UNIVERSITY OF MUMBAI
No.UG /363 of 2008

CIRCULAR :-

A reference is invited to the Ordinances, Regulations and syllabi relating to the Bachelor of Engineering degree course **vide** this office Circular No. UG/347 of 2002 dated 17th August, 2002 and the Principals of the affiliated collages in Engineering are hereby informed that the recommendation made by the Board of Studies in Civil Engineering at its meeting held on 11th April, 2008 has been accepted by the Academic Council at its meeting held on 13th June , 2008 **vide** item No.4.1 and that, in accordance therewith, the scheme of examination and syllabus prescribed for S.E.(Civil Engineering) (Sem.III and IV) of the B.E. degree course is revised as per **Appendix** and that the same has been brought into force with effect from the academic year 2008 – 2009.

MUMBAI-400 032
4th August, 2008

PRIN.K.VENKATARAMANI
REGISTRAR

To,
The Principals of the affiliated colleges in Engineering.

A.C./4.1/13.06.2008

MUMBAI-400 032 4th August, 2008

No.UG/363 - A of 2008,
Copy forwarded with compliments for information to :-

1) The Dean, Faculty of Technology.
2) The Chairman, Board of Studies in Civil Engineering.
3) The Controller of Examinations,
4) The Co-Ordinator, University Computerization Centre,

(D. A.KATE)
DEPUTY REGISTRAR
(U.G./P.G.Section.)

Copy to :-

The Director, Board of College and University Development, , the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information.

The Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section),Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education,(10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar,(PRO) , the Assistant Registrar, Academic Authorities Unit (2 copies)and the Assistant Registrar, Executive Authorities Unit (2 copies) . They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that, no separate Action Taken Report will be sent in this connection. the Assistant Registrar Constituent Colleges Unit (2 copies), BUCT(1 copy), the Deputy Account, Unit V(1 copy , the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), the Superintendent, Post-Graduate Section (2 copies), the Superintendent, Thesis Section (2 copies)

sk/07/2008

Enclosure to Item No. 4.1
13/6/08

UNIVERSITY OF MUMBAI

Revised Syllabus

and Scheme of Examinations

For

The Second Year

(Semester III and IV)

Of the

B.E. Degree Course

In

Civil Engineering

(With effect from the academic year 2008-2009)

UNIVERSITY OF MUMBAI
SCHEME OF INSTRUCTIONS AND EXAMINATION
(RR-2007)

SECOND YEAR ENGINEERING: (Civil Engineering)

Semester III

	Subjects	No. of periods per week (60 minutes each)			Duration of theory paper (hours)	Marks				
		Lecture	Practical	Tutorial		Theory Paper	Term Work	Practical	Oral	Total
1.	Applied Mathematics-III*	4	-	-	3	100	-	-	-	100
2.	Surveying-I*	3	3	-	3	100	25	-	-	125
3.	Strength of Materials*	4	2	-	3	100	25	-	25	150
4.	Building Materials and Construction*	4	2		3	100	25	-	25	150
5.	Engineering Geology*	3	2	-	3	100	25	-	25	150
6.	Presentation and Communication Techniques@	2	-	2	-	-	50	-	-	50
7.	Fluid Mechanics-I*	3	2	-	3	100	25	-	-	125
	Total	23	11	2	-	600	175	-	75	850

* Common to Construction Engineering @Common to all branches

Semester – IV

	Subjects	No. of periods per week (60 minutes each)			Duration of theory paper (hours)	Marks				
		Lecture	Practical	Tutorial		Theory Paper	Term Work	Practical	Oral	Total
1.	Applied Mathematics-IV*	4	-	-	3	100	-	-	-	100
2.	Surveying-II *	3	3	-	3	100	25	-	25 $	150
3.	Structural Analysis-I *	5	-	2	3	100	25	-	25	150
4.	Building Design and Drawing-I*	1	3	-	4	100	25	-	25#	150
5.	Concrete Technology*	4	2	-	3	100	25	-	25	150
6	Fluid Mechanics-II*	3	2		3	100	25		25	150
	Total	20	10	2	-	600	125	-	125	850

* Common to Construction Engineering $ Oral & Practical # Oral & Sketching

Class:-SE (Civil/Construction)			Semester III
Subject:- Applied Mathematics III			
Periods/week- each period of 60 minutes duration	Lecture	04	
	Practical	-	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	-	-
	Oral	-	-
	Term Work	-	-
	Total		100

Detailed Syllabus

Module	Topics	No of lectures
1.	**Complex Variables**	**Total 11**
	1.1.Necessary and sufficient conditions for function f(z) to be analytic (without proof), Harmonic functions, Orthogonal trajectories	03
	1.2 Milne Thomson's method to find analytic function from its real or imagining parts	02
	1.3 Cauchy Riemann's equation in polar- coordinates	01
	1.4 Mapping, Conformal mapping.	02
	1.5 Linear, bilinear mapping with geometrical interpretations	02
	1.6 Applications of Complex variables to Civil Engineering problems	01
2	**Fourier Series & Integrals**	**Total 12**
	2.1. Orthogonal & Orthonormal set of functions	01
	2.2 Fourier series, Determination of Fourier constants, Dirichlet's conditions	01
	2.3 Fourier series for $f(x)$, $x \in [c, c+2\pi]$ and $x \in [c, c+2L]$	03
	2.4 Fourier series of Odd and Even functions	01
	2.5 Half range Fourier Sine & Cosine series, Parseval's Identity	03
	2.6 Complex form of Fourier series	01
	2.7 Fourier Integral, Fourier integrals of even and odd functions	02
3	**Laplace Transforms**	**Total 15**
	3.1 Function of bounded variation(Statement only) Laplace Transforms of $1, e^{at}, \sin at, \cos at, \sinh at, \cosh at, t^n, erf\left(\sqrt{t}\right), J_0(t)$	02
	3.2 Shifting theorems, change of scale , $L\{t^n f(t)\}, L\left\{\frac{f(t)}{t}\right\} L\left\{\frac{d^n f(t)}{dt^n}\right\} L\left\{\int_0^t f(u)du\right\}$	03

