



List of New Course(s) Introduced

Department : Civil Engineering

Programme Name : B.Tech in Civil Engineering

Academic Year: 2024-25

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	CEUETT1	Design of Concrete Structures
02.	CEUETT2	Structural Analysis - II
03.	CEUETT3	Highway Engineering
04.	CEUETT4	Geotechnical Engineering-I
05.	CEUETT5	Environmental Engineering - I
06.	CEUETP1	Advanced Solid Mechanics
07.	CEUETP2	Construction Project Planning and Systems
08.	CEUETP3	Infrastructure Planning & Management
09.	CEUETP4	Disaster Preparedness and Planning Management
10.	CEUETP5	Basics of Computational Hydraulics
11.	CEUEL1	Highway Engineering Lab
12.	CEUEL2	Geotechnical Engineering Lab
13.	CEUEPF1	Mini Project-II
14.	CEUFTT1	Design of Steel Structures
15.	CEUFTT2	Environmental Engineering - II
16.	CEUFTT3	Water Resources Engineering -I
17.	CEUFTT4	Geotechnical Engineering-II
18.	CEUFTP1	Advanced Concrete Design
19.	CEUFTP2	Ground Improvement Techniques
20.	CEUFTP3	Sustainable Urban Transportation Planning
21.	CEUFTP4	Open Channel Flow
22.	CEUFTP5	Solid and Hazardous Waste Management
23.	CEUFMO1	MOOCs-1 *
24.	CEUFLT1	Environmental Engineering Lab
24.	CEUFLT2	Computer Applications in Civil Engineering. Lab
26.	CEUFPP1	Mini Project-III



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

Academic Year : 2024-25

School : Engineering & Technology

Department : Civil Engineering

Date and Time : 29-07-24 ;11:00AM

Venue : Online

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

Minutes of Meeting of BoS (29-07-2024)

A meeting of the Board of Studies (BoS) of Civil Engineering was held on 29-07-2024 at 11:00 AM in offline/Online (through Google Meet) in the Department of Civil Engineering. The following members of BoS were present in the meeting.

1	Prof. M. Chakradhara Rao	Head, Civil Engg. Dept., GGV	Chairman
2	Prof. Shailendra Kumar	Civil Engg. Dept., GGV	Member
3	Prof. R.K. Choubey	Civil Engg. Dept., GGV	Member
4	Prof. M. L. Agrawal	Principal, Institute of Technology, Korba.	External Member (Attended Online)
5	Shri. Ajay Somawar	Chief Engineer (Retired), Hasdeo Basin, Bilaspur	External Member (Attended Online)
6	Dr. V. V. S. Surya Kumar Dadi	Asso. Professor, Civil Engg. Dept., GGV	Member
7	Mr. Prakhar Modi	Asst. Professor, Civil Engg. Dept., GGV	Member (Attended Online)

At the outset, the chairman welcomed all the esteemed members.

In the meeting the members discussed the following Agenda item.

Agenda Item: To finalize and approve the scheme and syllabus for B.Tech. Civil Engineering 5th and 6th semester (NEP 2020) w.e.f. session 2024-25.

The chairman of the BoS has presented the B.Tech. Civil Engineering Scheme and the syllabus of B.Tech. 5th and 6th semester, prepared as per NEP 2020 & the AICTE guidelines to all the esteemed members. In the meeting the members discussed the proposed scheme and syllabus at length.

Resolution: After discussion, the members resolved the following.

- The members approved the proposed B.Tech. Scheme and the syllabus of B.Tech. 5th and 6th Semester of Civil Engineering w.e.f. 2024-25.
- The students shall select a MOOCs course of any other department except civil engineering offered by SWAYAM/NPTEL/AICTE of minimum 12 weeks (03 credits) to complete the requirement in open elective courses in 6th and 7th Semesters.
- The chairman of BoS / Head of the Civil Engineering is authorised to approve the list of open elective courses selected by the students from the MOOCs available on SWAYAM/NPTEL/AICTE during the 6th and 7th Semesters.

