Bachelor of Technology (CIVIL Engineering), KUK

CreditBased (2018-19 Onwards)

*SCHEME OF STUDIES/EXAMINATIONS (***Semester VII***)*

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major Test	Minor Test	Practical	Total	
1	CE401A	Design of Concrete StructureII	2:0:0	2	2	75	25	0	100	3
2	ES212A	Energy Science & Engineering	2:0:0	2	2	75	25	0	100	3
3	CE405A	Water Resources Engineering	2:0:0	2	2	75	25	0	100	3
4	OEII	Open ElectiveII	2:0:0	2	2	75	25	0	100	3
5	ELIII	ElectiveIII	3:0:0	3	3	75	25	0	100	3
6	ELIV	ElectiveIV	3:0:0	3	3	75	25	0	100	3
7	CE411LA	Concrete Drawing	0:0:3	3	1.5		40	60	100	3
8	ES212LA	Energy Science & Engineering Lab	0:0:2	2	1		40	60	100	3
9	CE415LA	Minor Project	0:0:8	8	4		40	60	100	3
10	SIM903A	Seminar on Summer Internship	1:0:0	1	0		50		50	3
		Total	15:0:13	28	22.5	450	320	180	950	

Note: (1) SIM903A is a credit course in which the students will be evaluated for the Summer Internship (training) undergone after 6th semester.

(2)The students have to carry out the MINOR Project either from Transportation Engineering, Hydraulic Engineering and GeotechnicalEngineering.

OPEN ELECTIVE II

Sl. No	Code No.	Subject	Semester	Credits
1.	OE407A	Metro Systems and Engineering	VII	3
2.	OE409A	Indian Music System	VII	3
3.	OE417A	Introduction to Philosophical Thoughts	VII	3

ELECTIVEIII A

Sl. No	Code No.	Subject	Semester	Credits
1.	EL419A	Environmental Impact Assessment	VII	3
2.	EL421A	Air and Noise Pollution Control	VII	3
3.	EL423A	Foundation engineering	VII	3
4.	EL425A	Rock Mechanics	VII	3

ELECTIVEIV A

Sl. No	Code No.	Subject	Semester	Credits
1.	EL427A	Railway Engineering	VII	3
2.	EL429A	Airport Planning and Design	VII	3
3.	EL431A	River Engineering	VII	3
4.	EL433A	Pipeline Engineering	VII	3

Bachelor of Technology (CIVIL Engineering), KUK
CreditBased (2018-19 Onwards)
SCHEME OF STUDIES/EXAMINATIONS **(Semester VIII)**

S. No.	Course No./ Code	Subject	L:T:P	Hours / Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major Test	Minor Test	Practical	Total	
1	CE402A	Engineering Economics, Estimation & Costing	2:0:0	2	2	75	25	0	100	3
2	CE404A	Bridge Engineering	2:0:0	2	2	75	25	0	100	3
3	OEIII	Open ElectiveIII	2:0:0	2	2	75	25	0	100	3
4	ELV	ElectiveV	3:0:0	3	3	75	25	0	100	3
5	ELVI	ElectiveVI	3:0:0	3	3	75	25	0	100	3
6	CE412LA	Compressive Viva	0:0:0	0	0			50	50	3
7	CE414LA	Major Project	0:0:10	10	5		40	60	100	3
8	CE LA	SeminarII	0:0:2	2	0		50	0	50	3
		Total	12:0:12	24	19	375	215	110	700	

Note: The student have to carry out the MAJOR Project either from Structural Engineering, Environmental Engineering and Water ResourceEngineering.

OPEN ELECTIVE – III

Sl. No	Code No.	Subject	Semester	Credits
1.	OE406A	ICT for Development	VIII	3
2.	OE408A	Comparative Study of Literature	VIII	3
3.	OE410A	History of Science & Engineering	VIII	3
4	OE418A	Economic Policies in India	VIII	3

ELECTIVEV A

Sl. No	Code No.	Subject	Semester	Credits
1.	EL420A	Prestress Concrete	VIII	3
2.	EL422A	Earthquake Engineering	VIII	3
3.	EL424A	Offshore Engineering	VIII	3
4.	EL426A	Structural Geology	VIII	3

ELECTIVEVI A

Sl. No	Code No.	Subject	Semester	Credits
1.	EL428A	Wastewater Treatment	VIII	3
2.	EL430A	Water and Air Quality Modelling	VIII	3
3.	EL432A	Traffic Engineering and Management	VIII	3
4.	EL434A	Infrastructure Planning and Design	VIII	3

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: DESIGN OF CONCRETE STRUCTUTRESII					
L	T	P/D	Total	**Subject Code: CE-401A**	Max. Marks: 100
2	0	0	2		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Students will acquire the knowledge about the design of concrete structures like Beam, Slabs, Stair case, Water Tanks and Building frames.			
UNIT		**Course Outcomes**			
I		Students will be able to study behavior in the Beam and Prestressed concrete – moments, shear and design of beam.			
II		Students will be able to design different types of Slabs, Stair case and Foundations.			
III		Students will be able to design of Water tanks, Silos and Bunkers.			
IV		Students will be able to analyze the frames structures			

UNIT I

Continuous Beams:

Basic assumptions, Moment of inertia, settlements, Modification of moments, maximum moments and shear, beams curved in plananalysis for torsion, redistribution of moments for single and multispan beams, design examples.

Prestressed Concrete:

Basic principles, classification of prestressed members, various Prestressing systems, losses in prestress, initial and final stress conditions, analysis and design of sections for flexure and shear, load balancing concept, I:S:Specifications. End blocksAnalysis of stresses, Magnel's method, Guyon's method, Bursting and spelling stresses, design examples.

UNIT II

Flat slabs and staircases:

Advantages of flat slabs, general design considerations, approximate direct design method, design of flat slabs, openings in flat slab, design of various types of staircases, design examples.

Foundations:

Combined footings, raft foundation, design of pile cap and piles, underreamed piles, design examples.

UNIT III

Water Tanks, Silos and Bunkers:

Estimation of Wind and earthquake forces, design requirements, rectangular and cylindrical underground and overhead tanks, Intze tanks, design considerations, design examples. Silos and BunkersVarious theories, Bunkers with sloping bottoms and with high side walls, battery of bunkers, design examples.

UNIT IV

Building Frames:

Introduction, Member stiffness’s, Loads, Analysis for vertical and lateral loads, Torsion in buildings, Ductility of beams, design and detailing for ductility, design examples.

Yield Line Theory:

Basic assumptions, Methods of analysis, yield line patterns and failure mechanisms, analysis of one way and two way rectangular and nonrectangular slabs, effect of top corner steel in square slabs, design exampl

Books:

1. Plain and Reinforced Concrete, Vol.2, Jai Krishna &O.P.Jain, Nem Chand & Bros.,Roorkee.
2. PreStressed Concrete, Krishna Raju, TMH Pub,New, Delhi.
3. Design of Prestressed Concrete Structures, T.Y.Lin, John Wiley &Sons, New .Delhi.
4. Reinforced ConcreteLimit Stage Design, A.K.Jain, Nem Chand & Bros., Roorkee.
5. IS 13431980,IS Code of Practice for Prestressed Concrete.
6. IS 33701976(Part I to IV), Indian Standard Code of Practice for Liquid Retaining Structures.
7. IS 4562000, Indian Standard of Practice for Plain and Reinforced Concrete, IS 1893, 4326 & 13920 Indian Standard Code of Practice for Earthquake Resistant Design of Structures.

