

## SCHEME OF INSTRUCTION & EXAMINATION

### B.E II YEAR (REGULAR)

### (CIVIL ENGINEERING)

### SEMESTER - II

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions		Scheme of Examination				
			Periods per Week	L/T	D/P	Duration in Hrs	Maximum Marks	Univ. Exam	Sessi- onals
<b>THEORY</b>									
1.	CE 251	Building Tech and Drawing	2	3	3	75	25		
2.	CE 252	Strength of Materials-II	4	2	3	75	25		
3.	CE 253	Surveying - II	4	-	3	75	25		
4.	CE 254	Fluid Mechanics-I	4	-	3	75	25		
<b>Electrical &amp; Mech. Tech.,</b>									
5.	EE 271	Part –A Electrical Tech.	3	-	3	38+37	12+13		
	ME 271	Part-B Mech. Technology	3	-					
<b>PRACTICALS</b>									
1.	CE 281	Strength of Materials	-	3	3	50	25		
2.	CE 282	Surveying –II	-	3	3	50	25		
3.	CE 283	Fluid Mechanics	-	3	3	50	25		
4.	CE 284	Surveying Camp	-	-	-	-	25		
<b>TOTAL</b>			<b>20</b>	<b>14</b>	<b>-</b>	<b>525</b>	<b>225</b>		

**Note: The 25 Sessional marks of Surveying Camp will be included in the B.E ¾ I Semester Memo**

**CE 251**

**BUILDING TECHNOLOGY AND DRAWING**

Instruction	2 Periods Theory 3 Periods Drawing
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

**PART – A**

**BUILDING TECHNOLOGY(30 MARKS)**

**Unit – I**

1. **Planning of Building:** Relevant building bylaws. Site selection for buildings, common errors in planning. Principles to be considered in judging plans. Circulation diagram prop for common areas like corridors, stairs, toilets etc. Study and design of small units. Data collection relating to different buildings.  
**Ventilation in Buildings:** General Principles of ventilation(Natural and artificial). Properties of air, air movements, temperature, humidity and quality of air. Design considerations for comfort.

**Unit – II**

3. **Acoustics of buildings:** Reverberation, Determination of absorption coefficient, acoustic intensity, acoustic measurements. Factors affecting the acoustics of buildings. Sound distribution in an auditorium. Sound absorbent materials. Requisites for good acoustics.
- 4 **Building Services.** Lifts and Escalators. Communication services(Telephone and intercom facilities) Fire protection(its importance, development of fire reduced spread of fire, fire resistance in structural elements, means of escape). Water supply(Water quality, water treatment, water distribution and plumbing fixtures) Power supply systems.

**PART – B**

**BUILDING DRAWING(45 MARKS)**

**Unit – III**

Drawing of plans, elevations and sections of two storeyed buildings with staircase  
Drawing of Plans, Elevations and Sections of simple buildings given line plan and specifications. Complete drawings of a building, given the site details and accommodation details.

**Unit – IV**

**Introduction to 3-D drafting** HEIGHT, EXTRUDE commands, UNION, SUBTRACT, AND INTERSECT Commands, SLICE, SECTION AND INTERFERENCE Commands. Complete 3-D Drafting of single storey residential building showing the plan, Elevation, section and perspective/isometric view, RENDERING of the view.

**References:**

1. S.P.Arora and S.P Bindra. A Text book on Building Construction, Dhanpat Rai & Sons. 1993.
2. Y.S.Shahane. Planning and Designing Building, Poona Aliies Book Stall, 3<sup>rd</sup> Edn.

**CE 252**

**STRENGTH OF MATERIALS – II**

Instruction	2 Periods Theory 3 Periods Drawing
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

**Unit – I**

**Deflections** Slope and deflection by the double integration method for canilever and simply supported beams including overganging beams carrying one or two point loads, u.d.l. and uniformly varying load over entire span. Moment area and conjugate beam methods.

**Unit – II**

**Propped Cantilevers:** Cantilever beams on elastic and rigid props for point load and u.d.l. only. Calculation of reactions – B.M. and S.F. diagrams, Deflections.

