

20PEB121					MATHEMATICS-II					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	0	4	4	25	50	25	-	-	100

COURSE OBJECTIVES

- Demonstrate the fundamentals and theorems of the course
- Promote critical thinking
- Improve skills to evaluate the solutions of reservoir flow equations.
- Improve mathematical skills for modelling and simulation.

Unit I

Hours: 10

Infinite Sequences and Series: Introduction of Convergence, Divergence of Sequences and Infinite Series The n th term test for Divergence, Integral Test, Comparison Test, Ratio Test, Root Test, Alternating Series, Absolute convergence, Conditional convergence, Power Series & Radius of convergence Taylor's series, Maclaurin's series, Successive differentiation, Leibnitz theorem (without proof)

Curve Sketching: Concavity Curve sketching, Polar co-ordinates, Relation between Polar and Cartesian Co-ordinates, Graphs in Polar co-ordinates

Indeterminate Forms: Indeterminate form $\left(\frac{0}{0}, \frac{\infty}{\infty}, \infty \times 0, \infty - \infty\right)$, indeterminate form $(0^0, 1^\infty, \infty^\infty)$

Unit II

Hours: 10

Partial Derivatives: Function of 2-variables, graphs, level curves, Limit, continuity of function of several variables, Partial derivatives and Clairauts' theorem, Tangent plane, Normal line, Linear approximation, Total differential, Chain rule, implicit differentiation, Euler's theorem for homogeneous function, Maximum and minimum values by second derivative test, Lagrange multipliers, Taylor's formula for two variables.

Improper Integrals: Improper integrals of Type- I and Type – II, Convergence and divergence of improper integrals

Unit III

Hours: 10

Multiple Integrals: Double integrals over rectangles and Fubini's theorem, Properties of double integrals Double integrals over general region, Double integrals in polar co-ordinates, Triple Integrals, Triple integrals in cylindrical coordinates, Triple integrals in spherical co-ordinates, Change of Order of Integration, Jacobian of several variables, Change of variable in multiple integrals.

Application of Integration: Volume by slicing, Volume of solids of revolution by disk method, Volume of solids of revolutions by washer method, Volume by cylindrical shell.

Unit IV

Hours: 09

Vector Functions: Vector & Scalar Functions and Fields, Derivatives Curve, Arc length, Curvature & Torsion Gradient of Scalar Field, Directional Derivative, Divergence of a Vector Field, Curl of a Vector Field,

Vector Calculus: Line Integrals, Path Independence of Line Integrals, Green's Theorem in the plane, Surface Integrals, Divergence Theorem of Gauss, Stokes's Theorem.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1- Understand analytic function of a complex variable and able to apply Cauchy integral theorem and residue theorem to solve contour integrations

CO2- Solve engineering problems using the principles of solution of differential equations.

CO3- To solve partial differential equations

CO4- Apply Laplace transform and its inverse to solve initial value and other related problems.

TEXT / REFERENCE BOOKS

1. Higher Engineering Mathematics Vol. 1 by Dr. K. R. Kachot, Mahajan Publishing House
2. Higher Engineering Mathematics, by B. S Grewal, Khanna Publication, Delhi.
3. Calculus (5th Edition), by James Stewart, Thomson (2003).
4. Higher Engineering Mathematics, by R. K. Jain & S. R. K. Iyernagar
5. Thomas' Calculus, eleventh edition, Pearson.
6. E.Kreyszig, Advanced engineering mathematics (8th Ed.), John Wiley (1999).
7. Advance Engineering Mathematics, by Michael D. Greenberg.
8. Engineering Mathematics, A Programmed Approach, by C. W. Evans, Stanley Thornes Publishers Ltd.
9. Calculus, Volumes 1 and 2, by T. M. Apostol, Wiley Eastern.
10. Calculus, by Robert T. Smith & Ronald B. Minton, McGraw-Hill.
11. Calculus – Single and Multivariable, by Hughes – Hallett et al., John-Wiley and Sons.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 10 Questions of 2 marks each-No choice

20 Marks

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks

80 Marks