WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

CIVIL ENGINEERING

SEMESTER - I

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Dura-tion in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessi-onals
		THEORY					
1.	MT 201	Mathematics – III	4	-	3	75	25
2.	CE 201	Building Drawing	-	6	3	75	25
3.	CE 202	Engineering Materials and Construction	3	-	3	75	25
4.	CE 203	Engineering Geology	4	-	3	75	25
5.	CE 204	Strength of Materials - I	4	2	3	75	25
6.	CE 205	Surveying – I	4	-	3	75	25
		PRACTICALS					
1.	CE 231	Engineering Geology Laboratory	-	3	3	50	25
2.	CE 232	Surveying - I Lab.	-	3	3	50	25
3.	CE 233	Computer Aided Civil Engineering Drafting Lab.	-	2	3	50	25
		Total	**19**	**16**	-	**600**	**225**

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

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 Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	CE 221	Mechanics of Materials (For ME, PE)	4	-	3	75	25
2.	CE 222	Environmental Studies (For EEE, IE, IT)	4	-	3	75	25
		PRACTICALS					
1.	CE 241	Mechanics of Materials Laboratory. (For ME, PE)	-	3	3	50	25

EEE Electrical & Electronics Engg.
IE Instrumentation Engineering
IT Information Technology
ME Mechanical Engineering
PE Production Engineering

MT 201

MATHEMATICS-III

(Common to all Branches)

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

UNIT –I

Partial differential Equations : Formation of partial differential equations of first order, Lagrange's solution. Standard types. Charpit's & Jacobi's method of solution, Partial differential equations of higher order, Monge's method.

UNIT-II

Fourier Series : Expansion of a function in Fourier series for a given range, half range sine and cosine expansion, odd and even functions of Fourier series, change of interval, complex form of Fourier Series.

UNIT – III

Partial differential Equations : Solution of wave equation, heat equation and Laplace's equation by the method of separation of variables, and their use in problems of vibrating string, one and two dimensional wave and heat flow and examples thereon.

UNIT-IV

Z - Transforms : Introduction. Basic theory of Z-Transforms. Z-transform of some standard sequences. Existence of Z-Transform, Linearity property, Translational Theorem, Scaling property, Initial and Final Value Theorems, Differentiation of Z-Transform, Convolution Theorem, Solution of Difference equations using Z-transforms.

UNIT-V

Numerical Methods : Solution of linear system of equations. Gauss elimination method Gauss-Seidel iterative method, ill-conditioned equations and refinement of solutions, Interpolation, Lagrange Interpolation, Newton's

divided difference interpolation, Newton's Forward and Backward difference Interpolation Formulas. Numerical differentiation and integration (Trapezoidal and Simpson's formulas) Solution of Differential equations by Runge Kutta Method.

Suggested Reading :

1. E. Kreyszig. *Advanced Engineering Mathematics*, Wiley Eastern Ltd., 8th Edition, New Delhi, 2006.
2. R. K. Jain and S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 2005.
3. B.V. Ramana, *Higher Engineering Mathematics*, Core Engineering Series, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2007.
4. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 34th Edition, 1998.

CE 201

BUILDING DRAWING

Instruction	6	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

UNIT - I

Introduction: Scope of the subject, notation used, method of presentation. **Conventional Signs:** Conventional representation of building elements. Representation of building materials in section. Representation of doors, windows, ventilators, cupboards and grills in plan. Representation of electrical and plumbing services. Bricks and brick sections in isometric view.

Brick Bonds: Plan and isometric view of wall junctions for half brick wall; one and one-and-a-half brick wall; brick masonry courses in English bond and Flemish bond.

Stone Masonry: Elevation, sectional plans and cross sections of walls of ashlar, CRS I and II sorts, URCS and RR stone masonry.

UNIT - II

Doors and Windows: Plan, section and elevation of a fully paneled door and a fully paneled window. paneled venetian and glazed doors.
Roofs: RC and sheet roofs, and profiles of shell roofs.

UNIT - III

Stairs: Different forms of stairs. Details of various RC staircases and steel staircases.

Foundations: Sectional elevations of stone masonry and RC footings of foundations in residential buildings.

UNIT - IV

Steel Roof Trusses: Various types of roof trusses. Detailed elevation and enlarged details of riveted and welded joints of a typical truss.

UNIT - V

Drawing of Plans, elevations and sections of a single storey 1-, 2- and 3-bed room residential building.

