Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. Final YEAR (SEMESTER – VIII: CIVIL ENGINEERING)
Credit Based Scheme w.e.f. 2015-16

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	CE 402B	ELEMENTS OF EARTH QUAKE ENGINEERING	3	1		25	75	-	100	4	3
2	CE 404B	IRRIGATION ENGINEERING II	3	2		25	75	-	100	5	3
3	MGT 402	HUMAN VALUES, ETHICS AND IPR	4	-		25	75	-	100	4	3
4		DEPARTMENTAL ELECTIVE – II*	3	1		25	75	-	100	4	3
5		DEPARTMENTAL ELECTIVE – III#	3	1		25	75	-	100	4	3
6	CE 406B	IRRIGATION ENGINEERING II LAB	-	-	3	20	-	30	50	1.5	3
6	CE 408B	PROJECT	-	-	8	75	-	125	200	8	3
7	GPCE 410B	GENERAL FITNESS FOR THE PROFESSION	-	-	-		-	100	100	4	3
Total			**16**	**5**	**11**	**220**	**375**	**255**	**750**	**34.5**	

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**

*** List of Departmental Elective – II**

1	CE - 452	DOCKS AND HARBOUR ENGINEERING
2	CE - 454	ROAD SAFETY AND ENVIRONMENT
3	CE - 456	CONSTRUCTION MANAGEMENT
4.	CE - 458	SOIL DYNAMICS
5	CE - 460	GROUND IMPROVEMENT
6	CE - 462	ENERGY EFFICIENT BUILDINGS
7	CE - 464	WATER POWER ENGINEERING
8	CE - 466	ENVIRONMENTAL IMPACT ASSESSMENTS

 # List of Departmental Elective – III

1	CE - 482	FINITE ELEMENT METHODS
2	CE - 484	RURAL WATER SUPPLY AND SANITATION
3	CE - 486	DISASTER MANAGEMENT
4	CE - 488	WASTE MANAGEMENT
5	CE - 490	MASS RAPID TRANSPORT SYSTEMS
6	CE - 492	WATER RESOURCES PLANNING AND MANAGEMENT
7	CE - 494	DESIGN OF MASONRY
8	CE-496	BRIDGE ENGINEERING

1 **Note: Students will be permitted to opt for any one elective from each group run by the Department. However, the Department shall offer those electives for which they have expertise. The choice of the students for any elective shall not be binding for the Department to offer, if the Department does not have expertise. The minimum strength of the students should be 20 to run an elective.**

CE 402B ELEMENTS OF EARTHQUAKE ENGINEERING

B. Tech. 4th Year (Semester – VIII)

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

UNIT I

Introduction: Introduction to various disasters, Disaster Management, Nature of dynamic loads, earthquake, wind and blast loads, characteristics of dynamic problems, method of discretization etc.

Theory of Vibrations: Formulation of Equation of Motions: Free and forced vibrations of single degree of freedom systems, damping and its effects, transient vibration, response spectrum theory. Review of formulation of flexibility and stiffness matrices of framed structures, application of vibration theory.

UNIT II

Multi-degree of freedom systems: Mode shapes and frequencies, numerical techniques for finding modes shapes and corresponding frequencies, orthogonality relationship of principal modes, Determination of fundamental frequency, Rayleigh's principle and its applications, normal mode theory for forced vibration, analysis of multi-degree freedom system, and dynamic response by mode superposition method.

Seismic performance, repair and strengthening: Vibration of continuum system, free and forced vibration response. Identification of Seismic damage in RC Buildings, effect of structural irregularities on performance, criteria for repair and strengthening, various techniques and their applications, seismic resistant building Architecture.

UNIT III

Introduction to Structural Failures due to Earthquake

Introduction to IS: 1893 - 2002: Seismic analysis and design of OHSR's, Framed structures by equivalent lateral load procedure and Modal analysis

UNIT IV

Introduction to Ductile Detailing of Structures, Concept of Soft Story Shear Walls

Use of Codes with reference to Masonry Buildings like IS: 4326, IS:

13828, IS: 13827 Text Book

1. **Dynamics of Structures, Clough and Penzian, McGraw Hill Publishing Co., New York**
2. **Structural Dynamics (Theory and Computation) Mario Paz, CBS Publishers and Distributors.**

Reference Books

1. **Structural Dynamics (An Introduction to computer methods), Roy R. Carig, Jr., John Wiley & Sons**
2. **Structural Dynamics Anil Kr. Chopra**

Note:

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

CE 404B IRRIGATION ENGINEERING II

B. Tech. 4th Year (Semester – VIII)

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

Unit I

Regulation works: Canal falls-necessity and location, development of falls, design of cistern element, roughening devices. Design of Sarda type fall. Design of straight Glacis fall. Off-take alignment, Cross-Regulator and Distributory Head Regulators, devices to control silt entry into the off-taking channel and Silt Ejector, Canal Escapes.

Cross Drainage Works: Classification and their selection, Hydraulic Design Aspects of Aqueducts, Syphon Aqueducts, Super Passage, Canal Syphon and Level Crossing, Design of Canal Transitions.

