Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

Teaching and Examination Scheme 2026-27

B.Tech. Civil Engineering

Sr. No.	Br.	Year	Sem.	Course Code	Course Name	Category	Teaching & Learning Scheme					Exam Hrs.	Marks			Credit
							Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester		CIE	SEE	Total	
							L	T	P	SL						
1	CE	III	V	CEUL501	Structural Analysis-II	PCC	45	0	0	45	90	3	40	60	100	3
2	CE	III	V	CEUL502	Geotechnical Engineering	PCC	45	0	0	45	90	3	40	60	100	3
3	CE	III	V	CEUL503	Design of Reinforced Concrete Elements	PCC	45	0	0	45	90	3	40	60	100	3
4	CE	III	V	CEUL504	Highway and Traffic Engineering	PCC	45	0	0	45	90	3	40	60	100	3
5	CE	III	V	CEUL511	Air and Noise Pollution Control	PEC	45	0	0	45	90	3	40	60	100	3
				CEUL512	Solid and Hazardous Waste Management	PEC	45	0	0	45	90	3	40	60	100	
				CEUL513	Environmental Impact Assessment	PEC	45	0	0	45	90	3	40	60	100	
6	CE	III	V	XXUL60X	Open Elective - I	OEC	45	0	0	45	90	3	40	60	100	3
				XXUL60X	Open Elective - II	OEC	45	0	0	45	90	3	40	60	100	
7	CE	III	V	CEUP520	Geotechnical Engineering Lab - I	PCC	0	0	30	-	30	3	60	40	100	1
8	CE	III	V	CEUP521	Concrete Structures Design	PCC	0	0	30	-	30	3	60	40	100	1
9	CE	III	V	CEUP522	Road Material Testing Lab	PCC	0	0	30	-	30	3	60	40	100	1
10	CE	III	V	CEUT530	Industrial Training	PSIT	0	0	30	30	60	3	60	40	100	2
11	CE	III	V	CEUA500	Social Outreach, Discipline & Extra Curricular Activities	SODECA	-	-	-	-	-	-	-	-	100	0.5
12	CE	III	V	NU99.6/NU99.7	Disaster Management and Preparedness/ Indian Constitution	NC	-	-	-	-	-	-	40	60	100	0
															Total	23.5

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							Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester		CIE	SEE	Total	
							L	T	P	SL						
1	CE	III	VI	CEUL601	Design of Steel Structures	PCC	45	0	0	45	90	3	40	60	100	3
2	CE	III	VI	CEUL602	Railway and Airport Engineering	PCC	45	0	0	45	90	3	40	60	100	3
3	CE	III	VI	CEUL603	Water Resources Engineering	PCC	45	0	0	45	90	3	40	60	100	3
4	CE	III	VI	CEUL611	Repair and Rehabilitation of Structures	PEC	45	0	0	45	90	3	40	60	100	3
	CE			CEUL612	Town Planning	PEC	45	0	0	45	90	3	40	60	100	
	CE			CEUL613	Application of Artificial Intelligence in Civil Engineering	PEC	45	0	0	45	90	3	40	60	100	
5	CE	III	VI	CEUL614	Bridge Engineering	PEC	45	0	0	45	90	3	40	60	100	3
	CE			CEUL615	Foundation Engineering	PEC	45	0	0	45	90	3	40	60	100	
	CE			CEUL616	Earthquake Engineering	PEC	45	0	0	45	90	3	40	60	100	
6	CE	III	VI	XXUL60X	Open Elective - I	OEC	45	0	0	45	90	3	40	60	100	3
	CE			XXUL60X	Open Elective - II	OEC	45	0	0	45	90	3	40	60	100	
7	CE	III	VI	CEUP620	Steel Structures Design	PCC	0	0	30	-	30	3	60	40	100	1
8	CE	III	VI	CEUP621	Water Resources Engineering Design	PCC	0	0	30	-	30	3	60	40	100	1
9	CE	III	VI	CEUP622	Geotechnical Engineering Lab - II	PCC	0	0	30	-	30	3	60	40	100	1
10	CE	III	VI	CEUP623	Advanced Concrete Structures Design	PCC	0	0	30	-	30	3	60	40	100	1
11	CE	III	VI	CEUP624	Estimating and Costing	PCC	0	0	30	-	30	3	60	40	100	1
12	CE	III	VI	CEUA600	Social Outreach, Discipline & Extra Curricular Activities	SODECA	-	-	-	-	-	-	-	-	100	0.5
13	CE	III	VI	NU99.7/NU99.6	Indian Constitution/ Disaster Management and Preparedness	NC	-	-	-	-	-	-	40	60	100	0

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Sr. No.	Br.	Year	Sem.	Course Code	Course Name	Category	Teaching & Learning Scheme					Exam Hrs.	Marks			Credit
							Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester		CIE	SEE	Total	
							L	T	P	SL						
															Total	23.5

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Structural Analysis -II	**Course Code**: CEUL501	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course, and Prerequisite	1
2	**Analysis of Statically Indeterminate Structures** using the Slope-Deflection method and Moment-Distribution method applied to continuous beams and portal frames with and without inclined members.	14
3	**Influence line diagram & Rolling load**: ILD for beams & frames, Muller-Breslau principle and its application for drawing ILD, Rolling load, maximum stress resultants in a member/section, absolute maximum stress resultant in a structure.	12
4	**Unsymmetrical bending:** Definition, location of NA, computation of stresses and deflection, shear centre and its location	7
5	**Approximate methods for lateral loads:** Analysis of multistory frames by portal method, cantilever method, and Introduction to factor method. Analysis of determinate space trusses by tension coefficient method.	11
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1.	Theory of Structure (SMTS-II)	B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain	Laxmi publication	Thirteenth (2017)
2.	Theory of Structure Vol. I	G.S. Pandit, S P Gupta R Gupta	Mc Graw Hill publication	First (2017)
3.	Theory of Structures	S. Ramamrutham R. Narayanan	Dhanpat Rai Publication Company	Ninth (2014)
4.	Structural Analysis-II	S.S. Bhavikatti	Vikas Publication	Fifth (2021)

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1.	Structural Analysis	R.C. Hibbler	Pearson publication	Ninth (2022)
2.	Structural Analysis	Devdas Menon	Narosa publication	First (2010)
3.	Indeterminate Structural Analysis	M. Vijayanand, Dr. K.U. Muthu, Dr. H. Narendra, Dr. Maganti Janardhana	Dreamtech Press company	First (2019)

Prerequisite:
Knowledge in structural analysis, mechanics of materials, calculus, statics, engineering mathematics, and physics.

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Geotechnical Engineering	**Course Code**: CEUL502	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Soil and soil-mass constituents:** Water content, specific gravity, void ratio, porosity, degree of saturation, air void and air content, unit weights, density index etc. Two-phase and Three phase diagrams, Inter-relationships of the above. Determination of index properties of soil: water content, specific gravity, particle size distribution, sieve and sedimentation analysis, consistency limits, void ratio and density index. Mineral structures, structures of Illite Montmorillonite and kaolinite and their characteristics. Darcy's law of permeability of the soil and its determination in the laboratory. Stresses in soil mass: total, effective and neutral pressure, calculation of stresses, influence of water table on effective stress, quicksand phenomenon. Classification of soil for general engineering purposes: particle size and I.S. Classification systems.	12
3	Mohr's circle of stress, shear strength of soil, parameters of shear strength, Coulomb's failure envelope, determination of shear parameters by Direct Shear test, Tri-axial and Unconfined Compression test. Principles of soil compaction, laboratory compaction tests; Proctor's test, Stresses in Soil under surface loading: Bossinesq's and Westergaard's analysis for vertical pressure and its distribution in a soil mass. Vertical stresses due to concentrated loads, Isobar diagram, Vertical stresses at a point under circular loaded area. Approximate methods of obtaining vertical pressure due to surface loading, Newmark's chart	12
4	**Compressibility and Consolidation:** Introduction to consolidation, comparison of compaction and consolidation, Spring Analogy Terzaghi's one dimensional consolidation theory, Degree of consolidation, consolidation test, Compressibility parameters, coefficient of consolidation. Pre-consolidation pressure and its determination. Normally, over and under-consolidated soils. Methods of predicting Settlement and its rate. Total and differential Settlement.	10
5	**Stability of Slopes:** Classifications of slopes, Stability analysis of infinite slopes. Stability of finite slopes by Swedish. Stability analysis by Taylor's stability number, Taylor's stability number curves. Case study on Slope failures.	5
6	**Earth Pressure Theories:** Active, passive and earth pressure at rest. Rankine's and Coulomb's theories for cohesive and cohesionless soil.	5
	Total	**45**

