



List of New Course(s) Introduced

Department : **Civil Engineering**

Programme Name : **B.Tech.**

Academic Year : **2021-22**

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	CE07TPE02B	CONSTRUCTION ENGINEERING MATERIALS
02.	CE07TPE02C	DISASTER PREPAREDNESS AND PLANNING
03.	CE07TPE02E	LOW COST HOUSING TECHNIQUE
04.	CE07TPE03E	ENVIRONMENTAL IMPACT ASSESSMENT AND LIFE CYCLE ANALYSIS
05.	CE07TPE04A	ENGINEERING HYDROLOGY
06.	CE07TPE04C	FOUNDATION ENGINEERING
07.	CE07TPE05B	AIRPORT PLANNING AND DESIGN
08.	CE07TPE05C	HIGHWAY CONSTRUCTION AND MANAGEMENT
09.	CE07TPE05D	CONTRACTS MANAGEMENT
10.	CE07TPE05E	CONSTRUCTION PROJECTS PLANNING & SYSTEMS
11.	CE07TOE02A	ARTIFICIAL NEURAL NETWORK
12.	CE07TOE02B	ECONOMIC POLICIES IN INDIA
13.	CE07TOE02C	HISTORY OF SCIENCE AND ENGINEERING
14.	CE08TPE06A	OFFSHORE ENGINEERING
15.	CE08TPE06B	SURFACE HYDROLOGY
16.	CE08TPE06D	WATER AND AIR QUALITY MODELLING
17.	CE08TPE06E	CONSTRUCTION EQUIPMENT & AUTOMATION
18.	CE08TPE07A	INFRASTRUCTURE PLANNING AND DESIGN
19.	CE08TPE07B	TRAFFIC ENGINEERING
20.	CE08TPE07E	URBAN HYDROLOGY AND HYDRAULICS
21.	CE08TOE03C	CYBER LAW AND ETHICS
22.	CE08TOE03D	HUMAN RESOURCES DEVELOPMENT AND ORGANISATIONAL BEHAVIOUR



Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2021-22

School : School of Studies of Engineering and Technology

Department : Civil Engineering

Date and Time : July 22, 2021 - 04:30 PM online

Venue : Department of Civil Engineering

Department of Civil Engineering
School of Studies of Engineering & Technology
Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur C.G.

Minutes of Meeting of BoS

A meeting of Board of Studies (BoS) of Civil Engineering was held on 22-07-2021 at 04.30 PM in online in the Department of Civil Engineering (through Google Meet) to discuss, finalize and approve the revised Scheme and syllabus of B.Tech. 4th year (7th and 8th Semesters) Civil Engineering w.e.f 2021-22 academic session. The following members of BoS were attended the meeting.

1. Dr. M. C. Rao, Chairman BoS, Head of the Department Civil Engg.
2. Prof. Umesh K Dewangan, Professor, Civil Engineering Dept., NIT Raipur, Subject Expert and External member of BoS
3. Dr. Shailendra Kumar, Professor, Civil Engg. Dept., GGV, member of BoS
4. Shri.R.K. Choubey, Asso. Professor, Civil Engg. Dept., GGV, member of BoS
5. Mr.A.K. Parashar, Asst.Professor, Civil Engg. Dept., GGV, member of BoS

The following external member of DRC could not attend the meeting due to ill health.

1. Shri. Sunil Kumar Shrivastava, Chief Manager (Civil), SECL, Bilaspur, Industry Expert and member of BoS

At the outset the chairman welcomed all the esteemed members.

The chairman of the DRC has presented the earlier BoS approved B.Tech. Civil Engineering Scheme (approved in the meeting held on 29-06-2019), the revised Scheme and the syllabus of B.Tech. 4th year, prepared as per the revised scheme & as per the AICTE guidelines to all the esteemed members. During meeting the members discussed the previously approved Scheme, the revised scheme and syllabus at length.

After discussion, the members of BoS have approved the B.Tech. scheme (revised) and detailed syllabus of B.Tech. 4th year (7th & 8th Semester) Civil Engineering and recommended to be made effective from session 2021-22. Further the external member has also sent his comments through e-mail (copy enclosed).

The meeting ended with vote of thanks.

Dr. M. C. Rao

Prof. Shailendra Kumar

Prof. Umesh K Dewangan
(Email copy attached)

Dr. R.K. Choubey

Mr. A.K. Parashar



The following revisions were introduced in the B.Tech. 4th year civil engineering :

- ❖ PRE-STRESSED CONCRETE (CE07TPE02A)
- ❖ INDUSTRIAL STRUCTURES (CE07TPE05A)
- ❖ EARTHQUAKE RESISTANT DESIGN OF STRUCTURES (CE08TPC18)
- ❖ FINITE ELEMENT ANALYSIS (CE08TPE07D)

The following new courses were introduced in the B.Tech. 4th year civil engineering :

- ❖ CONSTRUCTION ENGINEERING MATERIALS (CE07TPE02B)
- ❖ DISASTER PREPAREDNESS AND PLANNING (CE07TPE02C)
- ❖ LOW COST HOUSING TECHNIQUE (CE07TPE02E)
- ❖ ENVIRONMENTAL IMPACT ASSESSMENT AND LIFE CYCLE ANALYSIS (CE07TPE03E)
- ❖ ENGINEERING HYDROLOGY (CE07TPE04A)
- ❖ FOUNDATION ENGINEERING (CE07TPE04C)
- ❖ AIRPORT PLANNING AND DESIGN (CE07TPE05B)
- ❖ HIGHWAY CONSTRUCTION AND MANAGEMENT (CE07TPE05C)
- ❖ CONTRACTS MANAGEMENT (CE07TPE05D)
- ❖ CONSTRUCTION PROJECTS PLANNING & SYSTEMS (CE07TPE05E)
- ❖ ARTIFICIAL NEURAL NETWORK (CE07TOE02A)
- ❖ ECONOMIC POLICIES IN INDIA (CE07TOE02B)
- ❖ HISTORY OF SCIENCE AND ENGINEERING (CE07TOE02C)
- ❖ OFFSHORE ENGINEERING (CE08TPE06A)
- ❖ SURFACE HYDROLOGY (CE08TPE06B)
- ❖ WATER AND AIR QUALITY MODELLING (CE08TPE06D)
- ❖ CONSTRUCTION EQUIPMENT & AUTOMATION (CE08TPE06E)
- ❖ INFRASTRUCTURE PLANNING AND DESIGN (CE08TPE07A)
- ❖ TRAFFIC ENGINEERING (CE08TPE07B)
- ❖ URBAN HYDROLOGY AND HYDRAULICS (CE08TPE07E)
- ❖ CYBER LAW AND ETHICS (CE08TOE03C)
- ❖ HUMAN RESOURCES DEVELOPMENT AND ORGANISATIONAL BEHAVIOUR (CE08TOE03D)

विभागाध्यक्ष
HOD
सिविल इंजीनियरी विभाग
Department of Civil Engineering,
प्रो.स.गु.घा.विश्वविद्यालय, बिलासपुर (छ.ग.)
I.T., G.G.V. Bilaspur (C.G.)

Signature & Seal of HoD



Scheme and Syllabus

CIVIL ENGINEERING DEPARTMENT, SOS, ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA (A CENTRAL UNIVERSITY), BILASPUR

SCHEME OF B.TECH.VII SEMESTER CIVIL ENGINEERING (New CBCS)
W.E.F. 2021-22 (ODD SEMESTER)

S. No	Subject Code	Subjects	period/Week		Scheme of Evaluation				Grand Total	Credits	
					Internal Assessment (IA)			ESE			
					CT-I	CT-II	Total				
Theory			L	T	P						
1	CE07TPC17	Water Resources Engineering-II	3	0	0	15	15	30	70	100	3
2	CE07TPE02	Professional Elective -02X	3	0	0	15	15	30	70	100	3
3	CE07TPE03	Professional Elective -03X	3	0	0	15	15	30	70	100	3
4	CE07TPE04	Professional Elective -04X	3	0	0	15	15	30	70	100	3
5	CE07TPE05	Professional Elective -05X	3	0	0	15	15	30	70	100	3
6	CE07TOE02	Open Elective -02X	3	0	0	15	15	30	70	100	3
Practical											
1	CE07PPC08	Seminar*	-	-	3	-	-	50	-	50	1.5
2	CE07PPC09	Minor project	0	0	6	-	-	60	40	100	3
3	CE07PPC10	Estimation and Costing	0	0	3	-	-	30	20	50	1.5
									Total Credits		24

L - Lecture Hours, T-Tutorial Hours, P - Practical Hours, CT - Class Test, ESE - End Semester Exam; * Seminar on Industrial Training/Internship undergone during summer vacation of 6th Semester

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22/07/21



CIVIL ENGINEERING DEPARTMENT, SOS, ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA (A CENTRAL UNIVERSITY), BILASPUR

SCHEME OF B.TECH.VIII SEMESTER CIVIL ENGINEERING
W.E.F. 2021-22 (EVEN SEMESTER)

