Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER – IV: CIVIL ENGINEERING)
Credit Based Scheme w.e.f. 2013-14

S. No.	Course No.	Course Title	Teaching Schedule L	T	P	Marks of Class work	Examination Marks Theory	Practical	Total	Credit	Duration of Exam
1	MGT 201 B OR OR GES 201B	ENGINEERING ECONOMICS **COMMON FOR ALL BRANCHES EXCEPT BT & BME GROUP** "B' ENVIRONMENTAL STUDIES GROUP'A'	4 3	-	-	25 -	75 75*	-	100 75*	4	3
2	CE 202B	STRUCTURAL ANALYSIS - I	3	2		25	75	-	100	5	3
3	CE 204B	OPEN CHANNEL FLOW	3	1	-	25	75	-	100	4	3
4	CE 206B	GEOMATICS ENGINEERING	3	1	-	25	75	-	100	4	3
5	CE 208B	ENGINEERING GEOLOGY	3	1	-	25	75	-	100	4	3
6	CE 210B	CONCRETE TECHNOLOGY	3	-	-	25	75	-	100	3	3
7	CE 212B	STRUCTURAL ANALYSIS – I LAB	-	-	2	20	-	30	50	1	3
8	CE 214B	OPEN CHANNEL FLOW LAB	-	-	2	20	-	30	50	1	3
9	CE 216B	GEOMATICS ENGINEERING LAB	-	-	2	20	-	30	50	1	3
10	CE 218B	ENGINEERING GEOLOGY LAB	-	-	2	20	-	30	50	1	3
11	CE 220B	CONCRETE TECHNOLOGY LAB	-	-	2	20	-	30	50	1	3
12	GPCE 202B	GENERAL PROFICIENCY & ETHICS	1	-	-	75	-	-	75	2	3
		Total Group B	**20**	**5**	**10**	**325**	**450**	**150**	**925**	**31**	
		Group A	**19**	**5**	**10**	**300**	**375**	**150**	**825**	**31**	

Note:

1 **The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.**
2 **Electronics gadgets including Cellular phones are not allowed in the examination.**

3. Each student has to undergo Survey Camp of 2 weeks to be conducted by the Department during summer vacation and its evaluation shall be carried out in the V Semester.
4. The Environmental studies (GES-201 B) is compulsory & qualifying courses.

5. All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

CE – 202B: STRUCTURAL ANALYSIS I
B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
				Class Work	:	25 Marks
3	2	--	5	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

UNIT I

Analysis of determinate Trusses Introduction, determination of forces in member of trusses by method of joints, method of sections, Deflection of Joints of plane frames by castigliano's first theorem and unit load method.

Analysis of Dams, chimneys and Retaining Walls: Introduction, limit of eccentricity for no tension in the section, core of the section, middle third rule, wind pressure on chimneys.

UNIT II

Deflection of Beams Review of Double Integration Method and Macaulay's Method, moment area theorem, conjugate beam method, unit method and strain energy method. Maxwel's reciprocal theorem.

Thin cylinder and Spheres: Introduction, stresses and strains in thin cylinders and spherical shell, volumetric change, wire wound thin cylinders, thin vessels subjected to internal pressure.

UNIT III

Rolling Loads: Introduction to rolling loads and influence lines, Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point load, uniformly distributed load, several point loads etc.

Influence Lines: Construction of Influence lines for reaction, shear forces and bending moment for simply supported, overhanging and compound beams, influence lines for girders with floor beams, Influence lines for forces in members of frames.

UNIT IV

Arches: Introduction, Analysis of three hinged, two hinged and fixed arches, spandrel braced arches, Influence lines for horizontal thrust, shear force and bending moment for three hinged and two hinged arches.

Cables and suspension Bridges: Introduction, shape of a loaded cable, cable carrying point loads and UDL, cables with ends at different level, cable subjected to temperature stresses, suspension bridge with two hinged and three hinged stiffening girders, influence lines.