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Energy Science & Engineering					
L	T	P/D	Total	**Subject Code: ES-212A**	Max. Marks: 100
2	0	0	2		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		The knowledge acquired lays a goodfoundation for design of various civil engineering systems/ projects dealing with these energy generation paradigms in an efficient manner.			
UNIT		**Course Outcomes**			
I		To provide an introduction to energy systems and renewable energy resources			
II		It will explore fossil fuels and nuclear energy, and then focus on alternatives, renewable energy sources such as solar, biomass (conversions), wind power, waves and tidal, geothermal, ocean thermal, hydro and nuclear.			
III		It will explore society's present needs and future energy demands, examine conventional energy sources.			
IV		Energy conservation methods will be emphasized from Civil Engineering perspective.			

UNIT I

Introduction to Energy Science: Introduction to Energy, sustainability & the environment, Energy systems and resources Scientific principles and historical interpretation of energy use in critical societal, environmental and climate issues.

UNIT II

Energy Sources: Fossil fuels (coal, oil, oilbearing shale and sands, coal gasification) past, present & future, Remedies & alternatives for fossil fuels biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental tradeoffs of different energy systems; possibilities for energy storage or regeneration.

UNIT III

Energy & Environment: Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; economics of energy.

UNIT IV

Civil Engineering Projects connected with the Energy Sources: Coal mining technologies, Oil exploration off shore platforms, Underground and undersea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations aboveground and underground along with associated dams, tunnels, penstocks, etc.

Books:

1. Boyle, Godfrey (2004), Renewable Energy (2nd edition). Oxford University Press
2. Boyle, Godfrey, Bob Everett, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press
3. Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gaiam

4. JeanPhilippe; Zaccour, Georges (Eds.), (2005), Energy and Environment Set: Mathematics of
Decision Making, Loulou, Richard; Waaub, XVIII,
5. Ristinen, Robert A. Kraushaar, Jack J. AKraushaar, Jack P. Ristinen, Robert A. (2006) Energy
and the Environment, 2nd Edition, John Wiley
6. UNDP (2000), Energy and the Challenge of Sustainability, World Energy assessment
7. E H Thorndike (1976), Energy & Environment: A Primer for Scientists and Engineers, AddisonWesley Publishing Company

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Water Resource Engineering					
L	T	P/D	Total	**Subject Code: CE-405A**	Max. Marks: 100
2	0	0	2		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Understand application of systems concept, advanced optimization techniques to cover the sociotechnical aspects in the field of water resources			
UNIT		**Course Outcomes**			
I		Students will able to study the concept of water resource planning			
II		Students will of understand basics of economics			
III		Students will study about water resource systems			
IV		Students Will study about application of system approaches for water resources			

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, somecommon problems in project planning, functional requirements in multipurpose projects,multipurpose planning, basin wise planning, long term planning.Reservoir planningdependable yield, sedimentation in reservoir, reservoir capacity,empiricalarea reduction method.

UNIT II

Economic and Financial Analysis:

Meaning and nature of economic theory, micro and macroeconomics, the concept ofequilibrium, equivalence of kind, equivalence of time and value, cost benefit, discountingfactors and techniques, conditions for project optimality, cost benefit analysis, cost allocation, separable and nonseparable cost, alternate justifiable and remaining benefitmethods, profitability analysis.

UNIT III

Water Resources Systems Engineering:

Concept of system's engineering, optimal policy analysis, simulation and simulationmodeling, nature of water resources system, analog simulation, limitations of simulation,objective function, production function, optimality condition, linear, nonlinear anddynamic 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 anddrainage engineering, distribution network, and mathematical models for forecasting andother water resources related problems.

Books:

1 Water Resources Engineering by Linseley and Franzini

2 Economics of Water Resources Engineering by James and Lee.

3 Optimisation Theory and Applications by S.S.Roy

4 Water Resources Systems Planning & Economics by R.S.Varshney.
5 Operational ResearchAn Introduction by HamdyA.Taha.

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Metro Systems and Engineering					
L	T	P/D	Total	**Subject Code: OE-407A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To impart the knowledge about basic engineering principles of Metro System.			
UNIT		**Course Outcomes**			
I		Students will be able to know about the metro systems.			
II		Students will be able to learn about different metro structures and their construction methods.			
III		Students will be able to learn about electronic signaling systems and Automatic fare collection.			
IV		Students will be able to understand different facilities in metro.			

Unit – I

General: Overview of Metro Systems; Need for Metros; routing studies; Basic Planning and Financials.

Unit –II

Civil Engineering Overview and construction methods for: Elevated and underground Stations; Viaduct spans and bridges; Underground tunnels; Depots; Commercial and Service buildings. Initial Surveys & Investigations; Basics of Construction Planning & Management, Construction Quality & Safety Systems. Traffic integration, multimodal transfers and pedestrian facilities; Environmental and social safeguards; Track systemspermanent way. Facilities Management

UnitIII

Electronics And Communication Engineering Signaling systems; Automatic fare collection; Operation Control Centre (OCC and BCC); SCADA and other control systems; Platform Screen Doors.

UnitIV

Mechanical &TVS, AC: Rolling stock, vehicle dynamics and structure; Tunnel Ventilation systems; Air conditioning for stations and buildings; Fire control systems; Lifts and Escalators. ELECTRICAL: OHE, Traction Power; Substations TSS and ASS; Power SCADA; Standby and Backup systems.

Textbook:

1. Guidebook on Delhi Metro, DMRC
2. World Metro System, Paul. E. Garbutt.
3. Metro Rail in India for Urban Mobility, M.M Agarwal, S.Chandra, K.K Miglani

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Indian music system					
L	T	P/D	Total	**Subject Code: CE-409A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To learn basic concept of Indian Music.			
UNIT		**Course Outcomes**			
I		Students will be able to learn about ragas			
II		Students will be able to understand to learn about different notation of sound.			
III		Students will able to learn notation compositions.			
IV		Students will learn theory of ragas.			

UNIT I

Raga, Va(Nada, Swara, Shruti, Raga, Mela (Thata), Alankar, Tana, Gamak, Sthaya, Kaku, MargiDeshi, RagalapRupkalap, Vadi, Samvadi, Anuvadi, Vivadi, Tala, Laya, Avirbhav, Tirobhav, Parmelpraveshak Raga, Sandhiprakash ggeyakara, Kalawant.

UNIT II

Vibration, Pitch, Intensity, Timbre, Just intonation, Equal tempered scale, forced Vibration, Free Vibration.

UNIT III

Notation of compositions in prescribed ragas.

UNIT IV

Theoretical knowledge of prescribed ragas.