S. No	Subject Code	Subjects	period/Week			Scheme of Evaluation			Grand Total	Credits	
			L	T	P	Internal Assessment (IA)		ESE			
						CT-I	CT-II				Total
1	CE08TPC18	Earthquake Resistant Design of structure	3	0	0	15	15	30	70	100	3
2	CE08TPE06	Professional Elective -06X	3	0	0	15	15	30	70	100	3
3	CE08TPE07	Professional Elective -07X	3	0	0	15	15	30	70	100	3
4	CE08TOE03	Open Elective -03X	3	0	0	15	15	30	70	100	3
Practical											
1	CE08PPC11	Major Project	0	0	14	-	-	120	80	200	7
2	CE08PPC12	Structural Detailing Lab	0	0	3	-	-	30	20	50	1.5
									Total Credits	20.5	

L - Lecture Hours, T-Tutorial Hours, P - Practical Hours, CT - Class Test, ESE - End Semester Exam

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22/09/2021



List of Professional (Core) Electives			Credits	Semester
Sl. No.	Subject Code	Name of Subject	4	VI
x	CE06TPE01X	Professional Elective-1 (PE Group-1)		
A	CE06TPE01A	Structural Analysis by Matrix Methods		
B	CE06TPE01B	Advanced Surveying		
C	CE06TPE01C	Advanced Concrete Design		
D	CE06TPE01D	Railway Engineering		
E	CE06TPE01E	Basics of Computational Hydraulics		
Sl. No.	Subject Code	Name of Subject	3	VII
x	CE07TPE02X	Professional Elective-2 (PE Group-2)		
A	CE07TPE02A	Pre-stressed Concrete		
B	CE07TPE02B	Construction Engineering Materials		
C	CE07TPE02C	Disaster Preparedness and Planning		
D	CE07TPE02D	Advanced Structural Analysis		
E	CE07TPE02E	Low Cost Housing Techniques		
Sl. No.	Subject Code	Name of Subject	3	VII
x	CE07TPE03X	Professional Elective-3 (PE Group-3)		
A	CE07TPE03A	Environmental Geo-technology		
B	CE07TPE03B	Air Pollution Control Engineering		
C	CE07TPE03C	Solid and Hazardous Waste Management		
D	CE07TPE03D	Design of Hydraulic Structures		
E	CE07TPE03E	Environmental Impact Assessment and Life Cycle Analysis		
Sl. No.	Subject Code	Name of Subject	3	VII
x	CE07TPE04X	Professional Elective-4 (PE Group-4)		
A	CE07TPE04A	Engineering Hydrology		
B	CE07TPE04B	Structural Dynamics		
C	CE07TPE04C	Foundation Engineering		
D	CE07TPE04D	Rock Mechanics		
E	CE07TPE04E	Water Resources Planning & Management		



Sl. No.	Subject Code	Name of Subject	Credits	Semester
		Professional Elective-5 (PE Group-5)	3	VII
x	CE07TPE05X			
A	CE07TPE05A	Industrial Structures		
B	CE07TPE05B	Airport Planning and Design		
C	CE07TPE05C	Highway Construction and Management		
D	CE07TPE05D	Contracts Management		
E	CE07TPE05E	Construction Projects Planning & Systems		
		Professional Elective-6 (PE Group-6)	3	VIII
x	CE08TPE06X			
A	CE08TPE06A	Offshore Engineering		
B	CE08TPE06B	Surface Hydrology		
C	CE08TPE06C	Bridge Engineering		
D	CE08TPE06D	Water and Air Quality Modelling		
E	CE08TPE06E	Construction Equipment & Automation		
		Professional Elective-7 (PE Group-7)	3	VIII
x	CE08TPE07X			
A	CE08TPE07A	Infrastructure Planning and Design		
B	CE08TPE07B	Traffic Engineering		
C	CE08TPE07C	Repair and Rehabilitation of Structures		
D	CE08TPE07D	Finite Element Analysis		
E	CE08TPE07E	Urban Hydrology and Hydraulics		



List of Open Electives			Credits	Semester
Name of Subject			3	VI
Sl. No.	Subject Code			
x	CE06TOE01X	Open Elective-1 (OE Group-1)		
A	CE06TOE01A	Metro Systems and Engineering		
B	CE06TOE01B	Rural Technology and Community Development		
C	CE06TOE01C	Remote Sensing and GIS		
D	CE06TOE01D	ICT for Development		
Name of Subject			3	VII
Sl. No.	Subject Code			
x	CE07TOE02X	Open Elective-2 (OE Group-2)		
A	CE07TOE02A	Artificial Neural Network		
B	CE07TOE02B	Economic Policies in India		
C	CE07TOE02C	History of Science and Engineering		
D	CE07TOE02D	Engineering Risk-Benefit Analysis		
Name of Subject			3	VIII
Sl. No.	Subject Code			
x	CE08TOE03X	Open Elective-3 (OE Group-3)		
A	CE08TOE03A	Management Information System		
B	CE08TOE03B	Enterprise Resource Planning		
C	CE08TOE03C	Cyber Law and Ethics		
D	CE08TOE03D	Human Resources Development and Organizational Behaviour		



DEPARTMENT OF CIVIL ENGINEERING B TECH. FOURTH YEAR SYLLABUS W.E.F 2021-22

SYLLABUS	(SEMESTER VII)	Periods/Week		Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II			
Subject Code:	CE07TPE02B						70	100	3
Subject:	Construction Engineering Materials	3	0	0	15	15	30		

Course Learning Objectives:

- To introduce various construction materials on the basis of various classifications.
- To understand about various mortar making materials & its classification.
- To understand the emerging role of using polymers as construction material.
- To introduce about various modern construction materials.

Course Content:

UNIT-1 Construction Materials

Classifications of Construction Materials. Consideration of physical, Mechanical, thermo-physical Properties, characteristics behaviour under stress, Selection criteria for construction materials, green building materials.

UNIT-2 Materials for making Mortar and concrete

Lime manufacture, properties, hardening of lime, types of lime, lime concrete uses. Cement, pozzolanic material, aggregates, water, admixtures - characteristics, properties and uses. Types of mortars, special mortars, their properties and applications.

UNIT-3 Polymers in civil engineering

Rubber and plastics, properties, effect of temperature on mechanical properties. Uses and application. Polymers, fibres and composites, Fibre reinforced plastic. Architectural use and aesthetics of composites. Adhesives and sealants. Structural elastomeric bearings and resilient seating. Moisture barriers, Polymer foams and polymers in Building Physics. Polymer concrete composites

UNIT-4 Metals & Ceramics

Types of structural steels, special steel, alloy steel, stainless steel, light gauge steel, Corrosion of concrete and reinforcing steel in various environments. Ceramic Materials: Classification, Refractories, glass, glass wool, mechanical, thermal and electrical properties, fire resistance materials, Uses and application.

UNIT V MODERN MATERIALS

Glass - Sealants for joints - Fibre glass reinforced plastic - Clay products - Refractories - Composite materials - Types - Applications of laminar composites - Fibre textiles - Geomembranes and Geotextiles for earth reinforcement.

Text Books:

1. Rangawala S.C. Engineering Materials Chortor Publications 1991.
2. S.K. Duggal Building Materials, New Age International Publications 2006.
3. Bruntley L.R Building Materials Technology Structural Performance & Environmental Impact McGraw Hill Inc 1995.
4. R Chudley Construction Technology, Vol I - IV Longman Group Construction Ltd. 1973.



DEPARTMENT OF CIVIL ENGINEERING B.TECH - FOURTH YEAR SYLLABUS W.E.F 2021-22

Course Outcomes- On completion of this course the student will be able:

1. To remember & understand about various physical, Mechanical, thermo-physical Properties of various construction materials.
2. To Acquire knowledge about composition, microstructure, and engineering behavior of various materials used in civil engineering applications.
3. To understand about various Mortar & Concrete producing materials
4. To Remember & understand about modifications possibilities in construction materials.

SYLLABUS	(SEMESTER VII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE071PE02C							70	100	3
Subject:	Disaster Preparedness and Planning	3	0	0	15	15	30			

Course Learning Objectives:

1. Provide an understanding of the social nature of natural hazards and disasters.
2. Give students knowledge of the social factors affecting disaster mitigation, preparedness, response, and recovery.
4. Reveal unfounded myths about human behaviour in disasters.
5. Increase awareness of hazards and disasters around the world and the unequal social consequences stemming from disaster events.
6. Teach students skills to use information technology to access current disaster-relevant information for assessing, planning, mitigating, responding to and recovery from disaster from local through global levels.

Course Content:

UNIT-1 Introduction – Concepts and definitions: disaster, hazard, vulnerability, resilience, risks severity, frequency and details, capacity, impact, prevention, mitigation.

UNIT-2 Disaster Impacts – Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

UNIT-3 Disaster Risk Reduction (DRR)– Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT- 4 Structural and non-structural safety measures

UNIT- 5 Development vs Sustainable Development

Text Books:

1. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
2. Singh B.K., 2008, Handbook of Disaster Management: Techniques and Guidelines, Rajat Publication.