Text Books

1. **Elementary Structural Analysis, Norris & Wilbur, McGraw Hill Publisher,**
2. **Basic Structural Analysis, C.S. Reddy, Tata McGraw Hill Publication.**
3. **C K WANG, " Intermediate Structural Analysis" McGraw Hill Publisher**

Reference Books

1. **Structural Analysis (A unified approach), D.S. Parkash Rao, University Press.**
2. **Theory of structures, Punmia and Jain, Luxmi Publications.**
3. **Structural Analysis Thandvamoorthy TS Oxford University Press**
4. **Structural Analysis Devdas Menon Narosa Publishing House**

Note:

1. **In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

CE – 204B: OPEN CHANNEL FLOW

B. Tech. 3rd Year (Semester – V)

L	T	P	Credits		
3	1	--	4	Class Work	: 25 Marks
				Examination	: 75Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

Unit I

Flow in Open Channels: Difference between pipe flow and channel flow, Types of channels, Classification of flows, Sub Critical and Supercritical Flows, Velocity distribution and Uniform flow formulae.

Flow Measurement: Flow over notches and weirs ,Pitot tube floats and current meters for velocity measurement, Flow over Spillways, Sluice gates, free overfall

Unit II

Unsteady flow and Hydraulic jump: Froude number and types of hydraulic jump, Applications Jumps in channels. Unsteady flow equation, Pre jump and post jump depths, length of Hydraulic Jump and energy dissipation, Surges.

Concepts of Specific energy and specific Force: Specific energy and specific curve, Momentum Equation in open channels, Specific force & specific force curve Critical depth and its computation.

Unit III

Gradually Varied Flow: Channel transitions, Non-uniform flow in open channels, Dynamic equation for GVF, Water surface profiles in channels of different slopes GVF flow computations. Design of Channels: Design of Channels, Most efficient channel sections

Unit IV

Pumps and Turbines: Reciprocating pumps, their types, work done by single and double acting pumps. Centrifugal pumps, components and parts and working, types, heads of a pump-statics and manometric heads,. Force executed by fluid jet on stationary and moving flat vanes., Turbines-classifications of turbines based on head and specific speed, component and working of Pelton wheel and Francis turbines, cavitation and setting of turbines.

Text Books:

1. **K.G. Ranga Raju, “Flow Through Open Channels”, Tata McGraw Hill, New Delhi.**
2. **F. M. Hendersen, “Open Channel Flow”, McMillan, New York.**

Reference Books:

1. **K. Subramanya, “Flow in Open Channels”, Tata McGraw Hill, New Delhi.**
2. **R. H. French, “Open-Channel Hydraulics”, McGraw Hill Publishing Company, New York.**

Note:

1. **In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
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CE – 206B: GEOMATICS ENGINEERING

B. Tech. 3rd Year (Semester – V)

L	T	P	Credits			
				Class Work	:	25 Marks
3	1	--	4	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

UNIT – I

Introduction to Geomatic Engineering, GIS, GPS, DEM, DTED, History of surveying and mapping, Importance, Maps and maps Numbering systems, Large scale mapping, small scale mapping, Components of GIS, Application of GIS in civil engineering

Remote Sensing, Fundamentals, EMS, RS System, Active and Passive radiation – Electromagnetic Radiation – Nomenclature, Reflectance, Transmission and Absorption, Thermal Emission – Plank's formula, Stefan – Boltzman Law, Wein's Displacement Law; Emissivity – Kirchoff's Law, Characteristics of Solar Radiant Energy, Application of remote sensing to various engineering fields

UNIT – II

Interaction of EMR with Atmosphere – Scattering, Refraction, Absorption, Transmission. Atmospheric Windows.

Interaction of EMR with Earth Surface – Spectral Reflectance Curves. Interaction of earth surface with EM radiation in visible, NIR, TIR and Microwave regions. Idealised & Real sequence of remote sensing.