Suggested Reading

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*,, Allies Book Stall, Third Edition, 2004
3. M. G. Shah, C. M. Kale and S. Y. Patki, *Building Drawing*, Tata McGraw-Hill Book Co., 2002
4. IS 2210 : 1988, *Indian Standard Criteria for Design of Reinforced Concrete Shell Structures and Folded Plates*, Bureau of Indian Standards, New Delhi, 1989.

CE 202

ENGINEERING MATERIALS AND CONSTRUCTION

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

UNIT - I

Stones: Uses of stones as building materials. Characteristics of good building stones. Classification of stones. Quarrying, various methods. Dressing and polishing of stones.

Bricks: Composition of brick clay. Methods of manufacturing bricks. Preparation of brick earth. Tempering. Pugmill. Various steps of moulding. drying and method of burning of bricks; clamps, intermittent and continuos kilns, Bull's trench kiln, Hoffman's kiln. Characteristics of good building bricks, classification of bricks.

Building Blocks: Hollow building blocks for walls and roofing. Load bearing and non-load bearing blocks. Provisions of IS 2572. Flyash bricks and manufacture.

UNIT - II

Cement: Chemical composition of the ingredients for manufacturing cement. Outline of manufacturing process, flow diagram. Tests on cement. IS 269 specifications for Ordinary Portland Cement, various types of cements.

Blended Cements: Various types and their uses.

Fine Aggergate: Characteristics of good mortar sand, availability of sand and its classifications. Alternatives to natural sand. Bulking of sand.

Coarse Aggregate: Characteristics of good coarse aggregates for manufacture of concrete. Tests on aggregates. Light weight aggregates.

UNIT - III

Mortar: Different types of mortars, preparation, setting and curing. Manufacturing methods of mortar.

Concrete: Batching, mixing, transporting, compacting and curing. Readymix concrete.

Reinforcing steel: Types of reinforcement, specifications, storage and handling.

UNIT - IV

Timber: Timber as a building material and its uses. Various types of timber. Seasoning and its importance. Preservation of wood. Laminates and their uses.

Paints, Varnish and Distemper: Constituents, characteristics of good paints. Bases, vehicles, thinners and colouring pigments. Painting of different types of surfaces; types of varnish, and application. Types of distemper, and application.

Emerging Building Materials: Energy conservation in buildings. Recycled materials, local materials and industrial waste products as a means of sustainable development. Glass, composites and smart materials.

UNIT - V

Floors: Characteristics of good floors. Common types of floors. Stone flooring, concrete flooring, terrazo flooring. Ceramic and mosaic tiles. Industrial floors. Methods of construction, and maintenance.

Arches: Geometrical forms. Semicircular, segmental, HorseShoe, Stilted, Blunt, Equilateral, Acute, Three centered, Two cusped flat arch, Types of brick and stone arches.

Plastering, Pointing and White / Colour Washing: Types of plastering, preparation of surfaces, and defects. Types of pointing, preparation of surfaces. Preparation and application of white wash, and colour wash.

Form work and scaffolding: Requirements, types, materials, accessories, reuses and maintenance.

Suggested Reading

1. Sushil Kumar, *Building Construction*, Standard Publishers, 1992.
2. S. P. Arora and S. P. Bindra, *A Text Book of Building Construction*, Dhanpat Rai Publications, 2004.
3. National Building Code of India, 2005.
4. *Advances in Building Materials and Construction*, Central Building Research Institute, Roorkee, 2004.
5. *Civil Engineering Materials*, National Institute of Technical Teachers, Tata McGraw-Hill, New Delhi.

Additional Reading :