Books

1. S.S. Paranjape Bhartiya Sangeet Ka Itihasa
2. S.S. Paranjape Sangeet Bodh
3. V.N. Bhatkhande Bhatkhande Sangeet Shastra PartIII
4. Swami Prajnananda History of Indian Music

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Introduction to Philosophical Thoughts					
L	T	P/D	Total	**Subject Code**: **OE-417A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Students will acquire the knowledge about the Philosophical concepts			
UNIT		**Course Outcomes**			
I		Students will be able to understand concept of philosophy			
II		Students will be able to understand concept of ethics			
III		Students will be able to understand concept of philosophy of religion			
IV		Students will be able to understand concept of aesthetics			

UNIT I

Introduction to Class: Introduction to Philosophy and its worldview. 7 fold criteria for analysis, Presocratic Philosophy, Metaphysics & Epistemology: Ancient (Plato; Aristotle), Medieval (Plotinus; St. Augustine; St. Aquinas), Metaphysics & Epistemology continued: Stoicism, Epicureanism, Skepticism, & NeoPlatonism Berkeley; Leibniz; Spinoza; Locke; Hume; Kant; Introduction to Continental Philosophy

UNIT II

Introduction to Ethics: Virtue, Deontological, & Consequential Ethics: Consequential Ethics; Utilitarianism (Jeremy Bentham; John Stuart Mill); Egoism of Ayn Rand; Relativism; Ethics of Care vs. Ethics of Justice (Carol Gilligan) Existentialism/ Nihilism

UNIT III

Introduction to Philosophy of Religion: Existence of God: Arguments; Evidences; Existential; Religious Experience, Problem of Evil: Moral Evil: Natural Evil: God as Origin of Evil; Natural Evil; Pointless Evil, Problem of Miracles:

UNIT IV

Introduction to Aesthetics: Historical Survey: From Plato to Kuspit Read and discuss"Aesthetic Universals" by Denis Dutton Aesthetics continued: Objective/subjective beauty; aesthetic value; aesthetic experience

Books:

The Power of Idea, Book by Isaiah Berlin

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Environmental Impact Assessment					
L	T	P/D	Total	**Subject Code: EL-419A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		The aim of study is to understand the effect of Environment , Air and Water pollution on environment			
UNIT		**Course Outcomes**			
I		Students will study the different sources of Environment pollution			
II		Students will study the different sources of Air pollution and its effects			
III		Students will study about the Waste management and its disposal of waste			
IV		Students will study about Environmental assessment			

UNIT I

Environment and Human Activity: Resources, pollution, reuse and environmental management. Management of Aquatic Environment: Water quality controls. Drainage basin activities and water pollution. The impact of human activity on aquatic resources. The control measures, regional planning.

UNIT II

Air Quality Management: Atmosphere, effect of human activity on air quality, waste disposal alternative. Optimization, planning of waste disposal.

UNIT III

Waste Management: Waste disposal methods, impact of waste disposal of human activity. Land Use Management: Impact of land use on human life. Control, of hazards in land use, management of land use.

UNIT IV

Environmental Assessment: National environmental policy, implication of environment assessment in design process. Preparation of assessment, quantification. General requirements of environmental standards. Techniques of setting standards.

Books:

1. Environmental Impact Analysis by R.K. Jail and L.V. Urban.
2. Environmental Impact Assessment by Canter
3. Environmental Impact Assessment by J.Glasson.

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Air and Noise Pollution Control					
L	T	P/D	Total	**Subject Code EL-421A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To impart the knowledge about basic engineering principles of River Engineering			
UNIT		**Course Outcomes**			
I		To take up the basic concepts of air pollution			
II		The contents involved the knowledge of causes of air pollution			
III		The contents involved the knowledge of health related to air pollution and to develop skills relevant to control of air pollution.			
IV		To take up the basic concepts of Noise pollution			

Unit I

Introduction: History of Air pollution and episodes, Sources of air pollution and types, Introduction to meteorology and transport of air pollution: Global winds, Headley cells, wind rose terrestrial wind profile, Effects of terrain and topography on winds, lapse rate, maximum mixing depths, plume rise

Unit II

Effects of Air Pollution: Effects of Air Pollution on human beings, plants and animals and Properties. Global EffectsGreen house effect, Ozone depletion, heat island, dust storms, Automobile pollution sources and control, Photochemical smog, Future engines and fuels

Unit III

Air Pollution control: Air Pollution control at sourceequipments for control of air pollutionFor particulate matterSettling chambersFabric filtersScrubbersCyclones, Electrostatic precipitators, For Gaseous pollutantscontrol by absorptionadsorption scrubberssecondary combustion after burners, Working principles advantages and disadvantages, design criteria and examples.

Air Quality Sampling and Monitoring: Stack sampling, instrumentation and methods of analysis of SO2, CO etc, legislation for control of air pollution and automobile pollution.

Unit IV

Noise pollution: Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psychoacoustics and noise criteria, effects of noise on health, annoyance rating schemes; special noise environments: Infrasound, ultrasound, impulsive sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices. Noise control methods.

Books:

1. C. S. Rao, “Environmental Pollution Control Engineering”, Wiley Eastern Limited, 2000.
2. M. N. Rao, H. V. N. Rao, Air pollution, Tata McGraw Hill Pvt Ltd, New Delhi, 1993

3. Dr. Y. Anjaneyulu, “Air Pollution and Control Technologies”, Allied publishers Pvt. Ltd., 2002.
4. Advanced Air and Noise Pollution Control by Lawrence K. Wang, Norman C. Pereira & Yung Ise Hung.
5. Noise Pollution and Control by S. P.Singhal, Narosa Pub House

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Foundation Engineering					
L	T	P/D	Total	**Subject Code: EL-423A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To impart the knowledge on various soil exploration techniques, and analyses and design of various substructure			
UNIT		**Course Outcomes**			
I		Students will be able to study different types of soil exploration			
II		Students will be able to study slope stability			
III		Students will be able to understand Earth pressure theories			
IV		Students will be able to understand shallow foundation and pile foundation			

UNIT I

Soil Exploration: Need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test – pressure meter – planning of soil exploration programand preparation of soil investigation report.

UNIT II

Slope Stability: Infinite and finite earth slopes – types of failures – factor of safety of infiniteSlopes – stability analysis by Swedish slip circle method, method of slices, Bishop's Simplified method of slices – Taylor's Stability Number stability of slopes of earth dams under different conditions.

UNIT III

Earth Pressure Theories: Atrest earth pressures, Rankin's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Cullman's graphical method, effect of pore water, earth pressure due to surcharge loads.

Retaining Walls: Types of retaining walls – stability of gravity and cantilever retaining walls against overturning, sliding and, bearing capacity modes of failure, Drainage from backfill, introduction to reinforced earth walls.

UNIT IV

Shallow Foundations Types choice of foundation, location and depth safe bearing capacity, shear criteria, Terzaghi's, and IS code methods settlement criteria, allowable bearing pressure based on SPT N value and plate load test, allowable settlements of structures.

Pile Foundation: Types of piles, load carrying capacity of piles based on static pileformulae, dynamic pile formulae – Pile Capacity through SPT and CPT results pile loadtests load carrying capacity of pile groups in sands and clays, Settlement of pile groups, negative skin friction

TEXT BOOKS:

1. Das, B.M., (2011) Principles of Foundation Engineering –7th edition, CengagePublishing.
2. Foundation Design Principles and Practices, Donald P. Coduto, 2nd Edition, PearsonPublishers.
3. Bowles, J.E., (2012) Foundation Analysis, and Design – 5th Edition, McGrawHill Publishing Company, Newyork.

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Rock Mechanics					
L	T	P/D	Total	**Subject Code: EL-425A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To impart the knowledge about rock mechanism.			
UNIT		**Course Outcomes**			
I		Students will be able to understand basic concepts of rock engineering			
II		Students will be able to learn about different methods of rock exploration			
III		Students will be able to learn different tests performed on rocks.			
IV		Students will be able to learn about Pressure arch theory, subsidence and suitable protective measures			

Unit I

Definition & its importance: Rock mass & material form; Effects of discontinuities on rock mass. Physical properties of rocks, Mechanical properties of rocks. Engineering Classification of rock Masses (by deer & miller). Moh's scale of Hardness Rock Pressure & Subsidence.

