

Batch:2009-2013

III SEMESTER, B.Tech.-Civil				
Sr.No.	Course Code	Subject	L-T-P	Credits
1	MA201	Advanced Engineering Mathematics – II	4-1-0	5
2	ME201	Mechanics of Deformable Bodies	3-0-1	4
3	ME 202	Fluid Mechanics	3-1-0	4
4	CE 201	Surveying-I	3-0-1	4
5	CE 202	Building Material	3-0-0	3
6	HU 201	Business and technical communications –I	0-2-0	2
<i>Total Contact Hrs=16 hrs. Lectures+4 hrs. Tutorials+ 4 hrs. Lab=24 hrs.</i>			TOTAL	22

SIRPADAMPATSINGHANIAUNIVERSITY, UDAIPUR

COURSE CONTENTS

Second year (IST Semester) **Batch: 2009-2013**

L T P C

4 1 0 5

Course Code: MA-201

Course Name: Advanced Engineering Mathematics-II

Objective: In this course topics which help understand the applications of Mathematics in various disciplines of Engineering and Technology are discussed.

Finite differences and Interpolation: Finite differences, Differences operators and their relationships, Factorial notation. Forward, Backward and Divided Differences. Newton's forward and backward interpolation formula, Lagrange's interpolation formula.

Numerical Methods: Numerical differentiation using Newton's forward and backward interpolation formula. Numerical integration: Trapezoidal rule, Simpson's 1/3 rule. Numerical Solutions of ordinary differential equations: Picard's Method, Euler's Modified Method, Taylor's Series Method, Runge-Kutta Method, Adams-Moulton Method, Milne's Predictor and Corrector Methods.

Special functions: Bessel's equation; properties of Bessel's function; Recurrence formula for Bessel's function of first kind ($J_n(x)$); Equation reducible to Bessel's equation; Generating function, Orthogonality relations; Legendre's equation, Legendre function; Recurrence formula for Legendre function ($P_n(x)$);.

Complex Analysis: Functions, Limits and Continuity, Analytic Functions, Cauchy Riemann Conditions, Analytic Continuation, Complex Integration and Cauchy's Theorem, Cauchy's Integral Formula, Taylor's and Laurent Series, Zeros of an Analytic Function; Poles, Essential Singularities, Residue Theorem and its application to evaluation of integral, Introduction to Conformal Mapping.

Probability and Statistics: Random Experiment; Events; Algebra of Events; Counting techniques applied in probability problems; Conditional probability; General Multiplication Theorem; Independent events; Bayes' theorem and related problems. Random variables (discrete and continuous); Probability mass function; Probability density function and distribution function. Expectation and Variance; Moment generating

function; Probability Distribution—Binomial, Poisson and Normal. Transformation of random variables (One variable); Chebychev inequality (statement) and problems. Curve fitting and Method of Least Squares. Correlation and Regression.

References

- | | |
|---------------------------|---|
| 1 Rajaraman V | Computer Oriented Numerical Methods |
| 2 Sastri S S | Introductory Methods of Numerical Analysis |
| 3 Jain ,Iyengar and Jain, | Numerical Methods for Scientific and Engineering Computations |
| 4 Grewal B S | Numerical methods in Engineering and Science |

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

Second year (II Semester) Batch: 2009-2013

L T P C

3 0 1 4

Course Code: ME 201

Course Name: Mechanics of Deformable Bodies

Objective:

This course discusses some basic concepts regarding strength of materials such as various types of stress and strain, their interrelations and solution & methods.