1. IS 432 : 1982, *Indian Standard Specification for Mild Steel and Hard-Drawn Steel Wire for Concrete Reinforcement*, Part I and II, Bureau of Indian Standards, New Delhi, 1982.
2. IS 1077 : 1992, *Indian Standard Common Burnt Clay Building Bricks ___ Specification*, Bureau of Indian Standards, New Delhi, 1992.
3. IS 1786 : 1985, *Indian Standard Specification for High Strength Deformed Steel Bars and Wires for Concrete Reinforcement*, Bureau of Indian Standards, New Delhi, 1985.
4. IS 2117 : 1991, *Indian Standard Guide for Manufacture of Hand-Made Common Burnt Clay Building Bricks*, Bureau of Indian Standards, New Delhi, 1991.
5. IS 2248 : 1992, *Indian Standard Glossary of Terms relating to Clay Products for Buildings*, Bureau of Indian Standards, New Delhi, 1992.
6. IS 2572 : 1963, *Indian Standard Code of Practice for Construction of Hollow Concrete Block Masonry*, Bureau of Indian Standards, New Delhi, 1963.
7. IS 3495 (Parts 1 – 4): 1992, *Indian Standard Method of Test for Burnt Clay Building Bricks*, Bureau of Indian Standards, New Delhi, 1992.
8. IS 11650 : 1991, *Indian Standard Guide for Manufacture of Common Burnt Clay Building Bricks by Semi-Mechanised Process*, Bureau of Indian Standards, New Delhi, 1991.
9. IS 12269 : 1987, *Indian Standard Specifications for Grade 53 Ordinary Portland Cement*, Bureau of Indian Standards, New Delhi, 1990.
10. IS 13767 : 1993, *Indian Standard Burnt Clay Flyash Building Bricks ___ Specification*, Bureau of Indian Standards, New Delhi, 1993.
11. IS 14867 : 1999, *Indian Standard False Work for Concrete Structures ____ Guidelines*, Bureau of Indian Standards, New Delhi, 1999.

CE 203

ENGINEERING GEOLOGY

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

UNIT - I

Rocks: Distinguishing features of igneous, sedimentary and metamorphic rocks. Geological description and Indian occurrence of granite, basalt, dolerite, gabbro, laterite, sandstone, shale, limestone, slate, gneiss, quartzite, marble, khondolite and charnocite.

Geological Structures: Folds, fractures (joints) and faults. Basic types, mechanism, origin and classification, field identifications, and engineering analysis of folds, fractures (joints) and faults as mechanical defects of rock masses.

UNIT - II

Rock Weathering: Processes and end-products of weathering. Susceptibility of rocks to weathering; assessment of the degree of weathering. Tests of weatherability, and engineering classifications of rock weathering.

Geology of Soils: Formation of soils, nature of parent materials, relative stability of minerals, important clay minerals, geological classification, description and engineering. Types of soils and uses.

Hydrogeology: Hydrologic cycle, water table, aquifers, occurrence of ground water in various lithological formations. Ground water movement, springs. Ground water exploration. Ground water provinces of India.

UNIT - III

Rock Mechanics: Engineering properties of rocks. Stress-strain behaviour of rocks. **Site Investigation and Geotechniques:** Geological maps, and aerial photographs. Electrical resistivity and seismic refraction methods. Bore hole drilling.

UNIT - IV

Rock as Construction Material: Geological considerations in the selection of concrete aggregates, highway and runway aggregates, building stones, decorative stones, roofing and facing stones.

Geology of Dams and Reservoirs: Types of dams. Dam foundations and reservoirs. Engineering and geological investigations for a masonry dam site; analysis of dam failures in the past. Engineering geology of major dam sites of India.

UNIT - V

Tunnels: Stand-up time of different rocks. Engineering geological investigations of tunnels in rock; problems of tunneling, pay line and over break, logging of tunnels, and geology of some well known tunnels.

Geological Hazards: Geological aspects of earthquakes, tsunamis and land slides. Disaster prevention, mitigation and management

Suggested Reading

1. F. G. Bell, *Fundamentals of Engineering Geology*, Aditya Books Pvt. Ltd., New Delhi, 1992.
2. D. P. Krynine and W. R. Judd, *Principles of Engineering Geology and Geotechnics*, CBS Publishers & Distributors, First Edition, 1998.
3. R. V. G. K. Gokhale, *Engineering Geology*, BS Publishers, 2005.
4. P. B. Attewell and I.W. Farmer, *Principles of Engineering Geology*, Chapman and Hall, 1976.
5. Officers of the Geological Survey of India, *Engineering Geology Case Histories*, Geological Survey of India, Miscellaneous Publication No. 29, 1975.

CE 204

STRENGTH OF MATERIALS - I

Instruction	4	Theory periods per week
	2	Drawing periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

UNIT - I

Simple Stresses and Strains: Definitions, types of stresses and strains. SI units, and notation. Hooke's law, modulus of elasticity, stress-strain curves for mild steel and typical engineering materials. Ductile and brittle materials. Working stress and factor of safety. Deformation of bars under axial loads; prismatic and non-prismatic bars. Deformations due to self-weight. Bars of uniform strength. Poisson's ratio; volumetric strain and restrained strains. Relationship between elastic constants. Compound bars and temperature stresses. Statically indeterminate problems in tension and compression. Compound bars and temperature stresses. Indian standard codes of practice. Non-linear elasticity.