Unit II

Object and Methods of rock exploration, Rock exploration by direct penetration Core boring Core recovery Rock quality designation Fracture frequency by indirect penetration Large diameter calyx hole Logging of core

Unit III

Sampling and Sample preparation, Specimen Uniaxial compressive strength Test; Protodykanov strength index. Tests for measuring rock strengths Tensile strength tests, Flexural strength test, Shear strength test, Punch shear test and In situ tests.

Unit IV

Pressure arch theory Rectangular opening, circular shaft & long wall working. Creep, Convergence, Rock burst & Coal bumps, Rock Mass Rating. Subsidence: Definition & factors governing subsidence. Angle of draw, line of break; Critical area, Subcritical area, super critical area. Protective measures against Subsidence.

Books:

1. Fundamentals of Rock Mechanics" by J C Jaeger and N G W Cook
2. Rock Mechanics and Design Structures of Rock" by Obert and W I Duvall

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Railway Engineering					
L	T	P/D	Total	**Subject Code: EL-427A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Students will acquire the knowledge about the design of Railways			
UNIT		**Course Outcomes**			
I		Students will be able to study about permanent way and different types of rails			
II		Students will be able to study different types of Sleepers, fastenings and Ballast			
III		Students will be able to learn about Points and crossings, signalling and interlocking system			
IV		Students will be able to learn geometric design of Rails and stations			

UNIT I

Introduction, Permanent Way and Rails

Rail transportation and its importance in India. Permanent way: requirements and components. Gauges in India and abroad. Selection of gauge. Coning of wheels. Adzing of sleepers. Rails: functions, composition of rail steel, types of rail sections, requirements of an ideal rail section, length of rails. Defects in rails. Creep of rails. Long welded rails and continuously welded rails.

UNIT II

Sleepers, Fastenings and Ballast

Sleepers: functions, requirements of an ideal sleeper. Types of sleepers: wooden, cast iron, steel and concrete sleepers, advantages, disadvantages and suitability of each type. Sleeper density. Fastenings for various types of sleepers: fish plates, spikes, bolts, bearing plates, keys, chairs, jaws, tie bars. Elastic fastenings. Ballast: functions, requirements, types of ballast and their suitability.

UNIT III

Points and Crossings

Necessity. Turnout: various components, working principle. Switch: components, types. Crossing: components and types. Design elements of a turnout, design of a simple turnout. Layout plan of track junctions: crossovers, diamond crossing, singledouble slips, throw switch, turn table, triangle.

Signalling, Interlocking and Train Control

Signals: objects, types and classification. Semaphore signal: components, working principle. Requirements / principles of a good interlocking system. Brief introduction to devices used in interlocking. Methods of control of train movements: absolute block system, automatic block system, centralized train control and automatic train control systems.

UNIT IV

Geometric Design of the Track

Gradients, grade compensation. Super elevation, cant deficiency, negative super elevation. Maximum permissible speed on curves .Tractive resistances, types. Hauling capacity of a locomotive.

Stations, Yards and Track Maintenance

Stations: functions and classification. Junction, nonjunction and terminal stations. Yards: functions, types. Marshalling yard: functions, types. Maintenance of railway track: necessity, types of maintenance. Brief introduction to mechanized maintenance, M.S.P and D.T.M.

Books:

1. A text book of Railway Engineering by S.C.Saxena and S.P.Arora, Dhanpat Rai Publicatios, N.Delhi
2. Railway Track Engg. ByJ.S.Mundray, Tata McGrawHill Publishing Co. Ltd. N.Delhi.

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Airport Planning and Design					
L	T	P/D	Total	**Subject Code**: **EL-429A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Students will acquire the knowledge about airport planning and design.			
UNIT		**Course Outcomes**			
I		Students will be able to understand layout of airport plan			
II		Students will be able to design runway			
III		Students will be able to understand Structural design of airport pavement			
IV		Students will be able to understand basics of visual aids and to understand basics of airport grading and drainage			

UNIT I

Airport Planning: General Regional Planning Development of New Airport Data Required before Site Selection Airport Site Selection Surveys for Site Selection Drawings to be prepared Estimation of Future Air Traffic Needs.

UNIT II

Runway Design: Runway Orientation Basic Runway Length Corrections for Elevation, Temperature and Gradient Airport Classification Runway Geometric Design Airport Capacity Runway Configurations Runway Intersection Design.

UNIT III

Structural Design of Airport Pavements: Introduction Various Design Factors Design Methods for Flexible Pavement Design Methods for Rigid Pavement LCN System of Pavement Design Joints in Cement Concrete Pavement Airport Pavement Overlays Design of an Overlay.

UNIT IV

Visual Aids: General Airport Marking Airport Lighting.

Airport Grading And Drainage: General Computation of Earthwork Airport Drainage Special Characteristics and Requirements of Airport Drainage Design Data Surface Drainage Design Subsurface Drainage Design.

Books:

1. Airport Planning and Designing by S.K. Khanna, M.G. Arora.
2. Highway Engineering including Expressways and Airport Engineering by Dr. L. R. Kadyali, Dr. N. B. Lal.
3. Highway Engineering including Airport Pavements by Dr. S. K. Sharma.
4. Transportation Engineering by S. P. Chandola.

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: River Engineering					
L	T	P/D	Total	**Subject Code: EL-431A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To impart the knowledge about basic engineering principles of River Engineering			
UNIT		**Course Outcomes**			
I		Students will be able to study different rivers and related budgets and schemes			
II		Students will be able to study behavior of rivers			
III		Students will be able to understand mechanics of alluvial river and bio engineering techniques			
IV		Students will be able to understand various river training works			

Unit I

Introduction, classification of Rivers, Mechanics of alluvial rivers including channel and flood plain features, Sediment transport and budgets, River morphology and various classification schemes.

Unit II

Behavior of Rivers: Introduction, River Channel patterns, Straight river channels, causes, characteristics and shapes of meanders and control, cutoff, Braided Rivers, Bed forms, Instability of rivers, Hydraulic geometry, Delta formation and control.

Unit III

Mechanics of Alluvial Rivers, Rivers and restoration structures, Sociocultural influences and ethics of stream restoration.

Bioengineering Techniques, Classification review, Natural Channel Design Analysis, Time Series, and Analysis of flow, Sediment and channel geometry data.

Unit IV

River Training and Protection Works: Introduction, Classification of River Training, Types of training works, Protection for Bridges with reduced waterway, Design of Guide Band, embankment and spurs/dampers and other river/ flood protection works.

Books:

1. River Behaviour Management and Training (Vol. I & II), CBI&P, New Delhi.
2. Irrigation & Water Power Engineering, B. C. Punmia and Pande B. B. Lal.
3. River Engineering by Margeret Peterson

B. Tech. VII Semester (Civil Engineering)					
SUBJECT: Pipeline Engineering					
L	T	P/D	Total	**Subject Code: EL-433A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To impart the knowledge about basic engineering principles of Pipeline Engineering			
UNIT		**Course Outcomes**			
I		To familiarize the students with the various elements and stages involved in transportation of oil and gas.			
II		To understand international standards and practices in piping design.			
III		To know various equipment and their operation in pipeline transportation.			
IV		To understand modern trends in transportation of oil and gas			

UNIT I

Elements of pipeline design: Fluid properties, Environment, Effects of pressure and temperature, Supply / Demand scenario, Route selection, Codes and standards Environmental and hydrological considerations,

UNIT II

Economics – Materials / Construction, Operation, Pipeline protection, Pipeline integrity monitoring. Pipeline route selection, survey and geotechnical guidelines: Introduction – Preliminary route selection. Key factors for route selection -Engineering survey – Legal survey – Construction / Asbuilt survey – Geotechnical design.

