Four Year Degree Course in Engineering & Technology
Course and Examination Scheme with Credit Grade System
III Semester B.E. (Civil Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme								
		Hours per week			No. of Credits	Theory					Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min. Passing Marks	Max. Marks External	Max. Marks Internal	Total	Min. Passing Marks
MAT-301	Engg. Mathematics- III	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
CE-301	Engg. Geology	2	1	0	2	3 hrs	80	20	100	40	--	--	--	--
CE-302	Strength of Material	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-303	Fluid Mechanics- I	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-304	Geotechnical Engg.-I	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
Laboratories														
CE-305	Engg. Geology	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-306	Strength of Material	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-307	Fluid Mechanics- I	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-308	Geotechnical Engg.-I	0	0	3	2	--	--	--	--	--	25	25	50	25
Total		15	4	12	23	--	--	--	500	--	--	--	200	--
Semester Total			31		23					700				

Four Year Degree Course in Engineering & Technology
Course and Examination Scheme with Credit Grade System
IV Semester B.E. (Civil Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme								
		Hours per week			No. of Credits	Theory					Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min. Passing Marks	Max. Marks External	Max. Marks Internal	Total	Min. Passing Marks
CE-401	Structural Analysis-1	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
CE-402	Environmental Engg.-1	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-403	Concrete Technology	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-404	Hydrology & Water Resources	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-405	Surveying & Levelling – I	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-406	Building material & construction	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
Laboratories														
CE-407	Environmental Engg.-1	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-408	Concrete Technology	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-409	Surveying & Levelling – I	0	0	3	2	--	--	--	--	--	25	25	50	25
CE- 410	Computer Aided Drafting	0	0	2	1	--	--	--	--	--	25	25	50	25
Total		20	4	11	27	--			600	--	--	--	200	--
Semester Total		35		27		800								

Four Year Degree Course in Engineering & Technology
Course and Examination Scheme with Credit Grade System
V Semester B.E. (Civil Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory					Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min. Passing Marks	Max. Marks External	Max. Marks Internal	Total	Min. Passing Marks
CE-501	Environmental Engineering – II	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
CE-502	Transportation Engineering –I	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-503	Design of RCC Structure- I	3	1	0	3	4 hrs	80	20	100	40	--	--	--	--
CE-504	Project Management	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-505	Building Design and Drawing	1	0	0	1	4 hrs	80	20	100	40	--	--	--	--
CE-506	Surveying – II	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
	Laboratories													
CE-507	Transp. Engineering –I	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-508	Design of RCC Struct- I	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-509	B D D	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-510	Surveying – II	0	0	3	2	--	--	--	--	--	25	25	50	25
	Total	17	4	12	25	--	--	--	600	--	--	--	200	--
	Semester Total		33		25				800					

Note : Minimum five site visits is mandatory during the semester.

Four Year Degree Course in Engineering & Technology
Course and Examination Scheme with Credit Grade System
VI Semester B.E. (Civil Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory					Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min. Passing Marks	Max. Marks External	Max. Marks Internal	Total	Min. Passing Marks
CE-601	Design of Steel Structures	3	1	0	3	4 hrs	80	20	100	40	--	--	--	--
CE-602	Structural Analysis-II	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-603	Fluid Mechanics - II	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-604	Geotechnical Engg.- II	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
CE-605	Computer Application in Civil Engineering	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
Laboratories														
CE-606	Design of Steel Structures	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-607	Structural Analysis-II	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-608	Fluid Mechanics - II	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-609	Computer Application in Civil Engineering	0	0	3	2	--	--	--	--	--	25	25	50	25
Total		16	4	12	24	--	--	--	500	--	--	--	200	--
Semester Total			32		24				700					

Note :- 1. Professional Training of 4 weeks duration in-between VI and VII semester (in summer) is compulsory and students must submit report with duly signed by competent authority and must present the seminar based on same.

Four Year Degree Course in Engineering & Technology
Course and Examination Scheme with Credit Grade System
VII Semester B.E. (Civil Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week				Theory					Practical			
		L	T	P	No. of Credits	Duration of Paper (Hrs.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min. Passing Marks	Max. Marks External	Max. Marks Internal	Total	Min. Passing Marks
CE-701	Irrigation Engineering	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
CE-702	Structural analysis-III	4	0	0	4	4 hrs	80	20	100	40	--	--	--	--
CE-703	Design of RCC Structure - II	3	1	0	3	4 hrs	80	20	100	40	--	--	--	--
CE-704-CE-708	Elective - I	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
CE-709-CE-713	Elective - II	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
Laboratories														
CE-714	Irrigation Engineering	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-715	Design of RCC Structure - II	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-716-CE-720	Elective - II	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-721	Industrial Case Study	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-722	Project Phase - I	0	0	3	2	--	--	--	--	--	50	50	100	50
Total		17	3	15	27	--	--	--	500	--	--	--	300	--
Semester Total		35			27	800								

Four Year Degree Course in Engineering & Technology
Course and Examination Scheme with Credit Grade System
VIII Semester B.E. (Civil Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme								
		Hours per week				Theory					Practical			
		L	T	P	No. of Credits	Duration of Paper (Hrs.)	Max. Marks Theory Paper	Max. Marks College Assessment	Total	Min. Passing Marks	Max. Marks External	Max. Marks Internal	Total	Min. Passing Marks
CE-801	Quantity surveying & Estimation	3	1	0	3	4 hrs	80	20	100	40	--	--	--	--
CE-802	Transportation Engineering - II	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
CE-803-CE-807	Elective - III	4	0	0	4	3 hrs	80	20	100	40	--	--	--	--
CE-808-CE-812	Elective - IV	3	1	0	3	3 hrs	80	20	100	40	--	--	--	--
Practicals														
CE-813	Quantity surveying & Estimation	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-814 - CE-818	Elective - IV	0	0	3	2	--	--	--	--	--	25	25	50	25
CE-819	Project Phase - II	0	0	6	6	--	--	--	--	--	100	100	200	100
Total		14	2	12	24	--	--	--	400	--	--	--	300	--
Semester Total		28		24		700								