UNIT – III

Sensors and Platforms: Platforms, Orbital characteristics, Storage and Retrieval of data. IRS satellite systems – Introduction, Stages of development, Sensors, Types of scanning system

Data Processing: Initial data statistics. Pre-processing – Atmospheric, Radiometric and Geometric corrections, Image Histogram, Classification of images

UNIT – IV

Data analysis: Image Interpretation Elements, Keys and Aids. Basic Instrumentation. Visual analysis of data

Photogrammetry: Aaerial and terrestrial, applications, types and geometry of aerial photograph, flight planning, relief displacement, Stereoscopy, photogrammetric mapping, Mosaics

Text Books

1. **Geomatic Engineering, Manoj K Arora, RC Badjatiya, Nem Chand & Bros.**
2. **Remote Sensing and Image Interpretation, by Lillisand, T.M. & Kiefer R.W., John Wiley and Sons.**
3. **Introduction to Remote Sensing, by Campbell, J.B. Taylor and Francis.**
4. **Principles of Geographic information systems, Burrough, P.A and MacDonnel, R.a , Oxford University press**
5. **Concepts and Techniques of GIS, C.P.Lo,Albert K.W.Yeung, PHI**

Reference Books

1. **Digital Remote Sensing, by Nag. P. & Kudrat, M. Concept Publication Company.**
2. **Remote Sensing and Photogrammetry – Principles and Applications, by Jhanwar, M.L. and Chouhan, T.S. Vigyan Prakashan, Jodhpur.**

Note:

1. **In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

CE – 208B: ENGINEERING GEOLOGY
B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
				Class Work	:	25 Marks
3	1	--	4	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

UNIT – I

Introduction: Divisions of Geology, Importance of Engineering Geology, Geology applied to civil engineering practices. Weathering: Agents and effects, Geological works of rivers, wind, glaciers and oceans as agents of erosion, transportation and deposition, resulting features and engineering importance.

Rocks and Minerals: Classification of rocks for engineering purposes, Rock Quality Designation (RQD). Igneous, sedimentary and metamorphic rocks: their formation and structures. Identification and physical properties of minerals.

UNIT – II

Structural Geology: Stratification, dip and strike, Unconformities: Causes and types of unconformities, Folds: Definition, parts of a fold, classification, causes, relation to engineering operations.

Faults: Definition, parts of a fault, classification, causes, relation to engineering purposes. Joints: Definition, attitude, joint set, joint systems, classification, relation to engineering operations.

UNIT – III

Methods of geological explorations: gravity, electrical and seismic methods, remote sensing techniques, Geology of India. Introduction to GIS, components, database structure,, software packages.

Geological considerations in the Engineering projects: Tunnels and its design considerations, highways, foundations, dams and anchorage of dams, reservoirs. Under ground water in engineering Projects, aquifers, aquicludes, artisan wells.

UNIT – IV

Earthquakes: Definition, terminology, causes, earthquake waves, intensity, vibration quantification and natural damping, recording of earthquakes, seismic zones in India, factors to be considered and methods in earthquake proof construction.

Earth movements: Landslides and land subsidence, elementary idea about classification, factors causing landslides and land subsidence. Preventive measures for landslides viz retaining walls, slope treatment, chemical stabilization and drainage control.

Note: The subject will be treated with special reference to Indian Conditions. A conducted / guided tour through representative geological formations will be planned as a compulsory part of the course covering Stratigraphical, Structural and Petrological aspects.

Text Books:

1. **Engineering Geology by Parbin Singh, Kataria and Sons, Ludhiana/Delhi.**
2. **Geology for Engineers by D.S. Arora, Mohindra Capital Publishers, Chandigarh.**

Reference Books:

1. **Geology for Civil Engineers by Mcleans & Gribble; E & F Spon, London, U.K.**
2. **Engineering Geology by Richard E. Goodman, John Wiley and Sons, USA.**
3. **Engineering Behaviour of Rocks by I.W. Farmer; E & F Spon, London, U.K.**
4. **Rock Mechanics and Engineering by C. Jeager, Cambridge Univ. Press, London, UK**

5. **Fundamentals of Rock Mechanics by Jaeger and Cook, Metheun, London, U.K.**

Note:

1. **In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.**
2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

CE – 210B: CONCRETE TECHNOLOGY
B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
				Class Work	:	25 Marks
3	-	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

USE OF RELEVANT INDIAN STANDARDS IS ALLOWED IN THE EXAMINATION

UNIT – I

Constituents of Concrete: Properties of Cement, Tests on cement, Various types of cement & their applications, Bulking of Sand, properties of good sand and functions of sand in mortar and cement concrete, substitutes of sand, Classification of Aggregates, Properties of aggregates – specific gravity, bulk density, porosity, adsorption & moisture content of aggregates, deleterious substance in aggregate, Soundness of aggregate, Grading of coarse and fine aggregates, physical requirements of aggregates, and their tests, Admixtures: their purpose, their types, properties, dosages, effects and usages.