UNIT - II

Shear Force and Bending Moment: Definitions. Different types of beams and loads; shears force and bending moment diagrams for cantilever and simply supported beams with and without overhangs subjected to different types of loads viz., point loads, uniformly distributed loads, uniformly varying loads and couples. Relationships between loading, shear force and bending moment.

Bending Stresses in Beams: Theory of simple bending. Moment of resistance, modulus of section. Stresses in beams of various cross sections; flitched beams.

UNIT - III

Shear Stresses in Beams: Distribution of transverse shear stresses over rectangular, circular, triangular, I- and T- sections.

Direct and Bending Stresses: Distribution of stresses over symmetrical sections under combined axial load and bending moment. Cores of solid and hollow circular and rectangular sections.

Trusses: Methods of sections and joints applied to trusses of various configurations.

UNIT - IV

Thin Cylinders: Thin Cylinders subjected to internal fluid pressure; prestressed cylinders.

Thick Cylinders: Stresses under internal and external pressure. Compound cylinders.

Spherical Shells: Stresses under self-weight, uniformly distributed and crown loads.

UNIT - V

Graphic Statics:

1. Resultant of coplanar, concurrent, parallel (like and unlike) and non-concurrent forces.
2. Analysis of pin jointed determinate trusses and girders subjected to vertical and inclined loads.
3. Shear force and bending moment diagrams for cantilevers, simply supported beams, and beams with overhangs.

Suggested Reading

1. D. S. Prakash Rao, *Strength of Materials ___ A Practical Approach,* Universities Press, Hyderabad, 1999.
2. D. S. Prakash Rao, *Graphical Methods in Structural Analysis,* Universities Press, Hyderabad, 1997.
3. G. H. Ryder, *Strength of Materials,* Third Edition in SI units, Macmillan India Limited, Delhi, 2002.
4. A. Pytel and F. L. Singer, *Strength of Materials,* Harper & Row, Fourth Edition, New York, 1987.

Additional Reading

1. IS 516 : 1959, *Indian Standard Method of Tests for strength of Concrete,* Bureau of Indian Standards, New Delhi, 1959.
2. IS 1608 : 1995, *Indian Standard Mechanical Testing of Metals ___ Tensile Testing,* Bureau of Indian Standards, New Delhi, 1995.
3. IS 10 005 : 1994, *Indian Standard for SI Units and Recommendations for the Use of Their Multiples and Certain Other Units,* Bureau of Indian Standards, New Delhi, 1994.

CE 205

SURVEYING - I

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

UNIT - I

Chain Survey: Principles of chain survey, use and adjustment of various instruments employed in chain survey, including optical square and Abney's level. Offsets and errors in offsets. Obstructions in chaining, and chain angles. Errors and their sources. Determination of areas by chain survey.

UNIT - II

Compass Survey: Use and adjustment of prismatic and surveyor's compass. Methods of surveying with a compass. Magnetic declination, local attraction. Errors in prismatic survey. Drawing up field books. Plotting of compass survey. Distribution of closing error graphically by Bowditch Method.

UNIT - III

Plane Table Survey: Instruments employed in plane table survey. Use and adjustment of these instruments including simple alidade. Various methods of plane table survey. Three-point and two-point problems. Plane table contouring, using tangent clinometer. Errors in plane table survey.

UNIT - IV

Levelling: Definitions and principles of construction of a levelling instrument, and its various parts with special reference to spirit bubble and telescope. Use and adjustment of dumpy and tilting levels. Establishment of bench marks by levelling. Longitudinal levelling. Cross-section levelling. Flying levels, and reciprocal levelling. Methods of booking and reduction of levels. Errors in levelling; curvature and refraction corrections.

UNIT – V

Calculation of areas : Simpson's rule, and trapezoidal rule. Computation of cross sectional areas.

Contouring: Definition and characteristics of contours. Direct and indirect methods of contouring. Uses of contours. Estimation of volumes of earthwork, and of water storage by means of contour lines and sections. Grade contours.