LIST OF ELECTIVES

ELECTIVE - I		ELECTIVE – III	
CE -704	Finite element methods	CE -803	Machine foundation
CE -705	Air pollution & solid waste management	CE -804	Advance surveying
CE -706	Traffic Engineering	CE -805	Earthquake Engineering
CE -707	River Engineering.	CE -806	Pavement design
CE -708	Ground improvement technique	CE -807	Environmental impact assessment..
ELECTIVE - II		**ELECTIVE – IV**	
CE -709	Advanced R.C.C. design	CE -808	Experimental stress analysis
CE -710	Remote sensing & GIS	CE -809	Advanced design of steel structures
CE -711	Advanced soil mechanics	CE -810	Water transmission & distribution system
CE -712	Design of hydraulic structures	CE -811	Design of water & waste water Treatment System
CE -713	Advanced pre-stressed concrete	CE -812	Application of System engineering
		PRACTICAL	
PRACTICAL		CE -814	Advanced design of steel structures
CE -717	Advanced R.C.C. design	CE -815	Water transmission & distribution system
CE -718	Remote sensing & GIS	CE -816	Design of water & waste water Treatment system
CE -719	Advanced soil mechanics	CE -817	Application of System engineering
CE -720	Design of hydraulic structures	CE -818	Experimental stress analysis
CE -721	Advanced pre-stressed concrete		

III Semester B. E. (Civil Engineering)

Course Code: MAT301
Title of the Course: Engineering Mathematics - III

Course scheme					Evaluation scheme (Theory)				
lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
4	0	0	4	4	3	10	10	80	100

Unit	CONTENTS	Hours
I	Fourier series: Periodic function and their Fourier expansion, even and odd functions, change of interval, half range expansion.	12
II	Partial Differential Equation: Partial Differential Equation of first order degree i.e. Lagrange's form, Linear homogeneous p. d. e of nth order with constant coefficient method of separation of variables.	12
III	Matrices: Inverse of matrix by adjoin method, inverse of matrix by partitions method , Characteristics equations , Eigen values and Eigen vectors Reduction to diagonal form, Cayley- Hamilton Theorem (without proof) statement & verification , Sylvestor's theorem	12
IV	Numerical Methods: solutions of algebraic and transcendental equations. Iteration method, False position method, Newton Rapphson method ,Solution of System of linear equation, Gauss elimination method, Gauss Jordan method, Gauss Seidel method, Crouts method & relaxation method..	12
V	Numerical solution of ordinary differential equation by Taylor's series method, Picard's method, Runge Kutta method, Euler modified method, Milene's Predictor method .Higher order differential equation by Taylor's series method and runge Kutta fourth order method.	12

Reference Books:
1)   Engineering Mathematics by Dr.D.T.Deshmukh, Khanna publisher
2)   Higher Engineering Mathematics by B.S.Grewal, Khanna Publisher
3)   A textbook of Engineering Mathematics by N.P.Bali and Dr.N.Ch.Narayana Iyenger, Laxmi Publications Ltd.
4)   Advanced Engineering Mathematics by H.K.Dass.,S.Chand Publication ,2008

III Semester B. E. (Civil Engineering)

Course Code: CE301
Title of the Course: Engineering Geology

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
2	1	0	3	2	3	10	10	80	100

Unit	Contents	hours
1	**GENERAL GEOLOGY:-**Definition and scope & Geology, Internal structure of the earth, plate tectonics. Earthquake:- Terminology, Earthquake waves , causes and effects , intensity , magnitude , location of epicenter , tsunami, earthquake zones of India , Volcanoes and their products.	9
	MINROLOGY:-Definition and classification of minerals. General physical characters of following mineral group silica, feldspar, mica and pyroxene.	

2	**STRUCTURAL GEOLOGY**: Folds:- Parts of fold, classification, effects on outcrops, identification of fold in the field, importance of fold in civil Engineering .	9
	Faults:- Terminology , classification, recognition of fault in the field , importance of fault in civil engineering , Problems of dip, strikes and thickness of beds.	
3	**PETROLOGY:** Igneous rock:- Rock cycle Magma and lava, Tabular classification of igneous rocks.	9
	Textures and structures of igneous rock. Petro graphic description of common igneous rock.	
	Sedimentary rocks: Texture and structure of sedimentary rocks , classification of sedimentary rock, Petro graphic description of common sedimentary rocks.	
	Metamorphic rocks: Metamorphism , classification of metamorphic rocks, petrography description of common metamorphic rocks	
4	**ENGINEERING GEOLOGY**: Engineering properties of rocks , rock as a construction material, building stones, road metal ballast, surface and subsurface geophysical investigation , geological mapping , application of geology to the location , design and construction of dams , bridges and tunnels.	9
5	**GEOHYDROLOGY:** Hydrologic cycle, occurrence of ground water, Water table and water table maps, perched water table aquifer, aquiclude, aquifuge and aquitard, confined and unconfined aquifer, and springs.	9