DEPARTMENT OF CIVIL ENGINEERING B.TECH. FOURTH YEAR SYLLABUS W.E.F. 2021-22

3. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation

Course Outcomes-

The student will develop competencies in

- the application of Disaster Concepts to Management
- Analyzing Relationship between Development and Disasters
- Ability to understand Categories of Disasters
- realization of the responsibilities to society

SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE07TPE02D							70	100	3
Subject:	Advanced Structural Analysis	3	0	0	15	15	30			

Course Learning Objectives:

- To learn stiffness method for analyzing determinate and indeterminate structure.
- To study general theory regarding beams subjected to concentrated and distributed loads.
- To analyze curved beams in plane.
- To understand symmetrical and non-symmetrical bending of straight beams.
- To define basic fundamental of structural dynamics.

Course Content:

UNIT-1: Direct stiffness method Introduction - element stiffness matrix - rotation transformation matrix - transformation of displacement and load vectors and stiffness matrix - equivalent nodal forces and load vectors - assembly of stiffness matrix and load vector - determination of nodal displacements and element forces - analysis of plane truss - plane frame (with numerical examples) - analysis of grid - space-truss and space-frame (without numerical examples) - computer Implementation - introduction to analysis packages (A project on development of an analysis program using above method is envisaged at this stage)

UNIT-2: Beams on elastic foundation: general theory - infinite beam subjected to concentrated load - boundary conditions - infinite beam subjected to a distributed load segment - semi-infinite beam subjected to loads at its end - semi-infinite beam with concentrated load near its end - short beams.

UNIT-3: Beams curved in plane: Analysis of cantilever beam curved in plan - analysis of circular beams over simple supports

UNIT-4: Non-symmetrical bending of straight beams: Shear centre - a review, symmetrical and non-symmetrical bending - bending stresses in beams subjected to non-symmetrical bending - deflections of straight beams subjected to unsymmetrical bending - fully plastic load for unsymmetrical bending.

UNIT-5: Introduction to Structural Dynamics

Single degree of freedom - un-damped and damped vibration-free vibration - forced vibration,



DEPARTMENT OF CIVIL ENGINEERING B.TECH. FOURTH YEAR SYLLABUS W.E.F 2021-22

Introduction to multi degree of freedom systems.

Text Books:

1. Wang, C. K., Matrix Methods of Structural Analysis, International Textbook Company, 1970.
2. Przemieniecki, J. S., Theory of Matrix Structural Analysis, McGraw Hill, New York, 1985.
3. Weaver, W., and Gere, J. M., Matrix Analysis of Framed Structures, CBS Publishers, 2004.
4. Rujsekarn, S., and Sankarasubramanian, G., Computational Structural Mechanics, PHI
5. Boresi, A. P. and Sidebottom, O. M., Advanced Mechanics of Materials, John Wiley and Sons, 2003.
6. Srinath, L. S., Advanced Mechanics of Solids, Tata McGraw Hill, 2009.
7. Timoshenko, S., Strength of Materials, Part II, CBS Publishers, 2002.
8. Reddy, C. S., Basic Structural Analysis, Tata McGraw Hill, New Delhi, 2007.
9. Paz M., Structural Dynamics, CBS Publishers, 2007.
10. Meirovich, L., Elements of Vibration Analysis, McGraw Hill, 2007.

Course Outcomes-

- To interpret force-displacement relationship in truss, space frame etc. using direct stiffness method.
- To investigate semi-infinite & infinite beam subject to concentrated and distributed loads.
- To analyze circular and cantilever beams curved in plane.
- To explain symmetrical and non-symmetrical bending of straight beams.
- To outline basic fundamental of structural dynamics; free & forced vibration and multi degree of freedom systems.

SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE071PE02E							70	100	3
Subject:	Low Cost Housing Techniques	3	0	0	15	15	30			

Course Learning Objectives:

- To introduce various housing technique adopted in different zones in country.
- To study various uses of cost effective Technologies.
- To learn needs and innovations of building techniques for low cost construction.
- To learn space norms for low cost construction.
- To learn about building materials and costing of low cost construction.

Course Content:

UNIT-1 An introduction to the subject to understand the various building techniques adopted in different climatic zones of the country, which resulting in varied vernacular expressions.

UNIT-2 Use of cost effective technologies through the use of local materials, up gradation of traditional technologies, prefabrication etc.



DEPARTMENT OF CIVIL ENGINEERING B.TECH. FOURTH YEAR SYLLABUS W.E.F 2021-22

UNIT-3 Need for low cost construction, both in the rural and the urban sectors. Innovations of building techniques for low cost construction.

UNIT- 4 Analysis of space norms for low cost buildings. Study of usages pattern of low cost buildings by the habitants.

UNIT- 5 Comparative analysis of building materials and costing. Works of Laurie Baker, Hassan Fathy and other prominent architects.

Text Books:

1. "Building Systems for Low Income Housing", Ashok Kumar Jain; Management Publishing House, 1992
2. "Low Cost Housing in Developing Countries", Guru Charan Mathur; For Centre for Science & Technology of the Non-Aligned and Other Developing Countries, Oxford & IBH Publishing Company, 1993

Course outcomes:

Upon completion of this course students will be able to

- To classify various housing techniques adopted in different zones in country.
- To identify various uses of cost effective Technologies.
- To understand needs and develop innovations of building techniques for low cost construction.
- To explain space norms for low cost construction.
- To analysis about building materials and costing of low cost construction.



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SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	CE07TPE03E									
<i>Subject:</i>	Environmental Impact Assessment and Life Cycle Analysis	3	0	0	15	15	30	70	100	3

Course Learning Objectives:

- Identify environmental attributes for the EIA study.
- Identify methodology and prepare EIA reports.
- Specify methods for prediction of the impacts.
- Formulate environmental management plans.
- Understand the concept of life cycle analysis (LCA) and the basic principles.

Course Content:

UNIT-1 Introduction: Historical development of Environmental Impact Assessment (EIA). EIA in Project Cycle. Legal and Regulatory aspects in India. – Types and limitations of EIA – Cross sectoral issues and terms of reference in EIA – Public Participation in EIA. EIA process- screening – scoping – setting – analysis – mitigation

UNIT-2 Components and Methods for EIA: Matrices – Networks – Checklists – Connections and combinations of processes – Cost benefit analysis – Analysis of alternatives – Software packages for EIA – Expert systems in EIA. Prediction tools for EIA – Mathematical modelling for impact prediction – Assessment of impacts – air – water – soil – noise – biological – Cumulative Impact Assessment – Documentation of EIA findings – planning – organization of information and visual display materials – Report preparation. EIA methods in other countries.

UNIT-3 Environmental Management Plan: Environmental Management Plan – preparation, implementation and review – Mitigation and Rehabilitation Plans – Policy and guidelines for planning and monitoring programmes – Post project audit – Ethical and Quality aspects of Environmental Impact Assessment.

UNIT- 4 An Introduction to Sustainability Concepts and Life Cycle Analysis (Introduction, Material flow and waste management, What it all means for an engineer? Water energy and food nexus). Risk and Life Cycle Framework for Sustainability (Introduction, Risk, Environmental Risk Assessment, Example Chemicals and Health Effects, Character of Environmental Problems)

UNIT- 5 Environmental Data Collection and LCA Methodology (Environmental Data Collection Issues, Statistical Analysis of Environmental Data, Common Analytical Instruments, Overview of LCA Methodology - Goal Definition, Life Cycle Inventory, Life Cycle Impact Assessment, Life Cycle Interpretation, LCA Software tools). Life Cycle Assessment – Detailed Methodology and ISO Framework (Detailed Example on LCA Comparisons, LCA Benefits and Drawbacks, Historical Development and LCA Steps from ISO Framework)

Text Books:

1. Anjaneyulu.Y., and Manickam. V., Environmental Impact Assessment Methodologies, B.S. Publications, Hyderabad, 2007
2. Canter, L.W., Environmental Impact Assessment, McGraw Hill Pub. Co., New York. 1997

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3. David P. Lawrence, Environmental Impact Assessment: Practical Solutions to Recurrent Problems, John Wiley & Sons, 2003
4. Environmental Assessment, 2001. Ravi Jain, LV Urban, GS Stacey, H Balbach, McGraw-Hill.
5. Handbook on Life Cycle Assessment : Operational guide to the ISO standards, Kluwer Academic Publishers, 2004
6. Hosetti, B. B., Kumar A, Eds, Environmental Impact Assessment & Management, Daya Publishing House, 1998
7. Lawrence, D.P., Environmental Impact Assessment – Practical solutions to recurrent problems, Wiley-Inter science, New Jersey, 2003.
8. Petts, J., Handbook of Environmental Impact Assessment, Vol., I and II, Blackwell Science, London, 1999.
9. Rau, GJ. And Wooten, C.D., Environmental Impact Analysis Handbook, McGraw Hill 1980
10. Wathern.P., Environmental Impact Assessment- Theory and Practice, Routledge Publishers, London, 2004.