**Fixed Beams:** Determination of Shear force, bending moment, slope and deflection in fixed beams with and without sindkin of supports for (i) Point loads (ii) u.d.l. (iii) Uniformly varying load over entire span.

**Continuous Beams:** Determination of moment is continuous beams with and without sinking of supports by; the theorem of three moments, S.F. and B.M diagrams.

**Unit – III**

**Torsion:** Theory f pure Torsion in solid and hollow circular shafts, shear stress, angle of twist, strength and stiffness of shafts. Transmission of H.P. – Combined Torsion. And bending with and without end thrst – Determination of principal stresses and maximum shear stress – Equivalent B.M. and T.M.

**Springs:** close and Open coiled helical springs – under axial load and axial twist carriage springs.

**Unit – IV**

**Compound stresses and strains:** Principal stresses – Elipse of Stress – Mohr's circle of stress for bixial stresses with and without shear stress – Principal strains.

**Strain Energy.** Strain Energy of resilience in statically, determinate bars subject of gradually applied and suddenly applied loads, - impact or shock loads. Resilience of beams. Deflections from resilience – Castigliano's theorem I and its applications to beams – Reciprocal deflection.

#### **Unit – V**

Analysis of simple plane trusses and frames by method of joints and method of sections; columns and struts; Euler's Theory. Rankine's – Gordon's formula, and straight – line formula, effect of end conditions, slenderness ratio, Eccentrically loaded columns, Secant and Perry's formula.

#### **Suggested Reading:**

1. B.C Purnia, Strength of Materials and Theory of Structures., Laxmi Pub. 1992.
2. S. Ramamurthi, Strength of Material, Dhanpat Rai & Sons. 1993

#### **CE 253**

#### **SURVEYING – II**

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

#### **Unit – I**

**Theodolite:** Transit Vernier theodolite – Setting, use and temporary adjustments. Use of microoptic theodolite, Measurements of Horizontal angles and bearings by repetition and reiteration methods. Permanent adjustment of a transit theodolite.

#### **Unit – II**

**Theodolite Traversing and Computations:** Traversing by (i) included angles. (ii) bearings – conditions of closed traverse – Gale's Traverse Table – Closing error and its adjustment – Accuracy of traverse. Advantages of plotting traverse by co-ordinates – Omitted measurements in traverse and their computations. Errors in theodolite survey.

**Measurement of Vertical angles:** Trigonometrical leveling calculation of elevations and distances of accessible and inaccessible objects – problems. Trigonometrical leveling – Geodetic observations – Reflections and curvature corrections – Axis signal Correction – Determination of difference in elevation by single and reciprocal observations – problems.

#### **Unit – III**

**Setting out Curves:** Theory of Simple curves. Setting out simple curves by linear and instrumental methods, obstructions in curve Ranging. Compound Curves, Reverse Curves.

#### **Unit – IV**

**Setting out – Curves:** Transition curves – Computations and setting out of transition curves . Vertical curves – computations setting out of vertical curves.

## Unit – V

**Tacheometry:** Theory and use of Stadia wise in leveling instruments and theodolite. Fixed and movable hair tacheometers. Reduction by calculations tacheometric, tabular, use of tacheometric allidade in contouring by plain table. Tangential method of tacheometry, theory and use of JeffCott direct reading tacheometer. Use of RD's self reducing tachometer. Principle and use of (i) sistance bar (ii) beaman's stadia arc

### Suggested Reading

1. Surveying by B.C.Punna. Vol 1 and Vol 2. 13<sup>th</sup> Edition, Laxmi Publications.
2. Surveying by Late.T.P.Kannithker and S.V.Kulkarni. Pune, Vidyarthi Giriha Prakatan. 23<sup>rd</sup> Edition.

## CE 254

### FLUID MECHANICS- I

Instruction	4 Periods per week.
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

## Unit – I

**Fluid Properties and Kinematics:** Defination of fluid, Properties of fluid – Density, Specific weight , Specific Volume, Specific Gravity, Bulk Modulus. Vapour Pressure Viscosity and Surface Tension. Newton's Law of Viscosity and its applications. Capilarity.