UNIT III

Natural gas transmission: General flow equation, Steady state, Impact of gas molecular weight and compressibility factor on flow capacity, Flow regimes, Widely used steadystate flow equations. Summary of the impact of different gas and pipeline parameters on the gas flow efficiency

Pressure drop calculation for pipeline in series and parallel, Pipeline gas velocity, Erosional velocity – Optimum pressure drop for design purposes – Pipeline packing – Determining gas leakage using pressure drop method – Wall thickness / pipe grade, Temperature profile, Optimization process – Gas transmission solved problems.

UNIT IV

Gas compression and coolers: Types of compressors, Compressor drivers, Compressor station configuration. Thermodynamics of isothermal and adiabatic gas compression, Temperature change in adiabatic gas compression, Thermodynamics of polytropic gas compression, Gas compressors in series. Centrifugal compressor horsepower, Enthalpy

/ Entropy charts (Mollier diagram) – Centrifugal compressor performance curve . Influence of pipeline resistance on centrifugal compressor

Textbooks

1. MSc Pipeline Engineering, Newcastle University
2. MSc Subsea Engineering & Management, Newcastle University
3. MSc Offshore & Ocean Technology, Cranfield University
4. MSc Pipeline Asset Management, North Umbria University (This is a Distance Learning course available online worldwide

B. Tech. VII Semester (Civil)
CE-411LA CONCRETE DRAWING

L T P/D: 0 0 3
Total Marks: 100 **Sessional: 40 marks**
Vivavoce: 60 marks **Duration: 3 hrs.**

Preparing drawing sheets showing reinforcement details in case of:

1. Flat slabs
2. Underground and Overhead Water Tanks.
3. Combined Footings, Pile Foundations and Raft foundation.
4. T-Beam Bridge.
5. Silo/Bunker.

B. Tech. (Civil) VII Semester
ES – 212LA Energy Science & Engineering Lab

L T P/D 0 0 2
Total Marks: 100 **Sessional: 40 marks**
Vivavoce: 60 marks **Duration: 3 hrs.**

LIST OF EXPERIMENTS

1 Determination of Flash point and Fire point of lubricating oil using Abel Pensky and Pensky Martin (closed) Apparatus.

2 Determination of Calorific values of solid, liquid and gaseous fuels

3 Determination of Viscosity of lubricating oil using Redwood and Saybolt Viscometers

4 Valve Timing diagram of an I.C. Engine.

5 To determine the flash and fire point of the lubricating oil by Pensky martens apparatus

6 To determine the kinematic and absolute viscosities of the given oil using red wood viscometer.

7 To determine the viscosity of given oil using torsion viscometer

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Engineering Economics, Estimation & Costing					
L	T	P/ D	Total	**Subject Code: CE-402A**	Max. Marks: 100
2	0	0	2		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	The aim of study is to get knowledge about estimation of different civil works.				
UNIT	**Course Outcomes**				
I	Students will study the different methods of estimation				
II	Students will study about different types of specification used in civil works				
III	Students will study about rate analysis of different items				
IV	Students will study the terms used in civil works and public works accounts				

UNIT I

Estimate:

Principles of estimation, units, items of work, different kinds of estimates, different methods of estimation, estimation of materials in single room building, two roomed building with different sections of walls, foundation, floors and roofs, R.B. and R.VC.C. Works, Plastering, Whitewashing, Distempering and painting, doors and windows, lump sum items, Estimates of canals, roads etc.

UNIT II

Specification of Works:

Necessity of specifications, types of specifications, general specifications, specification for bricks, cement, sand, water, lime, reinforcement; Detailed specifications for Earthwork, Cement, concrete, brick work, floorings, D.P.C., R.C.C., cement plastering, white and colour washing, distempering, painting.

UNIT III

Rate Analysis:

Purpose, importance and requirements of rate analysis, units of measurement, preparation of rate analysis, procedure of rate analysis for items: Earthwork, concrete works, R.C.C. works, reinforced brick work, plastering, painting, finishing (whitewashing, distempering).

UNIT IV

Public Works Account:

Introduction, function of P.W. department, contract, guidelines, types of contracts, their advantages and disadvantages, Tender and acceptance of tender, Earnest money, security money, retention money, measurement book, cash book, preparation, examination and payment of bills, first and final bills, administrative sanction, technical sanction.

Books

1. Estimating and Costing for Building & Civil Engg.Works by P.L.Bhasin, S.Chand& Co., N.Delhi.
2. Estimating, Costing & Specification in Civil Engg. ByM.Chakarborty, Calcutta.
3. Estimating & Costing in Civil Engg..: Theory & Practice by B.N.Dutta, S.Dutta& Co., Lucknow.
4. Building Construction Estimating by George H.Cooper, McGraw Hill Book Co., New York.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: BRIDGE ENGINEERING					
L	T	P/D	Total	**Subject Code: CE-404A**	Max. Marks: 100
2	0	0	2		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Students will acquire the knowledge about the design of Railway, R.C.C and Steel Bridge and its foundation			
UNIT		**Course Outcomes**			
I		Students will be able to study Specifications for Roads and Railways Bridges			
II		Students will be able to design consideration for R. C. C. Bridges			
III		Students will be able to design consideration for Steel Bridges			
IV		Students will be able to Hydraulic & Structural design of Bridge			

UNIT I

Introduction:
Definition, components of bridge, classification of bridges, selection of site , economical span, aesthetics consideration, necessary investigations and essential design data.

Standard Specifications for Roads and Railways Bridges:
General, Indian Road Congress Bridge Code, width of carriage way, clearance, various loads to be considered for the design of roads and railway bridges, detailed explanation of IRC standard live loads.

UNIT II

Design Consideration for R. C. C. Bridges:
Various types of R.C.C. bridges, design of R.C.C. culvert and Tbeam bridges.

UNIT III

Design Consideration for Steel Bridges:
Various types of steel bridges (brief description of each), design of truss and plate girder bridges.

UNIT IV

Hydraulic & Structural Design:
Piers, abutments, wingwall and approaches. Bearings, joints, articulation and other details.

Bridge Foundation:
Various types, necessary investigations and design criteria of well foundation.

