



**MAHARASHTRA STATE  
BOARD OF TECHNICAL EDUCATION  
(AUTONOMOUS)**

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To,

The Principal / Head of the Institute.  
Affiliated to MSBTE,  
Mumbai

**Sub:-** Change in curriculum of subject Engineering Mathematics (9006) Second Semester 'C' Scheme

All the Principal / Head of the Institute should note the changes in curriculum of the subject Engineering Mathematics (9006) Second Semester 'C' Scheme of Diploma in Engineering & Technology.

Chapter No-3 Vector has been deleted & marks & Hours Distribution for the remaining chapter has been changed.

Convey this information to the faculty teaching this subject & students of IInd Semester of Diploma in Engineering & Technology of 'C' Scheme.

Enclosure: New Curriculum

Secretary

M. S. Board of Technical Education  
Mumbai - 400 051.

Copy Forwarded for information:-

1. Hon. Director, MSBTE, Mumbai-51
2. Dy. Secretary, M. S. Board of Technical Education, Regional Office Pune, Nagpur, Aurangabad & officer Incharge, Mumbai Sub-Region, for information & necessary Action.
3. D-42, for information & necessary Action.

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

**Course Code** :

**Semester** : Second

**Subject Title** : Engineering mathematics

**Subject Code** : 9006

**Teaching and examination Scheme**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	01	--	03	80	20	--	--	--	100

**Rationale:**

In 21<sup>st</sup> 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:

<b>Application:</b>	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.
<b>Procedure:</b>	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 theorem of probability	Explain geometric meaning of deri., max, & mini, rates, radius of curvature. to explain algebra of complex numbers Euler's forms, hyperbolic function.
<b>Concept:</b>	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.
<b>Facts:</b>	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. Definition of probability, random experiment.	First order and second order derivatives. Number system. Imaginary unit.

**Contents: Theory****Note:**

1. Chapters 1 to 3 are common for all branches.
2. Chapter 4-For Civil, Electrical, Mechanical and Electronics groups
3. Chapter 5-For Computer Engineering Group.

Chapter	Name of the Topic	Hours	Marks
01	<b>Function and Limit</b> <b>1.1 Function</b> 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
	<b>1.2 Limits</b> 1.2.1 Definition of neighborhood, concept and definition limit. 1.2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples.	08	12
02	<b>Derivatives</b> 2.1 Definition of Derivatives, notations. 2.2 Derivatives of Standard Functions 2.3 Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. 2.4 Derivatives of composite function (Chain rule) 2.5 Derivatives of inverse and inverse trigonometric functions. 2.6 Derivatives of Implicit Function 2.7 Logarithmic differentiation 2.8 Derivatives of parametric Functions. 2.9 Derivatives of one function w.r.t another function 2.10 Second order Differentiation.	12	20
03	<b>Statistics And Probability</b> <b>3.1 Statistics</b> 3.1.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 3.1.2 Graphical representation (Histogram and Ogive Curves) to find mode and median 3.1.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations.	10	16
	<b>3.2 Probability</b> 3.2.1 Definition of random experiment, sample space, event, Occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). 3.2.2 Definition of Probability, addition and multiplication theorems of Probability	04	08
<b>NOTE: Chapter 4 is for Civil, Electrical, Electronics and Mechanical Groups</b>			
04	<b>4.1 Applications Of Derivative</b> 4.1.1 Geometrical meaning of Derivative, Equation of tangent	06	08

	and Normal 4.1.2 Rates and Motion 4.1.3 Maxima and minima 4.1.4 Radius of Curvature <b>4.2 Complex number</b> 4.2.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 4.2.2 Algebra of Complex number (Equality, addition, Subtraction, Multiplication and Division) 4.2.3 De-Moivre's theorem (without proof) and simple problems. 4.2.4 Euler's form of Circular functions, hyperbolic functions and relations between circular & hyperbolic functions	04	08
<b>Note: Chapter 5 is for Computer Engineering Group Only</b>			
05	<b>5.1 Numerical Solution of Algebraic Equations</b> 5.1.1 Bisection method, Regula-Falsi method and Newton-Raphson method	06	08
	<b>5.2 Numerical Solution of Simultaneous Equations</b> 5.2.1 Gauss elimination method 5.2.2 Iterative methods-Gauss Seidal and Jacobi's method	04	08
<b>Total</b>		<b>48</b>	<b>80</b>

### 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	Probability
10	Probability
11	Application of derivative/numerical Solution of algebraic equations
12	Application of derivative/numerical Solution of algebraic equations
13	Complex Numbers/Numerical Solution of Simultaneous Equations
14	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	Dass H. K.	S. Chand Publication, New

	Mathematics		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.