	3.3 Convolution theorem (with proof) , Evaluation of real integrals using Laplace transforms	02
	3.4 Laplace transforms of special functions (Heaviside Unit step function, Dirac Delta function and periodic functions)	02
	3.5 Inverse Laplace Transforms,	01
	3.6 Evaluation of Inverse LaplaceTransforms using partial fractions, convolution theorems, shifting theorems and other properties.	03
	3.7 Application of Laplace Transform to solve initial & boundary value problems involving ordinary differential equation with one dependent variables	02
4	**Matrices**	**Total 12**
	4.1 Types of matrices(including orthogonal & unitary)	01
	4.2 Adjoint of a matrix, Partitioning of Matrices. Inverse of a matrix	03
	4.3 Elementary Transformation, rank of a matrix, normal form	02
	4.4 System of Homogeneous and Non Homogeneous linear equations, their consistency & Solution.	02
	4.5 Eigen values and Eigen vectors	02
	4.6 Cayley Hamilton Theorem(without proof) , problems based on Cayley Hamilton theorem.	02

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Recommended Books:

1. "Complex Variables and Applications" by R V Churchill & J W Brown, McGraw-Hill.
2. "Theory of Functions of a Complex Variable" by Shanti Narayan, S. Chand.
3. "Laplace Transsforms" by Murray Spiegel, Schaum Series.
4. "Engineering Mathematics" by Bali & Iyengar, Laxmi Publications.
5. "Matrices" by Shanti Narayan, S. Chand.

Class-:SE (Civil/Construction)			Semester III
Subject:- Surveying - I			
Periods/week- each period of 60 minutes duration:	Lecture	03	
	Practical	03	
	Tutorial	-	
Evaluation System	Theory Examination	Hours: 3	Marks: 100
	Practical	-	-
	Oral	-	-
	Term Work	-	25
	Total		125

Detailed Syllabus

Module	Topics	No. of lectures
1	**Introduction** Various types of surveying – based on methods and instruments, classifications, uses and necessity of geodetic surveying, photographic, astronomy and hydrographic surveying Plain and diagonal scale, various types of verniers, micrometers on surveying instruments, principles of surveying Different types of ranging, tapes, chains, steel band Linear measurements, approximate, direct, optical and electronic methods Chain surveying, minor instruments for setting out right angle	05
2	**Compass survey** Bearings – different types, compass – prismatic, surveyor, whole circle and reduced bearings, declination, local attraction, plotting of compass survey by different methods	06
3	**Levelling and contouring** Definitions, technical terms, different types of levels such as dumpy, quickset, precise, auto, temporary and permanent adjustments of dumpy and auto level, Auto levels, self compensating instrument, laser level. Difficulties in levelling work, reduction of levels, corrections and precautions in leveling work, problems Contour – definitions, contour interval, equivalent, uses and characteristics of contour lines, direct and indirect methods of contouring Running a level line, L section, cross section, methods of interpolation Grade contour – definition, use, setting out in field Computation of volume by trapezoidal and prismoidal formula, volume from spot levels, volume from contour plan	12
4	**Areas** Area of a irregular figure by Trapezoidal rule, average ordinate rule, Simposon's 1/3 rule, various coordinate methods Planimeter : types of planimeter including digital planimeter, area of	03

	zero circle, use of planimeter	
5	**Theodolite traverse** Various parts and axis of transit, technical terms, temporary and permanent adjustments of a transit, horizontal and vertical angles, methods of repetition and reiteration Different methods of running a theodolite traverse, Gales traverse table, balancing of traverse by Bow-Ditch's transit and modified transit rules Problems on one-plane and two-plane methods, omitted measurements Precautions in using theodolite, errors in theodolite survey Use of theodolite for various works such as prolongation of a straight line, setting out an angle	10
6	**Plane table surveying** Definitions, uses and advantages, temporary adjustments Different methods of plane table surveying Two point problem Errors in plane table survey, use of telescopic alidade	03

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

List of Practicals:-

1. Chaining Ranging and offsetting
2. Measuring Bearing of survey lines using Prismatic compass.
3. Measuring Bearing of survey lines using Surveyors compass.
4. Measurement of horizontal Angle by Repetition Method.
5. Measurement of horizontal Angle by Reiteration Method.
6. Measurement of verticle Angle using theodolite.
7. Determination of R.L. of points using Auto level and Dumpy level.
8. Measurement of irregular areas using Digital planimeter.
9. Measurement of areas by plane table survey- Radiation method.

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Report on minimum eight experiments conducted,
Report (inclusive of drawing sheets) of a two day project on theodolite traversing,
Assignments consisting of minimum twenty problems covering entire syllabus including at least three programs (de-bugged and with suitable comments and data with output for problems on above syllabus),
Graded answer paper of written test.
The distribution of term work marks shall be as follows:

Laboratory work (Experiments, assignments, Project report)	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Practical and theory)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. "Surveying and Levelling" Vol-I&II, by Kanetkar and Kulkarni, Pune Vidyarthi Griha, Pune.
2. "Surveying and Levelling" by N N Basak, Tata McGraw Hill New Delhi.
3. "Surveying" by R. Agor, Khanna Publishers.
4. "Surveying" Vol-I by Dr. K.R. Arora, Standard book house.

Class-: SE (Civil / Construction)			
Subject:- Strength of Materials			Semester – III
Periods/week-each period of 60 minutes duration	Lecture	04	
	Practical	02	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory of Examination	03	100
	Practical	-	-
	Oral Examination	-	25
	Term Work	-	25
	TOTAL		150

Detailed Syllabus

Module	Topics	No. of lectures
01	**Shear force and bending moment** Axial force, shear force and bending moment diagrams for statically determinate beams including beams with internal hinges for different types of loading, relationships between rate of loading, shear force and bending moment.	08
02	**Stress and strain** Stress, Strain, Modulus of elasticity(E), Modulus of Rigidity(G), Bulk Modulus(K), yield stress, ultimate stress, factor of safety, shear stress, Poisson's ratio. Relationship between E, G & K. Bars of varying sections, composite sections, temperature stresses.	06
03	**Simple theory of bending** Flexure formula for straight beams, moment of inertia, product of inertia and polar moment of inertia of plane areas, principal axes of inertia, moment of inertia about principal axes, transfer theorem, simple problems involving application of flexure formula, section modulus, moment of resistance of a section of flitched beams.	08
04	**Shear stress in Beams.** Distribution of shear stress across plane sections used commonly for structural purposes, shear connectors. Shear stress and force in beams of thin walled open cross sections, shear center of thin walled sections such as angle, tee, channel and I sections.	06
05	**Simple theory of torsion** Torsion of circular shafts - solid and hollow, stresses in shaft when transmitting power, close coiled helical springs under axial load.	04
06	**Bending moment combined with axial loads** Application to members subjected to eccentric loads, core of a section. Problems on chimneys, retaining walls etc. involving lateral loads.	04