Reference book:-
1. A Text book of Geology by P.K.Mukherjee, Raidant Publisher
2. Principles of Engineering Geology by K.M.Bangar, Standard Publisher Distributer
3. Engineering Geology Manual by B.S.Satyanarayana Swami
4. Principles of Petrology By G.W.Tyrell
5. Geological Maps by G.W.Chiplunkar
6. Physical & Engineering Geology By S.K.Garg, khanna publication,2003

III Semester B. E. (Civil Engineering)

Course Code: **CE302**
Title of the Course: **Strength of Material**

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

UNIT	CONTENTS	HOUR
1	**Mechanical properties and uni-axial problems**: Types of force distribution, concept of stress and strain, stress strain behavior of ductile and brittle material in uni-axial state of stress. Elastic, plastic and strain hardened zones stress – strain relations, elastic constants, relation between elastic constants.Uni-axial loading and deformation of simple cases of statically indeterminate problems under axial loading.Thin walled pressure vessel, cylindrical and spherical shells subjected to internal pressure.	9
2	**Axial force, shear force and bending moment diagram:** Concept of free body diagram, types of loads, determination of axial forces and shear forces and bending moment at a section. Axial forces SF and BM diagram in beams and simple frames, differential relation between shear force and bending moments, Relation between load and shear force.	9

3	**Stresses in beam:** Bending stresses in simple beam. Assumptions and derivation of simple bending theory, relation between bending moment, bending stress and curvature of homogeneous and composite beams. Shear stresses in simple beams, shear flow and shear stress distribution, shear Stress in composite beams.Combine effect of BM and axial force.	9
4	**Torsion of Shafts:** Torsion of circular sections, assumptions and derivation of relations between torsional moment, shear stresses and angle of twist. Torsional stress in solid and circular sections, torsion in thin walled hollow section closely coiled helical springs. Leaf spring. **Deflection of Beams:** Derivation of differential equation of moment curvature relation, deflection of beams by integration, Macauley's method.	9
5	**State of stress In Two Dimensions:** State of stress in two dimensions, differential equation of equilibrium, transformation of stresses , principal stresses, maximum shear stresses, Mohr's circle, combined bending and torsion, combined effect of Torsion and Shear. Shear flow in thin walled sections, concept of shear center of thin walled section, Unsymmetrical bending.	9

Reference books:

1. Strength of materials (vol.1 & 2) , S.P.Timoshenko, McMillan & Company, London
2. Strength of material – Ferdinand L. Singer, Harper Collins Publisher Inc, Singapore
3. Strength of material –U.L.Jindal, Galgotia Pub, 2000.

III Semester B. E. (Civil Engineering)

Course Code: **CE303**
Title of the Course: **Fluid Mechanics – I**

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

UNIT	CONTENTS	Hr.
1	**Fluids and Their Properties:** Definition of fluid. Difference between solids, liquids and gas. Fluid properties:- Mass density, specific weight and specific gravity, viscosity, Newton's equation, coefficients of dynamic and kinematic viscosity, Rheological Diagram, Ideal and real fluids. Compressibility and bulk modulus. Surface tension capillarity, pressure inside a bulb and cylindrical jet vapour pressure and cavitations. Effect of pressure and temperature on fluid properties.	4
	Fluids Pressure and Its Properties: Fluid pressure, law of fluid pressure, variation of fluid pressure with depth, pressure and pressure head, Atmospheric pressure and vacuum. Gauge and absolute pressures. Pressure measurement open and differential manometers.	3
2	**Hydrostatics:** Total hydrostatics pressure on plain and curved surface. Center of Pressure. Fluids in relative equilibrium; fluid masses subjected to horizontal vertical and inclined acceleration.	5
	Buoyancy and Floatation: Buoyant force and centre of buoyancy. Archimedes principle. Metacentre, its determination by analytical and experimental methods. Stability of floating bodies and three states of equilibrium.	5

		6
3	**Fundamentals of Fluid Flow : Kinematics of Flow:** Velocity its variation with space and time. Steady unsteady, uniform Non–uniform. One two and three dimensional rotational, irrotational flow. Acceleration of fluid particles, Normal and tangential acceleration. Streamline, path line, streak line, Lagrangian and Eularian approaches in fluid flow description. Equation of continuity in Cartesians co-ordinates stream functions, velocity potential and potential flow, Relationship between stream function and velocity potential, flow nets, circulation, vorticity, source and sink. Free and forced vertices.	
4	**Fundamentals of Fluid Flow (Kinetics of Flow):** Forces influencing motion, Eulers equations of motion, Navier – stokes, Reynolds Equation. Bernoulli's equation, Assumptions, derivation, limitation and application, Kinetic energy correction factor. Momentum equation, impact of jets, force on plates pipe bends and closed conduits, momentum: Venturimeter, orifice meter and flow nozzles.	4
	Fluid Measurement I : Velocity measurement: Pitot tube, pitot – static tube and Prandtl tube. Discharge measurement, venturimeter, orifice meter and flow nozzles.	2
	Fluid Measurement II: Orifice and mouthpieces, orifice: definition types, hydraulic coefficient factors affecting them and their experimental determination. Large orifice and submerged orifices, time for emptying tank by orifices. Mouth pieces: definition and utility, external and internal mouth piece, running free and running full pressure at vena contracta, coefficient of discharge.	4
	Flow measurement and control: Notches and weirs: Definition, types, rectangular, triangular and trapezoidal, end contraction coefficient of discharge and its determination. Error in measurement in head. Velocity of approach and its effects, Cippoletti, Broad crested and submerged weirs.	4
5	**Dimensional analysis and theory of models:** Dimensional analysis: Definition and use, fundaments and derived dimensions, dimension analysis by Raleigh and Buckingham's PI methods. Similitude geometric, kinematic and dynamic similarities. Predominant force, force ratio, dimensionless numbers and their significance.	6
	Behavior of real flows: Viscous flow, laminar and turbulent flow, Reynolds apparatus, Critical velocity. Reynolds number, simple problems on the determination of laminar and turbulent flow in pipes.	2