Suggested Reading

1. C. Venkatramaiah, *A Text Book of Surveying*, Universities Press, Hyderabad, 1997.
2. T. P. Kanetker and S. V. Kulkarni, *Surveying and Levelling*, Pune Vidyarthi Gruha Prakshan, Pune, 1994.
3. B. C. Punmia, *Surveying*, Vol. 1 and 2, Lakshmi Publications, 1994.

CE 231

ENGINEERING GEOLOGY LABORATORY

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

List of Experiments

1. Identification and description of physical properties of minerals.
2. Identification and description of geotechnical characteristics of rocks; IS:1123 - 1975.
3. Determination of apparent specific gravity, porosity and water absorption of different rocks; IS:1124 - 1974.
4. Study of structural models; folds, faults and unconformities.
5. Measurement of strike and dip of joints in granites using clinometer compass.
6. Measurement of electrical resistivity of rocks, soils and water.
7. Vertical electrical sounding.
8. Study of geological maps of Andhra Pradesh and India with reference to the distribution of building stones.
9. Study of geotechnical map of India and geomorphologic map of India.
10. Study of hydro-geological maps of Andhra Pradesh and India.
11. Study of tectonic map of India, seismo-tectonic atlas of India, and seismic zoning map of India.
12. Study of maps and sections pertaining to the foundation geology of major dam sites of India.
13. Study of topographic maps.

CE 232

SURVEYING -I LABORATORY

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

List of Experiments

1. Use of chain and tape and other accessories required for linear measurements.
2. Traversing by using chain and tape.
3. Application of traversing to locate a building and field objects.
4. Traversing by using compass.
5. Distance between two inaccessible points by compass survey.
6. Compass traversing and adjustment of closed traverse by Bowditch's method.
7. Plane table survey; radiation and intersection methods.
8. Two-point problem.
9. Three-point problem using trial and error method.
10. Flying levels using Dumpy Level.
11. Tilting levels; L. S. and C. S.
12. Demonstration of minor surveying instruments.

CE 233

COMPUTER AIDED CIVIL ENGINEERING DRAFTING LABORATORY

Instruction	2	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessionals	25	Marks

List of Experiments

1. **CAD:** Introduction to Computer Aided Drafting; features and environment.
2. **Coordinates and Basic Drafting Tools:** Exercises pertaining to basic building elements to illustrate the use of absolute and relative cartesian coordinates; object tools such as snap and grid.
3. **Display Commands:** Drawing scale and view magnification, zooming and panning commands.
4. **Creating and Editing 2-D Geometry:** Creating line objects, creating circle, arc, ellipse and various polygons. Introduction to polyline. Use of editing and modifying commands.
5. **Construction Techniques:** Tools to assist drafting. Creating offsets, trimming and extending of lines, and filleting of corners. Creating multiple objects through mirroring and array generation.
6. **Managing Object Properties:** Concept and significance of layers and its applications in building drawing. Use of different types of lines and their weightages.
7. **Creating Text and Defining Styles :** Exercises in adding text to a drawing. Management of text styles.
8. **Introduction to Blocks :** Significance of blocks in drawing. Creating blocks of common building elements and their insertion.
9. **Dimensions and Hatching :** Addition of dimensions to a drawing. Dimension style management. Hatching of sections; styles of hatch.
10. **2-D Single Storey building plan**

Suggested Reading

1. M. G. Shah, C. M. Kale and S. Y. Patki, *Building Drawing,* Tata McGraw-Hill Book Co., 2002
2. *Mastering Autocad,* BPB Publication, 2000
3. K. Venugopal, *Engineering Drawing and Graphics + Autocad,* New Age International (P) Ltd., New Delhi, 1998.
4. N. Siddiquee et al, *Engineering Drawing with a Primer on Autocad,* Prentice Hall of India Pvt.Ltd., New Delhi, 2004.

CE 221

MECHANICS OF MATERIALS

(Common to Mechanical / Production Engineering)

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

UNIT – I

Stresses and Strains: Definitions, types of stresses and strains. Elasticity and plasticity. Hooke's law. Stress-strain diagrams for engineering materials. Modulus of elasticity. Poisson's ratio. Relationship between elastic constants. Linear and volumetric strains. Bars of uniform strength. Temperature stresses. Compound bars.

UNIT – II

Shear Force and Bending Moment: Bending moment and shear force diagrams for cantilever, simply supported beams and beams with overhangs. Relationship between intensity of loading, shear force and bending moment. Simple theory of bending. Moment of resistance. Modulus of section. Flitched beams.