07	**Principal stresses** General equations for transformation of stress, principal planes and principal stresses, maximum shear stress, determination using Mohr's circle, principal stresses in shafts subjected to torsion, bending and axial thrust, concept of equivalent torsional and bending moments.	04
08	**Rivets and welds** Axially and eccentrically loaded riveted and welded connections.	07
09	**Thin cylindrical and spherical shells** Stresses and strains in thin cylindrical and spherical shells under internal pressure.	03

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

List of Experiments:-

1. Tension test on mild steel bars (stress-strain behavior, young's modulus determination)
2. Tests on tor steel bar (tension ,bend & re-bend)
3. Transverse test on cast iron.
4. Shear test on mild steel, cast irons, brass.
5. Torsion test on mild steel and cast iron bar.
6. Brinell hardness test (any three metal specimens).
7. Rockwell hardness test on mild steel
8. Izod / Charpy impact test (any three metal specimens)

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Report of minimum seven experiments.
At least 20 problems based on the above syllabus,
Graded answer paper of written test.
The distribution of marks for term work shall be as follows.

Laboratory work (experiments and assignments)	:10 marks
Written test (at lest one)	:10 marks
Attendance (practical and theory)	:05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:-

1. "Mechanics of Materials" by E. P. Popov, Prentice Hall of India Pvt. Ltd.
2. "Mechanics of Materials" by Timoshenko & Gere, Tata McGraw Hill New Delhi.
3. "Mechanics of Structures" Vol-I by S.B. Junnarkar, Charotar Publishers.
4. "Mechanics of Materials" by James M. Gere, Brooks/Cole.
5. "Strength of Materials", by G H. Ryder, MacMillan.
6. "Mechanics of Materials" by Pytel & Singer, McGraw Hill New Delhi.
7. "Strength *of* Materials" by Schaum's Outline Seriesout line service, William A. Nash, McGraw Hill Book Co.
8. "Mechanics of Materials" by Beer & Johnson, Tata McGraw Hill new Delhi.
9. "Strength of Materials" by Subramanian, Oxford University Press.
10. "Strength of Materials" by R.K. Rajput, S.Chand.

Class-: SE (Civil / Construction)			Semester – III
Subject:- Building Materials and Construction			
Periods/week-each period of 60 minutes duration	Lecture	04	
	Practical	02	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory of Examination	03	100
	Practical	-	-
	Oral Examination	-	25
	Term Work	-	25
	TOTAL		150

Detailed Syllabus

Module	Topics	No. of lectures
01	Classification of materials, requirements of building materials and products:functional, aesthetical and economical. Study of properties of materials-physical, mechanical, chemical, biological and other like durability, reliability, compatibility and econmic characteristics Types of structures- framed, load bearing and composite structures. Suitability and economic aspects of each type.	7
02	Stone-types, its properties,quarrying, milling and surface finishing, preservative treatments. Structural clay products- bricks, roofing tiles, ceramic tiles, raw materials and manufacturing process. Concrete blocks, flooring tiles, paver blocks-raw materials and manufacturing process Binder material: lime, cement: physical properties and manufacuring process, plaster of paris Mortar and concrete- ingradients, prepararion and uses Masonry construction-classification and bonding in stone, brick and concrete blocks, Masonry finishes-pointing, plastering and painting	10
03	Glass- types and uses	4
04	Timber: varieties, defects in timber, preservative treatments and wood composites	2
05	Metal and alloys: Ferrous and non ferrous metals and alloys, alluminum, tin , zinc, nickel, types and uses and anti-corrosive treatment	4
06	Floors and roofs: Types of floors,floor finishes and suitability. Types of roofs, wooden and steel trusses, roof cavering and drainage	6
07	Paints and varnishes, types, constituents and uses	3
08	Staircase: types, size and location, layout, design considerations	2

09	Formwork: materials used, design considerations,slip form shuttering, centering and staging, scaffolding	3
10	Building services--Air conditioning: systems of heating, air conditioning, ventilation, construction requirements Fire fighting: fire hazards, resisting materials, fire alarm system, fire extinguishers, fire loads, precautions Lifts: passenger handling capacity and accessories Acoustics and sound insulation: Characteristics of sound, reflection and absorption coeffient, acoustical defects, design and material Plumbing: requirement and basics in design, water supply system, waste water sysrem, materials Damp-proofing and water proofing: materials and methods	9

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

List of Practicals:-

1. Water absorption and compression test of bricks
2. Water absorption and transverse load test on tiles
3. Moisture content and flexural strength test on timber
4. Compression test on timber (Parallel / perpendicular to the grains)
5. Physical properties of cement: Fineness, consistency, Setting time, Soundness, Compressive strength
6. Compression test on Paver blocks
7. Water absorption, density and compression test on masonary blocks
8. Abrasion test on tiles

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Report of minimum 07 experiments,
Assignments including at least 20 sketches covering entire syllabus.
Graded answer paper of written test.

The distribution of term work marks shall be as follows:

Laboratory work (Experiments, assignments and sketches)	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Practical and theory)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. "Building construction" by S. P. Bindra and S. P. Arora, Dhanpat Rai & Sons, Delhi
2. "Building drawing" by M. G. Shah, C. M. Kale, S. Y. Patki, Tata McGraw Hill, Delhi
3. "Services in building complex" by V. K. Jain, Khanna Publishers
4. "Materials of construction" by D. N. Ghose, Tata McGraw Hill, Delhi
5. "Architectural materials science" by D. Anapetor, Mir Publishers
6. IS codes of different materials, BIS publications
7. "Introduction to engineering materials" by B. K. Agrawal, Tata McGraw Hill New Delhi
8. "Engineering materials" by Rangwala, Charotar Publications
9. "Engineering materials" by P. Surendrasingh, Vani Education Books New Delhi.
10. "Building construction" by Rangwala, Charotar Publications

Class-: SE (Civil / Construction)			Semester – III
Subject:- Engineering Geology			
Periods/week-each period of 60 minutes duration	Lecture	03	
	Practical	02	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory of Examination	03	100
	Practical	-	-
	Oral Examination	-	25
	Term Work	-	25
	TOTAL		150

