Civil Engineering Department

Curriculum & Syllabus 2013-14

S.E.(Civil) Full Time & Part Time

Department of Civil Engineering

Teaching and Evaluation Scheme

SE (Full-Time) in Civil Engineering (From 2013-14 onwards)

SEMESTER-I

THEORY COURSES

Sr. No.	Course Code	Subject	Scheme of Teaching (Hrs/Week)			Total Credits	Scheme of Evaluation (Marks)					
			L	T	P		Theory			Term Work	Practical /Viva-voce	Total
							Test	TA	ESE			
1	GE-221	Engineering Mathematics III	3	1	-	4	20	20	60	-	-	100
2	GE-222	Environmental Science	3	-	-	3	20	20	60	-	-	100
3	AM-223	Mechanics of Materials	3	1	-	4	20	20	60	-	-	100
4	CE-224	Fluid Mechanics I	3	1	-	4	20	20	60	-	-	100
5	CE-225	Surveying- I	3	-	-	3	20	20	60	-	-	100
6	CE-226	Computer Programming	1	-	-	1	25	25	--	-	-	50
LABORATORY COURSES												
1	AM-227	Lab: Mechanics of Materials	-	-	2	1	-	-	-	25	25	50
2	CE-228	Lab: Fluid Mechanics I	-	-	2	1	-	-	-	25	25	50
3	CE-229	Lab: Surveying- I	-	-	4	2	-	-	-	50	50	100
4	CE-230	Lab: Computer Programming	-	-	2	1	-	-	-	50	-	50
		Total Semester I	**16**	**03**	**10**	**24**	**125**	**125**	**300**	**150**	**100**	**800**

SEMESTER-II

THEORY COURSES

S. No.	Course Code	Subject	Scheme of Teaching (Hrs/Week)			Total Credits	Scheme of Evaluation (Marks)					
			L	T	P		Theory			Term Work	Practical /Viva-voce	Total
							Test	TA	ESE			
1	CE-231 to 235	Open Elective	3	-	-	3	20	20	60	-	-	100
2	AM-236	Theory of Structures I	3	1	-	4	20	20	60	-	-	100
3	CE-237	Numerical Techniques	3	1	-	4	20	20	60	-	-	100
4	CE-238	Fluid Mechanics II	3	-	-	3	20	20	60	-	-	100
5	CE-239	Survey II	3	-	-	3	20	20	60	-	-	100
6	CE-240	Building Construction & Design	3	-	-	3	20	20	60	-	-	100
LABORATORY COURSES												
1	CE-241	Lab: Survey II	-	-	4	2	-	-	-	50	50	100
2	CE-242	Lab: Building Construction & Design	-	-	4	2	-	-	-	50	50	100
		Total Semester II	**18**	**02**	**08**	**24**	**120**	**120**	**360**	**100**	**100**	**800**
		Grand Total	**34**	**04**	**20**	**48**	**245**	**245**	**660**	**250**	**200**	**1600**

L-Lectures, T-Tutorials, P-Practicals, TA-Teacher Assessment, ESE-End-Semester Examination

General Electives (Students of all branches are eligible for following courses)

CE-231   Professional Ethics

CE-232   Disaster Management

GOVERNMENT COLLEGE OF ENGINEERING, AURANGABAD

(An Autonomous Institute of Government of Maharashtra)

Department of Civil Engineering

Teaching and Evaluation Scheme

SE (Part-Time) in Civil Engineering (From 2013-14 onwards)

THEORY COURSES

Sr. No.	Course Code	Subject	Scheme of Teaching (Hrs/Week)			Total Credits	Scheme of Evaluation (Marks)					
			L	T	P		Theory			Term Work	Practical /Viva-voce	Total
							Test	TA	ESE			
SEMESTER-I												
1	GE-221	Engineering Mathematics III	3	1	-	4	20	20	60	-	-	100
2	GE-222	Environmental Science	3	-	-	3	20	20	60	-	-	100
3	AM-223	Mechanics of Materials	3	1	-	4	20	20	60	-	-	100
4	CE-226	Computer Programming	1	-	-	1	25	25	--	-	-	50
LABORATORY COURSES												
1	AM-227	Lab: Mechanics of Materials	-	-	2	1	-	-	-	25	25	50
2	CE-230	Lab: Computer Programming	-	-	2	1	-	-	-	50	-	50
		Total Semester I	10	2	4	14	85	85	180	75	25	450
SEMESTER-II												
1	CE-224	Fluid Mechanics I	3	1	-	4	20	20	60	-	-	100
2	CE-225	Surveying I	3	-	-	3	20	20	60	-	-	100
3	CE-231 to 235	Open Elective	3	-	-	3	20	20	60	-	-	100
4	CE-237	Numerical Techniques	3	1	-	4	20	20	60	-	-	100
LABORATORY COURSES												
1	CE-228	Lab: Fluid Mechanics I	-	-	2	1	-	-	-	25	25	50
2	CE-229	Lab: Surveying- I	-	-	4	2	-	-	-	50	50	100
		Total Semester II	12	2	6	17	80	80	240	75	75	550
SEMESTER-III												
1	AM-236	Theory of Structures I	3	1	-	4	20	20	60	-	-	100
2	CE-238	Fluid Mechanics II	3	-	-	3	20	20	60	-	-	100
3	CE-239	Survey II	3	-	-	3	20	20	60	-	-	100
4	CE-240	Building Construction & Design	3		-	3	20	20	60	-	-	100
LABORATORY COURSES												
1	CE-241	Lab: Survey II	-	-	4	2	-	-	-	50	50	100
2	CE-242	Lab: Building Construction & Design	-	-	4	2	-	-	-	50	50	100
		Total Semester III	12	01	08	17	80	80	240	100	100	600
		Grand Total	34	04	20	48	245	245	660	250	200	1600

L-Lectures, T-Tutorials, P-Practicals, TA-Teacher Assessment, ESE-End-Semester Examination

General Electives (Students of all branches are eligible for following courses)

CE-231 : Professional Ethics,   CE-232: Disaster Management

GE 221: Engineering Mathematics-III

Teaching Scheme   **Evaluation Scheme**

Lectures   3 Hrs/Week   Class Test   20 Marks

Tutorials   1 Hr/Week   Teacher Assessment   20 Marks

Total Credits   4   End-Semester Examination   60 Marks

Prerequisites:

Fundamental knowledge of differential equations and vector algebra

Course Educational Objectives:

To equip students with

1. Adequate knowledge of mathematics which will enable them in formulating problems and its solution
2. Solve related problems which will enable them to understand the subject and their applications in engineering

Course Outcomes Expected:

1. The students will be able to apply mathematical concepts to formulate and solve engineering problems

UNIT-1 n^{th} order Linear differential equations   08 Hrs

Methods of finding general solution of homogeneous and non- homogeneous linear differential equation with constant coefficients: General method, shortcut method, method of variation of Parameter; General solution of homogeneous and non-homogeneous linear differential equations with variable coefficients; Simultaneous Linear differential equations.