The meeting ended with vote of thanks.

Prof. M. Chakradhara Rao

Prof. Shailendra Kumar

Prof. R.K. Choubey

Prof. M. L. Agrawal

Shri. Ajay Somawar

Dr. V. V. S. S. K. Dadi

Mr. Prakhar Modi



Scheme and Syllabus

Civil Engineering Department, SoS Engineering and Technology
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
Scheme & Syllabus of B.Tech. Civil Engineering (NEP 2020)

w.e.f Academic Session 2024-25 (5th Semester/3rd Year)

S.No	Course Code	Course Name	Course Category	Teaching Hours/ Week			Evaluation Scheme			Credits		
				L	T	P	Continuous Internal Assessment (CIA)		Semester Examination Assessment		Total Marks	
							TA	IA				SEA
1	CEUETT1	Design of Concrete Structures	PC	3	0	0	10	30	60	100	3	
2	CEUETT2	Structural Analysis - II	PC	3	0	0	10	30	60	100	3	
3	CEUETT3	Highway Engineering	PC	3	0	0	10	30	60	100	3	
4	CEUETT4	Geotechnical Engineering-I	PC	3	0	0	10	30	60	100	3	
5	CEUETT5	Environmental Engineering - I	PC	3	0	0	10	30	60	100	3	
6	CEUETP1	Advanced Solid Mechanics	PE	3	0	0	10	30	60	100	3	
	CEUETP2	Construction Project Planning and Systems										
	CEUETP3	Infrastructure Planning & Management										
	CEUETP4	Disaster Preparedness and Planning Management										
	CEUETP5	Basics of Computational Hydraulics										
Labs/Projects												
7	CEUFLT1	Highway Engineering Lab	Lab1	0	0	2		25	25	50	1	
8	CEUFLT2	Geotechnical Engineering Lab	Lab 2	0	0	2		25	25	50	1	
9	CEUEPF1	Mini Project-II	Project	0	0	4		50	50	100	2	
Total				18	0	8					800	22

L-Lecture, T-Tutorial, P-Practical, TA-Teacher Assessment, CIA – Continuous Internal Assessment, SEA-Semester Examination Assessment, IA- Internal Assessment {Based on two class tests (CTs) of marks-15 each}, NEP-National Education Policy.

Civil Engineering Department, SoS Engineering and Technology
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
Scheme & Syllabus of B.Tech. Civil Engineering (NEP 2020)

w.e.f. Academic Session 2024-25 (6th Semester/3rd Year)

w.e.r. Academic Session 2024-25 (6 th Semester/3 rd Year)											
S.No	Course Code	Course Name	Course Category	Teaching Hours/Week			Evaluation Scheme			Credits	
				L	T	P	Continuous Internal Assessment (CIA)	Semester Examination Assessment	Total Marks		
											TA
1	CEUFTT1	Design of Steel Structures	PC	3	0	0	10	30	60	100	3
2	CEUFTT2	Environmental Engineering - II	PC	3	0	0	10	30	60	100	3
3	CEUFTT3	Water Resources Engineering -I	PC	3	0	0	10	30	60	100	3
4	CEUFTT4	Geotechnical Engineering-II	PC	3	0	0	10	30	60	100	3
5	CEUFTP1	Advanced Concrete Design	PE	3	0	0	10	30	60	100	3
	CEUFTP2	Ground Improvement Techniques									
	CEUFTP3	Sustainable Urban Transportation Planning									
	CEUFTP4	Open Channel Flow									
	CEUFTP5	Solid and Hazardous Waste Management									
6	CEUFMO1	MOOCs-1 *	OE	3	0	0	10	30	60	100	3
Summer Internship/Industrial Training **											
Labs/Projects											
7	CEUFLT1	Environmental Engineering Lab	Lab1	0	0	2		25	25	50	1
8	CEUFLT2	Computer Applications in Civil Engineering Lab	Lab 2	0	0	2		25	25	50	1
9	CEUFPF1	Mini Project-III	Project	0	0	4		50	50	100	2
Total				18	0	8				800	22