Detailed Syllabus

Module	Topics	No. of lectures
01	**Introduction:** Branches of geology useful to civil engineering, Importance of geological studies in various civil engg. Projects. Internal structure of the Earth and use of seismic waves in understanding the interior of the earth	01
02	**General and physical geology:** Agents modifying the earth's surface, study of weathering and its significance in engineering properties of rocks like strength, water tightness and durability etc. Geological action of river, wind, glacier, ground water and the related land forms created by them. Volcanism – Central type and fissure type, products of volcano, volcanic land forms. Earthquakes – Earthquakes waves, construction and working of seismographs; Earthquakes zones of India. Preventive measures for structures constructed in Earthquake prone area.	05
03	**Mineralogy:** Identification of minerals with the help of physical properties, rock forming minerals, megascopic identification of primary and secondary minerals, study of common ore minerals as prescribed under practical.	02
04	**Petrology:** Study of Igneous, sedimentary and metamorphic rocks, distinguishing properties between Igneous, sedimentary and metamorphic rocks to identify them in fields. Igneous Petrology – Mode of formation, Texture and structure etc. Hatch's scheme of classification, study of common igneous rocks. Sedimentary Petrology – Mode of formation .Textures, characteristics of shallow water deposits like lamination, bedding, current bedding etc, classification of secondary rocks types, residual deposits, chemically formed and organically deposits, commonly occurring sedimentary	05

	rocks. Metamorphic Petrology – Mode of formation, agents and types of metamorphism, metamorphic minerals, rock cleavage, structures and textures of metamorphic rocks, classification, commonly occurring metamorphic rocks.	
05	**Structural geology:** Structural elements of rocks, dip, strike, outcrop patterns, unconformities, outliers and inliers, study of joints, faults and folds, importance of structural elements in engineering operations.	04
06	**Stratigraphy and Indian geology** General principals of Stratigraphy and co-relation, geological time scale, Physiographic divisions of India and their characteristics, Geological history of peninsular India, Study of formations in the peninsula, Important economic minerals and building stones of India.	05
07	**Geological investigation** Preliminary Geological Investigation and their importance to achieve safety and economy of the projects supporting case studies of dams and tunnel projects in Maharashtra state. Methods of surface and subsurface investigations- Excavations – Trial pits, Trenches etc Core Drilling – Geological logging, Inclined Drill holes. Electrical Resistivity methods, Seismic methods and their applications. Use of Aerial photographs, Satellite emageries in civil engineering projects.	03
08	**Geology of dam and reservoir site:** Strengths, stability and water tightness of foundation rocks and their physical characters and geological structures. Geological conditions and choice of type of dams, Favorable and unsuitable conditions for locating dams, structural and erosional vallies, Precautions to be taken to counteract unsuitable conditions, Significance of faults ,dykes, crush zones, joints and unfavorable dips on the dam site and treatment giving to such structures.	03
09	**Tunneling:** Importance of geological considerations while choosing sites and alignments of the tunnel. Ideal site conditions for tunneling, geological conditions to be avoided. Tunneling to various types of rocks under various geological and structural conditions. Difficulties during tunneling and methods to overcome the difficulties.	02
10	**Ground water:** Sources and zones, water table, Unconfined and Perched. Factors controlling water bearing capacity of rocks, Pervious and Impervious rocks, Cone of depression and its use in Civil engineering. Geological work of groundwater. Springs and seepage sites and geological structures. Artesian wells. Different types of rocks as source of ground water.	06

	Methods of artificial recharge of ground water, geology of percolation tank.	
11	**Land slides:** Their types, causes and preventive measures for landslides.	02
12	**Building stones:** Requirements of good building stones, geological factors, controlling properties of good building stones, consideration of common rocks as building stones, study of different building stones from various formations in Indian Peninsula, geological factors controlling location of quarries, quarrying methods and quarrying operations.	02

Theory Examination:-

6. Question paper will consist of total seven questions carrying 20 marks each.
7. Only five questions need to be attempted.
8. Question number 1 will be compulsory and based on maximum part of the syllabus.
9. Remaining questions will be mixed in nature.
10. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

List of Practicals:-

1. Study of physical properties of the minerals.
2. Identification of minerals – Crystalline, crypto-crystalline and amorphous silica and their varieties, Orthoclase, Microclian, Plagioclase, Muscovite, Biotite, Hornblend, Asbestos, Augite, Olivin, Tourmaline, Garnet, Natrolite, Actinolite, Calcite, Dolomite, Gypsum, Beryl, Bauxite, Graphite, Galena, Pyrite, Hematite, Magnitite, Chalcopyrite, Chromite, Corundum, Talc, Fluorite, Kyanite.
3. Identification of rocks :
   Igneous rocks- Granite and its varieties, Synite, Diorite, Gabbro, Pegmatite, Porphyry, Dolerite, Rhyolite, Pumice, Trachyte, Basalt and its varieties, Volcanic Breccia, Volcanic tuffs.
   Sedimentary Rocks- Conglomerate, Breccia, Sandstone and its varieties, Shales, Limestones , Laterites.
   Metamorphic Rocks – Mica Schists, Hornblende Schists, Slate, Phyllite, Granite Gneiss and its varieties, Augen gneiss, Marbles and Quartzite.
4. Study of Geological maps (At least Eight).
5. Study of core samples, RQD, Core logging.
6. At least one Engineering problem based on Field data collected during site investigation.

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Report of experiments conducted,
At least 10 assignments covering entire syllabus,
Graded answer paper of written test.

The distribution of term work marks shall be as follows:

Laboratory work (Experiments and assignments)	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Practical and theory)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. "Text book of Engineering Geology" by Dr. R. B. Gupte. Vidyarthi Pune.
2. "Text book of Engineering Geology" by P. K. Mukerjee, Asia.
3. "Text book of Engineering and General Geology" by Parbin Singh, Catson Publication House.
4. "Text book of Engineering Geology" by N Chenna Kesavulu, Macmillan.
5. "Principles of physical Geology" by Arthur Homes, Thomas Nelson London.
6. "Principles of Geomorphology" by William D. Thornbury, John Wiley, New York.
7. "Principles of Engineering Geology" by K.M.Banger.
8. "Geology for Civil Engineering" A.C. McLean, C.D.Gribble, George Allen & Unwin London.
9. "Geology of India" by D.N.Wadia, National Book Trust.