Unit II

Diversion Canal Headworks: Various components and their functions, layout plan, selection of site for diversion headworks, Causes of failure of weir/barrages on permeable foundation, Bligh's creep theory, Khosla's method of independent variables, use of Khosla's curves, various corrections..

Unit III

Storage Headworks: Types of dams, selection of a site, gravity dam-two dimensional analysis, forces acting, stability criterion, elementary profile of a dam, Grout Curtain and drainage galleries, Arch dams, constant angle and constant radius arch dam, simple design and sketchs, most economical angle. Earth dam, design principles, seepage through earth dams, seepage line, control of seepage, design of filters.

Unit IV

Spillways and Energy Dissipators: Requirements of spillway and spillway capacity, types of spillways and their suitability. Design aspects of Ogee spillways, chute, side channel, shaft and syphon spillways, Energy dissipation below spillways, stage discharge and jump height curves, stilling basins, USBR and I.S. Stilling Basins for different Froude no. ranges, Design of stilling basins

Text Books

1. **Theory and Design of Irrigation Structures Vol. I & II by R.S.Varshney, Gupta & Gupta.**
2. **Fundamentals of Irrigation Engineering by Bharat Singh**

Reference Books

1. **Irrigation, Water Resources and Water Power Engineering by P.N.Modi.**

2. **Irrigation Engineering and Hydraulic Structures by S.K.Garg.**

Note:

3. **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.**

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

MGT 402 HUMAN VALUES, ETHICS & IPR
B. Tech. 4th Year (Semester – VIII)

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

UNIT I

Introduction: Role of Engineer in Nation Building and in service of mankind.

Engineering Ethics: Senses of 'Engineering Ethics' - variety of moral issues - types of inquiry - moral dilemmas

- moral autonomy Kohlberg's theory -Gilligan's theory - consensus and controversy - professions and professionalism professional ideals and virtues - theories about right action - self-interest-customs and religion

- uses of ethical theories.

UNIT II

Human Values: Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation

– Commitment – Empathy – Self-Confidence – Character – Spirituality Engineering as Social Experimentation: Engineering as experimentation - engineers as responsible experimenters - codes of ethics-a balanced outlook on law-the challenger case study

UNIT III

Engineer's Responsibility for Safety: Safety and risk - assessment of safety and risk - risk benefit analysis-reducing risk-the three mile island and Chernobyl case studies. Responsibilities: Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest, occupational crime.

UNIT IV

Rights: professional rights - employee rights - intellectual property rights (IPR)-discrimination, Arbitration and litigations.

Global Issues: Multinational corporations - environmental ethics-computer ethics-weapons development-engineers as managers-consulting engineers-engineers as expert witnesses and advisors-moral leadership-sample code of conduct.

Text Books

1. **Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.**
2. **Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.**
3. **W.R. Cornish, 'Intellectual Property', Universal Law Publishing Co. Ltd., Delhi, 2001.**
4. **P.S. Narayan, 'Intellectual Property Law in India', Gogia Law Agency, 1999.**

References

1. **Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint now available).**
2. **Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available)**
3. **John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.**
4. **Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.**

5. **Avinash Shivade, 'Intellectual Property Manual' , Lexis, Nexis, 2004**

Note:

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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calculator and cellular phone will not be allowed.

CE 452 : DOCK AND HARBOUR ENGINEERING

B. Tech.

4th Year (Semester – VIII)

L	T	P	Credits
3	1	--	4

Class Work	:	25 Marks
Examination	:	75Marks
Total	:	100 Marks
Duration of Examination	:	3 Hours

UNIT – I

Growth and regulation of Ports: History of Port – Classification of Harbours - Factors affecting the growth of Port. - Requirement of a Harbour- General Planning Port capacity –traffic analysis - Berth occupancy – financial evaluation - EIA -Description of selected Indian ports.

UNIT – II

Harbour Planning (Technical): Site investigation – harbour entrance - Navigational Channel – Depth of harbour – Turning basin – Anchor basin – berthing area – Storage area - Shipping terminal facilities – Essentials of passenger terminal, dry bulk cargo terminal, Liquid bulk cargo terminals and container terminals.

UNIT – III

Introduction to ocean waves – Wave transformation – Wave and wind climate inside Harbour. Break waters: Types – Factors determining their selection – Forces on break waters – Design of rubble mound and vertical break waters – Physical Model Studies.

Berthing structures – Types – Loads – Selection of berthing structures – Design principles of diaphragm walls, dolphins and piles.

UNIT – IV

Selection and Design principles of Dock fenders and Mooring accessories.

Design principles of dock structures - Graving dry dock – Slip way – floating dry dock.

Monitoring and repair of harbour structures - Dredging - Navigational aids – Light house.