UNIT – II

Properties of Fresh and Hardened Concrete: Properties & Tests of Cement Concrete, Workability, factors affecting workability, measurement of workability by different tests; Strength of concrete and factors affecting it, Water Cement Ratio – Abram's law, Degree of Compaction and Age of Conrete. Development of Strength of Concrete, Methods of Curing, Influence of Temperature, Steam curing, Durability, shrinkage & Creep of Concrete, Factors influencing Creep; Compression tests and Tension Tests, Flexural Tests & Splitting Tedsts, Freeze and Thaw in Concrete.

UNIT – III

Concrete Mix Design: Principles of Concrete Mix Design, Basic Considerations, Factors in the choice of mix design, outline of mix design procedure, Proportioning of Concrete mixes by various methods – BIS Method of Mix Design, American Concrete Institute, British Standard, Quality control and Acceptance Criterion. Grades of Concrete, stress strain curve, permissible stresses

UNIT – IV

Durability of Concrete: Sulphate attack of concrete, Corrosion of rebar wrt chloride and sulphate attack, Alkali Silica Reaction, Freezing and Thawing, Carbonation of Concrete, Corrosion Measurement Techniques, Prevention of Corrosion

Special Circumstances of Concreting: Hot weather concreting, Cold weather concreting, Underwater concreting, Heavy Concrete, Lightweight Concrete

Text Books:

1. **Concrete Technology, by A. M. Neville & J.J. Brooks, Pearson.**
2. **Concrete Technology, by M. L. Gambhir, Tata McGraw Hill, New Delhi.**
3. **Concrete Technology, by M.S. Shetty, S. Chand & Co.**

Reference Books:

1. **Handbook of Mix Design, BIS, New Delhi.**
2. **Concrete Technology, by A.R. Santhakumar, Oxford University Press.**
3. **Concrete Microstructure and its Properties by P K Mehta and PJM Monterio**
4. **IS: 269 1989**
5. **IS:383 1970**
6. **IS:10262 2009**

Note:

1. **In the semester examination, the examiner will set two questions from each**

unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.

2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

CE – 212B: STRUCTURAL ANALYSIS-I LAB

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
				Class Work	:	20 Marks
--	--	2	1	Examination	:	30 Marks
				Total	:	50 Marks
				Duration of Examination	:	3 Hours

List of Experiments:

1. To verify Betti's Law
2. To find the deflection of a pine connected truss.
3. To determine the flexural rigidity (EI) of a given beam.
4. To verify Moment-Area Theorems for slope and deflection of a beam.
5. To study the behavior of different types of struts.
6. To obtain experimentally the influence line for the horizontal thrust in a two hinged arch.
7. To determine the elastic displacement of curved members.
8. To determine the horizontal displacement of the roller end in a curved beam.
9. To make computer programs for theoretical verification of the above experiments.

Text Books:

Experimental Methods in Structural Mechanics Kukreja C B and Sastry V V

Note:

1. Ten experiments are to be performed in the Semester.

2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus

CE -214B: OPEN CHANNEL FLOW LAB

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
				Class Work	:	20 Marks
--	--	2	1	Examination	:	30 Marks
				Total	:	50 Marks
				Duration of Examination	:	3 Hours

List of Experiments:

1. **To determine Manning's co-efficient of roughness for the rough bed of a given flume.**
2. **To measure the velocity distribution in a rectangular channel by Prandtl Pitot tube and to determine the energy correction factors**
3. **To study the flow through a horizontal contraction in a rectangular open channel.**
4. **To calibrate a current meter**
5. **To study the formation of hydraulic jump in a horizontal rectangular open channel (Measurement of Froude no. and energy loss)**
6. **To study the flow over a hump in a channel bed.**
7. **To study the pressure distribution along the spillway surface for different heads.**
8. **To calibrate a broad-crested weir and to study the pressure distribution along its surface.**
9. **To calibrate a venturi flume.**
10. **To study the flow under a sluice gate and formation of hydraulic jump at different Froude no.**