Class -SE(Civil/Construction)			Semester III
Subject:- Presentation and Communication Techniques			
Periods/week- each period of 60 minutes duration	Lecture	2	
	Practical	-	
	Tutorial	2	
Evaluation System		Hours	Marks
	Theory Examination	-	-
	Practical	-	-
	Oral	-	-
	Term Work	-	50
	Total		50

Detailed Syllabus

Module	Topics	No of lectures
1.	**Communication in a business organization :** Internal and external communication, Types of meetings, strategies for conducting successful business meeting, documentation (notice, agenda, minutes, resolution) of meetings. Introduction to modern communication techniques. (e-mail, internet, video-conferencing etc.) Legal and ethical issues in communication (Intellectual property rights: patents, TRIPS, Geographical indication).	05
2.	**Advance technical writing:** Report writing: Definition and importance of reports, qualities of reports, language and style in reports, types of reports, formats (letter, memo, project-reports). Methods of compiling data for preparing report. A computer-aided presentation of a technical project report based on survey-based or reference based topic. The topics are to be assigned to a group of 8-10 students. The written report should not exceed 20 printed pages. Technical paper-writing, writing business proposals.	07
3.	**Interpersonal skills:** Introduction to emotional intelligence, motivation. Negotiation and conflict resolution, Assertiveness, team-building, decision-making, time-management, persuasion.	03
4.	**Presentation skills:** Elements of an effective presentation, Structure of presentation, Presentation tools, Audience analysis, Language: Articulation, Good pronunciation, Voice quality, Modulation, Accent and Intonation.	03
5.	**Career skills:** Preparing resumes and cover letters. Types of Resumes, Interview techniques: Preparing for job interviews, facing an interview, verbal and non-verbal communication during interviews, observation sessions and role-play techniques to be used to demonstrate interview strategies(mock interviews)	03

6.	**Group discussion:** Group discussions as part of selection process. Structure of a group discussion, Dynamics of group behavior, techniques for effective participation, Team work and use of body language.	03

Term Works:

Part-I (25 Marks): Assignments;

Each student has to appear for at least ONE written test during the term.

The term work shall consist of:

Two assignments on communication topics
Three assignments on report-writing
Three assignments on interpersonal skills
Two assignments on career skills
Graded answer paper of written test.

The distribution of term work marks shall be as follows:

Assignments	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Theory and Tutorial)	: 05 marks

Part-II (25 Marks): Presentation;

The distribution of term work marks shall be as follows:

Project report presentation	: 15 marks
Group discussion	: 10 marks

The final certification and acceptance of term-work ensures the satisfactory performance of laboratory work and minimum passing in the term-work.

Recommended Books :

1. Lesikar and Petit, Report writing for business, Tata McGraw Hill
2. Raman and Sangeeta Sharma, Technical communication, Oxford University Press. New Delhi.
3. Wallace & Masters. Personal development for Life & work, Thomson Lerning.
4. Heta Murphy, Effective Business Communication, McGraw Hill.
5. Huckin & Olsen, Technical writing and professional communication. McGraw Hill.
6. Fred Luthans, Organizational behavious, McGraw Hill.

Class-:SE (Civil/Construction)			
Subject:- Fluid Mechanics - I			Semester III
Periods/week- each period of 60 minutes duration	Lecture	03	
	Practical	02	
	Tutorial	-	
Evaluation System	Theory Examination	Hours	Marks
	Practical	3	100
	Oral	2	-
	Term Work	-	-
	Total	-	25
			125

Detailed Syllabus

Module	Topics	No. of lectures
1	**Properties of fluids:** Mass density, weight density, specific gravity, specific volume, viscosity, compressibility, bulk modulus, surface tension, capillary action, vapour pressure, types of fluids, basic concept applicable to fluid mechanics.	05
2	**Fluid static:** Pascal's law, Hydrostatic Law, pressure variation in fluids at rest, absolute, atmospheric, gauge pressure, measurement pf pressures. Hydrostatic force on plane and curved surface. Buoyancy and flotation: Archimede's principle Metacentre, metcentric height, equilibrium of floating and submerged bodies, oscillation of floating bidiy.	08
3	**Liquids in relative equilibrium:** Uniform linear acceleration, liquid containers subjected to constant horizontal and vertical acceleration, constant rotation with vertical axis.	04
4	**Fluid kinematics:** Description of fluid flow: Lagrangian method, Eulerian method. Streamline, Path lines and streak lines, Classification of Fluid Flows, Differential equation of continuity, continuity equation in polar co-ordinates, Rotational flow, Rotation and vorticity, stream function, potential function, circulation, flow net.	04
5	**Fluid dynamics:** Control volume and control surface, Euler's equation, Bernoulli's Theorem, Bernoulli's equation of real fluids, applications to flow measuring devices: Venturimeter, nozzle meter, pitot tube, rotameter.	10
6	**Flow measurement:** Orifice: hydraulic coefficients, small and large orifice, time of emptying a tank through orifice.	03

	Mouthpieces: External, convergent, Borda's mouthpieces **Notches and weirs:** rectangular, triangular, Cipolleti weirs, velocity of approach, end contractions.	
7	**Ideal fluid flow:** Uniform flow, source flow, sink flow, free vortex flow, superimposed flow: source and sink flow, doublet, flow past half body, flow past a Rankine ovel body, flow past a cylinder only.	03

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

List of Experiments:-

1. Determination of metacentric height.
2. Verification of Bernoulli's theorem.
3. Calibration of orifices
4. Calibration of mouthpieces
5. Calibration of notches
6. Calibration of weirs
7. Calibration of venturimeter
8. Calibration of orificemeter
9. Calibration of nozzlemeter etc.

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Report on minimum six experiments conducted.
Assignments consisting of minimum 15 problems covering entire syllabus
Graded answer paper of written test.
The distribution of term work marks shall be as follows:
Laboratory work (Experiments and assignments) : 10 marks
Written test (at least one) : 10 marks
Attendance (Practical and theory) : 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. "Hydraulics and fluid mechnics" by Dr. P. M. Modi and Dr. S. M. Seth, Standard Book House.
2. "Theory and applications of fluid mechanics" by K. Subramanya, Tata McGraw Hill New Delhi.
3. "Fluid mechanics" by Dr. A. K. Jain, Khanna Publishers.
4. "Fluid mechanics and fluid pressure engineering" by D. S. Kumar, F. K. Kataria and sons.
5. "Fluid mechanics" by R.K. Bansal, Laxmi Publications (P) Ltd.
6. "Fluid mechanics" by Frank M. White, Tata McGraw-Hill.
7. "Fluid mechanics" by Streeter, Wylie, Bedford, McGraw-Hill International Edition
8. "Fluid mechanics with engineering applications" by R. L. Daugherty, J. B. Franzini, E. J. Finnemore, Tata McGraw-Hill New Delhi.
9. "Fluid mechanics" by Joseph Spurk, Springer
10. "Mechanics of fluids" by Potler, Wiggert, Prentice-Hall International.