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Basic and applied Civil Mechanics	Rajan & Rao	New Age International Publishers	3rd(2016)
2.	Soil Mechanics & Foundation Engineering	Arora K.R	Standard Publishers and Distributers, Delhi.	7th(2020)

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Soil Engineering in Theory & Practice	Alam Singh	CBS Publishers and Distributers	2nd(2014)
2.	Principles of Geotechnical Engineering	Braja M. Das	CENAGE Learning New Delhi	7th(2002)
3.	Soil Mechanics and Foundations	Punmia B.C.	Laxmi Publications.	17th(2005)

Prerequisite:

1. Elementary knowledge of Engineering Geology
2. Basic Engineering Mathematics

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Design of Reinforced Concrete Elements	**Course Code**: CEUL503	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Fundamental concepts of design of RC members:** Types and function of reinforcement. Introduction to various related IS codes, Characteristic load and characteristic strength. Working Stress Method: Working stress design philosophy, Analysis and Design of singly reinforced rectangular beam section for flexure.	5
3	**Limit State Design:** Limit state design philosophy. Assumptions, Analysis and design of singly reinforced, doubly reinforced rectangular beams and flanged beams for flexure using codal provisions for simply supported, cantilever, fixed and continuous beams.	12
4	**Limit state of serviceability for deflection:** control of deflection as per codal provisions of empirical coefficients. **Limit state of collapse in shear:** Types of shear reinforcement and its detailing, analysis and design of shear reinforcement for prismatic sections. **Limit state of collapse in bond:** concept of bond stress, anchorage length and development length. Detailing and curtailment of reinforcement as per codal provisions.	9
5	**Slabs:** Analysis and design of one way and two way slabs using LSM, Detailing of reinforcement. Check for shear and deflection.	7
6	**Columns:** Short and long columns, their structural behavior, Analysis and design of axially loaded short columns, using LSM. **Footings:** Analysis and design of Isolated column footing for axial load. Introduction to combined footing for two columns (without central beam) for axial loads using LSM.	8
7	**Torsion:** Analysis and Design of beams for torsion as per codal method.	3
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	RCC Designs (Reinforced Concrete Structures)	B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain	Laxmi Publications Pvt. Ltd., New Delhi	10th Edition (2016)
2	Reinforced Cement Concrete Design	Neelam Sharma	S.K. Kataria & Sons, New Delhi	2nd Edition (2014)
3	Limit State Design of Reinforced Concrete Structures	P. C. Varghese	PHI Learning Pvt. Ltd., New Delhi	2nd Edition (2010)

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Reinforced Concrete Design	S. Unnikrishna Pillai, Devdas Menon	McGraw Hill Education (India)	4th Edition (2013)
2	Reinforced Concrete Structures	I. C. Syal, A. K. Goel	S. Chand & Company Ltd., New Delhi	5th Edition (2013)

Prerequisite:

1. Fundamentals of Construction Material
2. Strength of Material
3. Structural Analysis
4. Concrete Technology

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Highway and Traffic Engineering	**Course Code**: CEUL504	**Credit**: 03
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, scope and outcome of the course	1
2	**Highway Planning and Alignment:** Different modes of transportation and their characteristics; classification of roads; road patterns; road development projects in India such as PMGSY and Bharatmala Pariyojana. Introduction to National Transport Policy (NTP) and Dedicated Freight Corridors (DFCs). Requirements for highway alignment; factors controlling alignment; ethical approach and environmental protection in highway alignment decisions.	8
3	**Geometric Design of Highways:** Cross-sectional elements: Camber, carriageway, medians, kerbs, right of way (ROW) and land width, typical cross-section of a four-lane NH. Sight distance: Stopping Sight Distance (SSD) and Overtaking Sight Distance (OSD). Design of horizontal alignments: Design speed, super-elevation, radius of horizontal curves, widening of pavements on horizontal curves, and design of horizontal transition curves. Design of vertical alignments: Gradients, summit curves and valley curves, Ethical compliance of geometric design with IRC and MoRTH standards for safety. Introduction to Road Safety Audit; case study on identifying hazardous locations in geometric design.	12
4	**Highway Materials and Construction:** Desirable properties and testing procedures related to soil, aggregates, and bitumen. Component layers of flexible and rigid pavement structure; Construction methods of flexible and rigid pavements; Introduction to Highway construction equipment. Case study on sustainable road construction practices including the use of Reclaimed Asphalt Pavement (RAP) and Full Depth Reclamation (FDR).	10
5	**Traffic Engineering:** Road user and vehicular characteristics. Traffic data collection and presentation. Traffic volume, speed, delay, and journey time studies. Origin–Destination (O–D) studies. Parking and accident studies. Passenger Car Unit (PCU), Non-Motorized Transport (NMT) and public transport characteristics, and Level of Service (LOS), impact of road traffic on the environment and their remedial measuires.	7
6	**Traffic Management**: Traffic management concepts and objectives. Traffic control devices: traffic signs, road markings, and traffic islands. Traffic signals and basic signal timing principles. Intelligent Transportation Systems (ITS). Remedial traffic management measures including NMT facilities and public transport priority measures.	7
	Total	**45**

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Highway Engineering	S.K. Khanna, CEG Justo & A. Veeraraghvan	Nem Chand, and Brothers, Roorkee.	10th(2014)
2.	Traffic Engineering and Transport Planning	L. R. Kadiyali	Khanna Publications	8th(2013)

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Specification for Roads & Bridges by Ministry of Road Transports & Highways and Indian RoadCongress	Ministry of Road, Transport & Highways	Indian Road Congress	5th Edition (2013)
2.	Bituminous Road Construction in India	P. S. Kandhal	PHI Learning	2nd (2016)
3.	IRC and IS Codes			

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Air and Noise Pollution Control	**Course Code**: CEUL511	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**AIR POLLUTION: BASICS AND STANDARDS:** Air Pollution – Definition – Sources and classification – Air Pollutants: Effects on human health, vegetation, materials and atmosphere –Ambient air quality monitoring and stack emission sampling –Principles of various instruments used in air quality monitoring – Sensor based analyzers, Source apportionment and emission inventory – Smoke, ozone layer, smog, haze and visibility – Air Quality Index (AQI) – SAFAR - Air quality standards and legislation.	7
3	**METEOROLOGY AND DIFFUSION/DISPERSION MODELS:** Introduction to air pollution meteorology – Atmospheric motion – Lapse rates – Atmospheric stability – Inversions and its effects on pollutants – Atmospheric diffusion of pollutants – Transport –Transformation and deposition of air contaminants – Removal processes– Maximum Mixing Depths – Plume rise – Types of dispersion models like Gaussian Plume, Box, Line, Area, Sampling and analysis of particulate matter (PM10) in ambient air (Gravimetric Method).	10
4	**AIR POLLUTION CONTROL TECHNOLOGIES:** **Particulates:** Settling chambers, cyclone separation – Wet collectors – Fabric filters, electrostatic precipitators and other removal methods like absorption – Adsorption and precipitation. **Gaseous pollutants:** Removal of gaseous pollutants by adsorption, absorption, reactions and other methods.	10
5	**SOUND AND NOISE: BASICS AND LEGISLATION:** Noise pollution sources, effects of noise pollution, auditory and non-auditory effects, calculation of hearing handicap, CPCB ambient noise standards, OSHA noise standards for work place, WHO hearing loss standards. Sound, noise, physiology of hearing, frequency, wavelength, speed, loudness of sound, sound pressure and sound pressure level, equivalent noise level, Noise Pollution (Regulation and Control) Rules 2000.	12
6	**NOISE EFFECTS, CONTROL TECHNIQUES AND MITTIGATION:** Effects of noise on health annoyance rating schemes, continuous noise, intermittent noise, impulsive noise, noise instrumentation and monitoring procedure, noise indices noise control methods, Mitigation of noise at source - use of PPEs - noise barrier	5
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Air Pollution	M. N. Rao	Tata McGraw-Hill, New Delhi	2017
2	Air Pollution Control Engineering	H. D. Nevers	McGraw-Hill, New York	2016
3	The Impact of Noise Pollution: A Socio-Technological Introduction	G. Bugliarello, A. Alexander, J. Barnes, C. Wakstein	Pergamon Press Inc., USA	2014