Books:

1. Essentials of Bridge Engineering, D.J.Victor, Oxford & IBH Pub.N.Delhi.
2. Design of Bridges, N.Krishna Raju, Oxford & IBH, N.Delhi.
3. Bridge Deck Analysis, R.P.Pama&A.R.Cusens, John Wiley & Sons.
4. Design of Bridge Structures, T.R.Jagadish&M.A.Jairam, Prentice Hall of India, N.Delhi.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: ICT for Development					
L	T	P/D	Total	**Subject Code**: **OE-406A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To apply basics of Information technology in Civil Engineering problems.			
UNIT		**Course Outcomes**			
I		To study various optimization techniques in real world problems related to civil engineering			
II		To study the inventory models			
III		To study about assigning jobs to people in an efficient way			
IV		To study about sequencing techniques			

UNIT I

Introduction to ICT: New media and ICT, Different types of ICT. Use of ICT for development; e-learning; Web commerce; Mobile telephony and Development: telecom industry in India. ICT Projects implemented in India and Northeast – Problems and Prospects

UNIT II

Digital Revolution and Digital Communication: Basics of New media theories - Information Society; Surveillance society; Digital Divide, Knowledge society; Network society. Works of Machlup, Bell, Negroponte and Castells

UNIT III

Technology and Development: ICT for Development its societal implications; Evolution of ICT in Development Endeavour; ICT and Millennium Development Goals. Democratic and decentralized processes in development. Technology and culture: community and identity; participatory culture and ICT, community informatics

UNIT IV

Computer Mediated Communication and development:Different types of CMC; Important theoretical framework of CMC, cyber platform and communities, Social Networking Site; Convergent media, Multimedia platforms, Scope of convergent journalism for Development; Characteristics of convergent journalism; Different types of convergent journalism: precision journalism; annotative and open-source journalism; wiki journalism; open source journalism; citizen journalism; back-pack journalism,

Books

1. Heeks, R. (2017). Information and communication technology for development (ICT4D). Routledge.
2. Gairola, C. M., Chandra, M., Mall, P., Chacko, J. G., Phet, S., & Loh, H. (2004). Information and Communications Technology for development.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Comparative Study of Literature					
L	T	P/D	Total	**Subject Code**: **OE-408A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		The course aims to give the basic knowledge of methods and models of Comparative Literature.			
UNIT		**Course Outcomes**			
I		The course is expected to introduce the students about Conceptual Framework of Comparative Literature			
II		It will give the idea to students about the History of Comparative Literature.			
III		It will orient students towards History and Politics of Translation			
IV		It will give closer look at Indian Poetics and Literary Theory			

Unit I

Conceptual Framework of Comparative Literature: The Emergence of Comparative Literature. Difference/ Alterity and the Ethics of Plurality. Limitations of the Idea of National Literature. Theories of Interpretation

Unit II

History of Comparative Literature: French, German, Russian and Tel Aviv Schools Comparative Literature in India: From Tagore to the Present. World Literature: From Goethe to the Present, "The State of the Discipline" Reports

Unit III

History and Politics of Translation: Translation as Reception, Problems and Promises of Translation in Multilingual Situations, Untranslatability and Silence

Unit IV

Poetics and Literary Theory: Indian Poetics: Sanskrit and Tamil, Perso-Arabic Traditions, Western Classical Literary Theory

Books:

1. Bassnett, S. (1993). Comparative Literature: A Critical Introduction. Oxford: Blackwell.
2. Claudio Guillen. (1993). The Challenge of Comparative Literature. (Cola Franzen, Trans.). London: Harvard University Press.
3. Dev, A. (1984). The Idea of Comparative Literature in India. Kolkata: Papyrus.
4. Bernheimer, C. (1995). Ed. Comparative Literature in the Age of Multiculturalism. Baltimore: The Johns Hopkins University Press.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: History of Science & Engineering					
L	T	P/D	Total	**Subject Code**: **OE-410A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To provide the insight about the history of Science and Technology			
UNIT		**Course Outcomes**			
I		The course is expected to introduce the history of development of science and technology			
II		Students will able to learn statistical profile of science & engineering			
III		Students will able to learn about keys of effective learning.			
IV		Students will able to gain problem solving skill.			

Unit I

History of science & technology: introduction, beginning of science, technology & engineering, traveling through the ages. Science, Engineering & technology Major: Introduction, function, emerging field.

Unit II

Profile of Engineers, scientist & technologist: Statistical profile of science & engineering profession: Statistical, overview, college enrolment trends of science and engineering students, college majors of recent science &engineering students. Job placement trends, diversity of profession distribution of scientist and engineers by type of employer.

Unit III

Succeeding in the classroom: Introduction, attitude, goal, key to effectiveness, test taking, learning style, accountability and overcoming challenges. Biography of Isaac Newton, Einstein, Thomas Edison, Alfred Nobel, M. Visvesvaraya .

Unit IV

Problem solving: Introduction, analytical and creative problem solving, analytical problem solving, personal problem solving styles, brainstorming strategies, critical thinking. Failure of science & technology.

Textbooks;

1. Engineering your future by William C. Oaks, Oxford university press.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Economic Policies in India					
L	T	P/D	Total	**Subject Code**: **OE-418A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		Students will acquire the knowledge about Economic policies practiced in India			
UNIT		**Course Outcomes**			
I		Students will be able to understand concept of economy			
II		Students will be able to calculate National Income for India			
III		Students will be able to get introduction to five year plans.			
IV		Students will be able to understand role of agriculture in economy			

Unit I

Underdevelopment – Basic Features of Indian Economy: Growth and Structural Changes in Indian Economy – Demographic Features – Population: Size, Growth, Composition and their Implications on Indian Economy – Concept of Demographic Dividend –Occupational Distribution of Population in India – Population Policy of India.

Unit II

Estimation of National Income – Trends and Composition of National Income in India – Income Inequalities in India: Magnitude, Causes, Consequences and Remedial Measures – Poverty in India: Concept, Types, Causes and Consequences – Unemployment in India: Concept, Types, Trends, Causes and Consequences – Poverty Alleviation and Employment Generation Programmes in India.

Unit III

Five Year Plans: Concept and Objectives – Review of Five Year Plans – NITI Aayog – Economic Reforms: Liberalization, Privatization and Globalization – Impact of WTO onIndian Economy.

Unit IV

Importance and Role of Agriculture in Indian Economy – Trends in Agricultural Production and Productivity – Land Reforms – Green Revolution – Agricultural Finance – Agricultural Marketing – Agricultural Pricing – Food Security in India. Structure, Growth, Importance and Problems of Indian Industry – Large, Medium and Small Scale Industries: Role and Problems – Industrial Policies of 1948, 1956 and 1991– FEMA and Competition Commission of India –Disinvestment Policy – Foreign Direct Investment

Books:

1) SK Misra and Puri : Indian Economy, Himalaya Publishing House
2) Ishwar C Dhigra : The Indian Economy: Environment and Policy, SC Chand & Sons, New Delhi Dutt and Sundaram : Indian Economy

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Prestress Concrete					
L	T	P/ D	Total	**Subject Code: EL-420A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	To understand the concept of pre stress Concrete				
UNIT	**Course Outcomes**				
I	To learn the principles, materials, methods and systems of prestressing				
II	To know the different types of losses and deflection of prestressed members				
III	To learn the design of prestressed concrete beams for flexural, shear and tension				
IV	To learn the design the flexural members in pre stress				

UNIT I

Introduction: Basic concepts of Prestressing, terminology, advantages and applications of prestressed concrete. Materials for Prestressed Concrete: High strength Concrete, permissible stresses in concrete, high strength steel, permissible stresses in steel. Prestressing Systems: Prestensioning and post tensioning systems, various types of tensioning devices, LecMacall systems, MagnelBlaton post tensioning, Freyssinet systems, Gifford Udal system.

UNIT II

Losses of Prestress: Types of losses of Prestress, loss due to elastic deformation of concrete, loss due to shrinkage of concrete, loss due to creep of concrete, loss due to relaxation of stress in steel, loss due to friction, loss due to anchorage slip, total loss in pretension and post tensioned members. Analysis of Prestress and bending stresses: Basic assumptions, resultant stresses at a section, concept of load balancing, cracking moment.

UNIT III

Deflections: Factors influencing deflections, short term deflections of uncracked members, deflections of cracked members, prediction of long term deflections. Shear and Torsional Resistance: Ultimate shear resistance of prestressed concrete members, prestressed concrete members in torsion, design of reinforcements for torsion, shear and bending.