Class -SE(Civil/Construction)			
Subject:- Applied Mathematics IV			Semester IV
Periods/week- each period of 60 minutes duration	Lecture	4	
	Practical	-	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical	-	-
	Oral	-	-
	Term Work	-	-
	Total		100

Detailed Syllabus

Module	Topics	No of lectures
1.	**Vector calculus and analysis**	10
	1.1 Recall Gradient, Curl and Divergence (with properties). Conservative, Irrotational and Solenoidal fields	3
	1.2 Line integrals, properties of line integral. Green's theorem in plane	3
	1.3 Stoke's theorem and Gauss divergence theorem (without proof). Related identities and deductions.	4
2.	**Statistics and probability**	18
	2.1 Measures of central tendency(mean, median, mode, quartiles, deciles, percentiles, only introduction no questions to be asked),	1
	2.2 Measures of dispersion(mean deviation, quartile deviation, standard deviation), coefficient of variation	1
	2.3 Covariance & correlation .Karl Pearson's coefficient & spearman's rank coefficient (with proofs) (repeated and non-repeated ranks)	2
	2.4 Regression analysis(Linear and multiple)	2
	2.5 Introduction to probability and conditional probability, Baye's theorem	2
	2.6 Discrete and continuous random variable, Probability mass function & probability density function. Probability distribution for random variables.	2
	2.7 Expected value. Variance, Moments and Moment generating function.	3
	2.8 Binomial, Poisson and Normal distribution for detailed study.	4
	2.9 Central limit theorem (only statement) & problems based on it .	1
3	**Sampling theory & testing of hypothesis**	10
	3.1 Population and sample. Sampling with & without replacement. Random samples. Population parameters, Sample statistics	1
	3.2 Sampling distributions. Sample mean Sampling distribution of means. Sampling distribution of proportions.	2

	The sample variance. Sampling distribution of variances.	
	3.3 Cases where population variance is unknown. Sampling distribution of ratios of variances. Other statistics	1
	3.4 Statistical decisions. Statistical hypothesis. Null hypothesis and alternate hypothesis.	1
	3.5 Test of hypothesis and significance. Type I & Type II errors. Level of significance. One- tailed and two tailed tests.	1
	3.6 Tests of significance for large samples (between sample & population mean, difference between the means of two samples)	2
	3.7 Tests of significance for small samples (t-test, paired t-test, F-test).The χ^2 test for goodness of fit and contingency tables.	2
4	**Estimation theory**	4
	4.1 Unbiased estimates and efficient estimates. Point and interval estimates	2
	4.2 Confidence interval estimates of population parameters. Confidence interval for means, proportions, variance ratios. Maximum likelihood estimates.	2
5	**Complex variables**	8
	5.1 Line integral for a complex valued function. Cauchy's integral theorem and Cauchy's integral formula (with proofs)	3
	5.2 Singularities and poles. Taylor's & Laurent's series (without proof), Cauchy's residue theorem	3
	5.3 Evaluation of real integrals of the form $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$ & $\int_{-\infty}^{\infty} f(x)dx$ using residue theory	2

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus

Recommended Books :

1. "Vector calculus" by Shanti Narayan & J.N.Kapur, S.Chand & company Limited
2. "Probability& statistics for engineers" by Richard Johnson & Gupta, Pearson Education
3. "Probability& statistics" by Murray Spiegel, Schaum series
4. "Complex variables" by Churchill & Brown, Tata Mcgraw Hill

Class-:SE (Civil/Construction)			
Subject:- Surveying - II			Semester IV
Periods/week- each period of 60 minutes duration	Lecture	03	
	Practical	03	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical & Oral	-	25
	Term Work	-	25
	Total		150

Detailed Syllabus

Module	Topics	No. of lectures
1	**Curves** Definitions of different terms, necessity of curves and types of curves (i) Simple circular curves and compound curves, office and field work, linear methods of setting out of curves, Angular methods for setting out of curves, two theodolite and Rankine deflection angle methods. (ii) Reverse and transition curves, their properties and their advantages, design of transition curves, shift, spiral angle. Composite curves – office and field work, setting out of curve by angular method, composite curve problems. (iii) Vertical curves – definitions, geometry and types, tangent correction and chord gradient methods, sight distance on a vertical curve, difficulties in setting out curves and solutions for the same.	12
2	**Tacheometric surveying** Principles and uses, advantages, stadia formula, different methods of tacheometer, subtense bar method, location details by tacheometer, stadia diagram and tables, error and accuracy in tacheometric survey work. Application in plane table and curve setting	10
3	**Setting out works** General horizontal and vertical control, setting out of foundation plan for load bearing and framed structure, batter board, slope and grade stakes, setting out with theodolite. Setting out of sewer line, culvert. Setting out centre line for tunnel, transfer of levels of underground work. Project / route survey for bridge, dam and canal. Checking vertically of high rise structures	07

4	**Modern surveying instruments** Electronics in surveying, general principles used in the instruments. Electronic distance measurements – types, principles, applications in surveying, corrections for field observations. Electronic digital theodolite – types, uses and application, concept of total station-uses and application. Use of computer in survey work for level computation and plotting contour plan using Software. Introduction of GPS	05
5	**Precision leveling** Precise level and leveling staff, field procedure for precise leveling, field notes.	05

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral and Practical Examination:-

Oral examination will be based on entire syllabus and practical examination will be based on one experiment performed from the list of experiments given below. The distribution of marks shall be as follows

Oral – 15 Marks
Practical – 10 Marks

List of Practicals:-

1. To set out circular curves by linear and angular methods.
2. Setting out a composite curve by angular method.
3. To find the constants of a tacheometer and to verify field distances.
4. Height and distance problems in tacheometric surveying.
5. Use of theodolite for one plane and two plane methods.
6. Study of modern surveying instruments.
7. Setting out a simple foundation plan in the field.

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Three A1 size drawing sheets comprising of practical work on: Longitudinal section and cross sections, block contouring and tacheometric survey.
Assignments consisting of minimum twenty problems covering all topics,
Office and field work for minimum two types of curves by angular method, plotting of a contour plan on computer using suitable software,
Graded answer paper of written test.

The distribution of term work marks shall be as follows:

Laboratory work (Drawing sheets, assignments and computer output)	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Practical and theory)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. "Surveying and levelling" Vol-I&II, by Kanetkar and Kulkarni, Pune Vidyarthi Griha, Pune.
2. "Surveying and levelling" by N N Basak, Tata McGraw Hill New Delhi.
3. "Surveying" by R. Agor, Khanna Publishers.
4. "Surveying" Vol-I by Dr. K.R. Arora, Standard book house.