Course Outcomes At the end of the course the student will be able to:

- CO1 Identify environmental attributes for the EIA study.
- CO2 Identify methodology and prepare EIA reports.
- CO3 Specify methods for prediction of the impacts.
- CO4 Understand EIA tools & methodologies, auditing and documentation of EIA
- CO4 Formulate environmental management plans
- CO5 Perform life cycle inventory analysis of products.
- CO6 Develop strategies to bring energy efficiency in all stages of the product development cycle.
- CO7 Formulate plans for comprehensive environmental protection, in order to comply with environmental laws



DEPARTMENT OF CIVIL ENGINEERING B.TECH. FOURTH YEAR SYLLABUS W.E.F 2021-22

SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		1.	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE07TPE04A							70	100	3
Subject:	Engineering Hydrology	3	0	0	15	15	30			

Course Learning Objectives:

- 1) To develop the fundamentals of hydrology.
- 2) To study the various forms of precipitation, evaporation and infiltration
- 3) To know the types of Hydrograph and Rainfall-Runoff correlations
- 4) To learn the Flood forecasting and Flood routing methods
- 5) To understand the fundamentals of ground water hydrology

Course Content:

UNIT-1 Introduction- Description of Hydrologic Cycle, Overview of application of hydrology in engineering. Precipitation, Infiltration and Evapotranspiration Runoff and Hydrographs,

UNIT-2 Forms of precipitation, measurement, depth-area-duration and intensity-duration frequency relations, Evaporation - process, measurement, and estimation, Infiltration process, measurement, and estimation, Evapotranspiration measurement and estimation

UNIT-3 Rainfall Runoff correlations, Flow duration curve, Mass curve, Factors affecting flow hydrograph, Unit hydrograph, its analysis, and S-curve hydrograph, Synthetic and instantaneous unit hydrographs.

UNIT- 4 Statistical analysis, Flood frequency studies, Flood forecasting, rational method, Time Area curves, Risk, reliability, and safety factor, Flood control measures. Introduction to basic routing equations, Design flood, Channel and flood routing. Introduction to HEC-RAS software.

UNIT- 5 Occurrence of groundwater, types of aquifers, aquifer properties, Darcy's law, Conductivity and Transmissivity, yield from a well under steady state conditions, Laboratory and field measurement of permeability

Text Books:

1. Engineering Hydrology K.Subramanya, Tata McGraw-Hill Education
2. Hydrology Principles, Analysis and Design H.M.Raghunath, New Age International
3. Hand Book of Applied hydrology V.T.Chow, McGraw-Hill, Inc
4. Viesmann W and Lewis G Lt (2008) "Introduction to Hydrology". Prentice Hall of India
5. Ojha,C.S.P. , Bhunya, P. and Berndtsson, R.- Engineering Hydrology, Oxford University Press Canada.
6. K. C. Patra, Hydrology and Water Resources Engg., Narosa Publishing house, New Delhi.
7. D. K. Todd, Groundwater Hydrology, John Wiley and Sons

Course Outcomes- Upon completion of this course students shall be able to

- 1) Describe the basic concepts of hydrology and integrate the physical hydrological processes.
- 2) Explain the various process, measurement, and estimation of hydrological components
- 3) Formulate the runoff and hydrograph's estimation and apply into engineering practices.
- 4) Examine the various statistical methods for Flood studies and can investigate historical datasets.



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4. Dynamics of Structures by Humar, J.L., Prentice Hall, 1990.
5. Structural Dynamics by Mario, Paz, CBS Publ. New-Delhi, 1995.
6. Advanced Dynamics by Timoshenko, S., McGraw Hill Book Co, NY, 1948.
7. Elements of Vibration Analysis by Meirovitch, L., 2nd Edn. McGraw Hill Intr. Edn., Singapore, 1986.
8. Introduction of Structural Dynamics, Biggs, J.M., McGraw Hill, NY, 1964
9. Principles and techniques of vibrations by L Meirovich, 1997, Prentice Hall, NJ.
10. Analytical methods in vibrations by L Meirovich, 1967, Macmillan, NY.
11. Theory of vibrations by W T Thompson, 1983, Prentice hall, New Delhi
12. Vibration: fundamentals and practice by C W de Silva, 1999, CRC Press, Boca Raton.
13. Mechanical Vibrations by S S Rao, 2004, 4th Edition, Pearson Education, New Delhi.
14. Probabilistic theory of structural dynamics by Y K Lin, 1967, Me-GrawHill.
15. Introduction to random vibrations, N C Nigam, 1983, The MIT press, Massachussets.

Course Outcomes:

On the completion of this course, the student will be able to

- 1) Convert a physical structure into SDOF system/model
- 2) Find response of free and force vibration (harmonic, periodic and transient) of SDOF system
- 3) Calculate natural frequency and mode shapes of MDOF system
- 4) Carry out modal analysis of MDOF system
- 5) Get the Response of structures by performing experiments and/or by computer simulation.

SYLLABUS	(SEMESTER VII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	CE07TPE04C							70	100	3
<i>Subject:</i>	Foundation Engineering	3	0	0	15	15	30			

Course Learning Objectives:

- To introduction of different methods of soil exploration.
- To provide comprehensive studies of shallow foundation and calculate settlements.
- To analyze various types of footings & rafts.
- To introduction of various types of piles foundations and to calculate bearing capacity.
- To introduce Comprehensive studies of Retaining walls and determine stability.

Course Content:

UNIT-1 SITE INVESTIGATION AND SELECTION OF FOUNDATION

Scope and Objectives, Methods of Exploration , Auguring and Boring ,Wash Boring and Rotary Drilling ,Depth and Spacing of Bore Holes ,Soil Samples ,Representative and Undisturbed, Sampling Methods Split Spoon Sampler, Thin Wall Sampler, Stationary Piston Sampler ,Penetration Tests (SPT and SCPT) ,Data Interpretation ,Strength Parameters ,Bore Log Report and Selection of Foundation.

UNIT-2 SHALLOW FOUNDATION

Location and Depth of foundation, Codal Provisions, Bearing Capacity of Shallow Foundation on Homogeneous Deposits ,Terzaghi's Formula and BIS formula ,Factors Affecting Bearing Capacity Bearing Capacity from In-Situ Tests (SPT, SCPT and Plate Load) ,Allowable Bearing Pressure , Seismic Considerations in Bearing Capacity Evaluation, Determination of Settlement of Foundations



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on Granular and Clay Deposits ,Total and Differential Settlement , Allowable Settlements , Codal Provision , Methods of Minimizing Total and Differential Settlements.

UNIT-3 FOOTINGS AND RAFTS

Types of Isolated Footing, Combined Footing, Mat Foundation, Contact Pressure and Settlement Distribution, Proportioning of Foundations for Conventional Rigid Behavior, Minimum Thickness for Rigid Behavior, Applications, Compensated Foundation, Codal Provisions.

UNIT- 4 PILE FOUNDATION

Types of Piles and Functions ,Factors Influencing the Selection of Pile , Carrying Capacity of Single Pile in Granular and Cohesive Soil , Static Formula ,Dynamic Formulae (Engineering News and Hileys) ,Capacity from In-Situ Tests (SPT and SCPT) , Negative Skin Friction , Uplift Capacity, Group Capacity by Different Methods (Feld's rule, Converse — La-Barrae formula and Block Failure Criterion) ,Settlement of Pile Groups , Interpretation of Pile Load Test (Routine Test Only), Under Reamed Piles, Capacity under Compression and Uplift , Cohesive -Expansive ,Non Expansive — Cohesionless Soils , Codal Provisions.

UNIT- 5 RETAINING WALLS

Plastic Equilibrium in Soils ,Active and Passive States , Rankine's Theory for Cohesionless and Cohesive Soil ,Coulomb's Wedge Theory , Condition for Critical Failure Plane ,Earth Pressure on Retaining Walls of Simple Configurations , Culmann's Graphical method ,Pressure on the Wall due to Line Load ,Stability Analysis of Retaining Walls ,Codal Provisions.

Text Books:

- 1) Foundation Analysis and Design by J. E. Bowels, McGraw Hill. Companies, Inc. 6th Ed. 2001.
- 2) Principles of Foundation Engineering by B. M. Das, CENGAGE Learning. Seventh Edition.
- 3) Foundation Engineering Handbook by R. W. Day, McGraw Hill. ConstructionASCE Press. Ed. 2006.

Reference Books:

- 1) Basic and Applied Soil Mechanics by Gopal Ranjan & A.S. R. Rao, New Age International (P) Limited Publishers, New Delhi-110002.
- 2) Textbook of Soil Mechanics and Foundation Engineering –Geotechnical Engineering Series (PB 2018) by V.N. S. Murthy, CBS Publications, New Delhi
- 3) Soil Mechanics by Robert V. Whitman & T. William Lambe, Wiley India Pvt Ltd., New Delhi.
- 4) Soil Mechanics and Foundation Engineering (Geotechnical Engineering) by Dr. P.N. Modi, Standard Book House(Rajsons Publications Pvt Ltd), New Delhi-110002

Course Outcomes-At the end of the course completion, the students shall be able to:

- CO1 Understand different methods of soil exploration.
- CO2 Analyze various shallow foundations and calculate different types of settlements.
- CO3 Understand various types of footings & rafts.
- CO4 Analyze bearing capacity of piles with different methods
- CO5 Design stability of Retaining walls.