UNIT – III

Deflections: Slope and deflections by the method of double integration in cantilever, simply supported beams and beams with over hangs subjected to point loads and uniformly distributed loads.

Torsion: Derivation of torsion formula for circular sections. Torsional stresses, angle of twist, power transmission, effect of combined bending and torsion. Close coiled and laminated springs.

UNIT – IV

Shear Stresses in Beams: Distribution of shear stresses in rectangular, I- and T-, standard steel and hollow sections. Compound stresses, principal stresses and strains. Mohr's circle of stress.

UNIT – V

Cylinders: Stresses in thin and thick cylinders with internal and external pressures. Hoop and longitudinal stresses. Stresses in compound cylinders.

Direct and bending stresses; Core of rectangular, circular, I- and T-sections.

Columns and Struts: Euler and Rankine formulae for axial load applications. Secant and Perry formulae for eccentrically loaded columns.

Suggested Reading

1. D. S. Prakash Rao, *Strength of Materials ___ A Practical Approach*, Universities Press, Hyderabad, 1999.
2. G. H. Ryder, *Strength of Materials*, Third Edition in SI units, Macmillan India Limited, Delhi, 2002.
3. S. Ramamrutham, *Strength of Materials*, Dhanpat Rai & Sons, 1993.
4. S. S. Bhavakatti, *Strength of Materials*, Vikas Publications, 2003
5. B. C. Punmia, *Strength of Materials and Theory of Structures*, Laxmi Publications, 1992.

CE 222

ENVIRONMENTAL STUDIES

(Common to all Branches)

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

UNIT –I

Environmental studies : Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources, growing energy needs, renewable and non-renewable energy sources. Land Resources, land as a resource, land degradation, soil erosion and desertification.

UNIT – II

Ecosystems : Concepts of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers, energy flow in ecosystem, food chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT – III

Biodiversity : Genetic species and ecosystem diversity, bio-geographical classification of India. Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT - IV

Environmental Pollution : Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste management.

Environment Protection Act: Air, water, forest and wild life acts, issues involved in enforcement of environmental legislation.

UNIT – V

Social Aspects and the Environment : Water conservation, watershed management, and environmental ethics. Climate change, global warming, acid, rain, ozone layer depletion. Environmental protection act, population explosion.

Disaster management : Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology, disaster management cycle, and disaster management in India.

Suggested Reading

1. A. K. De, *Environmental Chemistry*, New Age Publications, 2002.
2. E. P. Odum, *Fundamentals of Ecology,* W.B. Sunders Co., USA.
3. G.L. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach,* Prentice Hall of India, 2005.
4. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2005
5. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, 1999.

CE 241

MECHANICS OF MATERIALS LABORATORY

(Common to Mechanical / Production Engineering)

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

List of Experiments

Cycle - I

1. Direct tension test on metal rods
2. Young's modulus of metal specimen by direct tension test
3. Brinnel's and Rockwell's hardness tests
4. Compression test
5. Impact 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. Fatigue test

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

CIVIL ENGINEERING

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	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	Fluid Mechanics - 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	-	3	38 + 37	12 + 13
	ME 271	**Part - B** Mechanical Technology	3	-			
		PRACTICALS					
1.	CE 281	Strength of Materials - Lab	-	3	3	50	25
2.	CE 282	Surveying - II Laboratory	-	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.

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	CE 222	Environmental Studies** (For CSE, ECE, ME, PE)	4	-	3	75	25
2.	CE 223	Solid Mechanics (For EEE, IE)	4	-	3	75	25
3.	CE 271	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	Theory periods per week
	2	Drawing per week
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 cantilever and simply supported beams, and beams with overhangs carrying point loads, uniformly distributed and varying load over entire span. Momen area and conjugate beam methods.

UNIT - II

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.

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.

UNIT - III

Compound stresses and strains: Principal stresses. Ellipse of stress. Mohr's circle for biaxial stresses. Principal strains. Introduction to failure theories.

Torsion: Theory of torsion in solid and hollow circular shafts, shear stress, angle of twist, strength and stiffness of shafts. Transmission of power. Combined torsion and bending with and without end thrust. Determination of principal stresses and maximum shear stress. Equivalent B. M. and T. M.

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. Rankine – Gordon's formula, straight-line formula, effect of end conditions, slenderness ratio, eccentrically loaded columns, and Secant and Perry's formulae.