CLASS : SE (Civil /Construction)			
Subject:– Structural Analysis - I			Semester – IV
Periods/week-each period of 60 minutes duration	Lectures	05	
	Practical	-	
	Tutorial	02	
Evaluation System	Theory	Hours	Marks
	Practical	03	100
	Oral	-	--
	Term Work	-	25
	TOTAL	-	25
		-	150

Detailed Syllabus

Module	Topics	No. of lectures
01	**Axial force, shear force and bending moment** Axial force, shear force arid bending moment diagrams for statically determinate frames with and without internal hinges.	06
02	**General theorems** Theorems relating to elastic structures, principle of virtual work, strain energy in elastic structures, stresses due to axial load & impact load, complementary energy, Castigliano's theorem, Betti's and Maxwell's reciprocal theorems, principle of superposition.	04
03	**Unsymmetrical bending** Flexural stresses due to bending in two planes for symmetrical sections, bending of unsymmetrical sections.	04
04	**Deflection of statically determinate structures** Deflection of cantilevers, simply supported and overhanging beams for different types of loadings using following methods – Double integration, Macaulay's method, Moment area, Conjugate beam, Principle of virtual work (unit load method) and Castigliano's theorem. Deflection of determinate pin jointed and rigid jointed frames by principle of virtual work (unit load method) and Castigliano's theorem.	16
05	**Influence lines for statically determinate structures** Influence lines for cantilevers, simply supported, overhanging beams and pin jointed warren truss, criteria for maximum shear force and bending moment, absolute maximum shear force and bending moment under moving loads (udl and series of point loads) for simply supported beam.	08

06	**Elastic arches** Determination of normal thrust, shear force and bending moment for parabolic, braced and segmental three hinged arches, influence lines for normal thrust, shear force and bending moment for three hinged parabolic arch.	08
07	**Suspension bridges** Simple suspension cable, different geometries of cables, minimum and maximum tensions in the cable supported at same/different levels, anchor cable, suspension cable with three hinged stiffening girder, influence line diagram for horizontal tension in the cable, shear force and bending moment at any section of the stiffening girder.	08
08	**Struts** Struts subjected to axial loads, concept of buckling, Euler's and Rankine's design formulae for strut with different support conditions. Struts subjected to eccentric and lateral loads, struts with initial curvature.	06

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
At least 25 problems covering entire syllabus,
Graded answer paper of written test.

The distribution of marks for term work shall be as follows.

Assignments : 10 marks
Written test (at lest one) : 10 marks
Attendance (tutorial and theory) : 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended books:

1. "Basic structural analysis" by C.S.Reddy, Tata McGraw Hill New Delhi
2. "Theory of structures" by Timoshenko & Young, Tata McGraw Hill New Delhi.
3. "Structural mechanics" Vol I & II by Junnarkar S.B., Charotar Publisher.
4. "Elementary structural analysis" by Norries & Wilbur, McGraw Hill.
5. "Structural analysis" by Laursen H.I., McGraw Hill Publishing Co.
6. "Structural analysis" by Bhavikatti, Vikas Publishers
7. "Structural theorems and their application" by B.G. Neal, Pergaman Press.
8. "Structural analysis" by Hibbler, Prentice Hall International
9. "Structural analysis" by Chajes, ELBS London
10. "Structural analysis" by Kassimalli, TWS Publications
11. "Comprehensive structural analysis" vol-I&II by Vaidyanathan R. and Perumal R., Laxmi Publications.
12. "Fundamentals of structural analysis" by K. M. Leet, C. M. Uang and A.M. Gilbert, Tata McGraw Hill New Delhi.
13. "Structural analysis" by Devdas Menon, Narosa Publishing House
14. "Elementary theory of structures" by Hseih, Prentice Hall

Class-: SE (Civil / Construction)			Semester – IV
Subject:- Building Design and Drawing - I			
Periods/week-each period of 60 minutes duration	Lecture	01	
	Practical	03	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory	04	100
	Practical	-	-
	Oral & Sketching	-	25
	Term Work	-	25
	TOTAL		150

Detailed Syllabus

Module	Topics	No. of lectures
01	Planning and preparing of working drawings of residential structures of all types such as bungalows, row houses, duplex, apartment houses etc., and principles of planning, relevant knowledge of building bylaws, code of practice for architectural drawings as per IS 962 and related causes of local D.C. rules.	8
02	Constructional details and drawings of foundations, floors, roofs – flat and pitched, doors and windows, staircases, plumbing items, columns, beams and slabs as per current practice.	5

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral and Sketching Examination:-

Oral and sketching examination will be based on entire syllabus.

Term Work:

Each student has to appear for at least ONE written test during the term.

The term work shall consist of:

Report on planning and design of two residential buildings (one designed as load bearing structure having ground plus one floor with pitched roof, other shall be designed as RCC framed structure having ground plus one floor)

Two A1 size drawing sheets, drawn independently for the two structures designed as mentioned above, showing following details drawn to scale as per standard practice : site plan, ground floor plan, first floor plan, elevation, section, door and window schedule

One A1 size drawing sheet, drawn for one of the two structures designed as mentioned above, showing following details drawn to scale as per standard practice : roof plan and its section, foundation plan and its section, stair and its section, typical door and window details including section, and any other specific detail
Graded answer paper of written test.

The distribution of term work marks shall be as follows:

Drawings and report on planning and design of buildings	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Practical and theory)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. "Building drawing" by M. G. Shah, C. M. Kale, S. Y. Patil, Tata McGraw Hill, Delhi
2. "Civil engineering drawing" by M. Chakraborty, Monojit Chakraborty Publication Kolkata.
3. "Building drawing and detailing" by BTS Prabhu, K. V. Paul and C. Vijayan, SPADES Publication Calicat.
4. "Planning and designing buildings" by Y. S. Sane, Modern Publication House Pune.