Text Books

1. Harbour and Coastal Engineering (Indian Scenario) Vol - I & Vol – II; S. Narasimhan & S. kathiroli, NIOT- Chennai
2. Design and construction of Port and marine Structures – Alonzo Def. Quinn – McGraw – Hill book Company

References

1. IS: 7314 1974 - Glossary of terms relating to Port and harbour Engineering.
2. IS: 4651 - Code of practice for Planning and Design of Port and harbour (Part – I) Site Investigation, (Part – II) Earth Pressure, (Part – III) Loading, (Part – IV) General Design Consideration, (Part – V) Layout and functional Requirement.

Note:

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

CE-454: ROAD SAFETY AND ENVIRONMENT

B. Tech. 4th Year (Semester – VIII)

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

UNIT – I

Planning for Network, Land Use and Road Environment for Safety, Designing for Safety: Road Link Design, Junctions.

Introduction to Road Safety Engineering and Crash Investigation, Human Factors Relating to Crashes/Accidents, Crash/Accident Investigation & Crash Problem Diagnosing, Crash Problems into Solutions & Crash, Investigation Reporting, Crash/Accident Costing, Economic Appraisal.

UNIT – II

Road Safety Auditing- An Introduction, How to Conduct Road Safety Audit, Design Stage Road Safety Audit, Road Safety Audits of Land Use Developments, Traffic Control Devices & Safety, Needs of Different Road Users, Road Safety Audit in Road Works & Pre Opening Safety Audit..

Street Lighting & Traffic Signals, Provisions for NMT Vehicles in India, Safety Provisions for Pedestrians & Cyclists, Road Signs and Pavement Markings.

UNIT – III

Safe System Approach- A Global Perspective, Speed Management & safety, Safe System and Speed & Assessing speed limit, Type of speed limit & Speed zone signing Infrastructure to support safe speed feedback and enforcement.

Hazard Management Organizational commitment & encouraging RSA, Road Safety Audit Checklist.

UNIT – IV

Site Visits and Preparation of the Audit Reports.

Risk Assessment & Prioritization of audit recommendations, Solutions and effectiveness & Corrective, Action Report.

Text Books

1. **Highway Engineering by Khanna and Justo, Nem Chand & Brothers, Roorkee**
2. **Highway Engineering by L.R. Kadyali, Nem Chand & Brothers, Roorkee**

Reference Books

1. **Highway Engineering by Oglesby and Hews**
2. **Transportation Engineering by G.V. Rao, Tata McGraw Hill Publisher, New Delhi**
3. **Traffic Engineering by Matson,Smith & Hurd**
4. **Road safety audit Manual**

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-456B CONSTRUCTION MANAGEMENT

B. Tech. 4th Year (Semester – VIII)

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

Unit-I

Waste Management: Introduction to waste and waste management. The concepts of waste productivity and its interrelationship with productivity. System concept of waste. Complementarily of waste and resource management.

Unit-II

Quality Management: Concept of quality management. Product vs. system quality. Quality assurance. Quality circles. Total quality management. ISO-9000 series and construction project.

Unit-III

Materials & Inventory Management: Material management. Requirements and purchases. Different methods of inventory management. Mathematical modeling. Suitable inventory model for construction.

Unit-IV

Risk Management: Decision theory, Decision under certainty. Probility and uncertainty, Decision risks. Risks involved in decisions pertaining to construction industry. Risk. management, Insurance against risks.

Management Information System: Principles of management information systems. Necessity and importance. Requirements of a good M.I.S. as a tool of data collection and dessimation. Use of table and charts. Artificial intelligence. Expert systems. Decision support systems.

Reference Books:

1) **Management Information Syatem by W.S. Jawadekar**
2) **Total Project Management by PK Joy**
3) **Construction Management and Planning by R. Sengupta**

Note:

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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.**

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CE-458B SOIL DYNAMICS

B. Tech. 4th Year (Semester – VIII)

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

UNIT I

Nature of dynamic loads, stress conditions on soil elements under Earthquake loading. Theory of vibrations.
Dynamic Earth Pressure problem and retaining walls: Behaviour of retaining walls during earthquakes. Modification of Coulomb's theory, Modified graphical constructions for lateral earth
pressure, Analytic solution of C - f soils, Indian standard code of practice. Dynamic Properties of soils.

UNIT II

Liquefaction of Soils: Theory, criterion of liquefaction, factor affecting and its determination, laboratory studies in Triaxial shear and oscillatory simple shear, Evaluation of liquefaction potential by various methods.Vibration table studies.
Liquefaction behaviour of loose and dense sands; silt and clayey silts. Introduction to Machine Foundations , Criteria for satisfactory functioning of machine foundation, methods of analysis, Degrees of freedom of a block foundation, Soil spring stiffness coefficients.

UNIT III

Block Foundation: Vibrations of a block, determination of dynamic coefficient by various methods. Design procedure for block foundation.

UNIT IV

I.S. method for design of reciprocating machines. Design Requirements of reciprocating , Methods of Designs, Machines Introduction to the dynamics of dams and reservoirs.