Trusses: Tension coefficients method and application to plane and space trusses.

Suggested Reading

1. D. S. Prakash Rao, *Strength of Materials ___ A Practical Approach,* Universities Press, Hyderabad, 1999.
2. D. S. Prakash Rao, *Graphical Methods in Structural Analysis,* Universities Press, Hyderabad, 1997.
3. G. H. Ryder, *Strength of Materials,* Third Edition in SI units, Macmillan India Limited, Delhi, 2002.
4. A. Pytel and F. L. Singer, *Strength of Materials,* Harper & Row, Fourth Edition, New York, 1987.

CE 252

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 micro-optic theodolite, Measurements 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 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 levelling, calculation of elevations and distances of accessible and inaccessible objects, problems. Trigonometrical levelling, geodetic observations, refraction and curvature corrections, axis signal correction, determination of difference in elevation by single and reciprocal observations, problems.

UNIT - III

Curves: Theory of simple curves. Setting out simple curves by linear and instrumental methods. Obstructions in curve ranging. Compound curves. Reverse curves.

UNIT - IV

Transition and Vertical Curves: Transition curves, computations and setting out of transition curves. Vertical curves, computations and setting out of vertical curves.

Total station : Features, concepts, types and applications.

UNIT - V

Tacheometry: Theory and use of stadia wires in levelling instruments and theodolite. Fixed and movable hair tacheometers. Reduction by calculations; tacheometric, tables; use of tacheometric alidade in contouring by plane table. Tangential method of tacheometry, Theory and use of Jeffcott Direct Reading Tacheometer. Use of RD's self reducing Tacheometer. Principle and use of substance bar and Beaman's stadia arc. Hydrographic survey ; brief introduction and applications.

Hydrographic Survey: Brief introduction, methods and applications.

Suggested Reading

1. C. Venkatramaiah, *A Text Book of Surveying,* Universities Press, Hyderabad, 1997.
2. T. P. Kanetker and S. V. Kulkarni, *Surveying and Levelling*, Pune Vidyarthi Gruha Prakshan, Pune, 1994.
3. B. C. Punmia, *Surveying*, Lakshmi Publications, 1994.

WITH EFFECT FROM ACADEMIC YEAR 2007-2008

CE 253

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

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

Fluid Kinematics: Classification of fluid flow, steady, unsteady, uniform, non-uniform, one, two and three-dimensional flows. Concepts of streamline, stream tube, path line and streak line. Law of mass conservation. Continuity equation from control volume and system analysis. Rotational and irrotational flows. Stream function, and velocity potential function. Significance and use of flownets.

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.

Impulse Momentum Equation: Momentum correction factor. Application of the impulse momentum equation to evaluate forces on nozzles and bends. Pressure on curved surfaces. Vortex flow; forced and free vortex.

UNIT - III

Measurement of Pressure: Piezometers and Manometers. Micro-manometer. Bourdon Gauge. Transducers.

Measurement of Discharge in Pressure Conduits: Venturimeter, orifice meter and nozzle meter, elbow meter, and rotameter.

Measure of Discharge in Free Surface Flows: Notches and weirs, and partial flumes.

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 a pressure wave for adiabatic and isothermal processes. Mach Number and Mach cone, and its applications. Stagnation pressure, density and temperature in adiabatic process.

UNIT - V

Flow through Pressure Conduits: Reynold's experiment and its significance. Upper and lower critical Reynold's Numbers. Critical velocity. Hydraulic gradient. Laminar flow through circular pipes. Hagen - Poiseuille equation. Characteristics of turbulent flow. Head loss in pipes. Darcy - Weisbach equation. Friction factor. Moody's diagram. Minor losses. Pipes in series and pipes in parallel.

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. A. K. Jain, *Fluid Mechanics*, Khanna Publishers, Delhi, 1993.
4. P. N. Modi and S. M. Sethi, *Hydraulic and Fluid Mechanics*, Standard Book House, Delhi, 1995.

EE 271

ELECTRICAL TECHNOLOGY & MECHANICAL TECHNOLOGY
PART - A ELECTRICAL TECHNOLOGY
(For CE)

Instruction	3	Periods per week
Duration of University Examination	1-1/2	Hours
University Examination	38	Marks
Sessionals	12	Marks

Unit I

DC Circuits : Ohm's law, Kirchoff's laws, Resistance network, Series, parallel and series - parallel circuits with dc sources, Power loss in resistive elements. Alternating Currents : Principles of production of ac waveform, Frequency, Effective value and form factor, Effective values of current and voltage, Vector representation, Behaviour of pure inductance, capacitance and resistance with sinusoidal sources, Impedance and power factor, simple ac network with R, L & C elements under steady-state, Three-Phase circuits under balanced conditions, Star-delta connections, Power in balanced three-phase circuit.