Introduction:

Review of equilibrium equations and free body diagram. 2

Stress and Strain:

Concepts of stress and strain, generalized Hooke's law, Stress-strain diagram of ductile and brittle material, compound and composite bars, thermal stresses, statically determinate and indeterminate problems, compatibility Equations. 3

Analysis of Plane stress and Strains:

Transformation equations for plane stress and plane strain, Mohr's stress circle, constitutive relations, strain measurements, strain rosettes. Mohr's circle for three dimensional stress and strain 5

Shear force and Bending moment diagrams:

Types of load on beam, classification of beams, shear force and bending moment diagrams: simply supported, overhung and cantilever beams subjected to any combination of point loads, uniformly distributed and varying load and moment, differential relationship between load, shear force and bending moment. 5

Theory of pure bending and Shear Stresses:

Derivation of flexural formula for straight beams, bending stress calculation for beams of simple and built up section, RCC beams. Shear stress formula for beams, shear stress distribution in beams. 5

Thin and Thick Cylinders and Pressure Vessels:

Introduction, Thin Walled Shells, Thick Shells, Compound Cylindrical Shell 4

Torsion of Circular shafts:

Basic assumptions, torsion formula, power transmitted by shafts, design of solid and Hollow shafts based on strength and stiffness. 3

Deflection of Beams:

Governing differential equation for deflection of straight beams having constant flexural rigidity, double integration and Macaulay`s methods for slopes and deflection. 5

Energy Methods:

Principle of superposition; Work done by forces- elastic strain energy stored; Maxwell-Bettis theorem; Castigliano`s theorems; Strain energy expressions; Fictitious load method; Statically indeterminate problems. 5

Stability of Columns:

Crippling load of an axially loaded columns under different end conditions, Euler`s and Rankines formula. 3

Theories of failures: Introduction, Different Theories of Failure 3

Mechanics of material Lab

List of Experiments:

1. Tension test
2. Bending test on simple support beam.
3. Torsion test
4. Hardness test
5. Compression test on wood or concrete
6. Impact test
7. Shear test

Reference Books:

3. Mechanics of Materials -Pytel and Kiusalaas
4. Mechanics of Materials -Gere and Timosheinko
5. Mechanics of Materials - Poppov
6. Strength of Materials- Ryder
7. Strngth of Materials- Pytel and Singer
8. Strength of Materials -Crandal, Dahal and Lardener

Mechanics of Materials- Riley, Struges and Morris

SIRPADAMPATSINGHANIAUNIVERSITY, UDAIPUR

COURSE CONTENTS

Second year (IST Semester) **Batch: 2009-2013**

L T P C

3 1 0 4

Course Code: ME-202

Course Name: Fluid mechanics

Objective:

This course discusses some of the basic concepts of hydrostatics and hydrodynamics that have applications in engineering such as various types of fluid flows.

Fluids and their properties	5
Definition of Fluid, Continuum Hypothesis, Difference between Solids and Fluids, Liquids and gases. Definition of Density, Specific Gravity, Pressure and Vapour Pressure. Viscosity, Newton's Law of Viscosity, Newtonian and Non-Newtonian Fluids, Rheological Diagram, Variation of Viscosity with Temperature and Pressure. Surface Tension and Capillarity.	
Fluid Statics	7
Introduction, Pascal's Law, Hydrostatic Pressure Variation for Incompressible Fluid, Hydrostatic Pressure Variation for Compressible Fluid, Pizeometric Head. Measurement of Pressure, Manometers. Static Forces on Surfaces: Plane Surfaces and Curved Surfaces. Buoyancy and Stability, Stability of Fully Submerged Bodies, Stability of Floating Bodies.	
Fluid kinematics	5
Introduction to Fluid Flow, Steady and Uniform Flow, Compressible and Incompressible Flow, One, Two and Three Dimensional Flow. Velocity and Acceleration of Fluid Particle.	

Stream line, Stream tube, path line and Streak line.
Conservation of Mass: Continuity Equation.
Stream Function, Vorticity and Velocity Potential.
Rotational and Irrotational Flow, Free and Forced Vortex.

Fluid Dynamics

6

Equation of Motion : Euler's Equation.
Energy Equation : Bernoulli's Equation, Applications of Bernoulli's Equation:
Venturimeter and Orificemeter, Stagnation and Static Tube: Pitot Tube.
Linear Momentum Equation.