Reference books:
1. Hydraulics and Fluid mechanics including hydraulics machines, Dr. P. N. Modi & Dr. S. M. Seth, Standard Book House pub..
2. Fluid Mechanics & Hydraulic machines By. Dr. R.K.Bansal , Laxmi publication
3. Hadraulics- James F.Curise , Mohsen M.Sherif, Vijay P.Singh, Pearson Publication

III Semester B. E. (Civil Engineering)

Course Code: CE304
Title of the Course: Geotechnical Engineering – I

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper in hr	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

UNIT	CONTENT	HOUR
1	**Introduction:** Formation of soil, residual & transported soil, soils generally used in practice such as sand, gravel, organic silt, clay, Bentonite, Hard pan cellche, peat ; loass, black cotton soil etc. **Phases of Soil:** Various soil, weight & volume inter – relationship. Density indices, methods of determining in situ density	**03**
2	**Index Properties & Their Determination:** Water content, specific gravity, sieve analysis, particle size distribution curve, sedimentation analysis, Differential and free swell value. Consistence of soil – Atterberge limits, determination, soil structures and application. **Classification of Soil:** Criteria of classification particle size classification, Textural classification, Unified & I.S. classification system field identification Expansive soil their identification and related problems.	*09*
3	**Permeability:** Darcv's law & its validity, Discharge & seepage velocity, factors affecting Permeability, Determination of co-efficients of permeability by Laboratory and field methods, permeability of stratified soil. **Seepage:** Seepage pressure, quick condition, flownets, Laplace equation, method to draw flow nets, characteristics & uses of flownets, preliminary problems of discharge estimation or homogeneous soils, effective normal and total stresses in soil mass.	**11**
4	**Consolidation:** Compression of laterally confined soil Terzaghis 1 – D consolidation theory (formation of Differential equation) , determination of coefficient of consolidation, degree of consolidation. Determination of preconsolidation pressure, settlement, rate of settlement. **Compaction:** Mechanics of compaction factors affecting compaction standard & modified proctot Tests OMC field compaction equipment quality control.	**10**
5	**Shear Strength :** Introduction, Mohrs diagram, Mohr Coloumbs theory, Measurment of shear strength by direct shear test, triaxial test, unconfined compression test, vane shear test, sensitivity. **Stress Distribution:** Stress distribution in soil mass Boussinesque point load, Uniformly loaded rectangular & circular areas, Newmarks charts.	**12**

Reference books:-
1. Soil Mechanics and Foundation Engg. By. V.N.S. Murthy, UBS Publisher
2. Soil Mechanics and Foundation Engg. Dr. B.C.Punmia, Laxmi Publication
3. Soil Mechanics and Foundation Engg. Dr.K.R.Arora, Standard Publisher Distributor
4. Soil Mechanics By. Lambe , Pearson Publication
5. Soil Mechanics By. Scott., Pearson Publication
6. Geotechnical Engg. –Braja M.Das, Pearson Publication
7. Principles of geotechnical engg.- Braja m.Das, Pearson Publication
8. Soils in Construction – W.L.Schroeder, S.E.Diekenson,Don C. Warrington, Pearson Publication

III Semester B. E. (Civil Engineering)

Course Code: **CE305**
Title of the Course: **Engineering Geology Laboratory**

Course scheme				Evaluation scheme (LABORATORY)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

LIST OF EXPERIMENTS
1. Megascopic identification of Rock forming minerals.

2. Megascopic identification of igneous rocks in hand specimen.

   a) Igneous plutonic rocks

   b) Igneous hypobasal rocks

   c) Igneous volcanic rocks

3. Megascopic identification of Sedimentary rocks in hand specimen.

4. Megascopic identification of Metamorphic rocks in hand specimen.

5. Study of Geological models with Folds , Faults , unconformity and igneous instrusion.

6. Draw profile along given lines and describe the topography of the area.

7. Study of Geological maps with inclined rocks beds.

8. Study of Geological maps with Folded and Faulted rock formation.

III Semester B. E. (Civil Engineering)

Course Code: **CE306**
Title of the Course: **Strength of Materials Laboratory**

Course scheme				Evaluation scheme (LABORATORY)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

LIST OF EXPERIMENTS: (Perform any 10)
1. Study of strain measuring instruments mechanical, electrical types.
2. Tension test on metals.
3. Hardness test on metals.
4. Torsion test on metals.
5. Impact test on metals.
6. Transverse test on beams including deflections.
7. Compression test on bricks & stones.
8. Measurement of static strains using electrical resistance gauge.
9. Shear center.
10. Deflection of springs.
11. Bricks: Absorption test, Dimension test, Crushing strength, Efflorescence.
12. Tiles: Flooring transverse strength, water absorption, and Flexural rigidity test.
13. Timber: Moisture content, strength parallel and Perpendicular grain transverse strength.