Text Books

1. **Rao, Kameswara "Vibration Analysis and Foundation Dynamics" Wheeler**
2. **Saran, Swami, "Soil Dynamics and Machine Foundations" Galgotia, New Delhi.**

Reference Books

1. **Prakash, S., Soil Dynamics, McGraw Hill International Edition, New York. Publishing, New Delhi.**
2. **Barken, D.D., "Dynamics of Bases and Foundations," McGraw Hill Book 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-460B GROUND IMPROVEEMNT

B. Tech. 4th Year (Semester – VIII)

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 different methods of ground improvement and its importance. Mechanical method of ground improvement, Ruthfuch method; methods based on PI.

Ground Freezing, methods, Hydrogeology of frozen soils, strength and behaviour of frozen soils. Ground heating, effect on soil properties, methods.

UNIT II

Drainage Techniques, filter drains, sand drains, sandwicks & band drains, lime columns. Electro-osmosis and Electrochemical stabilization.

Compaction & consolidation techniques viz. pre-compression, compaction piles, vibro-compaction (Vibro-floatation, Terra-probe, vibro-replacement, concrete columns & vibro-displacement), Dynamic compaction, explosive compaction.

UNIT II

Soil Reinforcement, load transfer mechanism, strength development, anchored earth. In-situ reinforcement techniques viz soil nailing, reticuled micropiles, soil dowels and anchors.
Grouts, properties, penetration, clay, cement clay, cement, clay-chemical, chemical and Bituminous grouts, grouting methods viz penetration, claquage, compaction & jet.

UNIT IV

Reinforced earth; Introduction, Mechanism of reinforced types of reinforcement strength characteristics. Design of reinforced earth retaining walls, abutments, earth slopes.

Exclusion techniques viz. sheet piles, contiguous bored piles, secant piles, slurry trenches. Diaphragm walls. Design of stone columns.

Text Books

1. **Ground Improvement Techniques by P. Purushotham Raj, Tata McGraw Hill, ND.**
2. **Engineering Treatment of Soils by F.G. Bell, E & FN Spon Publishers, UK.**

Reference Books

1. **Engineering Principles of Ground Modification by M.R. Hausmann, McGraw Hill Publishers, New York.**
2. **Ground Improvement Techniques & their Evolution by W.F. Van Impe., A.A. Balkema Publishers, Netherlands.**
3. **Koerner, R.M., Construction & Geotechnical methods in foundation engineering, MGH, New York,1985**

4. Bowle's.J.E., Foundation Analysis and design,4th edition,MGL,1998.
5. Jones.C.J.F.P., Earth reinforcement and soil structures, Butter worth &co., London,1985
6. Arora.K.R., Soil mechanics and foundation Engineering,SPD,2001

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-462B ENERGY EFFICIENT BUILDING

B. Tech. 4th Year (Semester – VIII)

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

UNIT I

Introduction: Fundamentals of energy - Energy Production Systems - Heating, Ventilating and air conditioning –Solar Energy and Conservation - Energy Economic Analysis - Energy conservation and audits -Domestic energy consumption - savings -Energy use in buildings - Residential - commercial buildings.

Environmental: Energy and Resource conservation - Design of green buildings - Evaluation tools for building energy - Embodied and operating energy - Peak demand - Comfort and Indoor air quality - Visual and acoustical quality - Land, water and materials - Airborne emissions and waste management.

UNIT II

Design: Natural building design consideration - Energy efficient design strategies - Contextual factors - Longevity and process Assessment -Renewable energy sources and design.

Advanced building Technologies - Smart buildings - Economies and cost analysis.

Services: Energy in building design - Energy efficient and environment friendly building – Thermal phenomena - thermal comfort - Indoor Air quality - Climate, sun and Solar radiations.

UNIT III

Psychometrics - passive heating and cooling systems - Energy Analysis - Active HVAC systems - Preliminary Investigation – Goals and policies.

Energy audit: Types of energy audit - Analysis of results - Energy flow diagram – Energy consumption/ Unit production - Identification of wastage -Priority of conservative measures - Maintenance of management programme.

UNIT IV

Energy Management: Energy management of electrical equipment - Improvement of power factor

– management of maximum demand - Energy savings in pumps - Fans - Compressed air systems - Energy savings in Lighting systems - Air conditioning systems - Applications.

Text Books

1. **Moore F., Environmental Control System McGraw Hill, Inc., 1994.**
2. **Brown, G Z, Sun, Wind and Light: Architectural design strategies, John Wiley, 1985.**

Reference Books

1. **Cook, J, Award - Winning passive Solar Design, McGraw Hill, 1984.**

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-464B WATER POWER ENGINEERING

B. Tech. 4th Year (Semester – VIII)

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

Unit I

Introduction: Sources of power , estimation of water power, necessity and importance of harnessing small hydro power, flow duration and power duration curves, load curve, load factors, capacity factors, utilisation factors, firm and secondary power.

Types of Hydro Power Plants: Elements of Hydro power, classification of hydro-power plants, run-of-river plants, storage plants diversion canal development, pumped storage plants, tidal power plants, base load and peak load plants in a power grid.

Unit II

Intakes: Intake structures, functions and their types, components of intakes-forebay, trash racks, gates and valves, force required to operate gates.