UNIT-2   Partial Differential equations   08 Hrs

Introduction of partial differential equations, Formation of partial differential equations, Solution of First-order Linear and non linear partial differential equations by Char pit's method/Adomian method, Method of separation of variables, Boundary value problems.

UNIT-3   Applications of differential equations   08 Hrs

(a)Applications of ordinary differential equations: Mechanical oscillations: Free oscillations, Damped free Oscillations, Forced oscillations, Electrical circuits, Applications in civil Engineering: Deflection of beams.

(b)Applications of partial differential equations: One dimensional heat flow equation, Two dimensional heat flow equation under steady state condition.

UNIT-4   Laplace transform and its applications   08 Hrs

Definition, Laplace transform of some basic functions, Properties of Laplace transform ,Laplace transform of Unit step function, Unit impulse function, error function, and periodic function, Use of Laplace transform to solve Linear differential equations and simultaneous linear differential equations.

UNIT-5   Vector calculus   Vector   08 Hrs

differentiation, Tangential and normal components of velocity and acceleration, Gradient of scalar point function, Divergence and Curl of vector point function and their applications. Line, surface and volume integrals, Stoke's theorem and Gauss-Divergence theorem.

Text Books:-

1. A Text Book of engineering Mathematics (Vol.1 &2) by P.N.Wartikar & J.N.Wartikar, Pune Vidhyarthi Griha Prakashan, Pune.
2. Advanced Engineering Mathematics by Erwin Kreyszig, Willey Eastern Ltd. Mumbai.
3. Engineering Mathematics-A Tutorial Approach by Ravish R Singh, Mukul Bhatt.

Reference Books:-
1. Higher Engineering Mathematics by B. S. Grewal, Khanna publication, New Delhi.
2. Advanced Engineering Mathematics by H. K. Dass, S. Chand and Sons.
3. Advanced Engineering Mathematics by Michael Greenberg,2/e, Pearson
4. Calculus by G. B. Thomas and R. L. Finney, Addison- Wesley, 1996
5. Elements of Partial Differential Equations by I.N.Sneddon

GE-222- Environmental Science

Teaching Scheme		Evaluation Scheme	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	0 Hrs/Week	Teacher Assessment	20 Marks
Total Credits	3	End-Semester Examination	60 Marks

Course Educational Objectives:
   Become aware of the importance of soil, water and air for humans and other life forms on the Earth.
   Become aware of the species extinction and loss of biodiversity.
   Become aware of the various national and international efforts that are in place for conserving the environment
   Get acquainted with national laws and global environmental conservation guidelines

Course Outcomes Expected:
   The students will be able to –
   1) Understand and appreciate the physical and chemical foundations of the Earth and its environment
   2) Understand the origin and definition of life
   3) Understand the origin and evolution of human societies and the major transformations brought by industrialization.
   4) Learn about the basics of environmental economics

UNIT-1 Natural Resources, Water resources: Use and over utilization of surface and ground water, Floods, drought, conflicts over water, dams: benefits and problems, Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Land resources: land degradation, soil erosion and desertification. Role of an individual in conservation of natural resources.   06 Hrs

UNIT-2 Global level efforts towards environment conservation and pollution control. Role of India at Global level pollution, conservation and policies of Government of India towards control of river pollution. Policy of Government of Maharashtra towards control of various pollution. Environment Protection Act, Vehicular emission standards, Noise Pollution (Regulation and Control) Rules, Concept of ISO 14000.   06 Hrs

UNIT-3 Biodiversity and its conservation, Bio-geographical classification of India, Biodiversity at global,   06 Hrs

National and local levels. India as a mega diversity nation, Hot spots of biodiversity, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity, Forest Conservation Act.

UNIT-4   Environmental Pollution: Definition, Cause, effects and control measures of Air pollution,   06 Hrs
Water pollution, Noise pollution, Thermal pollution, Nuclear hazards, Electronic Waste.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Municipal solid waste (management and handling) rules,.

UNIT-5   Urban problems related to water and energy, Water conservation, rain water harvesting, and   06 Hrs
watershed management, Climate change, nuclear accidents. Role of an individual in prevention
of pollution. Disaster management: floods, earthquake, cyclone and landslides

ASSIGNMENT
Assignment shall consist of power point presentation of related topic by individual student.

TEXT AND REFERENCE BOOKS
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha, University Grants Commission, New Delhi.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Environment Protection Act 1986.

AM-223: Mechanics of Materials

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	1 Hr/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Prerequisites:
Knowledge of Engineering Mechanics and Basic Mathematics.

Course Educational Objectives:
1) To expose the students to the concept of stresses, strains in structural materials and their behavior under loadings. Study the effect of temperature variation, lack of fit on stresses and strains in members.
2) To develop an understanding of shear force, bending moment, torsion and corresponding stresses in determinate structural members-beam, shafts etc and make him able to compute it.
3) To provide the knowledge and skill of obtaining deflections of structural members with external loads.
4) To expose the student to the concept of combined stresses and make them able to analyze it in the members under simple and combined loading.
5) To provide knowledge of theory of buckling of column.

Course Outcomes Expected:
1) The student will be able to apply the concepts and principles learned to the structural members subjected to different loads and their effects.
2) The student will be able to analyze and design the structural members subjected to tension, compression, bending, torsion etc. using the fundamental knowledge of the stresses, strains, material properties etc.
3) The students will be able to analyze the columns.

UNIT-1   **Simple Stresses and Strains:** Concept of normal stress and shear stress, Concept of normal strain and shear strain, Stress and strain diagram, Hooke's law, Elastic constants, Volumetric stress and strain, Stresses and strains in uniform and varying sections under axial loading, Saint Venant's principle, Stresses and strains in compound bars under axial loading, Concept of residual stresses, Thermal stresses and strains.   08 Hrs

UNIT-2   **Shear Force, Bending Moment, and Flexural stresses in Beams:** Axial force, shear force and bending moment diagrams for determinate beams for all types of loading, Relationship between intensity of loadings, shear force and bending moment at a section.   08 Hrs

Theory of pure bending, Elastic flexural formula, Section modulus, Flexural stresses in beams with symmetrical solid, hollow and built-up sections.

UNIT-3   **Shear stresses in Beams. Complex stresses and strains:** Shear stresses in beams with prismatic rectangular, circular and built-up sections, Concept of shear flow.   08 Hrs

Stresses on oblique plane, Transformation of plane stresses and strains, Concept of principle stresses and strains, maximum shear stress, Mohr's circle for plane stresses. Combined stresses due to direct and bending action.

UNIT-4   **Slope and Deflection of beams:** Introduction, Equation of elastic curve, Slope and deflection of   08 Hrs
statically determinate beams subjected to external loads by integration method, Macaulay's method, moment area method, Conjugate beam method. Deflection of propped cantilever, Deflection by principle of superposition.