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SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE07TPE05B							70	100	3
Subject:	Airport Planning and Design	3	0	0	15	15	30			

Course Learning Objectives:

1. To familiarize students with of airport planning.
2. To develop the knowledge for design and analysis of airport runway, taxiway and airport pavement crust.
3. To understand air traffic control system.

Course Content:

UNIT-1 Airport Planning: Significance of transport, Different modes of transportation, Airport master plan- FAA recommendation. Regional planning, airport site selection, survey for site selection, Estimation of future air traffic, Characteristics of aircraft, Environmental consideration.

UNIT-2 Runway Design: Orientation of runway , Basic runway length, Corrections for basic runway length, Runway geometric design

UNIT-3 Taxiway Design: Controlling factors of taxiway, Geometric design for taxiway, Design for exit taxiways.

UNIT- 4 Airport Pavement Design: Design factors, Design of flexible pavement, Design of rigid pavement, design of overlay pavements

UNIT- 5 Air Traffic Control and Visual Aids: Air traffic control objectives, control system. Visual aids-airport markings and lighting

Text Books:

1. Dr. S. K. Khanna, M.G. Arora and S.S. Jain, Airport Planning & Design, Nem Chand & Bros.,Roorkee
2. G.V. Rao Airport Engineering, Tata McGraw Hill Pub. Co., New Delhi
3. S.C. Rangwala and K.S, Rangwala, Airport Engineering, Charotar Publishing House Pvt. Ltd, Anand

Course Outcomes-

After learning the course the students should be able to:

1. Understand the fundamentals of airport planning.
2. Familiarize with design of runway.
3. Recognize design of taxiway
4. Understand airport pavement design
5. Analyse air traffic control system.



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SYLLABUS	(SEMESTER VII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	CE07TPE05C							70	100	3
<i>Subject:</i>	Highway Construction and Management	3	0	0	15	15	30			

Course Learning Objectives:

1. To familiarize students with highway construction materials.
2. To develop ability to pavement design.
3. To instruct students to concept of evaluation and strengthening of pavement.
4. To interpret students to concept of highway drainage.
5. To develop knowledge on concept of highway maintenance.

UNIT 1: Highway Materials: Soil, Desirable Properties, Classification, CBR, G. I., Modulus of Subgrade Reaction, Aggregates and their Characterisations, Bituminous materials, Bituminous mixes, Concept of Superpave.

UNIT 2: Construction of Pavement: Highway Constructions - Earth Roads, Gravel roads, Soil Stabilized Roads, WBM Roads, Bituminous roads. Surface dressing, Seal Coat, Tack Coat, Prime Coat, Grouted Macadam, Premix Methods and their Construction Procedures Construction of Cement Concrete Pavement Slab.

UNIT 3: Evaluation And Strengthening: Flexible And Rigid Pavement Evaluation, Strengthening of Pavements, Design of Overlays

UNIT 4: Highway Drainage: Significance of highway drainage, requirements of highway drainage. Design of surface drainage system, Design of sub-surface drainage system, Road construction in water-logged areas.

UNIT 5: Highway Maintenance: Types of defects in Flexible and Rigid pavement, Causes and Treatment, Special repairs. Pavement Evaluation- Pavement surface conditions and Structural Evaluation.

Text Books:

1. S.K. Khanna and C.E.J. Justo, "Highway Engineering", Nem Chand Publication.
2. Partha chakrobarty & Animesh Das "Principles of Transportation Engineering",PHL.
3. Subhash C Saxena "textbook of Highway and traffic engineering" CBS publishers and distributions pvt. Ltd.
4. L.R.Kadiyali&N.B.Lal, "Principles & Practices of Highway Engg. Khanna Publishers.
5. Specification for Road and Bridge Works (Ministry of Surface Transport - Published by Indian Roads Congress.

Course Outcomes:

At the end of this course, the student will be able to



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1. identify the highway materials.
2. design and analysis of pavement design.
3. conduct and analysis of evaluation and strengthening of pavement.
4. design and analysis of surface and sub-surface drainage system.
5. use various repair techniques for highway maintenance.

SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE07TPE05D	1	1	0	15	15	30	70	100	3
Subject:	Contracts Management	3	0	0	15	15	30			

Course Learning Objectives:

- To introduce about various Authorities, indulge in construction contract management.
- To impart knowledge on municipal bye-laws related to construction.
- To elaborate about construction contracts, arbitration, and litigation procedures

Course Content:

UNIT-1 Introduction and concepts of Construction law-public law-government departments and local authorities.

UNIT-2 Private law-contracts-torts-property law and building law-concepts-salient features sections

UNIT-3 Construction contracts-contracts specifications-types of contract documents used for construction.

UNIT- 4 Contract procurement- selection of contractor-contract procedure-salient features.

UNIT- 5 Arbitration and litigation procedure-preparation, settlement, evidence, price adjustment-need for the formulae-civil engineering and building formulae- practical implications.

Text Books:

1. Gajaria G. T., laws relating to building and engineering contracts in India, M. M Tripathi Private Ltd., Bombay, 1982.
2. Jimmie Hinze, construction contracts, 2nd edition. McGraw hill, 2001.
3. Joseph T. Bockrath, contracts and the legal environment for engineers and architects, 6th edition, McGraw Hill, 2000.

Course Outcomes-

1. To remember about various Authorities, indulge in construction contract management.
2. To understand about municipal bye-laws related to construction.
3. To remember & understand about various classifications of construction contracts.
4. To review about various steps of contract procurement in construction industry.
5. To evaluate the role of Arbitration and litigation procedure in settlement of contract related disputes.

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SYLLABUS	(SEMESTER VII)	Periods/Week			External Assessment (IA)			ESE	Grand Total	Credit
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE07TPE05E							70	100	3
Subject:	Construction Projects Planning & Systems	3	0	0	15	15	30			

Course Learning Objectives:

- To understand the project management and different scheduling techniques.
- To expertise in PERT network analysis.
- To learn CPM network analysis and compared with PERT.
- To understand time-cost analysis and resource scheduling.
- To understand the factor for equipment selection and cost of owning and operating and expertise in evaluation and analysis of different equipment life.

Course Content:

UNIT 1: Introduction: Objectives and functions of project management, project feasibility reports, Planning for construction projects: Steps, factors, advantages and disadvantages for different stake holder.

Scheduling: Scheduling Job layout and Line of balance, project management through networking, Bar Chart, Linked bar chart, Work-break down structures, Activity-on-arrow diagrams.

UNIT 2: PERT: Network analysis, critical path, probability of project.

UNIT3: CPM: Network analysis, Critical Path, Difference between CPM and PERT.

UNIT 4: Time-Cost Trade-off, Resource Scheduling

UNIT 5: Time and motion studies, Standard and special equipment, factors affecting selection of construction equipment, cost of owning and operating the construction Equipment, Equipment Life and Replacement Analysis

Text Books:

1. Chitkara, K.K. "Construction Project Management Planning", Scheduling and Control, Tata McGraw-Hill Publishing Co., New Delhi, 1998.
2. Srinath, L.S., "PERT and CPM Principles and Applications", Affiliated East West Press, 2001
3. Chris Hendrickson and Tung Au, "Project Management for Construction – Fundamentals Concepts for Owners", Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.
4. Moder, J., C. Phillips and Davis, "Project Management with CPM", PERT and Precedence Diagramming, Van Nostrand Reinhold Co., Third Edition, 1983.
5. Construction Planning and Equipment - R.L. Peurifoy - Tata McGraw Hill, New Delhi Willis, E.M., "Scheduling Construction projects", John Wiley and Sons 1986.
6. Halpin, D.W., "Financial and cost concepts for construction Management", John Wiley and Sons, New York, 1985.

Course Outcomes- At the end of the course students will be able to:

- To apply the knowledge in managing and handling of different civil engineering project and also able to schedule the project.



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SYLLABUS	(SEMESTER VII)	Periods Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE07TOE02A							70	100	3
Subject:	Artificial Neural Network	3	0	0	15	15	30			

Course Learning Objectives:

1. To provide an introduction to the field of artificial neural networks
2. To Study Basic learning algorithms: the back propagation algorithm, self-organization learning etc.
3. Model a Neuron and Express both Artificial Intelligence and Neural Network
4. To promote further independent learning on the topics of artificial neural networks
5. To learn Supervised and unsupervised Learning and Self-organization Feature Map.

Course Content:

UNIT-1 Introduction: Biological Neuron – Artificial Neural Model - Types of activation functions – Architecture: Feedforward and Feedback, Convex Sets, Convex Hull and Linear Separability, Non-Linear Separable Problem. XOR Problem. Multilayer Networks. Learning: Learning Algorithms, Error correction, and Gradient Descent Rule Learning objective of TLNs, Perceptron Learning Algorithm, Perceptron Convergence Theorem.

UNIT-2 Supervised Learning: Perceptron learning and Non Separable sets, μ -Least Mean Square Learning, MSE Error surface, Steepest Descent Search, μ -LMS approximate to gradient descent, Application of LMS to Noise Cancelling, Multi-layered Network Architecture, Backpropagation Learning Algorithm. Practical consideration of BP algorithm.