L-Lecture, T-Tutorial, P-Practical, TA-Teacher Assessment, CIA – Continuous Internal Assessment, SEA-Semester Examination Assessment, IA- Internal Assessment {Based on two class tests (CTs) of marks-15 each}, NEP-National Education Policy, MOOCs- Massive Open Online Courses

NOTE:

*The students should be opted the MOOC(s) offered by NPTEL/SWAYAM of 03 credits only and that needs to be approved by the BoS.

**Student shall take MOOCs based on availability of courses at SWAYAM portal during that academic year.



Civil Engineering Department, SoS of Engineering and Technology
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Syllabus	Semester - V	Teaching Hours/Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETT2	L	T	P	CIA	SEA	100	3	CEUDTT1
Course Name	Structural Analysis - II	3	0	0	40	60			

Course Objectives:

- To understand the principles of energy methods and their applications to indeterminate beams and plane frames.
- To know the principles and applications of slope deflection method to the indeterminate beams and rigid frames.
- To study the principles of the moment distribution method and its applications to indeterminate beams and rigid joint plane frames.
- To study the principles of matrix methods and their applications to beams.
- To apply the Muller Breslau Principle for constructing influence lines to indeterminate beams and two-hinged arches.

Unit	Content	Teaching /Lecture Hours
I	Analysis of indeterminate beams by consistent deformation methods and analysis of indeterminate rigid plane frames and trusses using the energy method.	8
II	Slope Deflection Method: Continuous beams and rigid joint plane frames by moment distribution due to loads and yielding of supports.	8
III	Moment-distribution method. Continuous beams and rigid joint plane frames by moment distribution method due to loads and yielding of supports.	10
IV	Introduction to Flexibility Matrix and Stiffness Matrix methods: Applications of the methods to simple indeterminate beams.	10
V	Analysis of symmetrical two hinge arches (parabolic and circular). Influence lines for propped cantilevers and continuous beams using Muller-Breslau's principle.	9
Total Lecture Hours		45

Course Outcomes: At the end of the course completion, a student is able

- CO1** To identify the suitable method of analysis for the analysis of indeterminate beams and trusses and analyses the same using consistent deformation method and energy method.
CO2 To analyze the indeterminate beams and rigid joint plane frames using slope deflection and moment distribution methods.
CO3 To analyze the mechanisms of slope stability and implement methods like Bishop's method for slope stability analysis.
CO4 To apply and analyze the indeterminate beams using matrix methods.
CO5 To construct the influence lines for stress resultants in indeterminate beams and two-hinged arches and analyze the same for moving loads.

Text Books: -

- Menon, D. (2017). Structural Analysis (2nd ed.). Alpha Science International, Limited.
- Wang, C. K. (2017). Intermediate Structural Analysis (1st ed.). McGraw Hill Education.
- Leet, K. M. (2007). Fundamentals of Structural Analysis (3rd ed.). McGraw-Hill Higher Education.

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Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Reference Books: -

- Hibbler, R. C. (2019). Structural Analysis (SI units) (10th ed.). Pearson.
- Jain, A. K. (2015). Advanced Structural Analysis (3rd ed.). Nem Chand & Bros.
- Negi, L. S., & Jangid, R. S. (1997). Structural Analysis (1st ed.). Tata McGraw Hill.