Unit III

Conveyance System: Penstocks, design criterion, economical diameter anchor blocks, cradles and footings, water hammer, instantaneous closure of power canal, surge tank, surges in canals.

Unit IV

Turbines: Types of turbines, specific speed and classification of turbines, synchronous speed, scroll casing , flumes and draft tubes, dimensions of scroll casing and draft tubes, setting of turbines Power House: General layout and arrangements of hydro-power units, number and size of units, sub-structure, spacing of units, super-structure, underground power stations, tidal power

Text books

1. **Water Power Engineering, Dandekar, M.M., Sharma,K.N.**
2. **Water Power Engineering, Borrows, H.K**
3. **Water Power Engineering, M.M.Deshmukh.**

Reference Books :

1. **Hydro-Electric Engineering Practice Vol.I ,II & III Brown J.G.**
2. **Water Power Development, Vol.I & II, Mosonyi,E.**
3. **Hydro Power Structures, R S Varshney, Nem Chand& Bros**

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-466B ENVIRONMENT IMPACT ASSESSMENTS

B. Tech. 4th Year (Semester – VIII)

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

UNIT-I

Basic Concepts of Environmental Impact Assessment: Description of the project and the environmental setting, identification of impacts, measurement and monitoring, prediction and assessment of impacts and communication of impacts.

UNIT -II

Environmental Impact Assessment Methodologies: Checklists, matrices, networks and overlays Prediction and Assessment of Impact on the physical environment, on the resources, on the economic activities, and on the socio-economic and political well being of local human settlements, Environmental cost benefit analysis Sustainable development.

UNIT-III

Environmental auditing: Definition and types of audits, EMS audits, performance audits; compliance audits, registration audits ISO 14000 series of standards and environmental auditing, Methodologies for Environmental Auditing: Objectives, audit teams, planning audits, conducting audits, reporting audit findings

UNIT -IV

Acts: Water act, Water Cess act, Air act, Environment Protection act and their amendments, Wildlife act and Forest acts.

Text Books

1. **R.E. Munn, Environmental Impact Assessment, John Wiley, New York, USA**
2. **Pollution Control Law Series; PCL/2/2001, Central Pollution Control Board, New Delhi.**
3. **Eds, Jain and Clark, Environmental Technology Assessment and Policy, John Wiley, New York, USA**
4. **National Conservation Strategy and Policy Statement on Environment and Development, Govt. of India, New Delhi**
5. **A guide to Manufacture, Storage and Import of Hazardous Chemicals Rules, Ministry of Environment and Forests, Govt. of India, New Delhi.**
6. **Canter, L.W., Environmental Impact Assessment, McGraw Hills, New York, USA**
7. **Woodside, Gayle and Patrick Aurrichio, ISO 14001 Auditing Manual, McGraw Hills, New York, USA**
8. **Pollution Control Acts, Rules and Notifications issued thereunder, Central Pollution Control Board, New Delhi.**
9. **Environmental Impact Assessment: A Manual, Ministry of Environment and Forests (Impact Assessment Division), Govt. of India, New Delhi**

Note:

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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.**

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CE-482B FINITE ELEMENT METHODS

B. Tech. 4th Year (Semester – VIII)

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

UNIT I

Introduction and basic concepts. Energy approach and variation principles in Finite-Element Method.

Basics Elements I: Various element shapes, Isoparametric elements, Axi-symmetric elements, plate bending elements.

UNIT II

Basic Elements II: introduction to 3-D elements, shell elements, interface elements, boundary elements, infinite elements.

Direct and variational formulations of element stiffness and loads.

UNIT III

Assemblage of elements, Boundary Conditions and Solution of overall problems.

UNIT IV

Techniques of nonlinear analysis: Mesh generation, graphic display and software packages. Organization of FEM programs, efficient solutions, input/output, pre and post processors.

Text Books

4. **Finite Element Analysis—Theory and Programming, C S Krishnamurthy, TMH Publication, New Delhi**
5. **Concept and Application of Finite Element Analysis, R D Cook, D S Malcus, John Wiley, Newyork.**

Reference Books

2. **Introduction to Finite Element Method, C S Desai and J F Abel, Affiliated East West Press, New Delhi.**
3. **Finite Element Primer, V K Manicka Selvam, Dhanpat Rai Publication, New Delhi**

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-484B RURAL WATER SUPPLY AND SANITATION

B. Tech. 4th Year (Semester – VIII)

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

Unit-I

Concept of environment and scope of sanitation in rural areas. Magnitude of problems of rural water supply and sanitation. Population to be covered, difficulties. National policy.

Water supply: Design population and demand loads. Various approaches of planning of water supply schemes in rural areas. Development of proffered sources of water springs. Wells, infiltration wells, radial wells and infiltration galleries, collection of raw water from surface source. Specific practices and problems encountered in rural water supply.

Unit-II

Improved methods and compact systems of treatment of surface and ground waters for rural water supply. Brief Details of multi-bottom settlers (MBS), diatomaceous earth filter, cloth filter, slow sand filter, chlorine diffusion cartridges.