III Semester B. E. (Civil Engineering)

Course Code: **CE307**
Title of the Course: **Fluid Mechanics – I Laboratory**

Course scheme				Evaluation scheme (LABORATORY)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

LIST OF EXPERIMENTS :- (PERFORM ANY 10)
1. Determination of Metacentric height.
2. Verification of Bernoullie's theorem.
3. Impact of jet.
4. Determination of loss coefficient for pipe expansion , contraction , bends , elbow etc.
5. Velocity measurement by pitot tube , pitot-static tube, current meter.
6. Discharge measurement by venturimeter-Determination of meter coefficient .
7. Discharge measurement by pipe , orifice , Determination of Cd.
8. Determination of Hydraulic coefficient of a sharp edged circular orifices.
9. Determination of Cd of an external cylindrical mouthpiece.
10. Flow over rectangular notch-Determination of Cd.
11. Flow over rectangular notch – Determination of K & Q-KH.
12. Study of status of flow using Reynold's apparatus.

III Semester B. E. (Civil Engineering)

Course Code: **CE308**
Title of the Course: **Geotechnical Engineering - I Laboratory**

Course scheme				Evaluation scheme (laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

Following Parameters Of Soil Can Be Monitored At Laboratory: (Perform any 10)

1. Determination of Moisture content by oven dry method.
2. Determination of Specific gravity of soil. (Pycometer, Density bottle)
3. Grain size analysis-(Sieve Analysis)
4. Determination of Atterberge limits.
    A) liquid limit   B) Plastic limit   C) Shrinkage limit
5. Determination of Permeability by constant head and falling head.
6. Determination of compaction characteristics of soil by Proctors compaction test.
7. Determinations of Field density by sand replacement method.
8.   Determinations of Field density by core cutter method.
9. Determination of shear parameter of soil by Unconfined compression test.
10. Determination of shear parameter of soil by Direct shear test.
11. Swell value test
12. Determination of Triaxial shear test (Demonstration)

IV Semester B. E. (Civil Engineering)

Course Code: CE401
Title of the Course: Structural Analysis – I

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
4	0	0	4	4	3	10	10	80	100

UNITS	CONTENTS	HOURS
1	Analysis of fixed and continuous beams by theorem of three moments, effect of sinking of support. Slope deflection method as applied to indeterminate beams & continuous beams, portal frames, frame with inclined legs up to 3 degrees of indeterminacy.	8
2	Analysis of continuous beams and simple portal frames (Non sway) using Moment Distribution methods.	10
3	Rolling loads on simply supported beams, concentrated and uniformly distributed loads, maximum B.M. and S.F. Influence lines for reactions, bending moments and shear forces in simply supported beams ,cantilevers and beams with overhangs. Influence lines for forces in members of simple trusses .	**10**
4	Strain energy method as applied to the analysis of redundant frames and redundant trusses up to two degrees of freedoms. Determination of deflection of trusses . Willot Mohr digram, Castiglanos theorems, Maxwells Bettis reciprocal theorem.	9
5	Buckling of Columns and Beams columns , Eulers and Rankines formula. Analysis of Two- Hinged arches , S.F., B. M. and axial thrust , Parabolic arches.	**8**

Reference books:-
1)   Comprehensive structural analysis by A.K.Jain, Laxmi publication
2)   Theory of structure by S. Ramamrutham Dhanpat Rai Publication,1993
3)   Basic structural analysis By C.S.Reddy Mc Graw Hill Publication
4)   Stuctural Analysis by Vazirani and Rathvani, Khanna Publication
5)   Theory of structure by R.S.Khurmi. S.Chand Publication
6)   Analysis ofstructures by Timoshanko & Young, McGraw-Hill Publication, 1965

IV Semester B. E. (Civil Engineering)

Course Code: CE402
Title of the Course: Environmental Engineering – I

Course scheme					Evaluation scheme (Theory)				
lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

UNITS	CONTENTS	HOURS
1	**Introduction , Importance and necessity of water supply scheme.** **Water demand:** Types of demand , empirical formulae ,factors affecting per Capita demand ,variation in demand ,design period and population forecasting methods and examples. **Sources of water** : Rain water, Ground water – springs, infiltration galleries, Dug wells, tube wells , Surface water – stream , lake river, impounding reservoirs, ponds. Intake structures : Location types – river , lake , canal reservoir etc.	07
2.	**Conveyance of water** : Types of pipes joints, fittings. **Hydraulic design aspects**: Head loss due to Friction: Manning's formula , Darcy's weisbatch formula, Hazen Williams formula and problem . **Rising main and pumps**: Classification, working, merits and demerits, selection of pumps. **Distribution systems** : Requirements for a good distribution system, Methods of distribution systems distribution systems and layouts of DS, appurtenances in water distribution system .Leakage and leak detector**.** **Storage reservoirs for treated water** : Types , capacity of reservoir, Mass curve examples on simple hydraulic design of pipes, estimation of population and water quality , plain sedimentation tanks, cascade aerators, filters. Pumps, dose of chlorine , Only simple sizing of units no detailed design.	10
3	**Water quality** : Water Quality Standards, General idea of water borne diseases, Physical characteristics: colour, taste and odour, temperature, turbidity. Chemical characteristics: total solid, chlorides, hardness, pH value, metals and other chemicals, nitrogen , dissolved gases. and bacteriological characteristics of water, Standards of drinking water .	**09**
4	**Water treatment**: Objective of treatment, unit, operations and processes, treatment flow sheet of conventional water treatment plant. **Aeration** : Purpose , types of aerators. **Coagulation and Flocculation**: Definition, Principals, types of coagulants and reactions , coagulant doses , types of mixing and flocculation devices. Sedimentation**:** Principles, types of setting basins, inlet and outlet arrangements. Clariflocculators**:** Principles and operation**.**	**13**
5	**Filtration** : Mechanism of filtration , types of filters, RSF, SSF , pressure filters, elements of filters UDS, design aspects filter sand specification ES, UC, operational problems in filtration. **Disinfection**: Purpose, Mechanism , criteria for good disinfectant various disinfectants their characteristics, disinfection by chlorination using different forms of chlorine.	06