COs, POs, and PSOs Mapping (Structural Analysis – II- CEUETT2)

PO \ CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3											
CO2	3	3	3	3	3	2				1				3	
CO3	3	3	3	3	3	2				1				3	
CO4	3	3	3	3	3	2				1				3	
CO5	3	3	3	3		3				1				3	



Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Syllabus	Semester -V	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETT3	L	T	P	CIA	SEA	100	3	Nil
Course Name	Highway Engineering	3	0	0	40	60			

Course Objectives:

- To understand the importance of transportation and characteristics of highway transport.
- To study the geometric design of highways
- To understand the traffic characteristics.
- To recognize the pavement materials.
- To understand the design concept of flexible and rigid pavement.

Unit	Content	Teaching/ Lecture Hours
I	Introduction: Role of transportation, Modes of transportation, characteristics of highway transport, Road development and planning in India, Road's classification, patterns, Engineering surveys for highway locations.	6
II	Geometric Design of Highway: Factors controlling the geometric design, Basic consideration for the design of highway, Cross-sectional element, Sight distance, Curve, Design of horizontal alignment, Transition curves, Set back distance, and Design of vertical alignment.	10
III	Traffic Engineering: Functions of traffic engineering, Traffic characteristics, Traffic studies on flow and speed, Peak hour factor, Accident study, Statistical analysis of traffic data, Microscopic and macroscopic parameters of traffic flow, Fundamental relationships, Traffic signs, Signal design by Webster's method, Types of intersection, Highway capacity, Level of service.	10
IV	Highway Materials: Subgrade soil, Plate bearing test, California bearing ratio test, Desirable properties of road aggregates, Test for road aggregates, Bitumen, Tar, Mix design, Marshall mix design.	8
V	Pavement Design: Types of pavement structure, Functions of pavement components, Design factors, Design of flexible pavement, Design of rigid pavement, Design of joint.	10
Total Lecture Hours		44

Course Outcomes: At the end of the course completion, a student is able

- CO1 To propose modes of transportation, transportation planning and survey.
CO2 To design cross-section elements, sight distance, horizontal and vertical alignment
CO3 To analyze traffic studies, traffic regulations and carryout control and intersection designs.
CO4 To interpret the properties of pavement materials
CO5 To design flexible and rigid pavements as per IRC specifications.

Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Text Books: -

- Kadiyali, L. R., & Lab, N. B. (2012). Principle and Practices of Highway Engineering. Khanna Publishers.
- Khanna, S. K., & Justo, C. E. G. (2011). Highway Engineering. Khanna Publishers.
- Rangawala, S. C. (2015). Highway Engineering. Charotar Publishing House Pvt. Ltd.
- Khisty, C. J., & Lall, B. K. (2002). Transportation Engineering: An Introduction (3rd ed.). Prentice Hall.

Reference Books: -

- Ministry of Road Transport and Highways (MoRTH). (2013). Specifications for Road and Bridge Works. Indian Roads Congress.
- Indian Roads Congress. (2017). Indian Highway Capacity Manual. Indian Roads Congress.

COs, POs, and PSOs Mapping (Transportation Engineering- CEUETT3)

PO \ CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	1		1	1						1		
CO2	3	3	3	3	3	3	1						3	3	3
CO3	3	3	3	3	3	3	1	1					3	3	3
CO4	3	3	2	2		1							1	1	3
CO5	3	3	3	3	3	3							3	3	



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Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Syllabus	Semester -V	Teaching Hours/Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETT4	L	T	P	CIA	SEA	100	3	Nil
Course Name	Geotechnical Engineering - I	3	0	0	40	60			

Course Objectives:

- To understand the fundamental principles of soil formation, classification, and properties to assess soil types.
- To develop the ability to analyze soil permeability, apply Darcy's Law, and construct flow nets for various seepage problems
- To understand and apply the principles of effective stress, compaction, and consolidation to predict and mitigate soil deformation and settlement in engineering projects.
- To understand and evaluate the stresses and shear strength characteristics in soil masses to determine the stability and safety of geotechnical structures

