WITH EFFECT FROM THE ACADEMIC YEAR 2015 - 2016

# SCHEME OF INSTRUCTION & EXAMINATION

## B.E. II YEAR
## CIVIL ENGINEERING

## SEMESTER - II

| Sl. No. | Syllabus Ref. No. | SUBJECT | Scheme of Instruction | | Scheme of Examination | | |
|---|---|---|---|---|---|---|---|
| | | | Periods per week | | Duration In Hours | Maximum Marks | |
| | | | L | D/P | | Univ. Exam | Sessionals |
| | | **THEORY** | | | | | |
| 1. | CE 251 | Strength of Materials-II | 4 | 2 | 3 | 75 | 25 |
| 2. | CE 252 | Surveying-II | 4 | - | 3 | 75 | 25 |
| 3. | CE 253 | FluidMechanics-I | 4 | - | 3 | 75 | 25 |
| 4. | CE 222 | Environmental Studies** | 4 | - | 3 | 75 | 25 |
| 5. | EE 271 | Electrical and Mechanical Technology | | | | | |
| | | **Part-A** Electrical Technology | 3 | - | 1.5 | 38 + | 12 + |
| | ME 271 | **Part-B** Mechanical Technology | 3 | - | 1.5 | 37 | 13 |
| | | **PRACTICALS** | | | | | |
| 1. | CE 281 | Strength of Materials-Lab. | - | 3 | 3 | 50 | 25 |
| 2. | CE 282 | Surveying-II Lab. | - | 3 | 3 | 50 | 25 |
| 3. | CE 283 | Fluid Mechanics-Lab | - | 3 | 3 | 50 | 25 |
| 4. | CE 284 | Surveying Camp | - | - | - | - | 50* |
| | | **TOTAL** | **22** | **11** | **-** | **525** | **200** |

* The sessional marks of Surveying Camp (50) will be included in the B.E. III year I Semester memorandum of marks.

** Syllabus given in curriculum of Semester I.

# SCHEME OF INSTRUCTION & EXAMINATION

## B.E. II YEAR CIVIL ENGINEERING

## SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

### SEMESTER - I

| Sl. No. | Syllabus Ref. No. | SUBJECT | Scheme of Instruction | | Scheme of Examination | | |
|---|---|---|---|---|---|---|---|
| | | | Periods per week | | Duration In Hours | Maximum Marks | |
| | | | L | D/P | | Univ. Exam | Sessionals |
| | | **THEORY** | | | | | |
| 1. | CE222 | Environmental Studies** (For CSE, ECE, ME, PE) | 4 | - | 3 | 75 | 25 |
| 2. | CE223 | Solid Mechanics (For EEE, IE) | 4 | - | 3 | 75 | 25 |
| 3. | CE271 | Fluid Dynamics (For ME, PE) | 4 | - | 3 | 75 | 25 |

CSE Computer Science & Engineering
ECE Electronics and Communication Engineering
EEE Electrical & Electronics Engg.
IE Instrumentation Engineering
ME Mechanical Engineering
PE Production Engineering





**CE 251**

## STRENGTH OF MATERIALS – II

| | |
|---|---|
| Instruction | 4 Periods per week |
| | 2 Tutorials per week |
| Duration of University Examination | 3 Hours |
| University Examination | 75 Marks |
| Sessional | 25 Marks |

**Objectives:**

- To study the basic concepts of deflections by using various methods.
- To know about flexural behavior of cantilever and fixed beams.
- To understand about the unsymmetrical bending, continuous beams and shear centre.
- To know about concept of train energy principles and its applications.
- To study the concepts of columns and struts.

**UNIT-I**

Deflections: Slope and deflections by the double integration method for cantilever and simple supported beams, and beams with overhangs carrying point loads,, uniformly distributed and varying load over entire span. Moment area and conjugate beam methods.

**UNIT-II**

**Indeterminacy:** Static indeterminacy and Kinematic indeterminacy. Determination of Static and Kinematic indeterminacies of beams, pin jointed and rigid jointed plane frames (2D problems only).

**Propped Cantilevers:** Cantilever beams on elastic and rigid props for point loads and uniformly distributed loads. Bending moment and shear force diagrams and deflections.

**Fixed Beams:** Determination of shear force, bending moment, slope and deflection in fixed beams with and without sinking of supports for point loads, uniformly distributed loads, and uniformly varying load over entire span.

**UNIT-III**

**Continuous Beams:** Determination of moments in continuous beams with and without sinking of supports by the theorem of three moments; bending moment and shear force diagrams.