UNIT IV

Design of Flexural Members : Dimensioning of flexural members, design of pretensioned andpost tensioned beams, design of partially prestressed members, design of one way and two way slabs, continuous beams.Design for axial tension, compression and bending, bond and bearing.

Books:

1. Prestressed Concrete by N. Krishna Raju, TMH Publishing Company, New Delhi,
2. Prestressed Concrete by P. Dayartnam, Oxford and IBH Publication, New Delhi.
3. Design of Prestressed Concreet Structures by T Y Lin& Ned H. Burns

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Earthquake Engineering					
L	T	P/ D	Total	**Subject Code: EL-422A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	To understand basics of Earthquake Engineering				
UNIT	**Course Outcomes**				
I	To introduce the basics of Seismology				
II	To introduce the seismic analysis and design				
III	To learn to assess the seismic performance of the structure				
IV	To learn about vibration control measures				

UNIT I

Seismology: Introduction, plate tectonics, earthquake distribution & mechanism, seismicity, seismic wave, earthquake magnitude & intensity, seismic zoning &seismometer.

UNIT II

Seismic Analysis and Design: General principles, assumptions, Seismic coefficient method, response spectrum method, strength and deflection, design criterion for structures, significance of ductility, codal provisions, and design examples.

UNIT III

Seismic performance, Repair and strengthening: Methods for assessing seismic performance influence of design ductility and masonry infills, criterion for repair and strengthening techniques and their applications, addition of new structural elements.

UNIT IV

Vibrational control: General features of structural control, base isolation, active and passive, Control system, earthquake resistance design as per IS: 1893, IS: 4326 and: 13920.

Books:

1. Elements Of Earthquake of Engineering, Jai Krishna, A. R. Chandershekaran&Brajesh Chandra, South Asian Pub New Delhi.
2. Dynamics of Structures, Clough &Penzion, McGraw Hill.
3. Earthquake Engineering, YX Hu, SC. Liu and W. Dong, E and FN Sons., Madras.
4. Earthquake Resistant Concrete Structures, George G. Penelis and J. Kapoors, E and FN Sons., Madras.Structural Dynamic, Mario Paz, CBB Pub. N.Delhi.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Offshore Engineering					
L	T	P/ D	Total	**Subject Code: EL-424A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	To impart the basic knowledge of off shore engineering				
UNIT	**Course Outcomes**				
I	To introduce the basics of offshore structures				
II	To introduces different loads on offshore structure				
III	To introduce the concept of general layout and consideration given				
IV	To introduce the concept of installation of offshore structurs				

UNIT I

Historical Development of Offshore Structures

Introduction, Definition of Offshore Structure, Historical Developments Deepwater challenges, Functions of Offshore Structures, selection of Offshore Structure and its Configurations, Bottom Supported Fixed Structures, Complaint Structures, Floating Structures, Novel offshore design, Field development concepts

UNIT II

Load and Responses

Introduction, Gravity Load, Hydrostatic Loads, Resistance Loads, Current loads on Structures, Current Drag and Lift Force, Steady and Dynamic Wind Loads on Structures, Wave Loads on Structures, Varying Wind Load, Impulse loads and Introduction to design

UNIT III

Topside Facilities and Layout

Introduction General layout Considerations Areas and Equipment Deck Impact Loads Deck Placement and Configuration Float over Deck Installation Helipad Platform Crane Living quarters Oil and gas treatment Oil and gas storage, offloading and export Utility and process support systems Drilling facilities

UNIT IV

Offshore Installation

Introduction , Installation of Fixed Platform Substructures Floating Structures, Foundations Subsea Templates , loadouts transportation Platform Installation Methods and installation criteria, Installation of Pipelines and Risers

Books:

1. Dawson, T.H., “Offshore Structural Engineering”, Prentice Hall, 1983
2. B.C Gerwick, Jr. “Construction of Marine and Offshore Structures”, CRC Press, Florida, 2000.
3. Subrata K Ckakrabarti, “Handbook of Offshore Engineering”, Vol 1, Vol 2, Elsevier Publishers, 1st edition, 2005.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: STRUCTURAL GEOLOGY					
L	T	P/D	Total	**Subject Code: EL-426A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	To introduce the concept of structural geology				
UNIT	**Course Outcomes**				
I	To introduce the concept of topography and its impact on structure.				
II	To introduce the concept of rock deformation.				
III	To understand geometric and genetic classification of folds				
IV	To learn origin and classification of fractures and fault.				

UNITI

Structure and Topography Effects of topography on structural features, Topographic and structural maps; Importance representative factors of the map

UNIT II

Stress and strain in rocks Concept of rock deformation: Stress and Strain in rocks, Strain ellipses of different types and their geological significance. Planar and linear structures; Concept of dip and strike; Outcrop patterns of different structures.

UNIT III

Folds and Fold morphology; Geometric and genetic classification of folds; Introduction to the mechanics of folding: Buckling, Bending, Flexural slip and flow folding

UNIT IV

Foliation and lineation Description and origin of foliations: axial plane cleavage and its tectonic significance Description and origin of lineation and relationship with the major structures

Fractures and faults Geometric and genetic classification of fractures and faults Effects of faulting on the outcrops Geologic/geomorphic criteria for recognition of faults and fault plane solutions

Books:

1. Davis, G. R. (1984) Structural Geology of Rocks and Region. John Wiley
2. Billings, M. P. (1987) Structural Geology, 4th edition, PrenticeHall.
3. Park, R. G. (2004) Foundations of Structural Geology.Chapman & Hall
4. Pollard, D. D. (2005) Fundamental of Structural Geology. Cambridge University Press.
5. Ragan, D. M. (2009) Structural Geology: an introduction to geometrical techniques (4th Ed). Cambridge University Press (For Practical)
6. Lahee F. H. (1962) Field Geology. McGraw Hill

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B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Waste Water Treatment					
L	T	P/D	Total	**Subject Code: EL-428A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	The aim of study is to understand the effect of waste water on environment and its treatment				
UNIT	**Course Outcomes**				
I	Students will study the effect of waste water on streams				
II	Students will study the working process of treatment plant				
III	Students will study about the standard for disposal				
IV	Students will study the types of industry responsible for waste generation				

Unit I

Sewer appurtenances: Man holes, Catch basin, flushing devices, inverted siphon. Ventilation of sewers. Sewage, Sewerage, Systems of sewerage, Sewage characteristics Physical, chemical and biological parameters, Biological oxygen demand, first stage BOD, Chemical Oxygen demand, Relative stability, Population equivalent.

Unit II

Waste water disposal systems Selfpurification of streams, DilutionOxygen sag curve, Streeter Phelp's Equation, land treatment, Treatment of sewage, Preliminary and Primary treatment –Theory and design of Screen, Grit chamber, Detritus chamber, Flow Equalization tank and Sedimentation tank.

Unit III

Secondary treatment methods Contact bed, Intermittent sand filter, Theory and design of Trickling filter, Activated sludge process, Trickling filterHigh rate, standard. Rotating biological contactor Design of Septic tank and Imhoff tank, Principle and working of Oxidation ditch and oxidation ponds.

Aerated lagoons, Design of up flow anaerobic sludge blanket reactors, Sludge treatment and disposalMethods of thickening, Sludge digestion Anaerobic digestion, Design of sludge digestion tanks and Sludge drying beds, methods of sludge disposal

Unit IV

Effects of industrial wastes on streams, sewerage systems and wastewater treatment plants. Minimizing the effects of industrial effluents on waste water treatment plants and receiving streamsconservation of water, process change, reuse of waste water, volume reduction, strength reduction, neutralization, equalization and proportioning.

