

2.2. APPLIED MATHEMATICS - II

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RATIONALE

Applied mathematics forms the backbone of engineering students. Basic elements of Differential calculus and integral calculus and statistics have been included in this course. This will develop analytical abilities to apply in engineering field and will provide continuing educational base to the students.

DETAILED CONTENTS

1. Differential Calculus (30 hrs)

1.1 Definition of function; Concept of limits.

$$\text{Four standard limits } \lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x}, \quad \lim_{x \rightarrow 0} \frac{a^x - 1}{x}, \quad \lim_{x \rightarrow 0} (1+x)^{1/x}$$

- 1.2 Differentiation by definition of x^n , $\sin x$, $\cos x$, $\tan x$, e^x , $\log_a x$ only
- 1.3 Differentiation of sum, product and quotient of functions. Differentiation of function of a function.
- 1.4 Differentiation of trigonometric inverse functions . Logarithmic differentiation. Exponential differentiation Successive differentiation (excluding nth order).
- 1.5 Applications:
 - (a) Maxima and minima
 - (b) Equation of tangent and normal to a curve (for explicit functions only) – Simple problems only

2. Integral Calculus (30 hrs)

- 2.1 Integration as inverse operation of differentiation
- 2.2 Simple integration by substitution, by parts and by partial fractions (for linear factors only)
- 2.3 Evaluation of definite integrals (simple problems)-

$$\text{Evaluation of } \int_0^{\pi/2} \sin^n x \, dx, \quad \int_0^{\pi/2} \cos^n x \, dx, \quad \int_0^{\pi/2} \sin^m x \cos^n x \, dx$$

using formulae without proof (m and n being positive integers only)

3 Ordinary Differential Equations (10 hrs)

- 3.1. Definition and formation of Differential Equations
- 3.2. Solution of first order Differential Equations of the type:
 - (i) Variable separable form

- (ii) Homogeneous Differential Equations
- (iii) Linear Differential Equations

4. Statistics (10 hrs)

- 4.1 Measures of Central Tendency: Mean, Median, Mode
- 4.2 Measures of Dispersion: Mean deviation, Standard deviation

RECOMMENDED BOOKS

1. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi.
2. Applied Mathematics –II by Dr. Sunita Rani Jain, Abhishek Publishers, Chandigarh
3. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
4. Applied Mathematics by Dr. RD Sharma
5. Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar
6. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
7. Engineering Mathematics by Dass Gupta
8. Engineering Mathematics by C Dass Chawla, Asian Publishers, New Delhi
9. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
10. Engineering Mathematics, Vol I, II & III by V Sundaram et.al, Vikas Publishing House (P) Ltd., New Delhi
10. Engineering Mathematics by N.Ch.S.N Iyengar et.al, Vikas Publishing House (P) Ltd., New Delhi
11. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,
12. Engineering Mathematics, Vol I & II by AK Gupta, Macmillan India Ltd., New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	30	35
2	30	40
3	10	10
4	10	15
Total	80	100