Reference books:-

1) Environmental Engg (vol 1 & 2) by B.C.Punmia, Laxmi Publication

2) Environmental Engg. (Vol. 1&2) by S.K.Garg

3) Environmental Engg.by Birdee, Dhanpat Rai and Sons, 1996

IV Semester B. E. (Civil Engineering)

Course Code:　　　　　**CE403**
Title of the Course:　　　**Concrete Technology**

course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

UNIT	CONTENTS	Hrs.
1	Main constituents of cements, Hydration of cement. Water required, Physical properties and testing of cement. Effect of fineness, Initial , final and false setting of cement, soundness test. hardening and compressive strength, grades and different types of cement.	8
	Aggregates: Sources of aggregates, classification and nomenclature. Aggregate characteristics and their significance in strength, workability, placement and compaction of concrete. Sampling, particle shape and texture, bond of aggregate, size & grading of aggregate strength of aggregate. Mechanical properties and tests – Specific gravity, bulk density, porosity, absorption of aggregate, moisture content of aggregate, bulking of sand abrasion test, impact value. Deleterious substances in aggregate, organic impurities, clay and other fine material etc.	
	Soundness of aggregate, crushed sand. Alkali aggregate reaction. Introduction of IS: 383, water quality for mixing and curing, acceptable water, pH value, Seawater chlorides content. Provisions in IS: 456.	4
2	**Fresh Concrete**: Batching, mechanical mixers, automatic batching and mixing plants. efficiency of mixing, workability measurement - Slump cone test, compacting factor test, flow table, Vee-Bee consistometer. Factor affecting workability, setting time, Significance of w/c ratio, Segregation, bleeding, voids, and permeability. Hot weather concreting, conveyance of concrete, placing of concrete, compaction, vibrators, curing of concrete, significance, methods of curing, temperature effects on curing and strength gain. IS code on curing, maturity of concrete, Framework for concrete- IS code.	5
		3
3	**Strength of concrete**- Gain of strength, w/c ratio. Factors affecting compressive strength, w/c ratio, type of cement, air entrainment, aggregate, mixing water, admixtures, curing conditions. Tensile and flexural strengths, relation between compressive and tensile strength. Failure modes in concrete, cracking in compression. Impact strength, fatigue strength, shear, elasticity, poisson's ratio. Testing of hardened concrete. Compression test cubes, strength and cylinder strength and their relation, effect of aspect ratio on strength. Flexural strength of concrete, determination of tensile strength, indirect tension test, abrasion resistance, accelerated curing test.	**7**
	Non Destructive test- significance, rebound hammer, ultra sonic pulse velocity test.	**3**
	Durability of concrete- Significance, water as an agent of deterioration, permeability of concrete, air sulphate attack and control, sea water attack, acid attack, efflorescence, resistance of corrosion, abrasion and cavitations, process of rusting of steel.	
4	**Mix Design**- Process, statistical relation between main and characteristic strength, variance, standard deviation, factors affecting mix properties, grading of aggregates, aggregate/cement ratio etc. Degree of quality control, design of mix by Road Note No. 4 (BS), ACI method, I.S.Code method.	7
5	**Additives and admixtures**- Types of admixtures, natural products, diatomaceous earth, calcined clays of shales, volcanic glasses, byproducts – pozzolona, fly ash, silica fume, rice husk ash, G.G. blast furnace slag, admixtures- air entraining, water reducing, accelerators, retarders, plasticizers and super plasticizers, permeability reducing, grouting agents, surface hardeners.	8
	Shrinkage- early volume changes, drying shrinkage, mechanism of shrinkage, factors affecting shrinkage, influence of curing and strong conditions, differential shrinkage, carbonation, Creep- factors influencing, relation between creep and time, nature of creep, effect of creep.	

Reference books:-

1) Concrete technology by M.S.Shetty, S.Chand & Co.Ltd.

2) Concrete Technology by M.L.Gambhir,Tata Mcgraw hill

IV Semester B. E. (Civil Engineering)

Course Code: CE404
Title of the Course: HYDROLOGY AND WATER RESOURCES

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper in hr	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	CONTENTS	Hrs
1	**Introduction:** Hydrological cycle, water balance equation, Precipitation-forms and types, equipments, methods of measurement. Optimum number of rain gauges, Radar measurement of rainfall, Estimation of missing rainfall data.	10
2	**Abstractions**: Infiltration- Defination, mechanism, factors affecting, infiltration indices, measurement. Evaporation, Transpiration-Definition, mechanism, Factors affecting evaporation, Estimation by pans, water budget, energy budget and empirical formula, Methods control of evaporation, Evapotranspiration, Interception.	10
3	**Runoff:** Sources and components of runoff, Classification of streams and measurement of discharge of a stream by Area – Slope and Area – Velocity methods. Hydrograph: Flood hydrographs and its components, S-Curve technique, unit hydrograph, synthetic hydrograph.	12
4	Statistical Methods, Statistics in hydrological analysis, Various methods of averages. Probability of an event, Frequency analysis, time series **Floods:** Causes and effects, Factors affecting peak flows and its estimation, Flood routing and Flood forecasting.	08
5	**Groundwater:** Introduction, Occurrence and distribution of Groundwater, Water table, Acquifers, Ground water exploration, Electrical resistivity method, Darcy's law. Introduction to hydraulics of wells, Open wells - yield test.	10

Text books/References:
1. S. K. Garg,Hydrology and water resources Engineering, Khanna Publishers.
2. M. J. Deodhar, Elementary Engineering Hydrology, Pearson Education, Edition 2009.
3. Raghunath H M, Hydrology, Wylie Publication, 1996.
4. Chow Ven Te, Maidment R David, Mays W Larry, Applied Hydrology, McGraw-Hill New Delhi, 1998.
5. Subramanya K, Engineering Hydrology, Tata McGraw-Hill, New Delhi, 1996.