UNIT-3 Support Vector Machines and Radial Basis Function: Learning from Examples, Statistical Learning Theory, Support Vector Machines, SVM application to Image Classification, Radial Basis Function Regularization theory, Generalized RBF Networks, Learning in RBFNs, RBF application to face recognition.

UNIT- 4 Attractor Neural Networks: Associative Learning Attractor Associative Memory, Linear Associative memory, Hopfield Network, application of Hopfield Network, Brain State in a Box neural Network, Simulated Annealing, Boltzmann Machine, Bidirectional Associative Memory.

UNIT- 5 Self-organization Feature Map: Maximal Eigenvector Filtering, Extracting Principal Components, Generalized Learning Laws, Vector Quantization, Self-organization Feature Maps, Application of SOM, Growing Neural Gas.

Text Books:

1. E.Rich and K.Knight, Artificial Intelligence, Forty Sixth Edition Tata McGrawHill, 2007
2. D.W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Tenth Edition, Prentice Hall of India, 2001
3. Klaus Obermayer and Terrence J. Sejnowski, Self-Organizing Map Formation, October 2001
4. Daniel J. Amit, Modeling Brain Function, 1989, Cambridge University Press.

Course Outcomes- The students would have learnt:



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- CO1: Model Neuron and Neural Network, and to analyse ANN learning, and its applications.
CO2: Able to solve the problem of Supervised Learning.
CO3: can able to apply SVM for image classification .
CO4: Evaluate a practical solution obtained using neural networks.
CO5: Can able to use Self-organization Feature Map.

SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	CE07TOE02B							70	100	3
<i>Subject:</i>	Economic Policies in India	3	0	0	15	15	30			

Course Learning Objectives: The course seeks to equip students with sector-specific knowledge and skills to analyze key economic issues and policy documents. It will also enable them to relate theoretical frameworks of macroeconomics and microeconomics to the Indian context.

Course Content:

UNIT-1 Macroeconomic policies and their impact: fiscal policy; financial and monetary policies.

UNIT-2 Agriculture: policies and performance; production and productivity; credit; labor markets and pricing; land reforms; regional variations.

UNIT-3 Industry: policies and performance; production trends; small scale industries; public sector; foreign investment, labor regulation

UNIT- 4 Services and trade: trends and performance, trade and investment policy

UNIT- 5 Indian development experience: a critical evaluation of growth, inequality, poverty and competitiveness, pre-and post-reform eras

Text Books:

1. Dutt Rudder and K.P.M Sunderam (2001): Indian Economy, S Chand & Co. Ltd. New Delhi.
2. Mishra S.K & V.K Puri (2001) "Indian Economy and -its development experience", Himalaya Publishing House.
3. KapilaUma: Indian Economy: Policies and Performances, Academic Foundation
4. Bardhan, P.K. (9th Edition) (1999), The Political Economy of Development in India, Oxford University Press, New Delhi.

Course Outcomes-

Students will have the capability to understand government policies and will enable informed participation in economic decision making, thus improving their employment prospects and career advancement.

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SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE07T0E02C							70	100	3
Subject:	History of Science and Engineering	3	0	0	15	15	30			

Course Learning Objectives:

Course Content:

UNIT-1 Historical Perspective

The nature of science and technology, Roots of science and technology in India, Science and society, Scientists and society, Science and Faith and the rise of applied sciences.

UNIT-2 Policies and Plans after Independence

Nehru's vision of science for independent India, Science and technology developments in the new era science and technology developments during the Five Year Plan Periods and science and technology policy resolutions.

UNIT-3 Research and Development (R&D) in India

Expenditure in R&D, Science and Technology Education, Research activities and promotion of technology development, Technology mission, Programs aimed at technological self reliance, activities of council of scientific and industrial research (CSIR).

UNIT- 4 Science and Technological Developments in Major Areas

Space – Objectives of space programs, Geostationary Satellite Services – INSAT system and INSAT services remote sensing applications, Launch Vehicle Technology

Ocean Development – Objectives of ocean development, Biological and mineral resources, Marine research and capacity building

Defence Research – Spin-off technologies for civilian use,

Biotechnology – Applications of biotechnology in medicine, Biocatalysts, Agriculture, Food, Fuel and Fodder, Development of biosensors and animal husbandry

Energy – Research and development in conservation of energy, India's nuclear energy program, technology spin-offs.

UNIT- 5 Nexus between Technology Transfer and Development

Transfer of Technology – Types, Methods, Mechanisms, Process, Channels and Techniques, Appropriate technology, Technology assessment, Technological forecasting, Technological innovations and barriers of technological change.

Text Books:

1. Kalpana Rajaram, Science and Technology in India, Published and Distributed by Spectrum Books (P) Ltd., New Delhi – 58.
2. Srinivasan, M., Management of Science and Technology (Problems & Prospects), East-West Press (P) Ltd., New Delhi.
3. Ramasamy, K.A., and Seshagiri Rao, K., (Eds), Science, Technology and education for Development, K., Nayudamma Memorial Science Foundation, Chennai – 8.
4. Kohli, G.R., The Role and Impact of Science and Technology in the Development of India, Surjeet Publications.
5. Government of India, Five Year Plans, Planning Commission, New Delhi.



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SYLLABUS (SEMESTER-VIII)	Periods/ Week	Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P			
Subject Code: CE08TPE06A							
Subject: Offshore Engineering	3 0 0	15	15	30	70	100	03

Course Objective:

- To introduce basics of offshore structures and its historical development.
- To characterize static and dynamic loads coming on offshore structure.
- To study about general layout consideration of deck and oil & gas processing system.
- To understand method involving platform installation.
- To learn about material used in design and construction of offshore structure.

Course Content:

UNIT 1 HISTORICAL DEVELOPMENT OF OFFSHORE STRUCTURES: Introduction - Definition of Offshore Structures - Historical Developments - Deep water challenges, Functions of Offshore Structures, selection of Offshore Structure and its Configurations, Bottom Supported Fixed Structures, Compliant Structures, Floating Structures - Novel offshore design - Field development concepts

UNIT 2 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 3 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 4 OFFSHORE INSTALLATION: Introduction - Installation of Fixed Platform Substructures - Floating Structures - Foundations - Subsea Templates - load outs - transportation - Platform Installation Methods and installation criteria - Installation of Pipelines and Risers.

UNIT 5: MATERIALS FOR OFFSHORE APPLICATIONS: Material for Construction-Structural Steel, Topside Materials, Advanced Composite materials, Corrosion Control, Material Reliability and Monitoring and Fracture Control.

Textbooks:

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

Reference Books:

- API RP 2A., "Planning Designing and Constructing Fixed Offshore Platforms", API
- McClelland, B & Reifel, M.D., "Planning & Design of fixed Offshore Platforms", VanNostrand, 1986
- Graff, W.J., "Introduction to Offshore Structures", Gulf Publ. Co. 1981.
- Reddy, D.V & Arockiasamy, M., "Offshore Structure" Vol.1 & 2,

Course Outcomes:

- To classify types of offshore structure and know its basic fundamental knowledge.



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- To analyze various loads and their response on the structure.
- To describe process involving deck layout and oil & gas treatment.
- To outline key feature of platform, foundation and pipelines installation.
- To identify and select appropriate material for construction.

SYLLABUS (SEMESTER-VIII)	Periods Week	Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P			
Subject Code: CE08TPE06B							
Subject: Surface Hydrology	3	0	0	15	15	30	70
							100
							03

Course Learning Objectives:

- 6) To understand the fundamentals of hydrology and concepts of watershed
- 7) To study the analysis of rainfall and its components.
- 8) To understand the estimation techniques of evapo-transpiration and infiltration
- 9) To learn various types of Hydrographs and its uses.
- 10) To know the Flood estimation and Flood routing methods

Course Content:

UNIT 1: Introduction: Scope and importance of hydrology, Hydrologic cycle, Global and India's Water resources, Applications of hydrology, Formation of precipitation, Climate and Weather seasons in India. Watershed concept and modeling: Catchment-topographic and ground water divide, Description of the catchment, catchment processes, demarcating a catchment, stream patterns.

UNIT 2: Location of rain-gauges and optimum number of rain-gauges, Analysis of rainfall data, Rainfall mass curve and hyetograph, Intensity-Duration analysis, Intensity-Frequency-Duration analysis, Depth-Area-Duration analysis, Double mass curve, Abstractions from precipitation: Evaporation-Process, measurement, empirical equations and Estimation by water budget method and Energy budget method.

UNIT 3: Evapo-transpiration-AET & PET, Estimation by Penman's equation, Reference Crop Evapo-transpiration by Blaney Criddle formula, Infiltration-Process, Factor affecting infiltration, Measurement, Horton's equation and Philip's equation. Infiltration indices, Probability and Statistics-Introduction, Probability and Random variables, PDF and CDF, Distribution functions, Selection of distribution function and its parameter estimation.

UNIT 4: Hydrograph and its features, Unit hydrograph and its derivation, Unit hydrographs from complex storms and for various durations, S-curve hydrograph and its uses, Synthetic unit hydrograph.