**Fluid Statics:** Pascal Hydro Static Law Absolute and Guage Pressure. Forcess on Immersed Bodies. Bouyance.

**Fluid Kinematics** Classification of fluid flow. – Steady UnSteady, uniform, nonuniform, one, two, and three dimensional flows, concepts of streamline, streamtube, pathline and streak line. Law of mass Consevation – Continuity Equation from Control Volume and System analysis, ratational and irrortational flows. String functions, velocity potential function. Significance and use of flow nets.

## Unit – II

**Fluid Dynamics:** Cnvective and local acceleration. Body forces and surface forces, Eulers Equation of motion from control volume and system analysis.

**Law of Energy Conservation** Bernoulli's Equation from integration of Euler's equation. Significance of Bernoulli's equation, its limitations, modifications and application to real fluid flows,

**Impulse Momentum Equation** Momentum Correction factor. Application of the Impluse momentum eqatuion to evaluate forces on nozzles, and bends. Pressure on curve surface - vortex flow - forced and free vertex.

## Unit – III

**Measurement of Pressure:** Piezometers and manometers – Micro Manometers Bourdon guage, Transducers.

**Measurement of Velocity** Pitot Tube, Pitot Static tube, current meter and hot – wire. Anemo meter.

**Measurement of Discharge in Pressure Conduits** Venturi meter Orificemeter and Nozzle meter, Elbo meter, rota meter

Measure of Discharge in Free Surface Flows Notches and Weirs,

#### **Unit – IV**

**Compressible Flow** Compressibility of liquids and gases, continuity equation, bernoulli's energy equation (for isothermal and adiabatic processes) and impulse momentum equation. Velocity of pressure of a pressure wave for adiabatic and isothermal processes mach no and mach cone and its applications. Stagnation pressure density and temperature in adiabatic processes.

#### **UNIT – V**

Flow through Pressure Conduits: Reynolds Experiment and its signification. Upper, Lower Critical Reynolds numbers. Critical Velocity Hydraulic gradient. Laminar flow through circular pipes - hagenpoiseuille equation. Turbulent flow characteristics . Head loss through pipe – Darcy – Weisbach equation. Friction factor .Moody's Diagram minor losses . Pipes in Series and Pipes in Parallel

#### **Suggested Reading:**

1. A.K.Jain Fluid Mechanics Khanna Publisher's Delhi, 1993
2. P.N.Modi & S.M.Sethi Hydraulics and Fluid Mechanics. Standard Book House , Delhi , 11<sup>th</sup> Edition.1995.

#### **EE 271**

### **ELECTRICAL AND MECHANICAL TECHNOLOGY**

#### **PART- A**

#### **ELECTRICAL TECHNOLOGY**

Instruction	2 Periods per week.
Duration of University Examination	1.5 Hours
University Examination	37 Marks
Sessionals	13 Marks

#### **Unit – I**

MKS Units and Practical Units of Current, Voltage, Power and Energy – Conversion of Mechanical of Heat Units to Electrical units and vice versa.

**DC- Circuits** Ohm's Law, Kirchoff's Laws , Resistance Networks – series- parallel and series – parallel circuits with DC sources, power laws in resistive. Elements. Measurement of Direct current and Voltage.

**Alternating Current** Principle of Production of AC ac wave form, frequency, effective value and form factor – measurement of effective value of currents and voltages. Vector representation behaviour of pure inductance, capacitance, and resistance with ac sinusoidal sources. Impedance and admittance simple AC network with RLC elements under steady state- circuits under balanced conditions – star delta connections, power in balanced 3 – phase circuit

### **Unit – II**

**Measurement** Working principle of ammeter, voltmeter, wattmeter and energy meter's measurement of power in 3 – phase circuits.

**Transformers:** Ideal transformers, Principle of transformation, working of actual transformer- under no load and load condition.- approximate equivalent circuit – principle and use of autotransformers.

### **Unit – III**

**Induction Motors** Production of rotating magnetic field – Synchronous speed, torque production, slip and speed of motor, slip-torque characteristics – Power factor on load condition – starting of induction motors – Basic ideas of single phase induction motors and applications

**Illumination:** Nature and production of light units of light measurement Coefficient of utilization and depreciation, Polar curves, Calculations of street lighting.