UNIT-5   **Theory of Torsion:** Torsion of circular members-solid and hollow, Stresses due to torsion.   08 Hrs

Analysis of Columns: Buckling and stability of columns, Axially loaded columns, Critical loads by Euler and Rankine theory, Concept of effective length, Effect of different idealized end conditions, slenderness ratio, Eccentrically loaded columns.

TEXT AND REFERENCE BOOKS

1. **S.Ramamrutham**: Strength of Material, Dhanpatrai & Sons, New Delhi.
2. **R. K. Rajput:** Strength of Material, S. Chand & Company , New Delhi.
3. **S. S. Bhavicutti:** Strength of Material (3E), Vikas Publishing House Pvt. Ltd. , New Delhi.
4. **Ferdinand P. Beer and E. Russell Johnston:** Mechanics of Material, McGraw Hill, New Delhi.
5. **James M. Gere and S.P. Timoshenko:** Mechanics of Material, CBS Publishers, New Delhi.
6. **William F. Riley, Leroy D. Struges and Don H. Morris:** Mechanics of Material, Jhon Wiley & Sons Inc., New York.
7. **E.P. Popov:** Introduction to Mechanics of Solids, Prentice Hall of India, New Delhi.
8. **S.H. Crandall, N. C. Dahl and T. V. Lardner:** Mechanics of Solids: An Introduction, McGraw Hill International, Tokyo.

CE 224: Fluid Mechanics-I

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	1 Hrs/Week	Teacher Assessment	20 Marks
Total Credits		End-Semester Examination	60 Marks

Course Educational Objectives:
1. To understand conceptually the properties of fluids, fluid statics, fluid dynamics and viscous flow
2. To expose various pressure measuring devices, discharge measuring devices and metacentric height.
3. To bring awareness about behavior of flow around submerged bodies to know boundary layer thickness and separation of boundary layer

Course Outcomes Expected:
1. The student will be able to assess the properties of fluids, fluid statics, fluid dynamics and viscous flow
2. The student will be able to determine discharge through various discharge measuring devices
3. The student will be able to know about flow profiles around submerged bodies

UNIT-1	**Introduction and Properties of Fluids:** Scope and application of fluid mechanics, Newton's law of viscosity, classification of fluids, Rheological diagram, Definition of fluid: ideal and real fluids, compressible and incompressible fluids, Newtonian and non Newtonian fluids, properties of fluids – specific weight, specific volume, specific gravity, viscosity, kinematic viscosity, compressibility, surface tension and capillarity, vapour pressure	8 Hrs
UNIT-2	**Fluid Statics**: Pressure at a point, Pascal's Law, measurements of fluid pressure, gauge, vacuum and absolute pressure, simple and differential manometers along with manometric equations, hydrostatics pressure on plane and curved surfaces, pressure diagram, pressure on dams, lock gates and sluice gates. Archimedes principle, concept of buoyancy, metacentre, determination of metacentric height by analytical and experimental method, equilibrium of floating bodies, conical buoys, stability of oscillating floating bodies, buoys anchored at the bottom.	8Hrs
UNIT-3	**Fluid Kinematics**: Lagrangian and Eulerian approach of fluid motion, dimensions of flow, axi- symmetric flow, classification of fluid flows, steady, unsteady, uniform, non uniform, laminar, transition, turbulent, Reynolds number, concept of vorticity, rotational, ir-rotational flows, path line, streak line, stream tube. Continuity Equation on Cartesian coordinates, velocity potential, stream function, flow net. velocity and acceleration of fluid particle, Tangential and normal acceleration. Relative equilibrium: Fluid masses subjected to uniform, linear and radial acceleration, free and forced vortex flow,	8 Hrs

radial flow.

UNIT-4   **Fluid Dynamics**: Forces acting on fluid in motion, Euler's equation of motion in   8 Hrs
Cartesian coordinates and along streamline. Bernoulli's Equation (or Energy equation) by integration of Euler's equation, Momentum equation, kinetic and momentum correction factors. Measurement of Flow: Venturimeter, Pitot tube, orifices, mouthpieces, flow over notches and weirs.

UNIT-5   **Viscous Flow**: Relation between shear stress and pressure gradient, steady   8Hrs
laminar flow through Circular pipes, Hazen-Puiseullies equation, laminar flow through inclined pipes and parallel plates at rest, simple coutee flow.

Concept of Boundary Layer Theory: Thickness of boundary layers, displacement thickness, drag force due to boundary layer, types of boundary layer, separation of boundary layer. (Analytical treatment not expected).

Forces on immersed bodies in flowing fluids: General equations, lift, drag, types of pressure distribution about buff, stream line bodies, aerofoil, Magnus effect, (Analytical treatment not expected)

TEXT AND REFERENCE BOOKS

1. P.N.Modi and S.M.Seth, Hydraulics and Fluid Mechanics including Hydraulic Machines, Standard Book House, Delhi,16th Edition, 2007
2. R.K. Bansal, Fluid mechanics and Hydraulic machines, Laxmi Publications (P) Ltd., New Delhi, 2012
3. V.L.Streeter and E.B.Wylie, Fluid Mechanics and Hydraulic machines, McGraw Hill Publications, New York, 2010
4. D.S.Kumar, Fluid Mechanics and Fluid Power Engineering, S.K.Katariya and Sons, New Delhi, 7th Edition, 2010

CE-225: Surveying- I

Teaching Scheme		Evaluation Scheme	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	0Hrs/Week	Teacher Assessment	20 Marks
Total Credits	03	End-Semester Examination	60 Marks

Course Educational Objectives:
1. To introduce basic concepts of surveying
2. To study methods and equipments for linear and angular measurements
3. To compute area and volume from given map
Course Outcomes Expected:
Students will be able to take linear and angular measurements, draw map and calculate area and volumes.