Pumps, pipe materials, appurtenances and improved devices for use in rural water supply. Planning of distribution system in rural areas.

UNIT-III

Community and sanitary latrines. Various methods of collection and disposal of night soil. Planning of waste water collection system in rural areas. Treatment and Disposal of waste water.

Compact and simple waste water treatment units and systems in rural areas such as stabilization ponds, septic tanks, Imhoff tank, soak pit etc. Disposal of waste water soakage pits and trenches.

Unit-IV

Disposal of Solid Wastes. Composting, land filling, incineration, Biogas plants, Rural health. Other specific issues and problems encountered in rural sanitation

Text Books

1. Excreta Disposal for Rural Areas and Small Communities. Wagner, Lanoix, WHO Publication.
2. Small Community water supplies - Holket (ed.) John Wiley & Sons.

Reference Books

1. Manual on Water Supply and Treatment - CPHEEO Govt. of India.
2. Water Treatment and Sanitation – Simple Method for Rural Area' by Mann H.T. and Williamson D.
3. 'Water Supply and Sewerage', by E.W.Steel & T.J.Mcghee, McGraw Hill.
4. 'Manual on Water Supply and Treatment', CPHEEO, Mini. Of Urban Development, Govt. of India.
5. 'Manual on Sewerage and Sewage Treatment', CPHEEO, Mini. Of Urban Development, Govt. of India

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-486B DISASTER MANAGEMENT

B. Tech. 4th Year (Semester – VIII)

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 Disaster Management: Natural and Man made Disasters- International Year of Disaster Reduction.

Hydro-meteorological based disasters I: Tropical Cyclones, Floods, droughts. Unit-II

Hydro-meteorological based disasters II: Desertification Zones and Forest Fires.

Geological based disasters: Earthquake, Tsunamis, Landslides, and Avalanches.

Unit-III

Manmade Disasters I: Chemical Industrial hazards, major power break downs, traffic accidents, Fire hazards etc.

Manmade Disasters II: Chemical Industrial hazards, major power break downs, traffic accidents, Fire hazards etc.

Unit-IV

Use of remote sensing and GIS in disaster mitigation and management.

Risk and Vulnerability to disaster mitigation and management options: Warning and Forecasting.

Text Books

1. **Thomas D. Schneid., Disaster Management and Preparedness, CRC Publication, USA, 2001**
2. **Patrick Leon Abbott, Natural Disasters, Amazon Publications, 2002**
3. **Ben Wisner., At Risk: Natural Hazards, People vulnerability and Disaster, Amazon Publications, 2001**
4. **Oosterom, Petervan, Zlatanova, Siyka, Fendel, Elfriede M., "Geo-information for Disaster Management", Springer Publications, 2005**

Reference Books

1. **Selected Resources Published by the National Disaster Management Institute of Home Affairs, Govt. of India, New Delhi.**

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-488B WASTE MANAGEMENT

B. Tech. 4th Year (Semester – VIII)

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

UNIT -I

Types of Industrial Waste: Liquid, solid, atmospheric and hazardous, Hazardous wastes: Characterization and treatment.

Solid wastes, non-hazardous wastes and hazardous wastes: Definition, sources and characteristics; Sampling and analysis techniques; Inventorying wastes; Strategies for source reduction, for the recovery of residual substances, byproducts and resources and for recycling and reuse of wastes.

UNIT -II

Municipal solid waste management: Segregation and recycling and reuse of wastes; Collection, transportation and storage of municipal solid waste; Resource recovery from wastes; waste exchanges; Municipal solid waste management programs.

Treatment and disposal: Biological and chemical treatment of hazardous wastes; Composting and vermi-composting of wastes.

UNIT -III

Solidification and stabilization of wastes; Incineration for the treatment and disposal of municipal solid wastes and hazardous wastes.

Land farming; Landfill disposal of municipal solid waste and hazardous waste; and Bioremediation.

UNIT -IV

Electronic waste Management.

Legal requirements: Municipal solid waste rules; Hazardous waste rules; Biomedical waste rules; Rules related to recycled plastics, used batteries, flyash, etc.

Text Books

1. **Pollution Control Acts, Rules and Notifications Issued Thereunder. Pollution Control Law Series: PCLS/02/1992. Central Pollution Control Board, Delhi.**
2. **Management of Municipal Solid Wastes - Status and Options. Control of Urban Pollution Series (CUPS/41/1994-95). Central Pollution Control Board. Delhi.**
3. **Hazardous waste management. M.D. LaGrega, P.L. Buckingham, J.C. Evans and the Environmental Resources Management Group. McGraw-Hill International Editions.**

Reference books

1. **Solid waste management in developing countries. A.D. Bhide and B.B. Sundaresan. INSDOC-UNESCO, New Delhi.**
2. **Environmental Engineers Handbook. D.H.F. Liu and B.B. Liptak. Lewis Publishers, New York.**
3. **Management of Solid Wastes in Developing Countries. Frank Flintoff.**

World Health Organization. New Delhi.