**Unsymmetrical bending:** Review- product of inertia, transformation laws for moment of inertia, and product of inertia. Principal axes and stresses due to unsymmetrical bending. Determination of maximum stresses in rectangular, I and Channel sections.

**Shear Centre:** Concept and importance of shear centre, shear flow and determination of shear centre of simple sections such as T sections and Channel sections with one axis of symmetry.

**UNIT-IV**

**Strain Energy :** Strain energy of resilience in determinate bars subjected to gradually applied loads and impact loads. Resilience of beams. Castigliano's theorem and its applications to beams. Theorem of reciprocal deflections.

**Springs:** Close and open coiled helical springs under axial load and axial twist carriage springs.

**UNIT-V**

**Columns and Struts :** Euler's theory. Tankine - Gordon's formula, straight line formula, effect of end condition, slenderness ratio, eccentrically loaded columns, and Secant and Perry's formulae.

**Trusses:** Tension coefficients method and applications to plane and space trusses.

***Suggested Reading :***


1. D.S. Prakash Rao, *Strength of Materials,* A Practical Approach, Universities Press, Hyderabad, 1999,
2. G.H. Ryder, *Stength of Materials,* Third edition in SI units, Macmillan India Limited, Delhi, 2002.
3. A. Pytel and F.L. Singer, *Strength of Materials,* Harper & Row, Fourth Editon, New York, 1987.
4. B. C, Punmia, *Strength of Materials and Theory of Structures,* Laxmi Publications, 1992.
5. S. Ramamrutham, *Strength of Materials,* Dhanpat Rai & Sons, 1993.






**CE 252**

## SURVEYING - II

| | |
|---|---|
| Instruction | 4 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 75 Marks |
| Sessional | 25 Marks |

**Objectives:**

- To know the impotence of theodolite and its practical applications
- To study the basic concept of trigonometrical leveling and field applications.
- To analyze the horizontal curves for survey work related to road and railways.
- To understand the concepts of vertical curves.
- To know the principles of areal photogrametry, total station and GIS.

**UNIT-I**

**Theodolite :** Transit vernier theodolite; setting, use and temporary adjustments. Measurement of horizontal angles and bearings by repetition and reiteration methods. Permanent adjustments of transit theodolite.

**UNIT-II**

**Theodolite Traversing and Computations :** Traversing by included angles, and bearings, conditions of closed traverse, Gale's traverse table, closing errors and its adjustment, accuracy of traverse. Advantage of plotting traverse by coordinates, omitted measurements in traverse and their computations. Errors in theodolite survey.

**Measurement of vertical angles :** Trigonometrical levelling, calculation of elevations and distances of accessible and inaccessible objects, problems.

**UNIT-III**

**Curves :** Theory of simple curves. Setting out simple curves by linear and instrumental methods. Setting out of Compound curves. Reverse curves, problems

**UNIT-IV**

**Transition and Vertical Curves :** Transition curves-cubic spiral and parabola, computations and setting out of transition curves. Vertical curves, computations and setting out of vertical curves.

**UNIT-V**

**Tachometry:** Theory and use of stadia wires in levelling instruments and theodolite. Fixed and movable hair methods. Reduction by calculations; tacheometric, tables; use of tacheometric alidate in contouring by plane table. Tangential method of tacheometry, Theory and use of Jeffcott Direct Reading Tacheometer. Principle and use of application

**Total Station:** Features, concepts, types and applications

**GIS and GPS:** Introduction, Mapping concepts, co-ordinate systems. Map projections, simple applications in civil engineering.

***Suggested Reading :***


1. C. Venkatramaiah, *A Text Book of Siirveying,* Universities Press, Hyderabad, 1997.
2. T.P. Kanetker and S.V. Kulkarni, Survt'yimf ami I,('veiling, Pune Vidyarthi Gruha Prakshan, Pune, 1994.
3. B.C. Punmia, Surveying, Lakshmi Publications, 1994.
4. *Advanced Surveying*, Total Station, GIS and Remote Sensing, Satheesh Gopi, R. Sathi Kumar & M. Madhu, Pearson Publishers.






**CE 253**

## FLUID MECHANICS – I

| | |
|---|---|
| Instruction | 4 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 75 Marks |
| Sessional | 25 Marks |

**Objectives:**

- To know various fluid properties, concept and method of fuid pressure measurement.
- To understand the basic concepts of of fluid motion.
- To study different equations of fluid motion and fluid dynamics.
- To analyze different flow characteristics of laminar and turbulent flows.
- To study the motion of gasses for different conditions of expansion.