Viscous Fluid Flow

6

Flow Through Closed Conduits, Steady Laminar Flow through Circular Pipe:
HagenPoiseuille Equation.
Losses in Pipe Flow: Major Loss - Darcy Weisbach Equation, Minor Losses.
Pipes in Series and Parallel.

Open Channel Flow

4

Introduction to Open Channel Flow, Chezy's Equation, Manning's Equation, Froude
Number.
Weirs and Notches.

Similarity and Dimensional Analysis

4

Introduction to Similarity, Types of Similarity: Geometric Similarity, Kinematic
Similarity, Dynamic Similarity.
Dimensional Analysis, Buckingham's Pi-Theorem.

Reference Books:

Fluid Mechanics by R.K. Bansal
Introduction to Fluid Mechanics and Fluid Machines by S.K. Som and G. Biswas.
Fluid mechanics by Dr. D.S. Kumar
Fluid mechanics by Dr. A.K. Jain
Fluid Mechanics by V.L. Streeter and E.B. Wylie

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

Second year (IST Semester) **Batch: 2009-2013**

L T P C

3 0 1 4

Course Code: CE-201

Course Name: Surveying

Objective: This course will help the students to design the layout of infrastructures like highways, railroads, bridges, tunnels, buildings and utilities. It will make the students capable of performing critical tasks in the fields of natural resource management, mineral exploration and navigation.

1. INTRODUCTION:

Definition, Object, Classification, Principle of Survey, Plans and Maps, Scales.

2. LINEAR MEASUREMENTS:

Different methods, Chaining, Offsets, Taping, ranging, Selection of survey stations, Define Term : Location sketch or Reference sketch , well condition and ill condition triangles, Reconnaissance survey and index map, Base Line, Tie Line, Check Line, Range Line, Obstacles, conventional symbols , Recording the field book.

3. COMPASS SURVEY:

Types of Compass, Measurements of angles, temporary and permanent adjustment, Closed Traverses and Open Traverses, bearings, W.C.B. and

R.B., Meridians, Local Attraction, declination and its variation, Dip of needle, Chain and Compass survey field work.

4. LEVELLING AND CONTOURING:

Object and Use, Definitions, leveling, Different types levels, Adjustment of level, types of leveling operations, Reading the leveling staff, Calculations of Reduced level, curvature correction, refraction correction, level book, reciprocal leveling, Contouring.

5. THEODOLITE SURVEY:

Introduction, use, types of theodolite, Definitions, temporary and permanent adjustment of theodolite, field operations with theodolite, theodolite traversing, latitude and departure, Gale's traverse table, omitted measurements in theodolite traversing, errors in theodolite traversing.

6. PLANE TABLE SURVEY:

Principles, Accessories, Advantages and dis-advantages of plane table survey, Suitability, Orientation of Plane Table, Procedure, methods of Plane Tabling, errors and pre caution, Plane table traversing.

7. COMPUTATION OF AREA AND VOLUME:

Determination of Area by different methods, Planimeter, Different Level sections, Determination of Volume by different methods.

8. CURVES:

Introduction, classification of curves, simple, compound and transition curves, methods of setting the curves, vertical curves.

PRACTICAL WORK: Practical work shall be based on sub-topics.

LIST OF PRACTICALS TO BE PERFORMED	
1	Introduction to surveying lab
2	Chain and Tape Survey
3	Compass survey
4	Measurement of Area By Planimeter
5	Project: Chain & Compass Survey
6	Project: Levelling by Dumpy Level
7	Theodolite Survey
8	Project: Contour Survey
9	Project: Plane Table Survey

TERM WORK:

(1) Imperial size drawing on: (A) Chain and compass Survey
(B) Levelling and Contouring (Traverse survey) (C) Plane Table Survey.