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-490B MASS RAPID TRANSPORT SYSTEMS

B. Tech. 4th Year (Semester – VIII)

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

UNIT – I

Role of Transportation: History of transit, Recent Trends in transit, Mass transportation characteristics, Demand Characteristics: Spatial, temporal and behavioral characteristics.
Mass Transportation Planning: Transportation demand surveys, Mass transportation demand estimation, Demand projection, Trip generation, Trip distribution, Model split and route assignment.

UNIT – II

Transport system Performance: Performance evaluation and analysis, Structure of decisionmaking, Evaluation and selection methods, selection procedure. Generation of alternative schemes, Economic evaluation methods.
Terminals: Functions of terminals, Design, Typical Terminal characteristics.

UNIT – III

Scheduling and Routes: Service analysis, Vehicle dispatch policy, Vehicle Requirements, Spacing of bus stops, Route spacing and performance.
Management: Operational and management issues in transport planning, Reserved bus lanes and signals, Vehicle monitoring and control system,, Nodal coordination.

UNIT – IV

Special Systems: People mover systems, Underground transportation, para transit, Rail transit system, case studies.

Text Books

1. Kristhi, Lal, Transporation Engineering, PHI, Delhi, 2008 Hay, W.W., An Introduction to Transportation Engineering, 2nd Ed., John Wiley & Sons, 2001
2. Kadiyali, L. R, “Traffic Engineering and Transport Planning”, Khanna Publishers New Delhi – 110006, 2006

Reference Books

1. Hutchinson, Urban Transport Planning, John Wiley, 2006
2. Dickey, J.W., et. al., Metropolitan Transportation Planning, TMH edition, 2002.
3. Paguette, R.J., et.al, Transportation Engineering - Planning and design, 2nd edn., John Wiley & Sons, 2002.
4. Railis, V.R, Intercity Transport, Engineering and Planning, The Macmillan Press, 2003.

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-492B WATER RESOURCES PLANNING AND MANAGEMENT

B. Tech. 4th Year (Semester – VIII)

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

Unit I

Water Resources Planning: Role of water in national development, assessment of water resources, planning process, environmental consideration in planning, system analysis in water planning, some common problems in project planning, functional requirements in multipurpose projects, multipurpose planning, basinwise planning, long term planning.

Unit II

Reservoir planning-dependable yield, sedimentation in reservoir, reservoir capacity, empirical-area reduction method.

Economic and Financial Analysis: Meaning and nature of economic theory, micro and macro economics, the concept of equilibrium, equivalence of kind, equivalence of time and value, cost benefit, discounting factors and techniques, conditions for project optimality, cost benefit analysis, cost allocation, separable and non-separable cost, alternate justifiable and remaining benefit methods, profitability analysis.

Unit III

Water Resources Systems Engineering: Concept of system's engineering, optimal policy analysis, simulation and simulation modeling, nature of water resources system, analog simulation, limitations of simulation, objective function, production function, optimality condition, linear, non-linear and dynamic programming, applications to real time operations of existing system, hydrologic modeling and applications of basic concepts.

Unit IV

Applications of System Approach in Water Resources: Applications of system engineering in practical problems like hydrology, irrigation and drainage engineering, distribution network, mathematical models for forecasting and other water resources related problems.

Text Books

1. Linsely et al., “Water Resource Engineering”, McGraw Hill Publishing Company, New York.
2. L.D. James and R. R. Lee, “Economics of Water Resources Planning”, McGraw Hill Publishing Company, New York.
3. Loukes et al., “Water Resources Systems Planning and Analysis”, Prentice Hall of India, New Delhi
4. Water Resources Systems Planning & Economics by R.S.Varshney
5. Optimisation Theory and Applications by S.S.Roy

Reference Books

1. M.C. Chaturvedi, “Water Resources Planning and Management”, Tata McGraw Hill.
2. B.C. Punmia and R.B. Pande “Irrigation and Water Power Engineering”, Standard Publishers.
3. V.T. Chow, “Applied Hydrology”, McGraw Hill Publishing Company, New York.
4. S.K. Garg, “Irrigation Engineering and Hydraulic Structures”, Khanna Publishers, ND.
5. Operational Research-An Introduction by Hamdy A.Taha

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-494B DESIGN OF MASONRY

B. Tech. 4th Year (Semester – VIII)

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

Unit I

Introduction: Brick masonry units, Concrete masonry units, types, grades and properties of concrete masonry units, mortar, grout and plaster.
Masonry construction, types of bonds, bond at connections, types of joints, contraction and expansion joints
Brick Masonry in Buildings: Brickwork, brick walls, brick columns and piers. Allowable stresses, cross sectional area, shape factor of units, slenderness ratio. Type of loading, net permissible stresses, composite brick concrete piers. Bed stone and bed plates.

Unit II

Laterally loaded Masonry Structure: Structures and loads, stability of masonry, masonry dams, retaining walls.
Foundations, Piers, Walls and Abutments: Wall and column footings in buildings, bridge foundations, the substructure, loads on substructures. Determination of safe bearing capacity. Lateral load resistance of well foundations.