**UNIT-I**

**Fluid Properties and Kinematics :** Definition of fluid, properties of fluids density, specific weight, specific volume, specific gravity, bulk modulus vapor pressure, viscosity and surface tension. Newton's law of viscosity and applications Capillarity.

**Fluid Statics:** Pascal's hydrostatic law. Absolute and gaugage pressure Forces on immersed bodies, Buoyancy.

**Fluid Kinematics** : Classification of fluid flow, steady, unsteady uniform non-uniform one two and three-dimensional flows. Concepts os streamline steam tube, path line and steak line. Law of mass conservation. Continuity equation from control volume and velocity potential function.

**UNIT-II**

**Fluid Dynamics:** convective and local acceleration. Body forces and surface forces. Euler's equation of motion from control volume and system analysis.

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

measurement, Coefficient of utilization and depreciation. Polar curves, Calculations of street lighting.

***Suggested Reading:***


1. Naidu M.S. & Kamakshiah S, *Introduction to Electrical Engineering,* Tata McGraw Hill, 1995.
2. John Bird, *Electrical Circuit theory and Technology,* Routledge Taylor & Francis Group, Fourth Edition, 2012.
3. Mehtha V.K., *Principles of Electrical Engineering and Electronics,* S.Chand & Co., 1999.
4. A. Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, *"Basic Electrical Engineering"* Tata McGraw Hill Education Pvt.Ltd., 2009.






**ME 271**

## ELECTRICAL AND MECHANICAL TECHNOLOGY
## PART –B: MECHANICAL TECHNOLOGY

| | |
|---|---|
| Instruction | 3 Periods per week |
| Duration of University Examination | 1.5 Hours |
| University Examination | 37 Marks |
| Sessional | 13 Marks |

**Objectives:**

- To know the working principle of earthmoving equipment.
- To study the types and working principles of conveying and hoisting equipment.
- To understand the working principle of concrete producing, concrete screening and concrete mixing equipment.
- To know the principle of pneumatic equipment and tools.

**UNIT-I**

**General description, operation, maintenance and selection of the following ;** Earth moving and Excavating Equipment: Shovels, Dragline, Clamshell, Cable excavator, Bucket wheel excavator, Tractor, Bulldozer, Scraper, Trenchers, Grader, Earth compactors.

**UNIT-II**

**Conveying Equipment:** Belt conveyor, Screw Conveyor, Bucket Conveyor, Apron Conveyer, Aerial ropeway. Hoisting Equipment: Hoist winch, Differential and Worm geared chain hoists, Fork lift trucks, Guyed and stiffly derricks, swing and non-swing mobile crane, Whirler, crane, Construction elevator, Passenger lift. Bucket elevators.

**UNIT-III**

**Aggregate and Concrete Producing Equipment:** Crusher's jaw, Gyratory, Hammer and Roll crusher. Screens-stationary, Shaking and vibrating screens, concrete mixers, concrete pumps.

**Pneumatic Equipment:** Reciprocating air compressor, Construction pneumatic jack hammer. Paving breaker, Rock drill, concrete vibrator.

***Suggested Reading:***


1. R.L.Peurifoy,*Construction Planning Equipment and Methods*, McGraw Hill Publishers,1956,
2. Mahesh Varma, *Construction Equipment and its Planning and Applications*. Metropolitan Books Co, Delhi, 2004.
3. Goodes Spence, *Building and Civil Engineering Plant*, Cross by Lock Wood, 1995.






**CE 281**

## STRENGTH OF MATERIALS LABORATORY

| | |
|---|---|
| Instruction | 3 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 50 Marks |
| Sessional | 25 Marks |

**Objectives:**

- To know and understand the experiments on various materials to asses their behavior/ limitations.
- To know the brittle and ductile material failure patterns etc, by conducting experiments.
- To understand shear force bending moment and defections for different types of beams.
- To know the rigidity modulus by conducting spring and torsion test.

**List of Experiments**

**CYCLE-I**

1. Direct tension test on metal rods atleast two types
2. Young's modulus of metal specimen by direct tension test
3. Brinnel's and Rockwell hardness tests
4. Compression test on brittle and ductile materials
5. Stress, strain and impact energy test

**CYCLE-II**

1. Test on a helical spring to determine the rigidity modulus
2. Torsion test to determine the rigidity modulus of a shaft
3. Deflection test on a cantilever beam to determine the Young's modulus
4. Deflection test on a simple beam to determine the Young's modulus
5. Deflection test on a fixed beam to determine the Young's modulus

6. Deflection test on a continuous beam to determine the Young's moduls

***Suggested Reading :***


1. Vasant Desai , *"Dynamics and Entrepreneurial Development and Management"*, HPH, 1997.
2. Prasanna Chandra, *"Project- Planning, Analysis, Selection, Implementation and Review"*, TMH, 1995.
3. Stephen R. Covey and A. Roger Merrill, *"First Things First"*, Simon and Schuster publication, 1994.
4. G.S. Sudha, *"Organizational Behaviour"*, NPH, 1996.
5. Robert D. Hisrich, Michael P. Peters, *"Entrepreneurship"*, 5/e, TMH, 2005.