Unit	Content	Teaching/ Lecture Hours
I	Soil Formation, Soil Types, Composition, Three-Phase System and Phase Relationships, Index Properties; Unified and Indian Standard Soil Classification System; Clay Minerals, Clay Water Relations, Field Identification Tests	8
II	Darcy's Law, Permeability - One-Dimensional Flow, Determination of Permeability, Equivalent Permeability in Stratified Soils, In-Situ Permeability Test Seepage Through Soils - Two - Dimensional Flow, Flow Nets, Uplift Pressure, Piping, Capillarity, Seepage Force, Confined and Unconfined Flows, Filter Criteria	9
III	Stresses in Soil Mass: Normal and Shear Stress on Plane, Geostatic Stresses, Stress Caused by point load, line load, and strip load, Vertical Stress due to embankment loading, vertical stresses below uniformly loaded circular area, vertical stress caused by rectangular loaded area, Boussinesq's Theory, Newmark's Influence Chart, Contact pressure	10
IV	Principle Of Effective Stress and Quicksand Condition; General Principles of Compaction, Compaction Tests, Factors Affecting Compaction, Field Compaction, Compaction Techniques; Fundamentals, 1-D Consolidation, Normally and Over-Consolidated Clays, Void Ratio - Pressure Relationships, Compressibility Characteristics, Time Rate of Consolidation, Coefficient of Consolidation, Settlement, Secondary Consolidation.	8
V	Shear Strength, Mohr's Circle, Effective and Total Shear Strength Parameters, Stress-Strain Characteristics of Clays and Sand; Mohr-Coulomb Failure Criterion, Direct Shear Test, Unconfined Compression Test, Triaxial Shear Test: Consolidated Drained, Consolidated Undrained, Unconsolidated Undrained, Vane Shear Test, Shear Strength of Clays and Sands, Critical Void Ratio, Stress Path, Pore-Pressure Coefficient.	8
Total Lecture Hours		43

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Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Course Outcomes: At the end of the course completion, a student is able

- CO1** To identify and classify different types of soils using the Unified and Indian Standard Soil Classification Systems and conduct field identification tests
- CO2** To measure and interpret permeability and seepage through soils, utilizing Darcy's Law, flow nets, and in-situ tests to determine soil filtration and drainage properties.
- CO3** To calculate stresses in soil masses using various theoretical approaches such as Boussinesq's Theory and Newmark's Influence Chart
- CO4** To demonstrate knowledge of compaction principles and consolidation processes to predict the behavior of normally and over-consolidated clays and calculate the settlement of the structure
- CO5** To perform and evaluate shear strength tests, including Direct Shear, Unconfined Compression, and Triaxial Shear Tests, to determine the stress-strain characteristics and failure criteria of clays and sands.

Text Books:-

- Das, B. M. (2018). Principles of Geotechnical Engineering (9th ed.). Cengage Learning.
- Craig, R. F. (2004). Soil Mechanics (7th ed.). CRC Press.
- Coduto, D. P., Kitch, W. A., & Yeung, M. R. (2010). Geotechnical Engineering: Principles and Practices (2nd ed.). Pearson.

Reference Books:-

- Holtz, R. D., Kovacs, W. D., & Sheahan, T. C. (2011). An Introduction to Geotechnical Engineering (2nd ed.). Pearson.
- Terzaghi, K., Peck, R. B., & Mesri, G. (1996). Soil Mechanics in Engineering Practice (3rd ed.). Wiley.
- Lambe, T. W., & Whitman, R. V. (1969). Soil Mechanics. Wiley.