UNIT-1   **LINEAR AND ANGULAR MEASUREMENTS**   6 Hrs
    a. Survey: object, classification, principles, difference between map and plan,
    b. Linear measurements: methods of distance measurements, instruments for measurement of distance, chaining a line, chaining along slope, offsets: instruments for laying offsets, triangulation, chain and cross staff survey, errors
    c. Angular measurements: Types of compass, Bearings, local attraction and correction to bearings, Chain and compass traversing, graphical method of adjustment, errors

UNIT-2 LEVELLING   6 Hrs
    a. Definition, study of auto level, laser level, digital level,
    b. Types of leveling: simple, differential, fly, check, profile, reciprocal etc. Profile leveling-plotting longitudinal section, cross section, leveling difficulties, volume calculations
    c. Contouring: Definition, characteristics, use, methods of locating and interpolating contour lines

UNIT-3 THEODOLITE   6 Hrs
    a. Introduction to vernier theodolite, types of theodolite, principal axes
    b. Uses of theodolite: Measurement of horizontal angle, vertical angle, magnetic bearing, prolonging a line, lining in, measuring deflection angles, direct angles, finding out elevations of objects (base accessible or inaccessible) by trignometrical observations
    c. Theodolite traversing- Computation of consecutive and independent coordinates, adjustment of a closed traverse, Gale's traverse table, omitted measurements, area by coordinates

UNIT-4 A) PLANE TABLE SURVEY   3 Hrs
    Introduction, accessories, temporary adjustments, advantages and disadvantages, methods, two point and three point problem and their solution
    B) Testing and permanent adjustments of Dumpy Level and Transit   3 Hrs

UNIT-5 A) TACHEOMETRY   4 Hrs
    a. Introduction, instruments, methods, principle of stadia method, determination of tacheometric constants, anallatic lens, horizontal and inclined sights with vertical staff
    b. Tacheometric contouring
    B) MINOR INSTRUMENTS   2 Hrs
    Study and use of planimeter, abney level, box sextant, Indian pattern clinometer

TEXT AND REFERENCE BOOKS

1. Prof. T. P. Kanetkar and Prof. S.V.Kulkarni, Surveying and leveling Vol. I & II, Pune Vidyarthi Griha Prakashan, Pune, 23rd Edition, 1985

2. Dr. A.M.Chandra , Plane surveying, New Age International Publishers New Delhi, Second Edition, 2006

3. Dr. B.C.Punmia , Surveying Vol I & II, Laxmi Publications (P) Ltd. New Delhi, Sixteenth Edition Reprint 2008
4. R. Subramanian, Surveying and Levelling, Oxford University Press, New Delhi, First Edition, 2007

CE-226: Computer Programming

Teaching Scheme   **Evaluation Scheme**

Lectures   1 Hrs/Week   Test   25 Marks
                                                     Teacher's Assessment   25 Marks
Total Credits   1   Total marks   50 Marks

Prerequisites:
The students going to learn this course should possess basic skills required for use of modern computers.

Course Educational Objectives:

In the current age, use of computers in day to day life is inevitable for everyone. Civil engineers also have to use inevitably computational tools for their daily duties which would help them to keep pace with the time. Therefore, the objective of this course meant for SE Civil students is to provide an opportunity for learning computer programming techniques especially for its application to civil engineering problems related to different subjects of the branch.

Course Outcomes Expected*: The students of would be able to do proper computer programming to solve typical problems encountered in civil engineering.

The concerned teacher can define additional outcomes

UNIT-1	Programming basics, Languages: Machine-Level/High-Level programming languages, Basic Steps to Write a Computer Program, development of program logics: algorithms, flowchart; File management, etc.	02 Hrs
UNIT-2	C programming: constants, variables, keywords, commands, statements; Data types: integers, chars, floats, doubles; Storage classes; Typical C program, execution, receiving inputs, etc.	03Hrs
UNIT-3	Decision statements: if, if-else, nested else-if, switch, goto; Logical operators, Conditional operators, while loop, for loop, break statement, continue statement, do-while loop, odd loop, etc.	03 Hrs
UNIT-4	Functions, scope rule of functions, calling convention, etc.	02Hrs
UNIT-5	Pointers, arrays, strings, standard library of string functions; Structures, etc.	02Hrs

TEXT AND REFERENCE BOOKS

Y. P. Kanetkar, Let Us C, 10th Edition, BPB Publications, New Delhi, India

Y. P. Kanetkar, Let Us C Solutions, BPB Publications, New Delhi, India

AM-227 Lab- Mechanics of Materials

Teaching Scheme   **Evaluation Scheme**

Practical   2 Hrs/Week   Term-Work   25 Marks

                                                                Viva-voce   25 Marks

Total Credits   01   Total   50 Marks

Prerequisite: Concerned theory of Mechanics of Materials.

Objective:

1. To provide real practical experience through laboratory work to clarify the theory of strength of material, to increase the investigative capacity of students and data acquiring skill and to establish its correlation with theory.

2. To study various loading machines, various type of loadings e.g. Axial, transverse, shear, torsion, point and line loading.

3. To understand the behavior of materials under loadings, and their failure patterns; various types of stresses; strength of elements e.g. beam, column, bar in torsion etc.

Minimum ten experiments shall be conducted from the following list. In addition at least new designed experiments to be conducted.

1. Tension test on Mild steel, High Yield strength deformed and cast iron specimen
2. Cold bend test on Mild and HYSD (I.S. 1608) steel bars.
3. Compression test on metals (I.S.1708).
4. Compression test on Wood (parallel and perpendicular to grains) (I.S.1708).
5. Direct shear test (Single, Double) on steel, Copper, brass specimen (I.S 5242-9779).
6. Punching shear test on thin metallic sheets.
7. Torsion test on circular mild steel bar (I.S. 1717).
8. Izod and Charpy Impact test on metals (IS: 1598 and IS: 1757 – 1973).
9. Study of Buckling of column.
10. Bending test on Timber beam.

11. Compression Test on bricks (IS 3495 (Parts 1 to 4) : 1992)

12. Water Absorption of tile (IS: 1077-1986).

13. Flexural test on tiles

14. Testing of structural steel

Term work shall consist of submission of journal containing the experiments performed by the candidate.

Viva Voce examination based on the term work shall be conducted at the end of the semester.

CE 228: Lab-Fluid Mechanics-I

Teaching Scheme		**Evaluation Scheme**	
Practicals Batch	2 Hrs/Week	Term Work	25 Marks
Total Credits	1	Viva-Voce	25 Marks

Course Educational Objectives:

1. To provide practical experience through laboratory work to clarify the theory of fluid mechanics, to increase the investigative capacity of students and data acquiring skill and to establish its correlation with theory.

2. To study various pressure measuring devices, discharge measuring devices and metacentric height.

3. To understand the behavior of flow nets through electrical analogy method.

Course Outcomes Expected:

1. The student will experience the theoretical concepts through the experimentation

   List of Experiments

   1. Study of pressure measuring devices
   2. Determination of Meta-Centric height
   3. Calibration of Bernoulli's equation
   4. Calibration of Venturimeter
   5. Determination of Hydraulic coefficients for an Orifice
   6. Determination of coefficient of discharge for mouthpieces
   7. Calibration of Rectangular Notch
   8. Calibration of Triangular Notch (Design Experiment)
   9. Study of electrical Analogy method for plotting of flow nets (Design Experiment)

   Practical Examination:

   The practical examination shall consist of term work assessment and viva- voce based on syllabus.

CE-229: Lab Surveying- I

Teaching Scheme   **Evaluation Scheme**

Practicals   4 Hrs/Week   Practical Exam   25   Marks
Tutorials   0 Hrs/Week   Term Work   50   Marks
Total Credits   02

Course Educational Objectives: Students will be able to:

1. Use the survey instruments.

2. Take linear and angular measurements.

3. Prepare layouts and maps.

4. Set out alignments for roads, railways etc.

Course Outcomes Expected: Students will be able to prepare layouts and maps from the linear and angular measurements.