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Air Pollution: Its Origin and Control	K. Wark, C. F. Warner, W. Davis	Harper and Row, New York	1998
2	Principles of Air Quality Management	R. D. Griffin	CRC Press, Boca Raton	2016
3	Environmental Engineering	H. S. Peavy, D. R. Rowe, G. Tchobanoglous	McGraw-Hill, New Delhi	2017
4	Advanced Air and Noise Pollution Control	L. K. Wang, N. C. Pereira, Y. Hung	Humana Press, New Jersey	2005

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Solid and Hazardous Waste Management	**Course Code**: CEUL512	**Credit**: 03
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	01
2	**Solid Waste:** Definition of solid waste, classification and sources of solid waste, factors influencing waste generation and composition, Evaluation of the impacts of improper solid waste management on public health, disease transmission, environmental quality, and community nuisance, with reference to sustainable development principles and SDGs.	06
3	**Collection, storage and transportation:** Functional elements of solid waste management systems, On-site storage methods and design of storage containers, Comparative analysis of waste collection systems (door-to-door, curbside, community bins), ethical responsibilities in waste dumping and source segregation with respect to public health, worker safety, and sustainability, vehicle routing and route balancing techniques for cost and energy optimization.	10
4	**Processing of Municipal Solid Waste:** Physical, chemical, and biological characteristics of solid waste, size reduction principles and equipment (shredders, grinders, pulverizers), Volume reduction techniques and material recovery systems, application of waste hierarchy and 3R (Reduce, Reuse, Recycle) principles in sustainable solid waste management.	09
5	**Treatment and Disposal of Solid Waste:** Biological treatment methods: composting, vermicomposting, and biogas production, Design principles of sanitary landfills, landfill leachate and gas generation and management systems.	10
6	**Other Waste:** Introduction, characterization and risk assessment of hazardous, Management strategies for radioactive waste, biomedical waste, plastic waste, and e-waste, latest Indian regulations related to: Solid Waste Management Rules-Hazardous and Other Wastes Rules-Plastic Waste Management Rules- E-Waste Management Rules, Case studies on advanced waste management practices and emerging technologies.	09
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Solid Waste Management	K Sasikumar and Sanoop Gopi Krishna	PHI Learning Pvt. Ltd.	**1 (2013)**
2	Textbook of Solid Wastes Management	Iqbal H Khan and Naved Ahsan	CBS Publisher & Distributor Pvt. Ltd.	**1(2017)**
3	Solid Waste Management: Present and Future Challenges	Jagbir Singh and A.L.Ramanathan	IK International Pvt. Ltd	1(2019)

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Sustainable Solid Waste Management: A Systems Engineering Approach	Ni-Bin Chang, Ana Pires	Wiley India Pvt Ltd.	1(2018)
2	Municipal Solid Waste Management	N N Bandela and DG Tare, BR	Publishing Corporation	1(2009)
3	A Comprehensive Book on Solid Waste Management with Application	H.S. Bhatia	Misha Books	1(2019)

Prerequisite:

1. Introduction to Environmental Engineering
2. Introduction to Engineering Chemistry

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Environmental Impact Assessment	**Course Code**: CEUL513	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Impact Assessment: Types And Significance:** Types of impacts, significant impacts, various impact assessments viz. health impact assessment, social impact assessment, disaster impact assessment, strategic environmental assessment	4
3	**EIA: Introduction & Planning:** Evolution of EIA; EIA at project; regional and policy levels; EIA legislative and environmental clearance procedures in India; EIA Rules-2006 and subsequent amendments, Rapid and Comprehensive EIA.	7
4	**EIA: Methodologies And Strategies:** Screening, baseline data collection, environmental inventory of physical, biological and socio-economic environment attributes, terms of reference, scoping, identification of impacts, rapid and comprehensive EIA, monitoring, analysis and report preparation in EIA, impact prediction tools / techniques such as adhoc method, checklist method, development of environment management plan, post project monitoring.	13
5	**Public Participation:** Project Affected Persons, significance of public participation in EIA, methods of public consultation –Public Notice and Public Hearing, Resettlement and rehabilitation issues, Land Acquisition, Rehabilitation and Resettlement Act, 2013.	12
6	**EIA: Case Studies:** Case studies / histories for different types of projects like metro rail project, nuclear power project, large hydro-electric power project, pharmaceutical industry, township and area development projects.	8
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Environmental Impact Assessment	R. E. Munn	John Wiley & Sons, Toronto	1979
2	Environmental Engineering and Management	Suresh K. Dhameja	S. K. Kataria & Sons, Delhi	2023

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Environmental Impact Assessment	Larry W. Canter	Tata McGraw-Hill Co., Singapore	1996

Relevant MoEF&CC Notifications and CPCB Acts & Rules:
Weblinks –

a) https://cpcb.nic.in/index.php
b) https://moef.gov.in/en/rules-and-regulations/environmentprotection/
c) https://cpcb.nic.in/general-standards/

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III / IV	**Semester**: V/VI/VII
Course Name: Climate Change Science	**Course Code**: CEUL560	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction**: Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Climate System**: Importance of climate change awareness for engineers, Difference between weather and climate, Overview of global climate system. Components of climate system, atmosphere, oceans, land, ice and biosphere, Solar energy and Earth's temperature, Basic concept of greenhouse effect, Greenhouse gases and their sources.	9
3	**Causes Of Climate Change:** Natural causes of climate variability, Human activities causing climate change, Industrialization, fossil fuel use and deforestation, Global warming trends, Climate change indicators (temperature rise, glacier melting, sea level rise).	9
4	**Past And Present Climate Change:** Evidence of past climate change, Ice ages and climate cycles, Climate change in the last 100–150 years, Climate change trends in India, Role of oceans and forests in regulating climate.	9
5	**Impacts Of Climate Change:** Impacts on water resources, agriculture, ecosystems and biodiversity, Effects on human health, Extreme weather events, Impacts on infrastructure and cities, Regional impacts	8
6	**Climate Change Mitigation And Adaptation:** Renewable energy and sustainable technologies, Energy efficiency, Carbon footprint and carbon sequestration, Climate policies and international agreements (IPCC, Kyoto Protocol, Paris Agreement), Individual and societal actions for climate change mitigation.	9
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition
1	Global Warming Science: A Quantitative Introduction to Climate Change	Eli Tziperman	Princeton University Press	2022
2	Climate Change: The Science of Global Warming and Our Energy Future	Edmond A. Mathez	Columbia University Press	2018