Unit II

Transformers : Ideal transformers, Principle of transformation, Working of actual transformer under no-load and load conditions, Approximate equivalent circuit, Open circuit & Short circuit tests, Regulation and efficiency.

Unit III

Induction Motors : Types of Induction motors, Production of rotating magnetic field, Synchronous speed, Torque production, Slip and speed of motor, Slip-torque characteristics, Starting of induction motors, Applications of induction motors, Illumination : Units of light measurement, Coefficient of utilization and depreciation, Polar curves, Calculations of street lighting.

Suggested Reading :

1. J.B. Gupta, *Fundamentals of Electrical Engineering*, S.K. Kataria & Sons, 2002.

ME 271

ELECTRICAL AND MECHANICAL TECHNOLOGY
PART - B
MECHANICAL TECHNOLOGY

Instruction	3	Periods per week
Duration of University Examination	1.5	Hours
University Examination	38	Marks
Sessionals	13	Marks

UNIT - I

Introduction: General description, operation, maintenance and selection of earth moving and excavating equipment such as shovels, dragline, clamshell, cable excavator, bucket wheel excavator, tractor, bulldozer, scraper, trenchers, grader and earth compactors.

UNIT - II

Conveying Equipment: Belt conveyor, screw conveyor, bucket conveyor, apron conveyor, aerial rope-way.

Hoisting Equipment: Hoist winch. Differential and worm geared chain hoists. Fork lift trucks, guyed and stiffley derricks, swing and non-swing mobile cranes. Whirler crane, construction elevator, passenger lift, bucket elevators.

UNIT - III

Aggregate and Concrete Producing Equipment: Jaw, roll, cone and gyratory crushers; hammer, rod and ball mills. Screens, stationery, revolving, shaking and vibrating. Concrete mixers and pumps.

Pneumatic Equipment: Reciprocating air-compressor. Pneumatic tools, jack hammer, paving breaker, rock drill and concrete vibrator.

Suggested Reading

1. R. L. Peurifoy, *Construction Planning, Equipment and Methods*, McGraw-Hill Publishers, 1956.
2. Mahesh Verma, *Construction Equipment and its Planning and Application*, Metropolitian Books Co., Delhi, 1975.
3. G. Spence and C. L. Wood, *Building and Civil Engineering Plant*, John Wiley & Sons, 1951.

WITH EFFECT FROM ACADEMIC YEAR 2007-2008

CE 281

STRENGTH OF MATERIALS LABORATORY

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

List of Experiments

CYCLE - I

1. Direct tension test on metal rods
2. Young's modulus of metal specimen by direct tension test
3. Brinnel's and Rockwell hardness tests
4. Compression test
5. Impact 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 modulus

CE 282

SURVEYING - II LABORATORY

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

List of Experiments

1. Vernier theodolite, measurement of horizontal angles using reiteration and repetition methods.
2. Theodolite 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. Tacheometric 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.
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 substense bar.
10. Plotting of simple curve using linear method.
11. Plotting of simple curve using angular method.
12. Total station and applications.

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 C_d, C_v and C_c for circular orifice
2. Determination of C_d for mouthpiece
3. Determination of C_d for 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 hours) between II year and III year
Duration of University Examination		No University Exam.
University Examination		None
Sessionals	50	Marks

A one week (6 days, 36 hours) surveying camp will be organised 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, organising and conducting a field survey, and plotting of the same.

CE 223

SOLID MECHANICS

(Common to Instrumentation / EEE)

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

UNIT – I

Simple Stresses and Strains: Definitions types of stresses and strains. Hooke's law, 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*, Third Edition in SI units, Macmillan India Limited, Delhi, 2002.
3. A. Pytel and F. L. Singer, *Strength of Materials*, Harper & Row, Fourth Edition, New York, 1987.
4. S. S. Bhavakatti, *Strength of Materials*, Vikas Publications, 2003.

CE 271

FLUID DYNAMICS

(Common to Mechanical / Production Engineering)

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

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, and use of flow nets.

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