List of exercises is given below

EXER.1	Use of instruments for linear measurements	2 Hrs
EXER.2	Use of dumpy level to determine elevations of points.	2 Hrs
EXER.3	Differential Levelling to determine elevations of points.	2 Hrs
EXER.4	Study and use of plane table survey.	2 Hrs
EXER.5	Radiation and intersection method in plane table survey.	2 Hrs
EXER.6	Study and use of Theodolite for measurement of angles.	2 Hrs
EXER.7	Measurement of horizontal and vertical angle using transit theodolite.	2 Hrs
EXER.8	Measurement of horizontal angle by method of repetition.	2 Hrs
EXER.9	Computation of horizontal distance and elevations by tacheometry for horizontal and inclined sights.	2 Hrs
EXER.10	Study and use of planimeter, box sextant, abney level and Indian pattern clinometer.	2 Hrs
Proj. 1	Theodolite traverse survey of a closed traverse for at least 0.5 ha area with details such as buildings, roads etc.	10 Hrs
Proj. 2	Plane table survey of a closed traverse of min 4 sides for at least 0.5 Ha with details as building, roads etc.	10 Hrs

The term work shall consist of

Full imperial drawing sheet as mentioned below

1. Theodolite traverse survey project   :1 sheet

2. Plane table survey   : 1 Sheet
    Field book containing record of all exercises and projects listed above.

CE-230: Lab Computer Programming

Teaching Scheme   **Evaluation Scheme**

Practicals   2 Hrs/Week   Term Work   50 Marks

Total Credits   1

Prerequisites

The students going to learn this course should possess basic skills of using modern computers.

Course Educational Objectives:

In the current age, use of computers in day to day life is inevitable for everyone. Civil engineers also have to use inevitably computational tools for their daily duties which would help them to keep pace with the time. Therefore, the objective of this course meant for SE Civil students is to provide an opportunity for learning computer programming techniques especially for its application to civil engineering problems related to different subjects of the branch.

Course Outcomes Expected*:
The students would be able to formulate suitable computer programmes to solve typical problems encountered in civil engineering.
*The concerned teacher can define additional outcomes

UNIT-1   Programming exercises based on Unit-1 of AM 222 Course: Computer Programming   04 Hrs

UNIT-2   Programming exercises based on Unit-2 of AM 222 Course: Computer Programming   06Hrs

UNIT-3   Programming exercises based on Unit-3 of AM 222 Course: Computer Programming   06 Hrs

UNIT-4   Programming exercises based on Unit-4 of AM 222 Course: Computer Programming   06Hrs

UNIT-5   Programming exercises based on Unit-5 of AM 222 Course: Computer Programming   02Hrs

TEXT AND REFERENCE BOOKS

Y. P. Kanetkar, Let Us C, 10th Edition, BPB Publications, New Delhi, India

Y. P. Kanetkar, Let Us C Solutions, BPB Publications, New Delhi, India

<p style="text-align:center;">CE 251: **Disaster Management**</p>

Teaching Scheme: **Examination Scheme**

Lectures: 3 hrs/ week   **ESE: 60 marks**

                                                            Test: 20 marks

                                                            Teacher's Assessment: 20 marks

Course Educational Objectives:
1. The students will be able to understand the significance of disaster management
2. Students will know different natural calamities
3. The students will understand different measures to be adopted to face the natural calamities

Course Outcomes Expected:
1. Students will be able to plan the pre-disaster activities
2. Students will understand essential post disaster activities

UNIT-1
Disaster Management: Meaning, Concepts, Principles, Approaches and Scope, Types of disasters, Disaster Mitigation: Hazard Assessment, Vulnerability Assessment, Risk Assessment, Protective Measures and Public Information.

UNIT-2
Disaster Management Policy: Principles and. Significance of disaster management policy, Policy options and approaches in disaster management, Essential components of disaster management policy, Formulation and execution of disaster management policy, Command and coordination in disaster management.

UNIT-3
Disaster Preparedness: Disaster Plan, Damage Inspection, repair and Recovery, Procedures, Communication and Control Centers, Disaster Forecasting, Warning and
Prediction.

UNIT-4
Disaster Relief: Rapid Damage Assessment, Search and Rescue operations, Evacuation and Shelter, Food and Medical Supply, Mass Media Coverage, Relief Aid, Maintaining Public Order.

UNIT-5
Reconstruction Planning: Meaning and Significance, Role of State and Central Government towards Disaster Management, Working of Different National and International Agencies, role of NGOs and funding policies

References:
1. H.K. Gupta (2003) Disaster management.
2. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000.
3. Disaster Management in India – A Status Report. National Disaster Management Division, Ministry of Home Affairs, Govt. of India, 2004.
4. Sharma, Vinod K. Disaster management, NCDM, IIPA, New Delhi, 1994.
5. Carter, W.N. Disaster Management: A Disaster Manager's Handbook, Asian Development Bank, Manila, 1992.

CE 252: Professional Ethics and Laws

Teaching Scheme:
Lectures: 3 hrs/ week

Examination Scheme
ESE: 60 marks
Test: 20 marks
Teacher's Assessment: 20 marks

Course Educational Objectives : -

1. **Student will get the idea of Ethics, Values, Moral standards**
2. **Student will know the importance of intellectual property rights**
3. **Student will be aware about social responsibility**

Course Outcomes expected :-

1. **Students will be aware about fundamental duties and importance of Intellectual property rights in their career**
2. **Students will know the importance of Ethics, Moral and Values in their profession**

Unit 1 : Preamble of the Constitution of India, Salient features of the constitution, Fundamental rights, Directive Principles & Fundamental Duties of the Indian citizen, Importance of different acts e.g. Indian Contract Act, Child Labour (Prohibition and Regulation) Act, Workmen's Compensation Act, Minimum Wages Act

Unit 2: Different Intellectual Property Rights, International aspect of intellectual property, Principles behind The Trade Marks Act, The Patents Act, The copyright Act, The Design Act, The Geographical Indications of Goods (Registration and Protection) Act, The Protection of Plant Varieties and Farmers' Rights Act, The Semiconductor Integrated Circuits Layout Design Act, The Biological Diversity Act

Unit 3 : Patents : What is patent, Inventions not patentable, Applications for patents, Publication and Examination of application, Grant of patent and rights conferred thereby, Patent office and its establishment

Unit 4 : Objective, Nature and Sources of Ethics, Types of ethics, Need and Importance of Professional ethics, Morality and Ethics

Unit 5 : Values, Norms, Beliefs, Moral Standards, Codes of Ethics, Ethics and the Organisation, The employee obligation to the firm, Firm's duties to the employee, Code of conduct of different engineering organisations

Reference Books:

1. Business Ethics-by C.S.V.Murthy, Himalaya publishing House

AM 256: Theory of Structures-I

Teaching Scheme		Evaluation Scheme	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	1 Hrs/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Prerequisite:

Knowledge of Engineering Mechanics and Mechanics of Materials

Course Educational Objectives:

1) To expose the students to the analysis of pin jointed statically determinate trusses

2) To expose the students to the energy principles and their applications for the analysis of beam , arch and

  three hinged suspension bridge

3) To expose the students to the analysis of statically indeterminate beams

Course Outcomes Expected:

1) The student will be able to analyse statically determinate pin jointed truss, three hinged arch and

  suspension bridge

2) The student will be able to analyse statically indeterminate beams

UNIT-1   Analysis of Pin Jointed Trusses   08 Hrs

  A) Analysis of statically determinate pin jointed plane trusses,

  B) Strain energy, Castigliano's theorem, Deflection of statically determinate pin jointed trusses.