**CE 281**

## SURVEYING - II LABORATORY

| | |
|---|---|
| Instruction | 3 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 50 Marks |
| Sessional | 25 Marks |

**Objectives:**

- To understand the basic practical applications of horizontal and vertical angles.
- To know the field measurements and field observations of leveling and plane table survey, and curves.
- To study and understand field observations and applications of total station,GPS, and GIS.

***List of Experiments :***

1. Vernier theodolite, measurement of horizontal angles using reiteration and repetition methods.
2. Thedolite traversing, Gale's traverse table.
3. Measurement of vertical angles; application to simple problems of height and distance using angle of elevation and depression.
4. R.L. 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. Difference in levels between two given points using two theodolite stations (baseline) in different planes.
6. Tachometric survey, determination of constants for the cases when the line of sight is horizontal and inclined.
7. Finding the difference of elevation between two points and their horizontal distance using single instrument station and the principle of stadia wires and tangential method of tacheometry.
8. Difference of elevations between two points, and their distance using two instrument stations (base line); checking the validity of the results.

9. Horizontal distance between two inaccessible points using substance bar.
10. Plotting of simple curve using liner method.
11. Plotting of simple curve using angular method.
12. Computation of earth works and develop contour lines using total station.





CE 283

## FLUID MECHANICS LABORATORY

| | |
|---|---|
| Instruction | 3 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 50 Marks |
| Sessional | 25 Marks |

*Objectives:*

- To study and conduct the coefficient of discharge measurements for different hydraulic machines.
- To verify the flow and velocity measurements by conducting different tests.
- To understand Bernouli,s theorem by conducting experiments.

*List of Experiments :*

1. Determination of $C_d$ $C_v$, and $C_c$ for circular orifice
2. Determination ofC for mouthpiece
3. Determination of $C_d$ V notch
4. Determination of $C_d$ for rectangular notch
5. Determination of $C_d$ for broad crested weir
6. Determination of $C_d$ for venturimeter
7. Determination of $C_d$ for hemi-spherical vessel
8. Determination of types of flows using Reynold's apparatus
9. Determination of Darcy's friction factor.
10. Verification of Bernoulli's theorem.

**CE 284**

## SURVEYING CAMP

| | |
|---|---|
| Instruction | 6 Days (36 Hrs) between II and III year |
| Sessional | 50 Marks |

**Objectives:**

- To understand the overview of the survey methodologies.
- To understand practical aspects of leveling contouring and longitudinal and cross sectional survey.

A one week (6day, 36 hours) surveying camp will be organized in the intervening period between the completion of the II year, II semester and the commencement of III year, I-Semester.

The work will be graded for 50 sessional marks by a committee consisting of the Head of the Department and 2 - 3 senior faculty members.

The surveying camp exposes the students to all the aspects of planning, organizing and conducting a field survey, and plotting of the same.





**CE 223**

## SOLID MECHANICS
## (For EEE, IE)

| | |
|---|---|
| Instruction | 4 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 75 Marks |
| Sessional | 25 Marks |

**Objectives:**

- To understand the basic concept, the stress and strains for different materials.
- To know the mechanism of the development of shear force and bending moment in beams.
- To study the concept of deflections and its applications.
- To analyze and understand shear stress, tensional stress and spring applications.
- To know the concept of direct and bending and compound stresses.

**UNIT-I**

**Simple Stresses and Strains:** Definitions types of stresses and strains. Hooke's stress-strain diagrams for engineering materials. Modulus of elasticity, Poisson's ratio, volumetric strain, and relationship between elastic constants. Compound bars, and temperature stresses.

**UNIT-II**

**Shear Force and Bending Moment:** Shear force and bending moment diagrams for cantilever, simply supported beams and beams with overhangs under point loads and uniformly distributed loads, Relationship between intensity of load, shear force and bending moment.