Books:

1. Industrial and Hazardous Waste Treatment by N.L.Nemerow&A.Dasgupta.
2. Industrial Effluents by N.Manivasakam.
3. Waste Water Treatment by M.N.Rao&A.K.Dutta.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Water and Air Quality Modelling					
L	T	P/ D	Total	**Subject Code: EL-430A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	This course aims at developing mathematical models for air and water quality check				
UNIT	**Course Outcomes**				
I	Students will learn the Mathematical Models for water quality				
II	Students will learn the Mathematical Models for dissolved oxygen.				
III	Students will learn the Mathematical Models for Estuary and Lakes				
IV	Students will learn about micrometeorological process.				

UNITI

Introduction to Mathematical Models: water quality modeldevelopment, calibration and verification cost: benefit analysis using models, Modelrequirements and limitations.

UNITII

D.O. Models for Streams: Dissolved oxygen model for streams sources and sinks of dissolved oxygen estimation of system parameters Streeter Phelps model oxygen 'sag' curvedetermination of Deoxygenation and reaeration coefficients

UNITIII

Benthal oxygen demand mass transport mechanisms Models for Estuary and Lakes: Physical chemical and biological processes in estuaries; Air quality models:

UNITIV

Micrometeorological processes, wind rose, dispersion, coefficients and stability classes, Gaussian and dispersion model, Stack height computation, Regional air quality models, Source inventories and significance

Books

1. Deaton, M.L and Winebrake, J.J., Dynamic Modelling of Environmental Systems, Verlag, 2000.
2. Chapra, S.C. Surface Water-Quality Modelling, McGraw-Hill, 2008.
3. Arthur C.Stern., Air Pollution (Third Ed.) Volume I – Air Pollutants, their transformation and Transport, (Ed.), Academic Press, 2006.
4. Wainwright, J and Mulligan, M., Environmental Modelling Finding simplicity in complexity, John Wiley and Sons Inc., New York, 2013

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: TRAFFIC ENGINEERING AND MANAGEMENT					
L	T	P/D	Total	**Subject Code: EL-432A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective		To understand and explain the various modes of Transport viz. Surface, Air, Rail and Water.			
UNIT		**Course Outcomes**			
I		To introduce the significance and scope of traffic engineering.			
II		Describe the different methods of conducting Traffic volume studies.			
III		Mention the various driver characteristics affecting traffic behavior onroads.			
IV		State the objectives in providing road markings and describe its effectiveness in traffic regulation.			

UNIT I

Introduction: Importance of Transportation Employment in Transportation Transportation Systems and Organization Characteristics of Driver, the Pedestrian, the Vehicle and Road, Traffic and Environment, Introduction to MRTS, LRTS and Underground railways.

UNIT II

Traffic Engineering Studies: Statistical studies for Traffic Engineering, Speed studies Volume Studies Travel time and Delay Studies Parking StudiesTraffic Forecasting Accident Studies, Traffic Flow Theory, Macroscopic and Microscopic Traffic model, Shock Waves Traffic Flow at signal and un signal intersection Simulation of Traffic.

UNIT III

Airport Planning: Airport -Accessibility ,Transport Connections, Forecasting Future Traffic – Airfield Capacity and Delay Aircraft characteristics , Airport Site Selection, Airport Classification, Planning of Airfield Components, Runway, Taxiway, Apron, Hanger, Passenger Terminals.

UNIT IV

Waterways Transport Systems: Fresh Water and Salt Water Navigation –Ocean, Currents and Tide, Canals and Waterways, Ports, Types of Ships Inland Water Transport-Planning, limitations and advantages Case Studies-Pipelines, Ropeways, Beltways and other means of transport.

Books:

1. Kadiyali L.R, “Traffic Engineering and Transportation Planning” Khanna Publishers, Delhi, 2005.
2. Khanna SK and Justo CEG, “Highway Engineering”, Nem Chand & Bros, Roorkee, 2010.
3. Brase/Brase “Understandable Statistics 3rd edition”,D C Health and Company, Lexington, Massachusetts,Toronko,1987.
4. Jason C.yu, Transportation Engineering: Introduction to Planning, Design and Operations, Elsevier,1992.
5. Taylor M.A.P and Young W,Traffic AnalysisNew Technology and New solution.

B. Tech. VIII Semester (Civil Engineering)					
SUBJECT: Infrastructure Planning and Design					
L	T	P/ D	Total	**Subject Code: EL-434A**	Max. Marks: 100
3	0	0	3		Theory: 75 marks
					Sessional: 25 Marks
					Duration: 3 hrs.
Course Objective	To understand various concepts of infrastructure planning and management.				
UNIT	**Course Outcomes**				
I	To understand the basic concepts related to Infrastructure Projects				
II	To understand the role of private sector infrastructure growth.				
III	To impart the strategies for successful Infrastructure Project implementation.				
IV	To develop Infrastructure modeling and Life Cycle AnalysisTechniques.				

Unit I

An Overview Of Basic Concepts Related To Infrastructure: Introduction to Infrastructure, an overview of the Power Sector in India., an Overview of the Water Supply and Sanitation Sector in India., an overview of the Road, Rail, Air and Port Transportation Sectors in India. An overview of the Telecommunications Sector in India. An overview of the Urban Infrastructure in India, an overview of the Rural Infrastructure in India, an Introduction to Special Economic Zones, Organizations and layers in the field of Infrastructure, The Stages of an Infrastructure Project Lifecycle., an overview of Infrastructure Project Finance.

Unit II

Private Involvement In Infrastructure: A Historical Overview of Infrastructure Privatization. The Benefits of Infrastructure Privatization, Problems with Infrastructure Privatization, Challenges in Privatization of Water Supply: A Case Study, Challenges in Privatization of Power: Case Study, Privatization of Infrastructure in India: Case Study, Privatization of Road Transportation Infrastructure in India.

Unit III

Challenges To Successful Infrastructure Planning And Implementation: Mapping and Facing the Landscape of Risks in Infrastructure Projects, Economic and Demand Risks: The Case study for Political Risks, SocioEnvironmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure, Challenges in Construction and Maintenance of Infrastructure.

Unit IV

Sustainable Development Of Infrastructure: Information Technology and Systems for Successful Infrastructure Management, Innovative Design and Maintenance of Infrastructure Facilities, Infrastructure Modeling and Life Cycle Analysis Techniques, Capacity Building and Improving the Governments Role in Infrastructure Implementation, An Integrated Framework for Successful Infrastructure Planning and Management Infrastructure Management Systems and Future Directions.

Books:

1. Grigg, Neil, Infrastructure engineering and management, Wiley, (1988).
2. Haas, Hudson, Zaniewski, Modern Pavement Management, Krieger, Malabar, (1994).

3. Hudson, Haas, Uddin, Infrastructure management: integrating design, construction, maintenance, rehabilitation, and renovation, McGraw Hill, (1997).
4. Munnell, Alicia, Editor, Is There a Shortfall in Public Capital Investment? Proceedings of a Conference Held in June (1990).
5. World Development Report 1994: Infrastructure for Development (1994).
6. Zimmerman, K. and F. Botelho, "Pavement Management Trends in the United States," 1st European Pavement Management Systems Conference, Budapest, September (2000).