UNIT-2   Fixed and Continuous Beams: 08 Hrs

  A) Fixed Beam: Static Indeterminacy, Analysis using Analytical, moment area and conjugate beam method, Sinking of support, Shear force and bending moment diagrams, Deflection

  B) Continuous Beams: Clapeyron's theorem of three moments, Analysis of continuous Beams, sinking of support, Shear force and bending moment diagrams, Deflection

UNIT-3   Influence lines for statically determinate structures: 08 Hrs
  Concept of Influence lines

  A) Influence lines for reaction, bending moment and shear force for statically

determinate beams

B) Influence line for forces in the members of statically determinate trusses.

Wheel loads, Criteria for maximum shear force, maximum bending moment

UNIT-4   **Three Hinged Arches:**   08Hrs

Analysis of three hinged arches: Parabolic and segmental three hinged arches, Determination of horizontal thrust, bending moment, radial shear and normal thrust Influence line diagrams for horizontal thrust, bending moment, radial shear and normal thrust

UNIT-5   **Three Hinged Suspension Bridges**   08 Hrs

Simple suspension cable, Anchor cable, Suspension bridge with three hinged stiffening girders. Influence line diagram for horizontal reaction at cable support, Influence line diagram for bending moment and shearing force at a given section in three hinged stiffening girders

TEXT AND REFERENCE BOOKS

1. Timoshenko S.P. and Young D.H., Theory of Structures, McGraw Hill , 1965
2. C.H. Norris, J.B. Wilbur and S.Utku, Elementary Structural Analysis, Tata McGraw Hill, New Delhi, 2003
3. S.J. Kinney, Indeterminate Structural Analysis, Oxford and IBH, 1985
4. C.K. Wang, Indeterminate Structural Analysis, Tata McGraw Hill, New Delhi
5. Devdas Menon, Structural Analysis, Narosa Publishing House, new Delhi, 2009
6. S. Ramamrutham and N. Narayan, Theory of Structures, Dhanpat Rai, New Delhi, 2000

CE 257: **Engineering Mathematics-IV**

Teaching Scheme: **Examination Scheme**
Lectures: 3 hrs/ week   **ESE: 60 marks**
                                        Test: 20 marks
                                        Teacher's Assessment: 20 marks

Course Objectives (Learning Outcomes):

- To introduce the principles of numerical techniques to graduate level civil engineering students.

- To review the basic principles of numerical differentiation, solving simple ordinary differential equations.
- To introduce optimization problems

.
Contribution of the Course to Program Outcomes:
- An ability to apply knowledge of mathematics, science and engineering.
- An ability to identify, formulate and solve engineering problems.

Unit-I :

Numerical Solution of algebraic and transcendental equations [6 hrs.]

Iterative methods for finding the roots of an equation, method of Successive approximation,, Newton-Raphson method. Numerical solution of simultaneous linear equations by Gauss Seidal and Gauss Jacobian Method

Unit-II :

Numerical differentiation and Integration [6 hrs.]

Calculus of finite differences: Forward differences, backward differences, central differences Numerical derivatives using finite differences (for equal and unequal intervals) using Newton's Forward and Backward difference formula, Sterling's central difference formula, Newton's divided difference method. Numerical Integration by Newton- Cote's quadrature formula, Trapezoidal rule, Simpson's one- third and three-eighth rule, Weddle's rule.

Unit-III :

Numerical Solution of Differential Equations [6 hrs.]

Numerical solution of Ordinary differential equations by Euler's modified method Runge-Kutta method of 4th order, Milne's predictor –corrector method. Numerical solution of partial differential equations by Finite difference Method.

Unit-IV :IV Statistics [6 hrs.]

Curve fitting, regression analysis, least squares method, multiple regression and correlation analysis.

Unit-V : Optimization Techniques [6 hrs.]

General Linear Programming Problem, Canonical and standard forms of LPP, Types of solutions of LPP, Optimal solution by Simplex method.

Reference Books :

1. M.K.Jain S.R.K.Iyengar, R.K.Jain, "Numerical Methods for Scientists and Engineering Computations" New Age international (Fourth edition)
2. Sharma S.D.: Operation Research, Kedar Nath & Co. Meerut
3. Steven C. Chapra, Tufts University, Raymond P Canale, University of Michigan, "Numerical Methods for Engineers ",6/e
4. Carnahan, B., Luther, H.A. and Wilkes, J.O., **"Applied Numerical Methods"**, John Wiley and Sons, 1969.
5. S.C. Gupta, V.K. Kapoor; Fundamentals of Mathematical Statistics: Eighth Edition; Sultan Chand & Sons.
6. Mathematical Statistics: J.N. Kapoor, H.C. Saxena; Fifteenth Edition; S. Chand & Company Ltd.
7. R.K. Gupta, Operations Research; Krishna Prakashan Media (Pvt) Ltd. Meerut.
8. E. Balaguruswamy, Numerical Methods; Tata McGraw-Hill.
9. S.S. Sastry, Advanced Engineering Mathematics; PHI Learning Private Ltd.

<div align="center">CE 258: **FLUID MECHANICS - II**</div>

Teaching Scheme:	Examination Scheme
Lectures: 4 hrs/ week	**ESE: 60 marks**
	Test: 20 marks
	Teacher's Assessment: 20 marks

Prerequisites:

Basic knowledge about properties of fluids, fluid kinematics, fluid dynamics, and discharge measuring devices

Course Educational Objectives:

4. The students will be able to understand flow through pipes and flow through open channels
5. Students will study flow through pipes, uniform and non-uniform flow in open channels and dimensional analysis and similarity
6. The students will understand application of impact of jet, turbine and pumps

Course Outcomes Expected:
3. Students will be able to design pipe network
4. Students will be able to design canal
5. Hydraulic design of pumps and turbines can be carried out by students

Unit – 1

Flow Through Pipes: Darcy's equation, major and minor losses, laws of friction, hydraulic gradient line and total energy line, flow through pipes in series and parallel, equivalent pipes and branching of pipes, three reservoir problems under steady state, Turbulent flow through pipes: Pandtl's theory, velocity distribution equation for smooth and rough pipes, mean velocity and variation of friction factor, Moody's chart. Water hammer: Rigid and Elastic water column theories function of surge tanks. Pipe Network Analysis, loops, formation of head and discharge equations Hardy cross method.