IV Semester B. E. (Civil Engineering)

Course Code: CE405
Title of the Course: SURVEYING & LEVELLING – 1

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

UNITS	CONTENTS	HRS.

1.	**CLASSIFICATION OF SURVEYS:**
	Chain, Tape Survey, Errors & Correction, Obstacles in chain surveying Cross Staff surveying.
	  a) Construction, used & testing of optical square, line ranger.
	  b) Computation of areas & volumes : Trapezoidal , Simpson's Rule & Other methods of determining the areas & Volumes.
	COMPASS SURVEYING:
	Prismatic & Surveyor's Compass. True & Magnetic Bearing, Local Attraction, Magnetic Declination, Compass traversing, Adjustments of traverses.
		10

2.	**LEVELLING:** Types of Level, study of Dumpy Level. Profile Leveling: Longitudinal Section And Cross Sections, plotting L-Section and Cross section. Reciprocal Leveling: Curvature and Refraction Corrections, distance to visible forizon. Principle Axes of Dumpy Level: Testing and adjustment of axis of bubble tube and line of collimation, Sensitivity of Bubble Tube.	**09**
3.	**THEODOLITE:** Introduction to 20" Vernier Theodolite: Type of Theodolite, Principle Axes of Theodolite. Use of Theodolite: Measurement of Horizontal angles, vertical angles, Magnetic Bearing, prolonging a line, lining in, measuring deflection angles, setting out angles, finding out elevation of objects (Base accessible and inaccessible) by trignometrical observations. Theodolite traversing: Computation of Consecutive and independent coordinates, adjustment of closed traverse, Gale's traverse table, omitted measurement, area calculation by coordinates. Temporary and permanent adjustments of transit Theodolite	13
4	**TACHEOMETRY - I:** Principle of stadia, Fixed hair method with vertical staff to determine horizontal distance and elevation of the point. Analytic lens. **CONTOURING:** Methods, characteristics, interpolation, uses locating contours Use of tachometry in surveying, Tachometric Contour Survey. Use of modern electronic distance measuring instruments. **COMPUTATION OF AREAS & VOLUMES:** Trapezoidal, Simpson's rules & other methods of determining the areas & volumes.	**08**
5	**CURVES – I:** Simple Circular Curves – Element and setting out by linear and angular methods. **MINOR INSTRUMENTS:** Study and use of Abney Level , Box sextant, Indian Fat tern clinometer's, Subtense bar. Use of modern Electronic distance measuring instruments like EDM. Geodimeter.	05

Reference books:-
1) Surveying and Leveling (Vol 1. & 2.) by:- B.C.Punmia, Laxmi Publication
2) Surveying And Leveling (Vol 1 &2) by Agor
3) Surveying And Leveling (Vol 1 &2) by Duggal, Tata McGraw Hill Publication
4) Surveying And Leveling (Vol 1 &2) by Kanetkar, Laxmi Publication
5) Surveying And Leveling (Vol 1 &2) by Basak, Tata McGraw Hill

IV Semester B. E. (Civil Engineering)

Course Code: CE406
Title of the Course: Building Materials and Construction

Course scheme					Evaluation scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper hour	MSE	IE	ESE	Total
4	0	0	4	4	3	10	10	80	100

UNIT	CONTENTS	HRS.
1.	**Foundations :** Necessity and types of foundation , Details shallow foundations. Bearing capacity of soils and its assessment . Preumptive bearing capacity values from codes. Loads on foundation ,Causes of failures of foundation and remedial measures, Foundation on black cotton soils, Setting out foundation trenches, excavation timbering of foundation trenches. Load bearing and framed structures.	8
2.	**Brickwork :** Qualities of good bricks , classification of bricks, tests on bricks as per as codes. Terms used in brickwork , commonly used types of bonds in brickwork such as header, stretcher, english and Flemish bonds, principles of construction.Reinforced brickwork , brick knogging.Parapets, coping, sills and corbels, brief introduction to cavity walls , load bearing and partition walls.Masonry construction using cement concrete blocks and clay walls, load bearing and partition walls.Masonry construction using cement concrete blocks and clay blocks.Precast construction : introduction to method and materials . precast elements likes poles, cover, jallies, steps corbets, truss elements etc. **Stone Work :** Stone , cutting and dressing , selection of stones types of stone masonary, principles of construction joints in masonary . Lifting heavy stones, common building stones in India. **Arches and Lintels :** Terminology in construction , types ,chajjas and canopies, pre cast Lintels & Arches.	01 10 03 03
3.	**Floors:** General principle, types and method of construction, upper floors finish & quality and floor tiles, synthetic & Ceramic Tiles. **Roofs:** Flat and pitches roofs, roof covering, types and their construction features. Thermal Insulation.	05
4.	**Stairs:** Types of stairs, functional design of stairs. **Doors and Windows**: Purpose, materials of construction and types.	06
5.	**Damp Proofing:** Causes and effect of dampness .Various methods of damp proofing Damp proofing in plinth protection, New Techniques of Damp proofing Damp Proofing in Plinth Protection, New Techniques of damp proofing, Epoxy etc. **Plastering and Pointing:** Necessity, types and methods.	04

