



SILVER OAK UNIVERSITY

Engineering and Technology (Diploma)

All Departments

Subject Name: Mathematics-1

Semester: 1

Prerequisite: Algebra, Trigonometry, Geometry and calculus

Objective: This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus and Basic elements of algebra.

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits | Evaluation Scheme | | | | Total Marks |
|-----------------|---|---|---------|-------------------|----|----------|----|-------------|
| L | T | P | | Internal | | External | | |
| | | | | Th | Pr | Th | Pr | |
| 2 | 2 | 0 | 4 | 40 | -- | 60 | -- | 100 |

Content:

| Unit No. | Course Contents | Teaching Hours | Weightage % |
|----------|---|----------------|-------------|
| 1 | Trigonometry: Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e ^x . | 10 | 25% |
| 2 | Differential Calculus: Definition of function; Concept of limits. Four standard limits $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$, $\lim_{x \rightarrow 0} \frac{\sin x}{x}$, $\lim_{x \rightarrow a} \frac{a^x - 1}{x}$, and $\lim_{x \rightarrow a} (1 + x)^{1/x}$. Differentiation by definition standard functions $x^n, \sin x, \cos x, \tan x, e^x, \log_a x$. Differentiation of sum, product and quotient of functions. Differentiation of function of a function. Differentiation of trigonometric and inverse trigonometric functions, Logarithm and its basic properties, Logarithmic differentiation, Exponential functions. | 10 | 25% |
| 3 | Complex Numbers: Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-movier's theorem, its application. | 08 | 20% |
| 4 | Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve | 04 | 10% |

| | | | |
|-------|--|----|------|
| | proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction. | | |
| 5 | Permutations and Combinations: Value of nPr and nCr . Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems | 08 | 20% |
| Total | | 40 | 100% |

Course Outcome:

| Sr. No. | CO statement | Unit No |
|---------|---|---------|
| CO-1 | To acquire necessary background in Trigonometry to appreciate the importance of the geometric study as well as for the calculation and the mathematical analysis. | 1 |
| CO-2 | The ability to find the effects of changing conditions on a system and to understand rate of change | 2 |
| CO-3 | To study complex numbers that enter into studies of physical phenomena in ways that most people cannot imagine. | 3 |
| CO-4 | To perform the partial fraction decomposition that lies in the fact that it provides an algorithm for computing the antiderivative of a rational function. | 4 |
| CO-5 | To understand the expansion using Binomial theorem | 5 |

Teaching & Learning Methodology: -

- (i) Focus on tricks of the trade and intuitive idea of Concept, use the main theorems as tools, no compromise on rigour, illustrative exercises under each topic, view point of applications
- (ii) Tutorial and Teacher guided Problem solving based pedagogy
- (iii) Topic based seminars, internet based assignments, teacher guided self-learning activities

List of Experiments/Tutorials: Unit wise/Topic wise Tutorials/Teacher Guided Problem Solving Sets are to be given for Practice and better understanding of Concepts and applications

Major Equipment: Nil

Books Recommended:-

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007
2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995
3. Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)
4. V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vikas Publishing House

List of Open Source Software/learning website: Scilab, MIT Opencourseware