(8 Hrs)

Unit – 2

Flow in open channels: Classification of channels, steady and unsteady flows, uniform and non uniform flows, laminar and turbulent flows, gradually and rapidly varied Flows, velocity distribution in open channels, geometric shapes of channel section and their Expressions, economic channel section (Rectangular and trapezoidal), basic equation of Fluid flow viz. continuity equation, Bernoulli's equation and momentum equation as applied to Channel flow, uniform flow, Chazy's and Manning's equations, Specific energy diagram, alternate depths, Froude number, specific force, sequent depths, critical, sub-critical and super critical flows.

(8 Hrs)

Unit – 3

Non uniform flow: Energy equation for gradually varied flow (GVF), Basic assumptions and Equations, slope profiles with different combinations, computation of GVF (by direct step method Only) Flow measurement appurtenances: Different channel transitions viz. Venturiflume and standing wave flume. Rapidly varied flow, phenomenon of hydraulic jump in rectangular channel section, basic equations, classifications and applications of hydraulic jump, conjugate depths and its computation.

Dimensional analysis and similarity: Dimensions of various physical quantities, Raleigh's method, Buckingham's theorem, types of similarities and Distorted and non-distorted models.

(8 Hrs)

Unit – 4

Impact of jets: Dynamic of force and momentum, impulse momentum equation, jet force on stationary and moving vanes, jet propulsion.

Turbines: Classification and types of turbines, impulse and reaction turbines, components and parts, vane angle, inflow and outflow condition, efficiency and characteristics of turbines based on Performance, specific speed, selection criteria for turbines, Governing of turbines, cavitations, draft tube and its function.

(8 Hrs)

Unit – 5

Centrifugal pumps: Parts of centrifugal pumps, Types, construction and principle of working, Principle of similarity, efficiencies, Characteristics and specific speed under various operation Conditions, priming of pumps, cavitations, minimum speed computation, multistage centrifugal Pumps, self priming, booster pumps.

Reciprocating pumps: Types, working principle, indicator diagram, works done effect of Acceleration and frictional resistance, slip separation in section and delivery pipes, Air vessel and its function, multi cylinder pumps. Introduction of Hydraulic ram, hydraulic accumulator, hydraulic crane

(8 Hrs)

REFERENCE BOOKS:
1. Hydraulics and Fluid Mechanics – Modi and Seth, Standard Book House, Delhi
2. Fluid Mechanics and Hydraulic Machines – by R.K. Bansal, Laxmi Publications (P) Ltd., New Delhi.
3. Fluid Mechanics and Hydraulic Machines – by V.L.Streeter and E.B.Wylie, McGraw Hill Publications, New York.
4. Fluid Mechanics and Hydraulic Machines – by Douglas J.F, Gasiorek J.M., Swaffield J.A. (2003) Pearson Education (Singapore) Pvt. Ltd.
5. Open Channel Flow- by K. Subramnaya, Tata MacGraw Hill Publishing Ltd., New Delhi.
6. Fluid Mechanics- by D.S.Kumar, S.K.Katariya & Sons, Delhi

CE 259 SURVEYING- II

Teaching Scheme

Lectures   3 Hrs/Week

Total Credits   03

Evaluation Scheme

Test	20 Marks
Teacher Assessment	20 Marks
End-Semester Examination	60 Marks

Course Educational Objectives: Students will be able to:

1. Understand the advanced methods in Survey.

2. Study the advanced methods & equipments for linear and angular measurements.

Course Outcomes Expected: Students will be able to use advanced equipments and methods of mapping.

UNIT-1   CURVES   6 Hrs

      a. Introduction, degree and radius of a curve, Types of curve

      b. Simple circular curve- Elements, setting out by linear and angular methods

      c. Compound curves- Elements and setting out of compound curve

      d. Transition curve- types, uses, length of transition curve, elements of transition curve, length of combined curve by method of deflection angle

UNIT-2   PHOTOGRAMMETRY   6 Hrs

      a. Introduction, types, types of photograph, Terrestrial photogrammetry, phototheodolite, principle of terrestrial photogrammetry

      b. Aerial photogrammetry: technical terms, scale, ground coordinates, relief displacement, flying height, computation of length and height from photograph, flight planning, ground control, radial line method of plotting

      c. Stereoscopic vision, fusion, stereoscope, parallax in aerial stereoscopic views, difference in elevation by stereoscopic parallax, Photographic interpretation, applications of photogrammetry, Introduction to remote sensing

UNIT-3   A) HYDROGRAPHIC SURVEYING   3 Hrs

      a. Introduction, horizontal and vertical control, Shore line survey, Tide, tide gauges

      b. Sounding, equipment, shore signal, angle measuring instruments, locating the sounding, reduction of sounding, plotting the sounding

B) MODERN SYSTEMS IN SURVEYING AND MAPPING   3 Hrs

      Electronic distance measurement, Digital theodolite, Total station, Global positioning

system, Geographic information system

UNIT-4 **GEODETIC SURVEYING**   6 Hrs

    a. Triangulation, triangulation figures, classification of triangulation systems, selection of stations, intervisibility and heights of stations, towers and signals, phase of a signal, eccentricity of signals

    b. Measurement of angle, instruments used, methods of observations, satellite station and reduction to center

    c. Base line measurement, field work, correction to measurement, reduction to MSL, extension of base

UNIT-5 **A. INTRODUCTION TO TRIANGULATION ADJUSTMENTS**   3 Hrs

    a. Kinds of errors, laws of weights, determination of most probable value of a quantity, normal equation, conditioned quantities, probable error, distribution of error to the field measurements, method of correlates

    b. Introduction to Station adjustment, figure adjustment and spherical excess, adjustment of quadrilateral

    B. SETTING OUT WORKS   3 Hrs

    Setting out buildings, culverts, bridges and tunnels

TEXT AND REFERENCE BOOKS

1. Prof. T. P. Kanetkar and Prof. S.V.Kulkarni, Surveying and leveling Vol. I & II, Pune Vidyarthi Griha Prakashan, Pune, 23rd Edition, 1985

2. Dr. A.M.Chandra , Plane surveying, New Age International Publishers New Delhi, Second Edition, 2006

3. Dr. B.C.Punmia , Surveying Vol I & II, Laxmi Publications (P) Ltd. New Delhi, Sixteenth Edition Reprint 2008

4. R. Subramanian, Surveying and Levelling, Oxford University Press, New Delhi, First Edition, 2007

CE-260: BUILDING CONSTRUCTION AND DRAWING

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	0Hrs/Week	Teacher Assessment	20 Marks
Total Credits	03	End-Semester Examination	60 Marks

Prerequisites:

Basic knowledge about various building components, building materials.