Class-: SE (Civil / Construction)			Semester – IV
Subject:- Concrete Technology			
Periods/week each period of 60 minutes duration	Lecture	04	
	Practical	02	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory of Examination	03	100
	Practical	-	-
	Oral Examination	-	25
	Term Work	-	25
	TOTAL		150

Detailed Syllabus

Module	Topics	No. of lectures
01	**Aggregates:** Properties of coarse and fine aggregates and their influence on properties of concrete	03
02	**Cement:** Physical properties of cement as per IS Codes, types of cements and their uses and uses	05
03	**Concrete:** Grades of concrete, Manufacturing of concrete, importance of w/c ratio. Properties of fresh concrete- workability and factors affecting it, consistency, cohesiveness, bleeding, segregation Properties of hardened concrete- Compressive, Tensile and Flexural strength. Modulus of Elasticity, Shrinkage and Creep Durability- Factors affecting durability, laboratory tests on durability such as Permeability test, Rapid chloride penetration test Concreting in extreme weather conditions, under-water concreting.	08
04	**Concrete mix design:** Mix design for compressive strength by I.S. method and DoE method, Mix design for flexural strength.	05
05	**Admixtures:** Plasticizers, Superplasticizers, Retarders, Accelerators, Mineral admixtures and other admixtures, test on admixtures, chemistry and compatibility with concrete.	06
06	**Ready mix concrete:** Advantages of ready mix concrete, components of RMC plant, distribution and transport, handling and placing, mix design of RMC.	03
07	**High performance and High strength concrete:** Constituents of high performance and high strength concrete,	05

	various tests and their applications.	
08	**Special concretes:** Light weight concrete, High density concrete, No fines concrete, Fiber reinforced concrete, Polymer concrete-types, Ferrocement, Shotcrete, Self compacting concrete, Reactive powder concrete, Bendable concrete.	06
09	**Repairs and rehabilitation of concrete structures:** Distress in concrete structures, causes and prevention, damage assessment procedure, crack repair techniques	04
10	**Non-Destructive testing of concrete:** Hammer test, ultrasonic pulse velocity test, load test, carbonation test, ½ cell potentiometer test, core test and relevant provisions of I.S. codes.	04

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

List of Practicals:-

1. Effect of w/c ratio on workability (slump cone, compaction factor, V-B test, flow table)
2. Effect of w/c ratio on strength of concrete.
3. Mix design in laboratory
4. Modulus of rupture of concrete.
5. Study of admixtures & their effect on workability and strength of concrete
6. Secant modulus of elasticity of concrete & indirect tensile test on concrete
7. Permeability test on concrete.
8. Rapid chloride penetration test
9. Tests on polymer modified concrete/mortar.
10. Tests on fiber-reinforced concrete.
11. Non destructive testing of concrete – some applications (hammer, ultrasonic)

Term Work:

Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Report of minimum 08 experiments.
At least 10 assignments covering entire syllabus,
Graded answer paper of written test.
The distribution of term work marks shall be as follows:

Laboratory work (Experiments and assignments) : 10 marks
Written test (at least one) : 10 marks
Attendance (Practical and theory) : 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. Concrete Technology, A. R. Shanthakumar, Oxford University Press.
2. Concrete technology theory and practice Shetty MS., S. Chand.
3. Properties of concrete, Neville, Isaac Pitman, London
4. Relevant I.S. codes, Bureau of Indian standard.
5. Special Publication of ACI on Polymer concrete and FRC.
6. Proceedings of International Conferences on Polymer Concrete and FRC.
7. Concrete Technology Gambhir M.L., Tata McGraw Hill, New Delhi.
8. Concrete Technology, Neville A.M.& Brooks. J. J., ELBS-Longman.
9. Tentative Guidelines for cement concrete mix design for pavements (IRC:44-1976), Indian Road Congress, New Delhi.
10. Repairs and rehabilitation – Compilation from Indian congress Journal – ACC Pub.

Class-:SE (Civil/Construction)			
Subject:- Fluid Mechanics - II			Semester IV
Periods/week- each period of 60 minutes duration	Lecture	03	
	Practical	02	
	Tutorial	-	
Evaluation System	Theory Examination	Hours	Marks
	Practical	3	100
	Oral	2	-
	Term Work	-	25
	Total	-	25
			150

Detailed Syllabus

Module	Topics	No. of lectures
1	**Flow through pipes:** Loss of head through pipes, Darey-Wiesbatch equation, minor losses, total energy line, hydraulic gradient line, Pipes in series, equivalent pipes, pipes in parallel, flow through laterals, flows in deed end pipes, siphon, power transmission through pipes, nozzles.	12
2	**Analysis of pipes network:** Hardy Cross method, water hammer in pipes and control measures, branching of pipes, three reservoir problem.	07
3	**Compressible flow:** Basic equation of flow (elementary study), Velocity of sound or pressure wave in a fluid, Mach number, Mach cone, area-velocity relationship, stagnation properties, flow of compressible flow through discharge measuring devices	05
4	**Laminar flow:** Reynolds experiment, Critical velocity, Steady laminar flow through: circular pipes, annulus, parallel plates: stationary and moving, kinetic energy correction factor, momentum correction factor, Dash pot.	07
5	**Turbulent flow through pipes:** Causes of turbulence, instability, mechanism of turbulence. Reynolds stresses. Semi-empirical theories of turbulence, Prandtl's mixing length theory. Universal velocity distribution equation, resistance equation, applications, Moody diagram.	07

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

They are requested to

Oral Examination:-
Oral examination will be based on entire syllabus.

List of Practicals:-

1. Reynolds's experiment
2. Determination of viscosity of fluid
3. Friction loss through pipes
4. Laminar flow through pipe
5. Minor losses
6. Velocity distribution in circular pipe
7. Turbulent flow through pipe.
8. Viscous flow through pipe etc.

Term Work:
Each student has to appear for at least ONE written test during the term.
The term work shall consist of:
Report on minimum six experiments conducted.
Assignments consisting of minimum 15 problems covering entire syllabus
Graded answer paper of written test.
The distribution of term work marks shall be as follows:

Laboratory work (Experiments and assignments	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Practical and theory)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books: .

1. "Hydraulics and fluid mechnics" by Dr. P. M. Modi and Dr. S. M. Seth, Standard Book House.
2. "Theory and applications of fluid mechanics" by K. Subramanya, Tata McGraw Hill New Delhi.
3. "Fluid mechanics" by Dr. A. K. Jain. Khanna Publishers.
4. "Fluid mechanics and fluid pressure engineering" by D. S. Kumar, F. K. Kataria and sons.
5. "Fluid mechanics" by R.K. Bansal. Laxmi Publications (P) Ltd.
6. "Fluid mechanics" by Frank M. White. Tata McGraw-Hill.
7. "Fluid mechanics" by Streeter, Wylie. Bedford, McGraw-Hill International Edition
8. "Fluid mechanics with engineering applications" by R. L. Daugherty, J. B. Franzini, E. J. Finnemore, Tata McGraw-Hill New Delhi.
9. "Fluid mechanics" by Joseph Spurk, Springer
10. "Mechanics of fluids" by Potler. Wiggert. Prentice-Hall International.