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition
1	Introduction to Modern Climate Change	Andrew Dessler	Cambridge University Press	2016
2	Climate Change 2021: The Physical Science Basis	IPCC	Cambridge University Press	2021
3	Global Physical Climatology	Dennis L. Hartmann	Academic Press	2015
4	Climate Change and Sustainable Development	David E. Newton	Facts on File	2017

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III / IV	**Semester**: V/VI/VII
Course Name: Road Safety and Management (OE)	**Course Code**: CEUL561	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, scope and outcomes of the course.	1
2	**Road User, Vehicle and Road Characteristics:** Road safety concepts, global and Indian road safety scenario, road accident statistics, institutional framework for road safety in India. Human factors in road safety, perception–reaction time, driver behavior, vulnerable road users. Vehicle safety features and standards. Road characteristics affecting safety, role of land use and roadside environment.	9
3	**Road Traffic Accidents:** Types, causes and prevention of road accidents. Accident data collection methods. Accident analysis techniques: accident rate, severity index, black spot identification. Use of accident data in planning and improvement of road facilities.	9
4	**Road Safety Audit (RSA):** Concept, objectives and importance of RSA. Stages of Road Safety Audit – feasibility, design, construction, operation and maintenance. RSA procedure, audit team composition, ethical issues. Use of checklists for highways, urban roads and intersections. Case studies on Road Safety Audits.	10
5	**Traffic Regulation and Safety Management:** Traffic laws and enforcement. Traffic signs, road markings and signals from a safety perspective. Speed management, traffic calming measures. Safety of pedestrians, cyclists and public transport users.	8
6	**Advanced Road Safety Management:** Intelligent Transportation Systems (ITS) for safety, road safety education and awareness, emergency response and post-crash management. Road safety policies, action plans and sustainable safety strategies.	8
	Total	**45**

Text Books:

S. No	Title	Author(s)	Publisher	Edition (Year)
1	Traffic Engineering and Transport Planning	L. R. Kadiyali	Khanna Publishers	Latest (2024/2025 print)
2	Highway Engineering	S. K. Khanna, C. E. G. Justo & A. Veeraraghavan	Nem Chand & Bros.	10th Revised Edition

Reference Books:

S. No.	Title	Author(s)	Publisher	Edition / Year
1	Manual on Road Safety Audit (IRC: SP: 88)	Indian Roads Congress (IRC)	Indian Roads Congress	Latest Revised:2019
2	Road Accidents in India	MoRTH (Ministry of Road Transport & Highways)	Government of India	Latest Annual Report
3	Traffic and Highway Engineering	Nicholas J. Garber & Lester A. Hoel	Cengage Learning India	5th Edition (SI Units)
4	Global Status Report on Road Safety	World Health Organization (WHO)	World Health Organization	2018 (latest major edition)

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Geotechnical Engineering Lab-I	**Course Code**: CEUP520	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs	**Teaching Scheme:** LI (30)	

Module No.	Contents
1	To determine the particle size distribution by Sieve Analysis
2	To determine grain size distribution of fine-grained soil by Hydrometer analysis
3	Determination of water content and specific gravity by Pycnometer
4	Determination of liquid limit by Cassagrande apparatus
5	Determination of liquid limit by cone penetrometer apparatus
6	Determination of plastic limit of soil
7	Determination of shrinkage limit of soil
8	Determination of field density by core-cutter
9	Determination of field density by sand replacement method
10	To determine the permeability of soil by constant and falling head methods.

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Concrete Structures Design	**Course Code**: CEUP521	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 hrs.	**Teaching Scheme:** LI (30)	

Module No.	Contents
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite
2	**Design of beam:** Design of singly reinforced rectangular beam, doubly reinforced rectangular beam, and flanged beam section for flexure and shear
3	**Slabs:** Design of one-way and two-way slabs using LSM, Detailing of reinforcement. Check for shear and deflection.
4	**Columns:** Design of axially loaded short column, Design of eccentrically loaded short column, Introduction to Pu-Mu interaction curves and their use for eccentrically loaded columns.
5	**Footing:** Design of isolated footing
6	**Torsion:** Analysis and Design of beams for torsion as per codal method
7	Software application for the design of structural members.

Text Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	RCC Designs (Reinforced Concrete Structures)	B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain	Laxmi Publications Pvt. Ltd., New Delhi	10th Edition (2016)
2	Reinforced Cement Concrete Design	Neelam Sharma	S.K. Kataria & Sons, New Delhi	2nd Edition (2014)
3	Limit State Design of Reinforced Concrete Structures	P. C. Varghese	PHI Learning Pvt. Ltd., New Delhi	2nd Edition (2010)

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Reinforced Concrete Design	S. Unnikrishna Pillai, Devdas Menon	McGraw Hill Education (India)	4th Edition (2013)
2	Reinforced Concrete Structures	I. C. Syal, A. K. Goel	S. Chand & Company Ltd., New Delhi	5th Edition (2013)

Prerequisite:

1. Fundamentals of Construction Material
2. Strength of Material
3. Structural Analysis
4. Concrete Technology

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Lab Name: Road Material Testing Lab	**Course Code**: CEUP522	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3	**Teaching Scheme:** LI (30)	

Module No.	Content
1	To evaluate toughness of aggregates by using Impact Test.
2	To determine strength of aggregates by using Crushing Value Test
3	To determine the hardness of aggregates by using Los Angeles Abrasion Test.
4	To assess the suitability of aggregates for pavement construction by measuring their Flakiness and Elongation Indices using shape tests.
5	To determine the consistency of bitumen by using Penetration Test.
6	To determine the softening point of bitumen to evaluate its suitability for different climatic conditions.
7	To measure the ability of bitumen to stretch by Ductility Test.
8	To assess the flow resistance of bitumen using Viscosity Test.
9	To determine the flash and fire point temperatures of bitumen to ensure safe heating practices and avoid fire hazards during pavement construction.
10	To evaluate the stability and flow characteristics of bituminous mixtures using Marshall Stability Test.

Syllabus

Name of the Programme: B.Tech.	**Year**: III	**Semester**: V/VI
Course Name: Disaster Management and Preparedness (Audit Course)	**Course Code**: NU99.X	**Credit**: Non-graded Units-2
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs.	**Teaching Scheme:** CI (15) = 15 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	Objective, Scope, Outcome of the Course, and Prerequisite	1
2	**Introduction:** Concepts and definitions: disaster, hazard, vulnerability, resilience, risk, capacity, impact, prevention, mitigation, disaster phenomena, recent events - Global, National and Regional.	2
3	**Disasters:** Disasters classification; Natural disasters; manmade disasters; hazard and vulnerability profile of India, Covid 2019 in India.	4
4	**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 response.	4
5	**Disaster Management in India:** Disaster Management Act 2005; 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 (NDMA); Usage of GIS and remote sensing techniques in disaster management.	4
	Total	**15**

Text Books:

S.No.	Title	Author(s)	Publisher	Edition(year)
1.	Disaster Management	P Kumar	OakBridge Publishers	First (2021)
2.	An Introduction to Disaster Management	S Vaidyanathan	CBS Publishers	First (2020)

Reference Books:

S.No.	Title	Author(s)	Publisher	Edition(year)
1.	Disaster Management	G K Ghosh	A P H Publishing Corporation	First (2011)
2.	Disaster Management and Preparedness	Nidhi Gauba Dhawan and Ambrina Sardar khan	CBS Publishers	First (2019)
3.	Disaster Management	Mrinalini Pandey	Wiley	Second (2023)

Prerequisite:

1. The students should be aware of basic sciences.

Syllabus

Name of the Programme: B. Tech.	**Year**: III	**Semester**: V /VI
Course Name: Indian Constitution (Audit Course)	**Course Code**: NU99.X	**Credit**: Non-graded Units-2
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs.	**Teaching Scheme:** CI (30) = 30 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite.	1
2	**Introduction to the Indian Constitution** Meaning of Constitution and Constitutionalism, Historical background of the Constituent Assembly; Government of India Act 1935, Salient features of the Constitution, the Preamble, and the process of Amendments (Article 368).	5
3	**Fundamental Framework of Governance** Constitutional provisions regarding territory and citizenship. Individual Rights & Duties, Detailed study of Fundamental Rights (Articles 12-35) and their restrictions. Directive Principles of State Policy (DPSP) and Fundamental Duties (Article 51A), and their role in governance and social justice.	6
4	**Union and State Governance & Judiciary** Powers and functions of the President, Vice President, Prime Minister, and Council of Ministers, Structure and functions of the Rajya Sabha, Lok Sabha, and State Legislatures. Hierarchy of the Indian Court System (Supreme Court, High Courts, and Subordinate Courts); Judicial Review and Activism. Role of judiciary in protection of rights and governance.	5
5	**Cyber Law, Intellectual Property and Environmental Laws** Introduction to Cyber Laws in India; The Right to Information Act (RTI) 2005, Information Technology Act 2000, digital signatures, electronic records, cybercrimes and their legal remedies, and the Cyber Regulations Appellate Tribunal. Introduction to Patents (legal aspects, filing, infringement) and Copyrights. Introduction to environmental protection, Constitutional provisions related to environment, major environmental legislations such as the Environment Protection Act, Air Act, and Water Act; role of citizens and engineers in environmental sustainability.	7
6	**Business Organizations & Engineering in Governance** Sole Traders, Partnerships, and the Companies Act (formation, Memorandum of Association, Shares), Role of engineers in digital governance; I.T. professionals in the Judiciary. Impact of secessionism and alienation on industrial development; the need for reformed engineering at the Union and State levels.	6
	Total	**30**

Text Books:

1. B. K. Sharma, Introduction to the Constitution of India, 7th ed. New Delhi, India: Prentice Hall of India, 2019.
2. P. M. Bakshi, The Constitution of India, 16th ed. New Delhi, India: Universal Law Publishing Co., 2022.
3. D. D. Basu, Introduction to the Constitution of India, 25th ed. New Delhi, India: LexisNexis, 2021.
4. V. K. Ahuja, Law Relating to Intellectual Property Rights, 3rd ed. New Delhi, India: LexisNexis, 2017.
5. P. Narayanan, Intellectual Property Law, 4th ed. New Delhi, India: Eastern Law House, 2019.
6. N. Vijayashankar, Cyber Laws in India, 2nd ed. New Delhi, India: Cyber Law College, 2018.
7. S. Shanthakumar, Introduction to Environmental Law, 2nd ed. New Delhi, India: LexisNexis, 2018.

Reference Books:

1. M. P. Jain, Indian Constitutional Law, 8th ed. New Delhi, India: LexisNexis, 2018.
2. J. N. Pandey, Constitutional Law of India, 51st ed. Allahabad, India: Central Law Agency, 2019.
3. S. K. Kapur, Human Rights under International Law and Indian Law, 2nd ed. New Delhi, India: Central Law Agency, 2016.
4. K. C. Agrawal, Environmental Law, 3rd ed. New Delhi, India: Natraj Publishing, 2017.
5. S. C. Tripathi, Environmental Law in India, 4th ed. New Delhi, India: Central Law Publications, 2019.
6. P. Duggal, Cyber Law in India, 2nd ed. New Delhi, India: Saakshar Law Publications, 2017.
7. T. Ramappa, Intellectual Property Rights Law in India, 3rd ed. New Delhi, India: Asia Law House, 2010.
8. A. Kumar and R. K. Suman, Cyber Laws and Information Technology, 1st ed. New Delhi, India: Kalyani Publishers, 2016.

Prerequisite:

1. Familiarity with basic concepts of civics and political science at school level
2. General awareness of Indian governance system and legal framework
3. Basic understanding of technology and its societal impact

Semester

VI

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Design of Steel Structures	**Course Code**: CEUL601	**Credit**: 03
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	Introduction: Types of Steels and their broad specifications. Structural steel forms- hot rolled, tubular, light gauge etc. and their applicability. **Plastic Analysis**: Plastic analysis of steel structures, fundamentals, shape factor, static and mechanism method of analysis, bending of beams of uniform cross sections (any shape)	10
3	**Connections:** Types of bolts, load transfer mechanism. Design of bolted and welded connections under axial and eccentric loadings with IS provisions **Tension Members:** Design strength in gross section yielding, net section rupture and block shear. Design of axially loaded members.	12
4	**Compression Members:** Types of buckling, buckling curves for different cross sections as per IS-800. Design of compression members: Axially loaded members including made up of angle section: single and in pair; built up columns including design of lacings and battens as per IS-800.	8
5	**Beams:** Design of simple and compound sections. Design of laterally supported and unsupported beams including for web buckling, web crippling, lateral torsional buckling.	8
6	**Column Bases**: Design of column bases for axial and eccentric compressive loads: Slab and gusseted base.	6
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Design of Steel Structures	S.S. Bhavikatti	I K international publication house pvt. Ltd.	2019
2	Limit State Design of Steel Structures	S.K. Duggal	McGraw Hill Education (India)	2019

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Design of Steel Structures	L.S. Negi	McGraw Hill Education (India)	2023
2	Limit State Design of Steel Structures	B.C. Punmia, A. K. Jain, and Arun Kumar Jain	Laxmi Publications (P) Ltd.	2017

Prerequisite:

1. Knowledge of Strength of Materials
2. Knowledge of Structural Analysis

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Railway and Airport Engineering	**Course Code**: CEUL602	**Credit**: 03
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, scope and outcome of the course	1
2	**Permanent way**: Typical railway track cross-section, capacity of railway track and measures to improve track capacity, gauges in railway tracks, coning of wheels and adzing of sleepers, Function of rails, requirement of rails, types of rail sections – comparison of rail types, length of rail, rail failures.	5
3	**Sleepers and Track Fittings**: Functions and requirements of sleepers, classification of sleepers: wooden, metal and concrete sleeper, comparison of different types of sleepers, spacing of sleepers and sleeper density. Rail fixtures and fastenings: Fish plates, spikes, bolts, chairs, keys, bearing plates. **Ballast**: Function and requirements of ballast, types, comparison of ballast materials.	5
4	**Geometric Design**: Gradients and grade compensation, safe speed on curves, radius or degree of the curve, super-elevation or cant, cant deficiency and negative cant, horizontal curves, length of transition curve. **Points and crossings**: Introduction, necessity of points and crossings, turnouts, points and crossings, design of a simple turnout. Case studies on recent development on modernization of Indian Railways.	12
5	**Airport** Planning: Factors in airport site selection, classifications of obstructions, Imaginary surfaces, Approach zone and turning zone. **Runway**: Runway orientation, basic runway length, corrections for elevation, temperature & gradient, airport classification.	9
6	**Runway & Taxiway Design**: Geometric design of runway, Airport capacity, factors controlling taxiway layout, geometric design standards for taxiway holding aprons, Wind-rose diagram. Structural design of runway pavements: design factors, LCN/PCN method of rigid pavement design. Terminal area, building area, parking area, apron, hanger, typical airport layouts. Failures in flexible and rigid pavements, Pavement management systems for runway pavements. Case studies on recent development in the Aviation Industry in India.	13
	Total	45

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	A Text Book of Railway Engineering	S.C. Saxena & S. P. Arora Veeraraghvan	Dhanpat Rai Publications (P) Ltd.	7th(2015)
2.	Airport Planning and Design	S.K. Khanna, M.G.Arora and S.S. Jain	Nem Chand & Brothers, Roorkee	6th(2012)

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Railway Engineering	Satish Chandra and M.M. Agarwal	Oxford University Press	2nd Edition (2012)
2.	Airport Engineering	Rangwala	Charotar Publishing House Pvt Ltd.	17th (2019)