Course Educational Objectives:
1. To introduce basic concepts of Building Construction.
2. To study the planning of building, considering various principles of planning.
3. To study various byelaws of local bodies for the preparation of submission drawing.

Course Outcomes Expected:

Students will be able to understand basic concepts of Building Construction and by learning the principles of planning and byelaws, they will be able to draw the various building drawings.

UNIT-1	Properties of Building materials like Tiles, Plywood, Paints, Aluminium, Glass and allied products, Design aspects of foundations for Load bearing structures (Axial and Eccentric loading), Types of walls, solid walls (types, loads on solid walls, construction procedure), cavity walls, advantages and construction procedure, Partition walls, advantages, requirements types and construction procedure.	6 Hrs
UNIT-2	Shoring, Underpinning, scaffolding, Formwork, Damp proofing, termite proofing and Fire protections, Construction Techniques.	6 Hrs
UNIT-3	Thermal and sound insulation, Ventilation and Air conditioning, Introduction to Earthquake resistant structures and Retrofitting of Structures, Building configuration (Masonry and Framed structures)	6 Hrs
UNIT-4	Relative functions and Role of owner, Architect, Structural Engineer and Contractor, Building byelaws of Municipal Council and Corporation, Principles of planning, Preparation of Submission and working Drawings.	6 Hrs
UNIT-5	**Building Finishes: -** Plastering, Pointing, White washing and colour washing, Distempering, painting, varnishing, Waterproofing Treatment, Plumbing services.	6 Hrs

TEXT AND REFERENCE BOOKS

1. Dr. B.C. Punmia, "Building Construction" Laxmi Publications Pvt. Ltd., New Delhi, Edition, 1998

2. S.P.Arora and S.P.Bindra, "A Text Book of Building Construction", Dhanpat Rai & Sons, Delhi, Edition 1996

3. M.G. Shah, C.M.Kale, S.Y. Patki, "Building Drawing with an Integrated Approach to Built Environment", Tata McGraw Hill Education Private Limited, New Delhi, Third Reprint 2012.

4. Pankaj Agrawal and Manish Shrikhande, "Earthquake Resistant Design of Structures", Prentice-Hall of India Pvt. Ltd. New Delhi.

5. National Building Code of India, S.P. 7 ISI

CE 261 LAB: SURVEYING- II

Teaching Scheme

Practicals	4 Hrs/Week	
Tutorials	0 Hrs/Week	
Total Credits	02	

Evaluation Scheme

Practical Exam: 25	Marks	
Term Work: 50	Marks	

Course Educational Objectives: Students will be able to:

1. Use the advanced survey instruments.

2. Make sounding and Prepare layouts and maps.

4. Set out curves and buildings.

Course Outcomes Expected: Students will be able to prepare layouts and maps from advanced methods and equipments for the linear and angular measurements. They will be able to make sounding and set out curves.

List of exercises is given below

EXER.1	Study of one second theodolite and measurement of horizontal and vertical angle	2 Hrs
EXER.2	Study of nautical sextant and measurement of angle using nautical sextant	2 Hrs
EXER.3	Study and use of stereoscope and parallax bar	2 Hrs
EXER.4	To find air base distance and difference of elevation for a given pair of photograph	2 Hrs
EXER.5	Study and use of E.D.M. and total station	2 Hrs
EXER.6	Three point problem for locating position of boat	2 Hrs
EXER.7	Measurement of base line by subtense bar method	2 Hrs
EXER.8	Satellite station and reduction to centre	2 Hrs
EXER.9	Setting out simple circular curve by linear and angular method	2 Hrs
EXER.10	Setting out a building	2 Hrs
Proj. 1	Road project for minimum length of 500 m including fixing of alignment, profile leveling, cross sectioning (use of total station may be taken.)	10 Hrs
Proj. 2	Block contouring for minimum of 0.5 Hectares area	10 Hrs

Note: The term work will consists of

Note: The term work will consists of

1. Road project – Profile leveling with plan   : 1 sheet

Cross sectioning   : 1 sheet

Volume calculations

2. Block contouring   : 1 Sheet

Note: The term work will consists of

    i. Field book containing record of all exercises and projects listed above.

  ii.   File of full imperial drawing sheet as mentioned below

CE 262: Lab Work - BUILDING CONSTRUCTION AND DRAWING

Teaching Scheme		**Evaluation Scheme**	
Practical	4 Hrs/Week	Term Work	50 Marks
Tutorials	0Hrs/Week	Practical/Viva voce	50 Marks
Total Credits	02		

Prerequisites:

Basic knowledge about various building components.

Course Educational Objectives:
1. To introduce basic concepts of Building Drawing.
2. To plan the building, considering various principles of planning.
3. To prepare various drawings taking in to consideration various byelaws of local bodies.

Course Outcomes Expected:

Students will be able to understand basic concepts of Building Drawing and by learning the principles of planning and building byelaws, they will be able to draw the various building drawings.

Laboratory Work

Drawing Sheet No. 1	Measured Drawing of Residential Building (Including Site Visit)	12 Hrs
Drawing Sheet No. 2	Data Drawing for Residential Building (Load Bearing and Frame Structure)	12 Hrs
Drawing Sheet No. 3	Details of Data Drawing	12 Hrs
Graph Sheet	Preparation of four plans of one room, two room tenements, Apartments and bungalow	04 Hrs

(CE-263) – Lab: Fluid Mechanics – II
(Term work: 25, Pract. /viva voce: 25)

Prerequisites:

Basic knowledge about properties of fluids, fluid kinematics, fluid dynamics, and discharge measuring devices

Course Educational Objectives:
1. The students will be able to calculate Chezy's and Manning's constant
2. The students will be able to decide coefficient of discharge for Venturiflume/Standing wave flume
3. The students will be able to form hydraulic jump in open channel
4. The students will be able to measure total head for pumps and power produced by turbines

Course Outcomes Expected:
1. Students can determine velocity of flow and discharge in open channel
2. Students will be able to use Venturiflume/Standing wave flume in open channel for discharge measurement
3. The students will be able to calculate loss of energy in hydraulic jump
4. Hydraulic design of pumps and turbines can be carried out by students

Laboratory Work
List of Experiments
1. Determination of Chezy's and Manning's constant.
2. Determination of coefficient for Venturiflume/Standing wave flume.
3. Determination of pipe friction factor.
4. Determination of minor losses.
5. Study of hydraulic jump.
6. Impact of jet.
7. Trial on turbine.
8. Trial on Centrifugal pump.
9. Trial on Reciprocating pump.

PRACTICAL EXAMINATION
The practical examination shall consist of term work assessment and viva- voce based on syllabus.