UNIT 5: Flood: Design flood and its estimation- Rational method, Frequency analysis Gumbel's and Log-Pearson's type III distribution, Selection of design return period. Flood routing- Reservoir routing: Channel routing- Prism and Wedge storage, Muskingum method. Flood control: Structural and Non-structural measures.

Text Books:

8. Engineering Hydrology K.Subramanya, Tata McGraw-Hill Education
9. Hydrology Principles, Analysis and Design H.M.Raghunath, New Age International
10. McGraw-Hill, Inc Hand Book of Applied hydrology V.T.Chow.
11. "Introduction to Hydrology". Prentice Hall of India Viessmann W and Lewis G Lt (2008)
12. Ojha, C.S.P. Bhunya, P. and Berndtsson, R.-



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- To describe the various forces to be considered on pier and abutment and design the bridge abutments and piers

SYLLABUS (SEMESTER-VIII)	Periods/ Week	Internal Assessment (IA)			ESE	Grand Total	Credits			
		L	T	P				CT-I	CT-II	TOTAL
Subject Code: CEG8TPE06D		L	T	P	CT-I	CT-II	TOTAL	70	100	03
Subject: Water and Air Quality Modeling		3	0	0	15	15	30			

Course Objectives:

- Understand the idea, methodology and basic tools of water and air quality modelling
- Understand the different modelling approaches, their scope and limitations.
- Understand the fate and transport of pollutants in different water bodies and ambient air.
- Become mindful of a wide range of applications of modelling for the water quality and air pollution.
- Understand Water quality indexing parameters and its application.

COURSE CONTENT:

UNIT I MODELING CONCEPTS: Casual and statistical models-Characteristics- Steps in model development - Importance of model building - conservation of mass and mass balance - calibration and verification of models; Transport phenomena - Advection, diffusion, dispersion, simple transport models; chemical reaction kinetics - Law of mass action, Rate constants, reaction order, types of reactions, equilibrium principles.

UNIT II WATER QUALITY MODELING: Water quality models - Historical development - Mass balance equation - Streeter - Phelps Equation - Modification to Streeter - Phelps Equation - Waste load allocations - Dissolved oxygen in Rivers and estuaries; Lake Water Quality Models; Models for Nitrogen, Bacteria, Phosphate and toxicants - Ground Water Quality Modeling - Contaminant solute transport equation, Numerical methods.

UNIT III AIR POLLUTION MODELING: Chemistry of air Pollutants - Atmospheric reactions, sinks for air pollution -Transport of air Pollutants - Meteorological settling for dispersal of air pollutants - Vertical structure of temperature and stability, atmospheric motions, Wind and shear, self-cleaning of atmosphere; transport and diffusion of stack emissions - atmospheric characteristics significant to transport and diffusion of stack emission - stack plume characteristics.

UNIT IV AIR QUALITY MODELS: Types of modeling technique, modeling for non-reactive pollutants, single source, short term impact, multiple sources and area sources, Fixed box models-diffusion models - Gaussian plume derivation- modifications of Gaussian plume equation- long term average-multiple cell model- receptor oriented and source-oriented air pollution model performance, accuracy and utilization.

UNIT V Water Quality Index: Categories of water quality index. Determination of water quality index (WQI): Industrial and municipal effluent index, ambient water quality index, combined water quality index and Delphi method. Air Quality Index: Categories of air quality index. Determination of air quality index (AQI): National AQI, Extreme value indices, regional indices.

Reference Books:

- Arthur C. Stern, Air Pollution, Air Pollutants, their transformation and Transport, (Ed.), (Third Ed.) Volume I, Academic Press, 2006.
- Chapra, S.C. Surface Water-Quality Modelling, McGraw-Hill, International Edition, 2008
- Deaton and Wine Brake, Dynamic Modeling of Environmental Systems, Wiley & Sons, 2002
- E.V. Thomson, Principles of Surface Water Quality Modeling and Control, Harper and Row Publishers New York, 1987.



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5. Hadlock, C.R., Mathematical Modelling in the Environment. The Mathematical Association of America
6. J.L. Schaor, Environmental Modeling Fate and Transport of Pollutants in Water, Air and Soil, John Wiley & Sons Inc., New York, 1996.
7. Lohani B. N. and North A. M. Environmental Quality Management, South Asian Publishers Pvt. Ltd., New Delhi, 1984.
8. Restegi A.K. (2008) Numerical Groundwater Hydrology, Pearson International Publishing Pvt. Ltd., Bombay.
9. Steven C. Chapra, Surface Water Quality Modeling, Tata McGraw-Hill Companies, Inc., New Delhi, 1997.
10. Thomann, R.V. and Mueller, J.A. (1987). Principles of Surface Water Quality Modelling and Control, Harper &
11. Wainwright, J and Mulligan, M., Environmental Modelling Finding simplicity in complexity, John Wiley and Sons Inc., New York, 2013.

Course outcomes:

- CO1: To provide basic knowledge on mathematical and statistical concepts required for model development.
- CO2: To Develop models based on the mass-balance approach
- CO3: To Perform data exploration and visualization
- CO4: To Predict the impact of the of external waste loading on different water bodies
- CO5: To Design and model of air & water quality and its applicability in the Control of pollution
- CO6: To Determine and evaluate the water quality index

SYLLABUS	(SEMESTER-VIII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	CE08TPE06E									
<i>Subject:</i>	Construction Equipment & Automation	3	0	0	15	15	30	70	100	03

Course Learning Objectives:

- To understand the factor for equipment selection and cost of owning and operating.
- To expertise in evaluation and analysis of different equipment life.
- To learn the engineering fundamentals of excavating equipments.
- To learn fundamentals of the pile driving and lifting equipments.
- To understand the concreting equipments and techniques and the advanced instruments like GIS etc. In construction.

Course Content:

UNIT 1: Introduction to course & Planning Process of Equipment: Factors affecting equipment selection. Cost of Owning and Operating Construction Equipment Elements of ownership cost, Depreciation accounting methods, Cost Estimation using Average Annual Investment method. Use of compounding factors in Equipment cost estimation based on time value method, Operating cost components, Caterpillar method and Peurifoy method.

UNIT 2: Equipment life and replacement analysis determination of economic life of equipment. Minimum cost method, Maximum profit method, Time value concept

UNIT 3: Engineering Fundamentals of Moving Earth Machine Performance-Required power, Available power, Usable power, Performance chart.



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Earthmoving and Excavating equipment Bull Dozers, Scrapers, Front end loaders, Excavators, Trucks, Productivity estimation and balancing of interdependent machines

UNIT 4 Piles and Pile driving equipment Pile types, pile hammers, principle of pile hammer, factors affecting pile hammer selection, Types of pile hammer: Drop hammer, Single acting and double acting steam hammers, Diesel hammers, Vibratory pile drivers.

Lifting equipment Cranes, Principles of lifting mechanism of crane, types of cranes-lattice boom crawler crane, lattice boom truck mounted cranes, telescopic boom crane, Tower cranes, Factors affecting lifting capacity of crane, Range diagram.

UNIT 5 Concreting equipment Steps in concrete making process, types of concrete mixer machines, Methods of handling and transporting concrete, Consolidation of concrete, Methods of finishing and curing of concrete.

Aerial and Satellite Surveying: GIS and GPS in Construction; use of Drones for spread out sites; Use of robots for repetitive activities.

Reference Books:

1. Construction Planning and Equipment - R.L.Pcurifoy - Tata McGraw Hill, New Delhi
2. Construction Equipment & Planning and Application. - Mahesh Verma Artec Publication.
3. GPS satellite surveying- Alfred Leick, Wiley

Course Outcomes- At the end of the course students will be able to:

- To apply the knowledge in equipment selection and able to find cost of owning and operating.
- To find the equipment life, which help in comparisons of different equipments.
- To select the earth excavating equipment on the basis of output and different selection factors.
- To decide the pile driving equipment and lifting equipment based on safe working load determination
- To decide the concreting equipment based on the construction project and relate the knowledge on Surveying to the new frontiers of science like GIS, GPS and Remote Sensing.

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SYLLABUS	(SEMESTER-VIII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	CE08TPE07A							70	100	03
<i>Subject:</i>	Infrastructure Planning and Design	3	0	0	15	15	30			

Course Learning Objectives:

1. To introduce the various infrastructure sector role in India
2. To explain the effect of Infrastructure Privatization with case studies.
3. To introduce the risks in successful infrastructure planning and implementation.
4. To impart the strategies for successful infrastructure project implementation.
5. To explain Innovative Design and Maintenance of Infrastructure Facilities.

Course Content:

UNIT 1: 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 Post 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 Players in the field of Infrastructure, The Stages of an Infrastructure Project Lifecycle., an overview of Infrastructure Project Finance

UNIT 2: 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 3: 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, Socio-Environmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure, Challenges in Construction and Maintenance of Infrastructure.

UNIT 4: Strategies for Successful Infrastructure Project Implementation: Risk Management Framework for Infrastructure Projects, Shaping the Planning Phase of Infrastructure Projects to mitigate risks, Designing Sustainable Contracts, Introduction to Fair Process and Negotiation, Negotiating with multiple Stakeholders on Infrastructure Projects, Sustainable Development of Infrastructure, Information Technology and Systems for Successful Infrastructure Management.