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Water Resources Engineering	**Course Code**: CEUL603	**Credit**: 03
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	01
2	**Introduction:** Definitions, functions and advantages of irrigation, present status of irrigation in India, classification for agriculture, soil moisture and crop water relations, Irrigation water quality. Consumptive use of water, principal Indian crop seasons and water requirements. **Water Logging:** Causes, preventive and curative measures, drainage of irrigated lands, saline and alkaline lands	10
3	**Canal Irrigation:** Types of canals, design of channels, Kennedy's Theory, Lacey's Theory. Risks and Safety in Over-Irrigated Areas. **Diversion Head works:** Design for surface and subsurface flows, Bligh's and Khosla's methods.	08
4	**Dams:** Suitable sites, causes of failures, stability and seepage analysis, flow net, principles of design of earth dams, Force acting on a gravity dam, stability requirements. Ethical Issues in Human and Wildlife Relocation	09
5	**Well Irrigation:** Open wells and tube wells, types of tube wells, duty of tube well water, Aquifers. Case Study on Western Region Groundwater Table Trends Over the Last 10 Years **Cross-Drainage Structure:** Necessity of cross-drainage structures, their types and selection, comparative merits and demerits.	08
6	**Hydrology:** Definition, Hydrologic cycle, measurement of rainfall, Groundwater Recharge and Rainwater Harvesting for Sustainable Water Management, Flood hydrograph, Rainfall analysis, and Unit hydrograph and its determination, S-Curve	09
	Total	**45**

Text Books:

S. No.	Title	Author(s)	Publisher	Edition
1	Irrigation Engineering and Hydraulic Structure	S.K. Garg	Khanna Publisher	38th Edition (2023)
2	Irrigation and Water resource Engineering	G.L. Asawa	New Age International Publisher	2nd Edition (2024)
3	Irrigation Engineering	M.J. Dholawala, N.P. Singh and T. Banerjee	Charotar Publishing House	1st Edition (2015)

Reference Books:

S. No.	Title	Author(s)	Publisher	Edition
1	Irrigation, Water Power and Water Resource Engineering	K.R. Arora	Standards Publishers Distributors	2010
2	Irrigation and Water Power Engineering	B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Pande Brij Basi Lal	Laxmi Publication	16th Edition (2021)

Prerequisite:

1. Elementary knowledge of Fluid Mechanics

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Repair and Rehabilitation of Structures	**Course Code**: CEUL611	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Deterioration of Concrete Structures**: Penetrability of concrete permeability, sorptivity, diffusion. Physical processes- abrasion, erosion. Chemical- carbonation, chloride and sulfate attack. Alkali – Aggregate Reaction. Corrosion- mechanism. Factors affecting and Preventive measures :for all the above, including water – proofing techniques for various conditions, sacrificial anode, corrosion resistant steel, corrosion inhibitors, protective coatings etc.	10
3	**Cracks in Concrete and Masonry Structures-** Types, patterns, measurement and preventive measures. Crack repairing techniques	6
4	**Assessment of Risk/Damage in Structures:** Preliminary investigation- visual, history collection etc. **Detailed Investigation:** core cutting, rebar locator, corrosion meter, penetration resistance, pull out tests, half–cell potential, concrete resistivity etc. Interpretation of non-destructive test data from all the above tests as well as rebound hammer number and ultra-sonic pulse velocity. Destructive and chemical tests- on material samples from site.	10
5	**Materials for Repair:** polymers and resins, self-curing compounds, FRP, ferro-cement- properties, selection criterion, cement based and polymer modified mortars etc	6
6	**Repair Techniques:** Grouting, Jacketing, vacuum concrete, Gunite and Shotcrete, Mortar repair for cracks, shoring and underpinning, External bonded plates processes, limitations, design computations etc. including numerical problems, Under Water Repair Techniques.	8
7	**Case Studies:** related to rehabilitation of bridge piers, heritage structures,	4
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Concrete Technology	Santha Kumar, A.R.	Oxford University Press	2007
2	Concrete repair and maintenance	Peter.H.Emmons	Galgotia publications Pvt. Ltd	2001
3	Repair and protection of concrete structures	Noel P.Mailvaganam	CRC Press	1991

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Concrete Technology Theory and Practice	Shetty, M.S.	S.Chand and company	2005
2	Diagnosis and treatment of structures in distress	R.N.Raikar	R&D Centre of Structwel Designers & Consultants Pvt.Ltd	1994

Handbook on Repair and Rehabilitation of RCC buildings, Published by CPWD, Delhi, 2002

Prerequisite:

1. Student should be familiar with general construction materials.
2. Student should have basic knowledge of concrete properties, mix design etc.

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Town Planning	**Course Code**: CEUL612	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
	Introduction: Objective, Scope, Outcome of the Course and Prerequisite	1
1	**Introduction:** Objects of town planning, principles of town planning, Origin and growth of towns – development of towns, Modern town planning in India, Socio – Economic aspects of town planning. Selection of site for an ideal town. **Surveys & Planning:** Various types of surveys to be conducted for town planning projects. Data to be collected in different types of town planning surveys. Types of planning, -a brief note on urban, rural and regional planning.	07
2	**Zoning:** Definition – objects and principles of zoning. Advantages of zoning, Special Economic Zone (SEZ), Maps for zoning. **Housing:** Classification of residential buildings as per HUDCO norms, Housing in villages, Low Cost Housing, Housing policy, different types of housing agencies involved in housing, investment in Housing, Housing Problems in India. **Slums:** Causes, growth, characteristics, effects, slum clearance and re-housing, prevention of slum formation, financial assistance for slum clearance.	10
3	**Public buildings & Industries:** Classification – location, Design Principles of public building, Grouping of public buildings. Effects of Industries on towns and cities, classification of industries, regulation of their location. **Recreation measures:** Parks- park ways, Playgrounds, Theme parks, boulevards and their space standards, knowledge of Landscape sketches for a) Residential Building, b) Public Buildings and c) Industrial Buildings.	08
4	**Master Plan:** Meaning – Definition – objects and necessity of master plan, Data and Drawings required for master planning. Preparation of a layout plan for a residential area showing LIG, MIG and HIG houses and other amenities (not to scale), Urban and regional development plans. **Re-planning Existing Towns:** General - Objects of re-planning – Analyzing the defects of existing towns, difficulties in Master Planning of existing towns / cities - Urban renewal projects, merging of suburban areas – Decentralization - Satellite Towns – Smart cities- definition and features.	10
5	**Urban Roads:** objects, requirements, classification, types of street systems, through and bypass roads, outer and inner ring roads, expressways, freeways. **Delineation of planning areas**- Regional plan, Structure plan, detailed development plan and Transportation plan. Planning principles of Ebenezer Howard (Garden city concept), Patrick Geddes, Dr.C.A.Doxiades, Soria Y Mata (Linear city) and Clarence, A. Perry (The neighborhood concept).	09
	Total	**45**

LIST OF TEXT BOOKS

Sn.	Title	Author(s)	Publisher	Edition
1.	Fundamentals of Town Planning	G. K. Hariskar	Dhanpat Rai Publication	2nd (2017)
2.	A Text book of Town Planning	Abir Bandyopadhyay	Books & Allied Ltd	1st (2011)

REFERENCE BOOKS

Sn.	Title	Author(s)	Publisher	Edition
1.	Town Planning	S.C. Rangwala	Charotkar Publication	29th (2016)
2.	Town Planning	A. K. Jain	Khanna Publication	1st (2020)

Government of India References:

1. Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines Volume-I & II

Prerequisite:

1. Knowledge of concepts of Building Planning.
2. Knowledge of concepts of Surveying.

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: V
Course Name: Application of Artificial Intelligence in Civil Engineering	**Course Code**: CEUL613	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, scope, outcomes of the course; basics of Artificial Intelligence; role of AI in civil engineering; overview of intelligent systems; applications of AI in planning, design, construction and management	1
2	**Fundamentals of Artificial Intelligence:** Definition and philosophy of AI; problem formulation; intelligent agents; knowledge representation; reasoning and decision-making concepts	4
3	**Machine Learning Basics:** Introduction to machine learning; types of learning (supervised, unsupervised); data preprocessing; regression and classification; performance evaluation; applications in civil engineering datasets	6
4	**Artificial Neural Networks (ANN):** Biological neuron model; ANN architecture; activation functions; learning process; backpropagation algorithm; applications of ANN in flood forecasting, traffic prediction, structural performance analysis	6
5	**Fuzzy Logic and Fuzzy Systems:** Fuzzy sets; membership functions; fuzzy inference systems; fuzzy decision making; applications in geotechnical engineering, environmental engineering and construction management	6
6	**Genetic Algorithms and Evolutionary Techniques:** Fundamentals of genetic algorithms; encoding, selection, crossover and mutation; optimization problems; GA–ANN hybrid systems; applications in structural optimization and construction scheduling	6
7	**AI Applications in Civil Engineering:** AI applications in structural engineering, transportation engineering, environmental engineering, geotechnical engineering and construction management; case studies	8
8	**Mini Project / Case Study:** Identification of civil engineering problem; data collection; selection and implementation of suitable AI technique; result interpretation and presentation	8
	Total	45

Text Books

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Artificial Intelligence: A Modern Approach	Russell, S. J. and Norvig, P.	Pearson Education, India	4th Edition (2022)
2	Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications	Rajasekaran, S. and Vijayalakshmi Pai, G. A.	PHI Learning Pvt. Ltd., New Delhi	2011
3	Deep Learning	Goodfellow, I., Bengio, Y. and Courville, A.	MIT Press, USA	2015

Reference Books

Sn.	Title	Author(s)	Publisher	Edition (Year)
1	Neural Networks and Learning Machines	Haykin, S.	Pearson Education	3rd Edition (2016)
2	Machine Learning	Mitchell, T. M.	McGraw-Hill Education	1st Edition (2017)
3	Genetic Algorithms in Search, Optimization and Machine Learning	Goldberg, D. E.	Addison-Wesley	1st Edition (1989)

SYLLABUS

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Bridge Engineering	**Course Code**: CEUL614	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Introduction:** Types of bridges & classification of road & railway bridges. IRC & Railway loadings for bridges, wind load and Earthquake forces, Expansion Joints	7
3	**Steel bridges:** Introduction to Design of through-type & deck-type steel bridges for IRC loading. Design of through-type truss bridges for railway loadings.	15
4	**Reinforced concrete culverts & bridges:** Reinforced concrete slab culvert, T-beam bridges- courbons & Hendry-Jaegar methods.	13
5	**Bearings:** Bearings for slab bridges and girder bridges. Elastomeric bearings, design concepts as per IRC 83 (Part II).	9
	Total	**45**

Text Books:

S.No.	Title	Author(s)	Publisher	Edition(year)
1.	Bridge Engineering	S. Ponnuswamy	Tata McGraw-Hill	Third (2017)
2.	Design of Bridges	N Krishna Raju	CBS Publishers	Fifth (2005)
3.	Essentials of Bridge Engineering	D.J. Victor	Oxford University Press	Sixth (2019)
4.	Design Of Bridge Structures	Jagadeesh and Jayaram	PHI Learning	Third (2020)

Reference Books:

S.No.	Title	Author(s)	Publisher	Edition(year)
1.	Design of Concrete Bridges	P. Nagarajan	Wiley	First (2020)
2.	Design of Steel Structures	S.K. Duggal	McGraw-Hill Education	Third (2017)

Indian Standards

IRC Codes & Specifications
Railway Bridge Loads & Design

Prerequisite

1. Knowledge of Design of RC Structures
2. Knowledge of Design of Steel Structures

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Foundation Engineering	**Course Code**: CEUL615	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope and Outcome of the Course	1
2	**Foundations:** Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table, effect of eccentric and inclined loading, Contact pressure, estimation of minimum depth of foundation, plate load test, settlement analysis in sands and clays, Different types of shallow foundations and its design, Sustainable approach for reuse and rehabilitation of foundation	16
3	**Pile foundation:** Classification of piles, Bearing capacity of piles, Pile load test, Group capacity of vertical piles, static and dynamic formula, negative skin friction, IS code provisions, piles subjected to lateral loading	12
4	**Foundations on difficult soils:** Collapsible soil and expansive soil, under reamed piles (single and multiple bulb), load carrying capacity of under reamed piles. Case study related to foundations on difficult soils.	6
5	**Well foundation and caissons:** Depth of well, Bearing capacity and settlement of well, Lateral stability of well foundations, Sinking of wells, Tilts and shifts,	6
6	**Site Investigation:** Soil Exploration and sampling, standard penetration tests and preparation of site investigation report.	4
	Total	**45**

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Principles of Foundation Engineering	B M Das	Cengage India Private Limited	8th(2017)
2.	Advanced Foundation Engineering	VNS Murthy	CBS Publishers and Distributors Private Limited	1st(2017)

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Soil Mechanics and Foundations	Punmia B.C	Laxmi Publications New Delhi	18th(2023)
2.	Soil Mechanics And Foundation Engineering	Arora K.R	Standard Publishers and Distributers	1st(2020)

Prerequisite:

1. Elementary knowledge of mathematics
2. Understanding about soil mechanics

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

SYLLABUS

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Basics of Structural Dynamics & Earthquake Engineering	**Course Code**: CEUL616	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Introduction to Structural Dynamics:** Types of dynamic loads (wind, earthquake, blast), difference between static and dynamic analysis, degrees of freedom, dynamic equilibrium equations. Equation of Motion (By Newton's Law and By D'Alembert's Principle), Degrees of Freedom, Simplified Single Degree of Freedom, Mathematical Modeling, Equation of Motion for Free Vibration for Damped and Undamped System (Single Degree of Freedom System), Equation of Motion for Forced Vibration for Damped and Undamped System (Single Degree of Freedom System), Logarithmic Decrement, Multi-Degree of Freedom Systems (MDOF)	15
3	**Earthquake Load Analysis on Structures:** Introduction to methods of Earthquake Load Analysis (Linear Static, Linear Dynamic, Non-Linear Static, Non-Linear Dynamic), Analysis of Structure by Linear Static Method (Seismic Coefficient Method), Analysis of Structure by Linear Dynamic Method (Response Spectrum Method)	13
4	**Seismic Behaviour of RC Structures:** Load Transfer Path, Strength Hierarchy, Reversal of Stresses, Importance of Beam-Column Joints, Importance of Stiffness and Ductility (Capacity Design Concept) in Structures, Effect of Short Column, Effect of Soft Storey, Improper Detailing, Effect of Masonry Infill Walls, Effect of Eccentricity, Effect of Pounding, Effect of Floating Columns, Effect of Flexibility and Effects of Setbacks, Earthquake Resistant Features of RC Structures	9
5	**Engineering Seismology:** Earth and its interior, Continental Drift and Plate Tectonics, Inter Plate Earthquake (Convergent Boundaries, Divergent Boundaries and Transform Boundaries), Intra Plate Earthquake (Faults and Types of Faults), Seismic Waves, Basic Terminology, Measuring Units and Instruments	7
	Total	**45**

Text Books:

S.No.	Title	Author(s)	Publisher	Edition(year)
1.	Earthquake Resistant Design of Structures	Manish Shrikhande & Pankaj Agrawal	PHI Publication, New Delhi	First (2011)
2.	Earthquake Resistance Design of Structures	S. K. Duggal	Oxford University Press, New Delhi	Second (2013)
3.	Dynamics of Structures	A. K. Chopra	Pearson, New Delhi	Sixth (2025)

