

Course Name : All Branches of Diploma in Engineering and Technology.

**Course Code : CE/ME/IE/EJ/DE/ET/EX/EE/EP/MU/EV/IS/CO/CM/IF/PG/PT/AE/
CV/MH/FE/CD/ED/EI**

Semester : Second

Subject Title : Engineering Mathematics

Subject Code: 12013

Teaching and examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	01	--	03	100	--	--	--	100

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

Rationale:

In 21st century man has developed new disciplines like Information Technology Genetic Engineering, Biotechnology etc. on the basis of Mathematics. Thus the study of mathematics is necessary to develop in the student the skills essential for these new disciplines. The subject is extension of basic mathematics of First Semester and stepping into the prerequisites to learn applied mathematics. Engineering Mathematics lay down the foundation to understand and express principles and laws involved in other technological subjects.

Objective: The student will be able to

Acquire knowledge of Mathematical terms, concepts, principles and different methods. Develop the ability to apply mathematical methods to solve technical problems, to execute management, plans with precision. Acquire sufficient mathematical techniques necessary for daily and practical problems.

Learning Structure:

Application:	Relationship between two quantities that vary, continuity of curves	Use of derivatives in applications. Slope of a curve	Analysis of experimental data for drawing valid conclusions and decision-making process.	To understand various physical quantities. Understanding signal processing, laws of impedance fluid flow, electricity.
Procedure:	To explain value of function & types of fun. Methods to evaluate limits of different functions.	To explain methods for finding derivative of different function. Second order derivative.	To explain measures of central tendency and dispersion addition and multiplication	Explain geometric meaning of deri., max, & mini, rates, radius of curvature. algebra of complex numbers Euler's forms, hyperbolic function.
Concept:	Dependent and independent variables. Standard formulae for Limits. Theorems on Limit	Derivatives of Standard functions. Rules of Differentiation	Classification of data, frequency, mean, mode and median. Sample space, event occurrence of event & types.	Slope of the curve, increasing decreasing functions. Real and imaginary parts of complex no. Euler's exponential forms.
Facts:	Concept of interval, neighborhood of a point, Definition of function and limit. Meaning of $X \rightarrow a$	Definition of derivative and notation, order of derivative	Concept of data, frequency distribution, attribute and variant.	First order and second order derivatives. Number system. Imaginary unit.

Contents: Theory**Note:**

1. Chapters 1 to 5 are common for all branches.
2. Chapter 6-For Civil, Electrical, Mechanical and Electronics groups
3. Chapter 7 & 8-For Computer Engineering Group.

Chapter	Name of the Topic	Hours	Marks
01	Function and Limit 1.1 Function 1.1.1 Definitions of variable, constant, intervals such as open, closed, semi-open etc. 1.1.2 Definition of Function, value of a function and types of functions, Simple Examples..	04	08
	Limits 2.1 Definition of neighborhood, concept and definition limit. 2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples		
03	Derivatives 3.1 Definition of Derivatives, notations. 3.2 Derivatives of Standard Functions 3.3 Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. 3.4 Derivatives of composite function (Chain rule) 3.5 Derivatives of inverse and inverse trigonometric functions. 3.6 Derivatives of Implicit Function 3.7 Logarithmic differentiation 3.8 Derivatives of parametric Functions. 3.9 Derivatives of one function w.r.t another function 3.10 Second order Differentiation.	14	24
	Applications Of Derivative 4.1.1 Geometrical meaning of Derivative, 4.1.2 Maxima and minima 4.1.3 Radius of Curvature		
4		06	12
05	Statistics 5.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. Marks 08 5.2 Graphical representation (Histogram and Ogive Curves) to find mode and median Marks 06 5.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations. Marks 10	10	24
NOTE: Chapter 6 is for Civil, Electrical, Electronics and Mechanical Groups			
06	Complex number 6.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 6.2 Algebra of Complex number (Equality, addition, Subtraction, Multiplication and Division) 6.3 De-Moivre's theorem (without proof) Examples based on it,	06	16

	roots of complex numbers, roots of unity 6.4 Euler's form of Circular functions, hyperbolic functions and relations between circular & hyperbolic functions		
Note: Chapter 7 and 8 is for Computer Engineering Group Only			
07	Numerical Solution of Algebraic Equations Bisection method, Regula-Falsi method and Newton-Raphson method	03	08
08	Numerical Solution of Simultaneous Equations Gauss elimination method Iterative methods-Gauss Seidal and Jacobi's method	03	08
Total		48	100

Tutorial

Note: Tutorials are to be used to get enough practice for solving problems. It is suggested that in each tutorial at least five problems to be solved.

Tutorial No.	Topic on which tutorial is to be conducted
1	Function
2	Limits
3	Derivative
4	Derivative
5	Derivative
6	Statistics
7	Statistics
8	Statistics
9	Application of derivative/numerical Solution of algebraic equations
10	Application of derivative/numerical Solution of algebraic equations
11	Complex Numbers/Numerical Solution of Simultaneous Equations
12	Complex Numbers/Numerical Solution of Simultaneous Equations

Learning Resources:**Books:**

Sr. No	Title	Authors	Publications
1	Mathematics for Polytechnic	S.P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune.
2	Calculus :Single Variable	Robert T Smith	Tata McGraw Hill
3	Advanced Engineering Mathematics	Dass H. K.	S. Chand Publication, New Delhi
4	Fundamentals of Mathematical Statistics	S.C Gupta and Kapoor	S. Chand Publications New Delhi.
5	Higher Engineering Mathematics	B.S Grewal	Khanna Publication, New Delhi
6	Applied mathematics	P. N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune.