

B.Sc. DEGREE PROGRAMME
MATHEMATICS (COMPLEMENTARY COURSE)
FOURTH SEMESTER
MM4C04 : MATHEMATICS

5 hours/week

3 credits

30 weightage

Texts:

1. Erwin Kreyszig, Advanced Engineering Mathematics, Eighth Edition, Wiley, India.
2. George B. Thomas, Jr. and Ross L. Finney, Calculus, LPE, Ninth Edition, Pearson Education.

Module I (20 hrs)

Linear Differential equations of Second and Higher order: Differential Operators, Euler-Cauchy Equation, Wronskian Nonhomogeneous Equations, Solutions by Undetermined Coefficients, Solution by variation of Parameters.

(Sections 2.1, 2.2, 2.3, 2.4, 2.6, 2.7, 2.8, 2.9, 2.10 of Text 1).

Module II (20 hrs)

Laplace Transforms: Laplace Transform, Inverse Transform, Linearity, Shifting, Transforms of Derivatives of Integrals, Differential Equations. Unit step Function, Second Shifting Theorem, Dirac Delta Function, Differentiation and integration of Transforms, Convolution, Integral Equations, Partial Fractions, Differential Equations.

(Sections 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 of Text 1 – excluding Proofs).

Module III (30 hrs)

Fourier Series : Periodic Functions, Trigonometric Series, Fourier Series, Even and Odd functions, Half-range Expansions.

(Sections 10.1, 10.2, 10.4 of Text 1 – Excluding Proofs).

Partial differential Equations: Basic Concepts, Vibrating String, Wave Equation, Separation of Variables, Use of Fourier Series.

(sections 11.1, 11.2, 11.3 of Text 1).

Module IV (20 hrs)

Numerical Methods: Methods of First-order Differential Equations (Section 19.1 of Text 1). Picard's iteration for initial Value Problems. (Section 1.9 of Text 1).

Numerical Integration: Trapezoidal Rule, Simpson's Rule. (Section 4.9 of Text 2).

References

1. S.S. Sastry, Engineering Mathematics, Vol. II, 4th ed., PHI.
2. Murray R. Spiegel, Advanced Calculus, Schaum's Outline Series.
3. Murray R. Spiegel, Laplace Transforms, Schaum's Outline Series.

PATTERN OF QUESTION PAPER

For each course the external examination is of 3 hours duration and has maximum weightage 30. The question paper has 4 parts. Part I is compulsory which contains 12 objective type / fill in the blanks multiple choice type questions set into 3 bunches of four questions. Each bunch has weightage 1. Part II is compulsory and contains 9 short answer type questions and each has weightage 1. Part III has 7 short essay type/paragraph questions of which 5 are to be answered and each has a weightage 2. Part IV contains three essay type questions of which 2 are to be answered and each has weightage 4.

Part	No. of Questions	No. of questions to be answered	Weightage
I (Objective type)	3 bunches of 4 questions	All	$3 \times 1 = 3$
II (Short Answer)	9	All	$9 \times 1 = 9$
III (Short Essay)	7	5	$5 \times 2 = 10$
IV (Long Essay)	3	2	$2 \times 4 = 8$