Unit III

Structural Design: General, Load Dispersion, arching action, design thickness/cross section. Design of foundations, piers, walls, dams and retaining walls, design of RBC slabs, lintels, Reinforced Brick columns.
Masonry Arches and Domes: Arches in buildings, stability of masonry arches. Design of masonry arches by elastic theory. Analysis of masonry domes – stability of masonry domes.

Unit IV

Seismic Design of brick masonry buildings. Introduction to SP20 (S&T):1991 "Handbook on Masonry Design and Construction".

Text Book

1. **Structural Design in Steel, Masonry and Timber by A.S. Arya, Nem Chand & Bros.**
2. **Building Construction, Sushil Kumar, Standard Publishers and Distributors**

Reference Books

1. **SP20 (S&T): 1991 "Handbook on Masonry Design and Construction".**

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-496B BRIDGE ENGINEERING

B. Tech. 4th Year (Semester – VIII)

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

Unit I

Investigation of Bridges: Definition, components of a bridge, classifications, importance of bridges. Need for investigations, selection of bridge site, preliminary data to be collected, design discharge and its determination, linear waterway, economical span, vertical clearance above HFL, scour depth, choice of bridge type

Standard Specifications: Road bridges, I.R.C. loadings, code provisions on width of carriageway, clearances, loads considered etc. Standard specifications for railway bridges, Railway bridge code.

R.C.C. Culvert, Skew Culvert

Unit II

Reinforced Concrete Bridges: T-beam bridge, Courbon's theory for load distribution. Balanced cantilever bridges, pre-stressed concrete bridges, (General discussions).

Unit III

Steel Bridges: Introduction to suspension bridges, cantilever bridges, cable-stayed bridges. General arrangement of single-track broad-gauge railway bridge with open floor, design of stringers, cross girders, main trusses, top and bottom lateral bracing, complete design of through type truss bridge. Sub Structure: Types of piers and abutments, design forces, design of piers and abutments.

Unit IV

Bearing and Joints: Various types of expansion bearing and fixed bearings, elastomeric bearings, joints and their types, design of bearings

Construction, inspection and maintenance of bridges.

Text Books

1. **Elements of Bridge Engineering, D. Johnson Victor, Oxford and IBH Publishers, New Delhi.**
2. **Design of Steel Structures, A.S. Arya and J.L. Ajmani , Nem Chand Brothers, Roorkee.**

Reference Books

1. **Design of Concrete Bridges, Khanna Publishers, New Delhi, Vazirani & Ratwani.**
2. **Analysis, Design and Construction of Bridges by V.K. Raina, Tata McGraw Hill**

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 406 B IRRIGATION ENGINEERING - II LAB

B. Tech. 4th Year (Semester – VIII)

L	T	P	Credits			
				Class Work	:	20Marks
-	-	3	1.5	Examination	:	30Marks
				Total	:	50 Marks
				Duration of Examination	:	3 Hours

1 Design and drawing of Sloping Glacis Weir on permeable foundation for surface and sub surface flow conditions.
2 Design of Sarda type fall & sloping glacis fall.
3 Seepage line in a homogeneous earth dams on impermeable foundation with horizontal drainage using viscous analogy.
4 Design of Ogee Spillway for a given design discharge and head condition.
5 Design of stilling basin for a given flow conditions.
6 Obtaining flow-nets for simple cases by trial and error, electrical analogy or viscous analogy.
7 Design and drawing of Syphon Aquaduct.
8 Drawing of various types of Arch Dam, their plan and sectional view for a given section of a valley.
9 Design of a Gravity Dam section.

Note: It is must that a student appears in examination with at least 7 complete experiments from the above list.

CE 408B PROJECT

B. Tech. Semester – VIII (Civil Engineering)

L	T	P	Credits			
--	--	8	8	Class Work	:	75 Marks
				Examination	:	125Marks
				Total	:	200 Marks
				Duration of Examination	:	3 Hours

The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department	**: Chairperson**
Project coordinator	**: Member**
External expert	**: To be appointed by the University**

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

GFCE – 402 GENERAL FITNESS FOR THE PROFESSION
B. Tech. Semester – VIII (Civil Engineering)

L	T	P	Credits	Examination	:	100 Marks
--	--	--	4	Total	:	100 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.

The evaluation will be made by the committee of examiners constituted as under:

1. **Dean, Faculty of Engineering & Technology/ Director /Principal of affiliated college : Chairperson**
2. **Chairperson of the department : Member**
3. **External expert : Appointed by the university**

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 (12 Marks)
III Technical Activities / Industrial, Educational tour (12 Marks)
IV Sports/games (16Marks)

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

B. A student will support his/her achievement and verbal & communicative skill through presentation before the examiners. (40 Marks)

C. Faculty Counselor Assignment (20 Marks)

It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.

A counselor will assess the student which reflects his/her learning graph including followings:

1. **Discipline throughout the year**
2. **Sincerity towards study**
3. **How quickly the student assimilates professional value system etc.**
4. **Moral values & Ethics- Syllabus (one lecture/week on the topics of Human values/Ethics is to be delivered)**