Reference Books:

Surveying Vol.1 and Vol.2 By B.C. Punnamia

Surveying and Levelling By Kanitkar and Kulkarni

Surveying Vol.1 and Vol.2 By Dr. K.R. Arrora

Basic surveying by W. Whyte and R. Paul

Surveying By S.K. Duggal

SIRPADAMPATSINGHANIAUNIVERSITY, UDAIPUR

COURSE CONTENTS

Third Year (1st Semester) Batch: 2009-2013

L T P C

3 0 0 3

Course Code: CE 202

Course Name: Building Material

Objective: *This course discusses the different materials used in building construction, the various structural building components, the methods for detailing various types of buildings with all specifications, building bye laws and regulations.*

1.STONES, BRICKS AND TILES:

Properties of building stones – relation to their structural requirements.
Classification of stones – Stone quarrying – precautions in blasting,
Dressing of stone, Composition of good brick earth, various methods of
manufacture of bricks. Comparison between clamp burning and kiln
burning.

2.Qualities of a good brick. Characteristics of good tile – manufacturing
methods, Types of tiles.Use of Materials like aluminium, gypsum, glass
and bituminous materials – their quality.

3.LIME AND CEMENT:

Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of Cement concrete and their importance – various test for concrete.

4.WOOD: Structure – properties – Seasoning of timber. Classification of various types of woods used in buildings – Defects in timber. Alternative materials for wood, Galvanized Iron, Fiber-reinforced plastics, steel, Aluminum.

5.MASONRY :

Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry, cavity and partition walls.

6.FOUNDATIONS:

Foundations : Shallow foundations – Spread, combined strap and mat footings.

7.BUILDING COMPONENTS: Lintels, Arches, Vaults-stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazzo floors, Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs, Madras Terrace/Shell Roofs.

8.FINISHINGS : Proofing Damp and water proofing- materials used. Plastering, pointing, white washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish – Form work and scaffolding.

9.Building Byelaws and Regulations:

Introduction – Terminology – Objectives of building byelaws – Floor area ratio (FAR) – Floor space Index (FSI) – Principles underlying building byelaws – classification of bye buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

10. Residential Buildings: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

11. Public Buildings: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

12. SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

13. DOORS WINDOWS, VENTILATORS AND ROOFS: Panelled Door – paneled and glazed door, glazed windows – paneled windows – Swing ventilator – Fixed ventilator – Couple roof – Collar roof – King Post truss – Queen post truss.

14. SLOPED AND FLAT ROOF BUILDINGS

Given line diagram with specification to draw, plan, sections section and elevation.

TEXT BOOKS:

1. Building material by S K Duggal – New Age International Publishers; Second Edition
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
3. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi
4. Building construction: a textbook for engineering students by Rangwala. S.C., K.S. Rangwala, P.S. Rangwala, Charotar Publishing House

REFERENCES:

1. R.Chudly “Construction Technology “– Volumes I and II” 2nd Edition, Longman, UK, 1987.

2. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

Second year (IST Semester) **Batch: 2009-2013**

L T P C

0 2 0 2

Course Code: HU-201

Course Name: Business and technical communication-I

Objective:

A student is required to write different types of business letters for services or information. The course trains them to acquire excellent writing skills to survive and excel in their professional activity.

Aim: The course focuses on developing interpersonal skills and helps in developing independent study and learning strategies.

Effective Business Correspondence: Types of Business Messages and Processes of writing them. Listening, Negotiation and Conflict resolution by working on the AIDA formula (Attention, Interest, Desire and Action).

Internal Communication: Memo and Memo Letters, Business Letters.

Technical Proposals: Types of Proposals, Solicited and Unsolicited Proposals, Business Proposals, Research Proposals, Tender or Bid.

Literature

Critical Appreciation of various types of texts.

Recommended Reading

Duan. P, Gu. W,& Ma. Y. 2001, English for Technical Communication [M]. Beijing: Science Press.

Pickett, N. A., &Laster, A. A. (1980).Technical English [M]. New York: Harper & Row Publishers.

McMurrey. Power Tools for Technical Communication, current edition. Heinle.

Meenakshi Raman and Sangeeta Raman, Technical Communication, Oxford University Press.