Reference Books:

S.No.	Title	Author(s)	Publisher	Edition(year)
1.	Dynamics of Structures	Clough & Penzin	CBS Publishers	Second (2015)
2.	Reinforced Concrete Structures	Park & Paulay	John Wiley & Sons	First (1975)
3.	Introduction to Structural Dynamics	John M. Biggs	McGraw-Hill Education	First (1964)

Indian Standards

IS: 1893 Part-I (2025), Criteria for Earthquake Resistant Design, General Provision to Building
IS: 13920 (2016), Code of Practice for Ductile Detailing of RC Structures

Prerequisite:

1. Design of RC Structures
2. Structural Dynamics
3. Effect of earthquake hazards on structures

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III / IV	**Semester**: V/VI/VII
Course Name: Remote Sensing and GIS Techniques	**Course Code**: CEUL660	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Photogrammetry:** Definition of Photogrammetric Terms, Geometry of aerial and terrestrial photographs, Aerial camera and phototheodolite, Scale of a Photograph, Tilt and Height displacements, Stereoscopic vision and stereoscopes, Height determination from parallax measurements, Flight planning, Maps and Map substitutes and their uses.	9
3	**Remote Sensing:** Basic concepts of remote sensing data and collection, Remote Sensing advantages and limitations, Remote Sensing System, Electromagnetic radiation and spectrum, Spectral signature, Atmospheric windows, energy interactions with atmosphere and with earth surface features (soil, water and vegetation). Different types of platforms, sensors and their characteristics, Orbital parameters of a satellite, Multi concept in Remote Sensing.	12
4	**Image Interpretation:** Principles of interpretation of aerial and satellite images, equipments and aids required for interpretation, resolution, image and false colour composite. Ground truth – collection and verification, advantages of multidate and multiband images. Digital Image Processing concept. Elements of visual and digital interpretation techniques	11
5	**Geographic Information System (GIS):** Introduction to GIS, components of GIS, Geographical referenced data. Spatial data-attribute data. Applications of GIS in map revision, Land use, Agriculture, Forestry, Archaeology, Municipal, Geology, water resources, Soil Erosion, Land suitability analysis, and traffic management.	12
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Remote Sensing and GIS	Bhatta B	Oxford University Press	2011
2	Basics of Remote sensing & GIS	S. Kumar	Laxmi Publications	2005
3	Remote Sensing and its Applications	Narayan LRA	Universities Press	2012

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Remote Sensing and GIS	Bharat Nagar & Pramod Kumar	Priya Tech Publications	2013
2	Introduction to Geographic Information Systems	Kang-tsung Change	Mc Graw Hill Educations	2017

Prerequisite:

1. Elementary knowledge of advanced surveying techniques.

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III / IV	**Semester**: V/VI/VII
Course Name: Solid Waste Management	**Course Code**: CEUL661	**Credit**: 03
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	01
2	**Introduction to Solid Waste and Environmental Impact:** Importance of solid waste management; effects of waste on water, soil, and air; ecosystem role in waste assimilation; urban vs rural waste; overview of national initiatives (Swachh Bharat, National Urban Sanitation Policy)	07
3	**Types, Sources and Generation of Solid Waste:** Definition and types of solid waste (municipal, industrial, biomedical, e-waste); sources: household, commercial, institutional; factors affecting waste generation; MSW generation in India	08
4	**Safety, Ethics, and Regulations in Solid Waste Management:** Health and environmental hazards from waste; safety measures and PPE; ethical considerations in waste handling; Municipal Solid Waste Rules and Plastic Waste Management Rules; case studies; responsibilities of engineers	10
5	**Solid Waste Treatment Technologies:** Composting; vermicomposting; biogas production; pyrolysis; incineration; engineered landfills; handling and recycling of e-waste and plastics.	10
6	**Sustainability, Circular Economy, and Innovative Practices:** Circular economy; 3R concept (Reduce, Reuse, Recycle); material recovery; segregation at source; zero-waste initiatives; smart city waste solutions; community participation; case studies	09
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Solid Waste Management	K Sasikumar and Sanoop Gopi Krishna	PHI Learning Pvt. Ltd.	1 (2013)
2	Textbook of Solid Wastes Management	Iqbal H Khan and Naved Ahsan	CBS Publisher & Distributor Pvt. Ltd.	1 (2017)
3	Ecology, environmental Science & Conservation	S P Singh and J S Singh, S R Gupta	S.Chand (G/L) & Company Ltd	1 (2017)

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition(year)
1	Sustainable Solid Waste Management: A Systems Engineering Approach	Ni-Bin Chang, Ana Pires	Wiley India Pvt Ltd	1 (2018)
2	Municipal Solid Waste Management	N N Bandela and DG Tare	BR Publishing Corporation.	1 (2009)
3	Energy Environment Ecology and Society	Preeti Jain, Shankar Lal Garg, K. G. Garg	Variety Books Publishers Distributors.	1 (2014)
4	Solid Waste Management Rules	MoEF&CC		2016

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Steel Structure Design	**Course Code**: CEUP620	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (30)**	

Analysis and design Problems as per different topics of syllabus of theory CEUP620, with latest version of IS 800 and other relevant IS codes.

In addition to numerical problems, following exercises:

1. Case study of foot over bridges/truss- Girder Bridge in vicinity /hometown of the students, preferably in groups of 8-10 students. A report including photographs marked with names and section details of different members in it (maximum limit of words: 1000).

2. Case study of a structure using tubular sections or light gauge sections in vicinity /hometown of the students, preferably in groups of 8-10 students. A report including photographs marked with names, size and section details of different members in it (maximum limit of words: 1000).

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Water Resource Engineering Design	**Course Code**: CEUP621	**Credit**: 01
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite
2	Numerical on Duty Delta Base Period, Efficiency, Khor Period
3	Design of Channel Using Kennedy and Lacey theory, Numerical on Bligh's and Khosla's methods.
4	Numerical on Force acting on a gravity dam and stability check
5	Numerical on discharge and duty in wells
6	Numerical on hydrograph, rainfall measurement

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Geotechnical Engineering Lab- II	**Course Code**: CEUP622	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1	To determine the compaction characteristics of soil by Standard proctor compaction test
2	To determine the California bearing ratio (CBR) value of soil
3	To determine the compressibility parameters of soil.
4	To determine the swelling characteristics of soils through free swell index test.
5	To determine the swelling characteristics of soil by swelling pressure test.
6	To determine shear strength parameters of the soil by Direct Shear test.
7	To determine the strength characteristics of the soil by unconfined compressive strength test.
8	To determine the shear strength characteristics of the soil by Triaxial test.
9	To determine the in-situ properties of soil using Standard Penetration Test (SPT).

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Advanced Concrete Structure Design	**Course Code**: CEUP623	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1.	**Continuous Beams:** Analysis and Design of continuous beams using coefficients (IS Code), concept of moment redistribution
2.	**Retaining walls**: Analysis and design of Cantilever Retaining Walls, Introduction to counterfort and buttress-type retaining walls and their structural behaviour.
3.	**Curved Beams**: Analysis and design of beams curved in plan.
4.	**Circular Domes:** Analysis and design of Circular domes with u.d.l. & concentrated load at the crown.
5.	**Water Tank:** Design of a rectangular water tank.

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: III	**Semester**: VI
Course Name: Estimating and Costing Lab	**Course Code**: CEUP624	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs	**Teaching Scheme: LI (30)**	

Module No.	Content
1	Types of estimates and methods of estimation, Basic Schedule of Rates (BSR) and Units of measurements
2	Prepare preliminary estimates (Plinth Area and Cubic Content methods).
3	Prepare detailed estimates of buildings (Long wall-short wall and Centre Line method), RCC work including B.B.S. and other civil engineering works.
4	Earthwork calculation for road works.
5	Rate analysis of different items of civil works by ethical considerations.