UNIT 5: 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.

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Text Books/References:

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. Boteho, "Pavement Management Trends in the United States," 1st European Pavement Management Systems Conference, Budapest, September (2000).

Course Outcomes:

- On the completion of this course, the student will be able to:
- a. Design an integrated framework for infrastructure planning and management.
 - b. Analyse the strategies for Infrastructure Project implementation.
 - c. Perform Infrastructure modelling and Life Cycle Analysis Techniques.

SYLLABUS	(SEMESTER-VIII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE08TPE07B									
Subject:	Traffic Engineering	3	0	0	15	15	30	70	100	03

Course Objectives:

1. To develop the basic knowledge of Traffic Engineering.
2. To define Traffic flow characteristic.
3. To develop knowledge about traffic control system.
4. To understand the parking and highway lighting.
5. To develop the knowledge of different pollution occurring and its remedial measures.

Course Content:

UNIT 1: Introduction To Traffic Engineering-Definition and Scope of Traffic Engineering, Functions, Organization and Importance of Traffic Engineering. Elements of Traffic Engineering: Vehicular, Driver and Road Characteristics.

UNIT 2: Traffic Flow Parameters -Traffic flow parameters: volume, density, speed and related terms, Relationship between various parameters, Study and analysis of vehicle arrivals, headways, and gap acceptance in traffic flow. Highway Capacity and Level of Service.

UNIT 3: Traffic Control-Definition, functions and importance of traffic control, Methods of traffic control: Traffic signs, Road Markings, and other traffic controls aids. Traffic Regulation. Intersection control and design of traffic signals.

UNIT 4: Parking- Parking survey, types of parking, design of parking places. Lighting-Lantern arrangement, Types of lamp

UNIT 5: Traffic and Environment- Pollution problems of cities, Detrimental effects of traffic on environment, Noise pollution, Air pollution, Vibration, Environmental Impact Assessment.

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SYLLABUS	(SEMESTER-VIII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	CE08TPE07E							70	100	03
<i>Subject:</i>	Urban Hydrology and Hydraulics	3	0	0	15	15	30			

Course Objectives:

1. To describe physical properties of urban area.
2. To understand the elements of drainage systems.
3. To study about urban water supply
4. To know about the measures to control storm water pollution
5. To learn urban watershed software.

Course Content:

UNIT 1: Urbanisation: Process of urbanisation, Trends of urbanisation and industrialisation, influence on hydrologic cycle, effects and consequences for drainage, Rainfall analysis in urban environment, design storm. Urban Runoff computations: Empirical, Time-area and unit hydrograph approaches. Urban storm water runoff: overland flow.

UNIT 2: Design of drainage system elements: Hydraulic fundamentals, infiltration and on-site detention of storm water, design of sewerage and drainage channels, design of appurtenances, road drainage, design of pumping stations

UNIT 3: Urban water supply: Estimate of demand, sources in surface and groundwater, Reservoir, capacity estimation.

UNIT 4: Control of storm water pollution: Pollution build-up and wash off process with reference to urban drainage systems. Source control in commercial and industrial complexes, storage options - dry and wet ponds, biological treatment of wastewater, chemical treatment of storm water

UNIT 5: Introduction to urban watershed software - Hydrologic Cistem, water conservation and ecological aspects, Water harvesting.

TEXT BOOKS:

1. Chow V T, Handbook of Applied Hydrology: A Compendium of Water resources technology, McGraw Hill, New York, 1964.
2. Gupta R S, Hydrology and Hydraulic Systems, Prentice Hall Publishers, New Jersey, 1989.
3. Geiger W F, Marsalek J Z, and Rawls G J, Manual on Drainage in Urban Areas, 2 Volumes, UNESCO, Paris, 1987
4. Hall M J, Urban Hydrology, Elsevier Applied Science Publishers, New York, 1984.
5. Stahre P, and Urbonas B, Stormwater Detention for Drainage, water quality and CSO Management, Prentice Hall Publishers, New Jersey, 1983.
6. Wanielista M P, and Yousef Y A, Stormwater Management, JohnWiley and Sons, New York, 1993.

Course Outcome: At the end of the course students shall be able to:

1. Understand and explain the effects of urbanization on rainfall and runoff.
2. Design various urban drainage system elements.
3. Estimate the demand of urban areas
4. Identify and apply the control required for storm water pollution
5. Use urban watershed software for simulation purpose.

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SYLLABUS	(SEMESTER VIII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE08TOE03C							70	100	3
Subject:	Cyber Law and Ethics	3	0	0	15	15	30			

Course Learning Objectives:

1. To Create cyber security awareness and to understand principles of web security.
2. To make attentive to students about possible hacking and threats in this communication era.
3. To understand key terms and concepts in cyber law, cybercrimes, intellectual property, Copyright trademarks and domain theft.
4. To understand the business impact and potential of e-commerce and to learn about the technologies required to make e-Commerce viable.
5. Discuss Issues for creating Security Policy, Jurisdictional Issues and dispute resolution in cyberspace.

Course Content:

UNIT-1

Introduction Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level, Cyber Law - International Perspectives UN & International Telecommunication Union (ITU) Initiatives Council of Europe - Budapest Convention on Cybercrime, Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD), World Bank, Commonwealth of Nations.

UNIT-2 Constitutional & Human Rights Issues in Cyberspace Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace - Access to Internet, Right to Privacy, Right to Data Protection, Cyber Crimes & Legal Framework Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud Cyber terrorism, Cyber Defamation.

UNIT-3 Cyber Torts Cyber Defamation, Different Types of Civil Wrongs under the IT Act 2000, Intellectual Property Issues in Cyber Space Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues

UNIT- 4 E-Commerce Concept, E-commerce-Salient Features, Online approaches like B2B, B2C & C2C Online contracts, Click Wrap Contracts, Applicability of Indian Contract Act, 1872,

UNIT- 5 Dispute Resolution in Cyberspace, Concept of Jurisdiction, Indian Context of Jurisdiction and IT Act, 2000. International Law and Jurisdictional Issues in Cyberspace, Dispute Resolutions .

Text Books:

1. Chris Reed & John Angel, Computer Law, OUP, New York.
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi.
3. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute.
4. Jonthan Rosenoer, Cyber Law, Springer, New York.
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York.
6. S. R. Bhansali, Information Technology Act, 2000, University Book House Pvt. Ltd.

Course Outcomes- After successful completion of the course, students



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1. Will be able to analyse and evaluate the cyber security needs of an organization.
2. Will be able to implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.
3. Will be able to understanding of the fundamental legal principles relating to confidential information, copyright, patents, designs, trademarks and unfair competition;
4. Will be able to apply the skills necessary for large-scale web based e-commerce project development and e-commerce application.
Design operational and strategic cyber security strategies and policies for dispute resolution in cyberspace.

SYLLABUS	(SEMESTER-VIII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
Subject Code:	CE08TOE03D									
Subject:	Human Resources Development and Organizational Behavior	3	0	0	15	15	30	70	100	03

Course Content:

UNIT 1: HRD-Macro Perspective: HRD Concept, Origin and Need, HRD as a Total System; Approaches to HRD; Human Development and HRD; HRD at Macro and Micro Climate.

UNIT 2: HRD-Micro Perspective: Areas of HRD; HRD Interventions Performance Appraisal, Potential Appraisal, Feedback and Performance Coaching, Training, Career Planning, OD or Systems Development, Rewards, Employee Welfare and Quality of Work Life and Human Resource Information; Staffing for HRD: Roles of HR Developer; Physical and Financial Resources for HRD; HR Accounting; HRD Audit, Strategic HRD

UNIT 3: Instructional Technology for HRD: Learning and HRD; Models and Curriculum: Principles of Learning; Group and Individual Learning; Transactional Analysis; Assessment Centre; Behaviour Modeling and Self-Directed Learning; Evaluating the HRD

UNIT 4: Human Resource Training and Development: Concept and Importance; Assessing Training Needs; Designing and Evaluating T&D Programmes; Role, Responsibilities and challenges to Training Managers.

UNIT 5: Training Methods: Training with in Industry (TWI): On the Job & Off the Job Training; Management Development: Lecture Method; Role Play; In-basket Exercise; Simulation; Vestibule Training; Management Games; Case Study; Programmed Instruction; Team Development; Sensitivity Training; Globalization challenges and Strategies of Training Program, Review on T&D Programmes in India.

Reference Books:

1. Nadler, Leonard: Corporat Human Resource Development, Van Nostrand Reinhold, ASTD, New York.
2. Rao, T.V and Pareek, Udai: Designing and Managing Human Resource Systems, Oxford IBH Pub. Pvt.Ltd., New Delhi, 2005.
3. Rao, T.V: Readings in HRD, Oxford IBH Pub. Pvt. Ltd., New Delhi, 2004.
4. Viramani, B.R and Seth, Parmila: Evaluating Management Development, Vision Books, New Delhi.
5. Rao, T.V. (et.al): HRD in the New Economic Environment, Tata McGraw-Hill Pub.Pvt. Ltd., New Delhi, 2003.
6. Rao, T.V: HRD Audit, Sage Publications, New Delhi.

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