DIP - MATHEMATICS

III Semester (Lateral entry students): Common for all branches

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
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Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

Prerequisite: Basic principles of algebra and calculus.

I. COURSE OVERVIEW

The course focuses on more advanced Engineering Mathematics topics which provide with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. The course includes root finding techniques, Interpolation,, numerical solutions of ordinary differential equations, vector calculus, Partial differential equations . The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

II. COURSE OBJECTIVES:

The students will try to learn:

I. Enrich the knowledge solving algebra and transcendental equations and differential equation by numerical methods.
II. Multiple integration to evaluate mass area volume of the plane.
III. Analyze gradient, divergence and curl and evaluate line, surface, volume integrals over a vector field.

III.COURSE SYLLBUS:

Module-I: ROOT FINDING TECHNIQUES AND INTERPOLATION (09)

Root finding techniques: Solving algebraic and transcendental equations by bisection method, method of false position, Newton-Raphson method; Interpolation: Finite differences, forward differences, backward differences; Symbolic relations; Newton's forward interpolation, Newton's backward Interpolation of unequal intervals: Lagrange's interpolation.

Module-II: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (09)

Taylor's series method; Step by step methods: Euler's method, modified Euler's method and Runge-Kutta method for first order differential equations.

Module-III: MULTIPLE INTEGRALS (09)

Double and Triple integrals; Transformation of coordinate system; Finding the area of a region using double integration and volume of a region using triple integration.

Module-IV: VECTOR CALCULUS (09)

Line integral, surface integral and volume integral; Vector integral theorems: Green's theorem in a plane, Stoke's theorem and Gauss divergence theorem without proofs.

Module-V: PARTIAL DIFFERENTIAL EQUATIONS AND APPLICATIONS (09)

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equation by Lagrange method.

IV. Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

V. Reference Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 9th Edition, 2006.
2. Veerarajan T., "Engineering Mathematics for first year", Tata McGraw-Hill, New Delhi, 2008.
3. D. Poole, "Linear Algebra: A Modern Introduction", Brooks/Cole, 2nd Edition, 2005.
4. Dr. M Anita, Engineering Mathematics-I, Everest Publishing House, Pune, First Edition, 2016.

VI. Web References:

1. http://www.efunda.com/math/math_home/math.cfm
2. http://www.ocw.mit.edu/resources/#Mathematics
3. http://www.sosmath.com/
4. http://www.mathworld.wolfram.com/

VII. E-Text Books:

1. http://www.e-booksdirectory.com/details.php?ebook=10166
2. http://www.e-booksdirectory.com/details.php?ebook=7400re