## **PART – B**

### **MECHANICAL TECHNOLOGY**

Instruction	2 Periods per week.
Duration of University Examination	1.5 Hours
University Examination	37 Marks
Sessionals	13 Marks

### **Unit – I**

General description, operation, maintenance and selection of the following:

**Earth moving and Excavating Equipments:** Shovels, dragline, clamshell, cable excavator, bucket wheel, tractor, bulldozer, excavator, trenchers, grader, earth compactors

### **Unit –II**

**Conveying Equipment** Belt Conveyor, Screw Conveyor, Bucket conveyor, apron conveyor, aerial ropeway,

**Hoisting Equipment** Hoist winch. Differential and worm geared, chain hoists. Fork lift trucks, gantry and stiffly derricks, swing and non swing mobile crane, whirler crane, construction elevator, passenger lift, bucket elevators,

### **Unit – III**

Aggregate and Concrete Producing equipment, Crushers Jaw, Gyratory and roller crusher, screens – stationary, revolving, shaking and vibrating schemes.

Concrete Mixers, Concrete Pumps,

**Pneumatic Equipments**          Reciprocating air –compression. Construction pneumatic tools – jack hammer, paving breaker, rock drill, concrete vibrator.

**Suggested Reading:**

1. R.L.Purifoy(1956) construction planning equipment and methods, Mc Graw Hill Publishers.
2. Dr. Mahesh Varma(1975) construction equipment and its planning and its application. Metropolitan Books Company, Delhi
3. Goodes Spence(1951) Building and Civil Engineering Cross by lock wood .

**CE 281**

**STRENGTH OF MATERIALS LABORATORY**

Instruction	3 Periods per week.
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks

**Cycle – I**

1. Direct Tension Test on metal rods
2. Young's Modulus of metal specimen.
3. Brinell's Hardness Test
4. Compression Test.
5. Impact Test

**Cycle – II**

- 6 Spring Test
- 7 Torsion Test
- 8 Bending Test
- 9 Continous Test
- 10 Deflection of Beam

**CE 282**

**SURVEYING LAB – II**

Instruction	3 Periods per week.
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks

1. Introduction of vernier theodolite – measurement of horizontal angles using re iteration and repetition methods.
2. theodolite traversing – gales traverse table
3. measurement of vertical angles – application to simple problems of height and distance using angle of elevation and depression
4. finding the RL of a given point using two instrument stations in the same vertical plane as that of the point when the base of the point is inaccessible.

5. finding the difference of level between two given points using two theodolite stations(base line) in different planes.
6. Introduction to tacheometric survey, determination of constants for both the cases when of the line sight is horizontal inclines.
7. Finding the difference of elevation between two points and their horizontal distance using single instrument station and using the principle of stadia wise.
8. Finding the horizontal distance between two inaccessible points using substance bar
9. Finding the difference of elevation and their distance using two measurements(base line) and checking trust worthyness of results.
10. Plotting of simple curve using linear method
11. Plotting of simple curve using angular method
12. Introduction to advanced surveying instruments.

### **CE 283**

#### **FLUID MECHANICS – LABORATORY – I**

Instruction	3 Periods per week.
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks

#### **List of Experiments:**

1. Determination of Coefficient of Discharge for Orifice.
2. Determination of Coefficient of Discharge for Mouth Piece.
3. Determination of Coefficient of Discharge for V Notch
4. Determination of Coefficient of Discharge for Rectangular Notch.
5. Determination of Coefficient of Discharge for Broad Crested weir.
6. Determination of Coefficient of Discharge for Venturi meter
7. Determination of Types of flows using Reynolds Apparatus.
8. Determination of Darcy's friction factor.
9. Verification of Bernoulli's Theorem

### **CE 284**

#### **SURVEYING CAMP.**

Instruction	3 Periods per week.
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks

A one week (six days 36 hours) surveying camp should be organized in the intervening period between the completion of II year II Semeste and the commencement of III year I semester.

The work has to be graded for 25 sessional marks. By a committee. Consisting of the Head of the Dept. and 2- 3 Senior faculty members.

The surveying camp should be exposed the student to all the aspects of planning, organizing and conducting a field survey and plotting of the same.