	Temporary Timbering: Centering and formwork shoring, underpining and scaffolding. **Painting:** White washing, colour washing and distempering, new materials & Techniques.	04

Reference books:-

1) Building Technology by Sushil Kumar, Standard Publishers Distributors, 2006
2) Building Construction and material by Dr. B. C. Punmia and Jain, Laxmi Publication
3) Building Construction By Rangawala, Charotar Publishing House Pvt. Limited, 2009

IV Semester B. E. (Civil Engineering)

Course Code: CE407
Title of the Course: **Environmental Engineering – I Laboratory**

Course scheme				Evaluation scheme (LABORATORY)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

S.No	Name of Practical (Perform any 10)
1	To determine the pH value of a given sample of water.
2	To find the Turbidity of a given sample of water using Jackson's Turbidity meter.
3	To determine the conductivity of given sample of water.
4	To fine out the concentration of chlorides in the given sample of water.
5	To determine the amount of dissolved oxygen (D.O.) in the given sample of water.
6	To determine the amount of suspended solids(SS), dissolved solids(DS) & total solids(TS) in a given sample of water.
7	To Estimate the hardness of the given sample of water by EDTA method.
8	To determine residual chlorine in a given sample of water.
9	To determine available chlorine percentage on a given sample of bleaching powder.
10	To determine Acidity & Alkalinity of given water sample.
11	Bacteriological plate count & MPN (Most Probable Number) tests.

IV Semester B. E. (Civil Engineering)

Course Code: CE408
Title of the Course: **CONCRETE TECHNOLOGY LABORATORY**

Course scheme				Evaluation scheme (LABORATORY)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

PRACTICALS TO BE PERFORMED BY STUDENTS (ANY 10)

SR.NO	LIST OF PRACTICALS
1	Normal Consistancy, setting time, soundness
2	Compressive Strength , briquette for tension test
3	Test of structure by cover meter
4	Particle shape, texture and Elongated / Flakiness of aggregates – demonstration. Flakiness index, sieve analysis, particle size distribution curve.
5	Crushing value test, impact value , abrasion test
6	Bulk density, specific gravity, absorption & moisture content, Bulking & percentage silt in sand test on concrete.
7	Workability – slump test, compaction factor, flow test, vee bee test.
8	Concrete mix design IS Code method.
9	Cube strength of concrete, Accelerated test, Flexural strength, split tension test
10	Rebound hammer test, ultrasonic pulse velocity test
11	Field permeability test
12	Test for P^H of concrete Or for carbonation

IV Semester B. E. (Civil Engineering)

Course Code: **CE409**
Title of the Course: **Surveying & Levelling – I Laboratory**

Course scheme				Evaluation scheme (LABORATORY)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

SR.NO.	LIST OF PRACTICALS (Perform any 10)
1.	Measurements of distance by ranging and chaining.(direct and indirect ranging)
2.	Locating various objects by chain and cross staff survey.
3.	Determination of area of given polygon by chain and cross staff survey.
4.	Measurement of bearing of sides of traverse with prismatic compass and computation of correct included angles.(open and closed traverse)
5.	Locating given building by chain and compass traversing (one full size drawing sheet).
6.	Determination of elevation of various points with dumpy level by collimation plane method and rise and fall method.
7.	Fixing bench mark w.r.t. temporary bench mark with dumpy level by fly levelling and check levelling.
8.	L - section and cross section of road (one full size drawing sheet each for l - section and cross section).
9.	Measurement of horizontal angles with theodolite by method of repetition.

10.	Measurement of vertical angles with theodolite.
11.	Determination of horizontal distance between two inaccessible points with theodolite.
12.	Locating given building by theodolite traversing (one full size drawing sheet).
13.	Locating given building by plane table traversing (one full size drawing sheet).
14.	Three point problem in plane table traversing.
15.	Determination of elevation of point by trigonometrical levelling.
16.	Contour plan of given area (one full size drawing sheet).
17.	Study of planimeter.
18.	Determination of area of irregular figure by using planimeter.
19.	Study of box sextant, abney level, optical theodolite.

IV Semester B. E. (Civil Engineering)

Course Code: **CE410**
Title of the Course: **Computer Aided Drafting Laboratory**

Course scheme				Evaluation scheme (LABORATORY)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

SR.NO.	LIST OF PRACTICALS (**Minimum 4 drawing for submission to be prepared based on building plans or civil engineering work.**)
1.	Specifying distance and coordinates, polar coordinates, relative Cartesian coordinates. Interpreting cursor modes and understanding prompts, choosing command options , selecting Setting up work area, measurement system, scale factor modes as drafting tools, Symbol ,Blocks Layers, Templates, Copying Objects, editing lines, changing length of objects Geometric constructions –Line and points parallel lines perpendicular lines, breaking lines, dividing lines, fillets , chamfers , circles, tangent , arcs, curves through points , breaking polylines, similar shapes , arrays of lines or circles , Polygons ,solid shape ellipse.
2.	Hatch pattern boundary, Adding text. Text formatting style size of text & scale of drawing Dimension style, unit height, location, arrow style.
3.	Polylines, editing, creating spline curve, dividing in segments. Filling in solid area.
4.	Preparation of submission and working drawing of residential / public building.
5.	Printing & Plotting drawing output devices, paper size orientation, control on scale and location.

Note: *Syllabus for the V to VIII Semester courses shall be prescribed in due course of time.*