B. TECH. I YEAR (4YDC) COMMON FOR ALL BRANCHES

MA 10011: MATHEMATICS – I

HOURSPERWEEK			CREDITS			MAXIMUM MARKS				
L	P	Tu	Th	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	Th.	SW	Pr.	
3	--	1	4	--	--	30	70	--	--	100

PRE –REQUISITES: NIL

COURSE OBJECTIVES

Enable the students to apply the knowledge of Mathematics in various engineering fields by making them

1. To revise the basic concepts of differential calculus and their applications for functions of several variables in engineering problems.
2. To incorporate the knowledge of multiple integral to support the concurrent and subsequent engineering studies.
3. To develop the basic concepts of measure of central tendency, measure of dispersion, correlation and curve fitting.

COURSE OUTCOMES

After completing this course student will be able to

CO1: Develop competency in applying the ideas of partial derivatives and use Taylor's and Maclaurin's series for series expansions of function and obtain approximate values.

CO2: Apply the knowledge of Lagrange's multipliers for finding the extreme values of functions and understand the concept of curvature and asymptotes.

CO3: Evaluate the integral in terms of beta and gamma functions and formulate multiple integrals.

CO4: solve application problems of area, length and volume of various types of curve.

CO5: Analyze statistical data using measures of central tendency, measure of dispersion and acquire the knowledge of correlation and curve fitting.

COURSE CONTENTS

THEORY

Unit 1 **Differential Calculus:** Partial derivatives: Definition, Euler's theorem of homogeneous function, Differentiation of implicit function, Total differential coefficients, Jacobians, Expansion of functions by Taylor's and Maclaurin's series of one and two variables .

Unit 2 **Differential Calculus (Continued):** Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers and their applications, Curvature in Cartesian and polar coordinates, Asymptotes (cartesian coordinates).

Unit 3 **Integral Calculus:** Beta and Gamma functions, Elementary ideas of multiple integrals, Change of order of integration and change of variables in double integrals using Jacobians.

Unit 4 **Integral Calculus (Continued):** Detailed study of tracing of curves, Area, Length of curve, Volume and Surface of revolution.

Unit 5 **Statistics:** Review of measures of Central Tendencies and measure of Dispersion, Correlation : Karl Pearson and Spearman's rank correlation, Curve fitting by the method of least squares, fitting of straight line, second degree parabolas and more general curves.

ASSESSMENT

1. Internal Assessment for continuous evaluation, mid-term tests, tutorials, class performance, etc. (30%) .
2. End semester Theory Exam (70%) .

TEXT BOOKS RECOMMENDED

1. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.
2. H. K. Das, Advanced Engineering Mathematics, S. Chand and Company Ltd., New-Delhi, 2009.

REFERENCE BOOKS

1. S. S. Sastry, Engineering Mathematics Volume I and Volume II, PHI Learning Private Limited, New Delhi 2008.
2. Tarit Majumdar , Engineering Mathematics Volume – I , New central Book Agency (P) LTD, Kolkata.
3. S Pal and S. C. Bhunia, Engineering Mathematics, Oxford University Press, New Delhi, 2015.
4. Probability and Statistics, Murray R. Spiegel, John J. Schiller, R. Alu Srinivasan, Schaum's Outline Series McGraw Hill, 2009, Third Edition.

B. TECH. I YEAR (4YDC) COMMON FOR ALL BRANCHES

MA 10511: MATHEMATICS –II

HOURS PER WEEK			CREDITS			MAXIMUM MARKS				
L	P	Tu	Th	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	Th.	SW	Pr.	
3	--	1	4	--	--	30	70	--	--	100

PRE –REQUISITES: NIL

COURSE OBJECTIVES

Enable the students to apply the knowledge of Mathematics in various engineering fields by making them

1. To perform elementary operations on matrix and learn to solve systems of linear equations and their application problems.
2. To solve first order and first degree ordinary differential equations, higher order linear differential equations and their applications.
3. To develop the basic concepts of probability theory and their applications.

COURSE OUTCOMES

After completing this course student will be able to

CO1: Acquire the knowledge of rank of matrix and applying this concept to know the consistency and solving the system of linear equations, find Eigen values, Eigen vectors and their applications in relevant Engineering domain.

CO2: Introduce the concepts of finding inverse by Cayley Hamilton Theorem, Diagonalization of matrix and reduce the quadratic form to canonical form using orthogonal transformation.

CO3: Identify the type of a given differential equations and select and apply the appropriate analytical technique for finding the solution. Classify differential equations according to certain features and solve first order differential equations.

CO4: Solve second order linear differential equation and simultaneous differential equation with their applications in relevant domain.

CO5: Acquire the basic knowledge of probability theory and probability distributions (Binomial, Poisson and Normal) with their applications in relevant domain..

COURSE CONTENTS

THEORY

Unit 1 **Matrices :** Review of matrices , Rank of a matrix by Echelon form and Normal form , Inverse of matrices by Gauss- Jordan method, System of linear equations : Solving system of Homogeneous and Non- Homogeneous linear equations, Linear Dependence and Independence, Eigen values, Eigen vectors with their properties and applications.

Unit 2 **Matrices (continued):** Cayley-Hamilton theorem. Finding inverse and power of a matrix by Cayley Hamilton Theorem, Diagonalization of a matrix, Quadratic forms and Nature of the Quadratic forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation and some applications of matrix theory in Engineering domain.

Unit 3 **Ordinary Differential Equations:** Formation of differential equations, differential equations of first order and first degree (Variable separable, Homogeneous, Linear and Exact), Linear differential equations with constant coefficients.

Unit 4 **Ordinary Differential Equations (continued):**Second orderlinear differential equations with variable coefficients, Simultaneous differential equations, Method of variation of parameters, Application to simple problems.

Unit 5 **Probability:** Mathematical and classical definition of probability, Addition theorem of probability, Multiplication theorem of probability , Review of Basic probability concepts, Conditional Probability , Bayes theorem, Probability Distribution : Binomial, Poisson and Normal distributions and their application in Engineering field.

ASSESSMENT

1. Internal Assessment for continuous evaluation, mid-term tests, tutorials, class performance, etc. (30%) .
2. End semester Theory Exam (70%) .

TEXT BOOKS RECOMMENDED

1. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.
2. H. K. Das, Advanced Engineering Mathematics, S. Chand and Company Ltd., New-Delhi, 2009.

REFERENCE BOOKS

1. ZafarAhsan, Differential Equation and their Applications, Prentice Hall of India Pvt. Ltd., New Delhi,2004.
2. M. Ray, H. S. Sharma and S Chaudhary, Mathematical Statistics, Ram Prasad and Sons, Agra, 2004.