R I P T I O N

In the first of this course we discuss the solution of ordinary differential equations with variable coefficients using Taylor's, power series and Frobenius methods, then we go into some special differential equations, as Legendre and Bessel differential equations which lead us to some special functions, as Legendre, Bessel, Gamma and Beta functions. After that we study the method of separation of variables to solve partial differential equations that help us to study some applications like heat transfer in a bar, vibrating of a string and potential fields. In the last of this course we discuss some special complex transformations, conformal mappings, such as bilinear and Schwarz Christoffel transformations.

T E X T B O O K

Erwin Kreyszig, 'Advanced Engineering Mathematics', John Wiley, 9th edition, 2006.

C O U R S E A I M

When dealing with some physical problems, an ordinary or partial differential equation arises. Our course aims to give the student the ability to extract exact solutions of these problems.

C O U R S E O B J E C T I V E S

Upon completion of this course the student will be able to:

Solve ordinary differential equations with variable coefficients.

Solve partial differential equations with the method of separation of variables.

Deal with some special functions.

Construct some special complex functions.

COURSE OUTLINE

Week Number 1: Differential equation with variable coefficients, ordinary and singular points.

Week Number 2: Solution about ordinary points.

Week Number 3: Solution about singular points: Regular singular points, the method of Frobenius - Case I.

Week Number 4: Solution about singular points: The method of Frobenius - Case II and Case III.

Week Number 5: Gamma functions.

Week Number 6: Beta functions.

Week Number 7: 7th week exam, Special functions: Bessel functions.

Week Number 8: Legendre polynomials.

Week Number 9: Partial D.E: Method of separation of variables.

Week Number 10: Heat equation.

Week Number 11: Wave equation.

Week Number 12: 12th week exam, Conformal Mapping: complex functions as mapping.

Week Number 13: Linear Fractional mapping.

Week Number 14: Schwarz - Christoffel mapping.

Week Number 15: Revision.

Week Number 16: Final Exam.