**UNIT-III**

**Theory of Simple Bending :** Assumptions and derivation, Modulus of section, moment of resistance, and determination of flexural stresses. Direct and bending stresses on rectangular, circular and standard

structural sections. Distribution of shear stresses on rectangular, circular, I-, T-, standard steel and hollow sections.

**UNIT-IV**

**Deflections :** Slope and deflections by the method of double integration in cantilever, simply supported beams, and simple beams with overhangs under point loads and uniformly distributed loads.

**Strain Energy :** Concepts and applications, Stresses and deformations in bars due to gradually applied loads, sudden and impact loads.

**UNIT-V**

**Torsion :** Theory of torsion, and derivation of basic equation, solid and hollow circular shafts, strain energy, transmission of power; combined bending and torsion,

**Springs:** Close coiled helical springs subjected to axial loads and couples' strain energy in springs.

***Suggested Reading :***


1. D.S. Prakash Rao, *Strength of Materials A Practical Approach,* Universities Press, Hyderabad, 1999.
2. G.H. Ryder, *Strength of Materials, Harper & Row,* Fourth Edition, New York, 1987.
3. A. Pytel and F.L. Singer, *Strength of Material, Harper & Row,* fourth Edition, New York, 1987.
4. S.S. Bhavakatti, *Strength of Materials, Vikas Publications,* 2003.
5. S. Ramamrutham, *Strength of Materials,* Dhanpat Rai & Sons,1993.






**CE 271**

## FLUID DYNAMICS
## (For ME, PE)

| | |
|---|---|
| Instruction | 4 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 75 Marks |
| Sessional | 25 Marks |

**Objectives:**

- To know various fluid properties, concept and method of fuid pressure measurement.
- To understand the basic concepts of fluid motion.
- To study different equations of fluid motion and fluid dynamics.
- To analyze different flow characteristics of laminar and turbulent flows.
- To study the motion of gasses for different conditions of expansion.

**UNIT-I**

**Properties of fluids:** Definition of fluid and concept of continuum. Fluid properties; pressure, density, specific weight, specific volume, dynamic and kinematic viscosity. Classification of fluids; ideal and real fluids.

**Fluid Kinematics:** General concepts of path lines, stream lines, streak lines and stream tubes. Classification of fluid flow; steady and unsteady, uniform and non-uniform, laminar and turbulent, rotational and irrotational, one, two and three-dimensional flows. Definition and properties of stream function and velocity potential function.

**UNIT-II**

**Fluid Dynamics:** Energy of a fluid body, potential energy and potential head, pressure energy and pressure head, kinetic energy and kinetic head, energy equation. Derivation of Euler's and Bernoullis' equations, and their applications. Impulse momentum equation and its applications.

**UNIT-III**

**Measurement of Fluid Flows;** Measurement of pressure, and use of pressure measuring devices such as manometers, Bourdon's

pressure gauge and transducers. Measurement of velocity, and use of velocity measuring devices such as pitot tube and hot wire anemometer. Measurement of discharge, and use of discharge measuring devices such as venturimeter, orifice meter and rotameter; derivation of relevant formulae. Discharge formulae for weirs and notches.

**UNIT-IV**

**Laminar and Turbulent Flow through Pipes;** Distinction between laminar and turbulent flows; Reynold's number and its significance. Upper and lower critical values of Reynold's numbers for flow in pipes. Development of laminar and turbulent flow in circular pipes. Hagen-Poisciiille equation; frictional losses m pipes. Darcy's equation. Estimation ofDarcy's friction factor. Empirical formulae and Moody's chart.

**Boundary Layer Theory:** Development of laminar and turbulent boundary layers on a flat plate, pressure gradient, and phenomenon of separation. Fluid flow over an aerofoil, flow around a cylinder at rest, rotational flow around a cylinder at rest, lift and drag forces, and coefficients; circulation and Maimus effect.

**UNIT-V**

Compressible fluid flow: Concepts of compressible flow, continuity, momentum and energy equation of compressible flow. Velocity of sound in compressible and incompressible fluids. Mach Number. Classification of compressible flow; adiabatic flow in perfect gas, stagnation pressure and temperature. Temperature, pressure, density ratios as functions of Mach number.

***Suggested Reading :***


1. K. L. Kumar, *Engineering Fluid Mechanics.* Eurasia Publishing House 1997.
2. R. K. Rajput, *Fluid. Mechanics and Hydraulic Machines* S Chand & Co.,2003.
3. P. N. Modi and S. M. Seth, *Hydraulic and Fluid Mechanics,* Standard Book House, Delhi, 1995.
4. V L. Streeter, *Fluid Mechanics.* McGraw-Hill Co. Ltd., 2002.