Charotar University of Science and Technology, Gujarat
B.E./B.Tech CIVIL Sem 1 syllabus

Engineering Graphics

Unit-1 Fundamentals of Engineering Drawing 08 Hours 14%
1.1 Importance of engineering drawing, drawing instruments and materials, BIS and ISO
1.2 Different types of lines used in engineering practice, methods of projections as per SP 46-
1988.
1.3 Engineering Scale.
1.4 Engineering Curve.
Unit-2 Projections of Points and Lines 06 Hours 14%
2.1 Introduction to methods of projections
2.2 Projections of lines inclined to both the planes
Unit-3 Projections of Planes 06 Hours 14%
3.1 Projection of plane
3.2 Auxiliary Projection Method
Unit-4 Projections & Section of Solid 06 Hours 14%
4.1 Projection of solids
4.2 Sectional view
4.3 True shape of Sections
4.4 Auxiliary Inclined Plane (AIP), Auxiliary Vertical Plane (AVP)
Unit-5 Orthographic Projection 06 Hours 14%
5.1 Principle projection
5.2 Methods of first and third angle projection with examples / problems
Unit-6 Isometric Projections 06 Hours 14%
6.1 Terminology, Isometric scale
6.2 Isometric view and Isometric projection with examples / problems
7. Computer Aided Drafting 04 Hours 8%
7.1 Introduction to 2D drafting facilities in CAD software - AutoCAD.
Unit-8 Development of Lateral Surfaces 04 Hours 8%
8.1 Method of Development
8.2 Developments of cylinder, cone, prism, pyramid

Engineering Physics

Unit 1. Error Analysis:
1.1 Uncertainties in Measurements: Sources and estimation of errors, accuracy and
precision, systematic error, random error, Significant figure and round off
1.2 Uncertainties, Parent and Sample Distributions, Mean and Standard Deviation of
Distributions
1.3 Average error, r.m.s error, probable error and error propagation
1.4 Introduction to regression analysis and its uses
1.5 Applications with numericals
Unit 2. Introduction to Quantum Mechanics:
2.1 Origin of quantum mechanics
2.2 Dual nature of matter, concept of wave group, Davisson and Germer experiment
2.3 Heisenberg's uncertainty principle and its applications, Schrodinger's wave equation
2.4 Interpretation of wave equation and wave function
2.5 Applications of Schrodinger's wave equation
Unit 3. Acoustics and Ultrasonics:
3.1 Introduction to waves
3.2 Characteristics of Sound waves
3.3 Architectural Acoustics, Absorption Coefficient, Reverberation, Sabine's formula,
Factors affecting acoustics of buildings and their remedies
3.4 Ultrasonics: Introduction and properties
3.5 Production: piezoelectric and magnetostriction method
3.6 Detection of Ultrasonic waves
3.7 Applications with numericals
Unit 4. Physics of Laser and its applications:
4.1 Lasers and its properties, Spontaneous and stimulated emission
4.2 Einstein coefficients
4.3 Gas laser (He-Ne Laser), Semiconductor Laser, Applications of Laser
4.4 Basic Principle of Holography, Construction and reconstruction of hologram,
Applications of Holography
4.5 Introduction to optical fibre, Numerical Aperture of optical fibre
4.6 Types of optical fibre, applications of optical fibre
Unit 5. Condensed Matter and Material Physics
5.1 Basics of Crystal structure

5.2 X – Ray: properties, production, applications of X – Rays
5.3 Conductors, Insulators and Semiconductors: Band theory of Solids
5.4 Energy gap, Fermi energy, Electrical conductivity and mobility
5.5 Hall effect
5.6 Introduction to magnetic materials
5.7 Basics of superconductivity and its applications

Unit 6. Nanoscience

6.1 Introduction to nanomaterials
6.2 0D, 1D, 2D nanostructures
6.3 Bottom-up and Top-down approach to synthesis of nanomaterials
6.4 Structural characterization by XRD and SEM
6.5 Applications of nanomaterials

ENGINEERING MECHANICS

Unit-1 Introduction

Introduction of Mechanics, Fundamental concepts and idealization of mechanics, Fundamental principles & Laws of mechanics, Scalar and Vector Quantities, Components , unit vectors and position vector, Composition and resolution of vector, System of Units

Unit-2 Fundamental of Static

2.1 Coplanar Concurrent Force system

Introduction of Force , Effect of force and Characteristics of force, Types of force, Type of force systems, Principle of Transmissibility, Resultant of force systems, Resolution of a single force , Composition and Resolution of force system, Resolution method for coplanar concurrent force system

2.2 Moments and Couples

Moment of a force, Principle of moments, Coplanar applications, Parallel force system, Couples, Equivalent couples, Operations with couples, Equivalent system of forces

2.3 Coplanar Non-Concurrent Force system

Introduction, Resultant of coplanar non-concurrent force system, Concentrated and distributed loads

2.4 Equilibrium of Rigid bodies

Equilibrium, Resultant & Equilibrant, Principle of action and reaction, Free body diagram & Lami’s theorem, Tensions of strings, condition of equilibrium for Coplanar concurrent forces & Coplanar non-concurrent forces, Equilibrium of Coplanar concurrent forces, Equilibrium of Coplanar non-concurrent forces

2.5 Forces in Space

Introduction, Force in space, resultant of concurrent forces in space, equilibrium of particle in space.

Unit-3 Friction

Friction and its applications, Types of friction and Laws of dry friction, Angle of friction, Angle of repose, Coefficient of friction, Block Friction, Ladder friction, Wedge friction

Unit-4 Introduction to Beams

Types of load, supports and beams, support reaction for Statically determinate beam

Unit-5 Centroid and Centre of Gravity

Introduction, basic definitions and their understanding, Concept of centre of gravity, Centroids of Linear elements & Planar elements, Determination of centroids by integrations, Centroids of Composite sections (1D, 2D)

Unit-6 Fundamentals of Kinematics and Kinetics of Particles

Rectilinear motion, Curvilinear motion, Motion of rigid bodies, Velocity and acceleration, Newton's law of motion, Energy and momentum.