Note: Ten experiments are to be performed in the Semester taking atleast seven experiments from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

CE – 216B: GEOMATICS ENGINEERING LAB
B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
				Class Work	:	20 Marks
--	--	2	1	Examination	:	30 Marks
				Total	:	50 Marks
				Duration of Examination	:	3 Hours

List of Experiments

1. **Study of Aerial photographs.**
2. **Study and image interpretation of remote sensing data.**
3. **Introduction to CAD/GIS/Image Processing software**
4. **Study of digital image characteristics such as:**
   - **DN value,**
   - **Histogram,**
   - **Color image generation,**
   - **Simple Image enhancement,**
   - **On-screen digitization from images,**
   - **Area computation,**
   - **Geo-registration of images etc.**

Note: The students will perform all above mentioned experiments. However, some more experiments may be performed as designed & set by the concerned Institution as per the scope of the syllabus.

CE – 218B: ENGINEERING GEOLOGY LAB

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
--	--	2	1	Class Work	:	20 Marks
				Examination	:	30 Marks
				Total	:	50 Marks
				Duration of Examination	:	3 Hours

List of Experiments:

1. Study of minerals-hand specimens.
2. Study of rocks-hand specimens.
3. Field description of rocks for engineering practices.
4. Study of elements of symmetry and Crystal systems with crystal models.
5. Study of Geological Maps.
6. Dip and strike problems.
7. Study of optical properties of minerals.

Note: All experiments are to be performed in the Semester however some more experiments may also be performed as designed & set by the concerned Institution as per the scope of the syllabus.

CE – 220B: CONCRETE TECHNOLOGY LAB
B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
				Class Work	:	20 Marks
--	--	2	1	Examination	:	30 Marks
				Total	:	50 Marks
				Duration of Examination	:	3 Hours

List of Experiments:

1. **To determine standard consistency, initial and final setting times of cement**
2. **To determine compressive strength of cement**
3. **To determine the specific gravity of cement**
4. **To determine specific gravity of fine aggregate**
5. **To determine the specific gravity of coarse aggregate**
6. **To determine the grading of fine aggregate**
7. **To determine the grading of coarse aggregate**
8. **To determine the water absorption and moisture content of fine aggregate**
9. **To determine the water absorption and moisture content of coarse aggregate**
10. **To determine the compressive, tensile and flexural strengths of concrete**
11. **To design a mix grade of concrete as per Indian standard IS:10262 2009**

Text Books

1. **Material Testing Laboratory manual Kaushik S K, Kukreja CB Gupta VK and Kishore K. Standard Publishers Distributors**
2. **Concrete Laboratory Manual M. L. Gambhir**

Note: All experiments are to be performed in the Semester however some more experiments may also be performed as designed & set by the concerned Institution as per the scope of the syllabus.

GPCE 202B GENERAL PROFICIENCY & ETHICS

B. Tech. Semester – IV (Civil Engineering)

L	T	P	Credits			
				Examination	:	75Marks
1	--	--	2	Total	:	75 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I.	Academic Performance	
II.	Extra Curricular Activities / Community Service, Hostel Activities	(8 Marks)
III	Technical Activities / Industrial, Educational tour	(8 Marks)
IV	Sports/games	(14 Marks)
V	Moral values & Ethics	(15 Marks)

NOTE: Report submitted by the students should be typed on both sides of the paper.

C. A student will support his/her achievement and verbal & communicative skill through presentation before the committee.
(30 Marks)

C. Moral values & Ethics

Syllabus - Process for Value Education, self-evaluation concept and process.
A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.
The evaluation of this course will be made by the following Committee.

University Departments:

1	Chairperson of the Department	Chairman
2	Senior Most Faculty Counselor	Member
3	Vice- Chancellor's Nominee	Member

Affiliated Colleges:

1	Director/Principal	Chairman
2	Head of the Department/Sr. Faculty	Member
3	External Examiner to be appointed by the University	Member

Note: Remuneration will be paid to the external examiner only (at par with the other practical examinations).