COs, POs, and PSOs Mapping (Geotechnical Engineering – I- CEUETT4)

PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO	CO 1	CO 2	CO 3	CO 4	CO 5									
CO1	3	3	3	3								3	2	2
CO2	3	3	3	3								3	2	2
CO3	3	3	3	3								3	2	2
CO4	3	3	3	3								3	2	2
CO5	3	3	3	3								3	2	2



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Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Syllabus	Semester -V	Teaching Hours/Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETT5	L	T	P	CIA	SEA	100	3	Nil
Course Name	Environmental Engineering - I	3	0	0	40	60			

Course Objectives:

- To learn the water sources, demand, and water quantity estimation techniques.
- To know the water characterization and various physical and chemical treatment techniques.
- To learn the basics of water supply, purification, and treatment
- To learn filtration, coagulation, and softening techniques & mechanisms for water treatment.
- To study distribution systems

Unit	Content	Teaching/Lecture Hours
I	Introduction: Necessity and importance of water supply schemes. Water demand: Classification of water demands, Estimation of the quantity of water required by a town, per capita demand, factors affecting per capita demand, design period and population forecasting, and variation in water demand.	10
II	Sources of water supply: Surface sources and underground sources, Intake works, site selection, type of intake works	8
III	Quality of water: Common impurities, physical, chemical, and biological characteristics of water, and water quality standards for municipal and domestic supplies.	8
IV	Treatment of water: Object of water processing, flow diagrams of typical ground water system and surface water systems. Sedimentation Theory of sedimentation, sedimentation tanks and its types, design parameters related with sedimentation tanks, sedimentation with coagulations, coagulants and coagulant aids, Jar test for determining coagulant dosage. Filtration: Theory of filtration, slow sand and rapid sand filters, Construction and operation. Disinfection: Methods of disinfection, Chlorination, Types of chlorination, Break Point chlorination. Softening: Methods of Softening, Iron Removal, Fluoridization. Distribution System: Methods of distribution, layout of distribution system,	10
V	methods of analysis, pressure in the distribution system, distribution reservoirs, functions, and its types,	8
Total Lecture Hours		44

Course Outcomes: At the end of the course completion, a student is able

- CO1** To forecast the population and design water supply schemes.
CO2 To identify the various constituents present in a water sample selection.
CO3 To demonstrate water quality concepts and their effect on the treatment process selection.
CO4 To identify different treatment units in a water treatment plant and formulate their design procedures.
CO5 To design various water distribution network systems.

Civil Engineering Department, SoS of Engineering and Technology
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Text Books: -

- Garg, S. K. (2010). Water Supply Engineering (8th ed.). Khanna Publishers.
- Punmia, B. C., Jain, A. K., & Jain, A. K. (2010). Water Supply Engineering. Laxmi Publications.
- Peavy, H. S., Rowe, D. R., & Tchobanoglous, G. (1985). Environmental Engineering. McGraw-Hill Education.
- Birdi, G. S. (2005). Water Supply and Sanitary Engineering. Dhanpat Rai Publications
- Anjaneyulu, Y. (2004). Introduction to Environmental Science. B.S. Publications.
- Henry, J. G., & Heinke, G. W. (2004). Environmental Science and Engineering (2nd ed.). Pearson Education.

Reference Books: -

- Garg, S. K. (2010). Water Supply Engineering (8th ed.). Khanna Publishers.
- Birdi, G. S. (2005). Water Supply and Sanitary Engineering. Dhanpat Rai Publications
- Anjaneyulu, Y. (2004). Introduction to Environmental Science. B.S. Publications.
- Henry, J. G., & Heinke, G. W. (2004). Environmental Science and Engineering (2nd ed.). Pearson Education.

COs, POs, and PSOs Mapping (Environmental Engineering – I- CEUETT5)

PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	2									2	3		1
CO2	2	2	2			1						2	3		1
CO3	2	2	2									2	3		1
CO4	3	2	2				2					2	3		1
CO5	3	2	2				2	2				2	3		1



Civil Engineering Department, SoS of Engineering and Technology
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Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Syllabus	Semester -V	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETT4	L	T	P	CIA	SEA	100	3	Nil
Course Name	Geotechnical Engineering - I	3	0	0	40	60			

Course Objectives:

- To understand the fundamental principles of soil formation, classification, and properties to assess soil types.
- To develop the ability to analyze soil permeability, apply Darcy's Law, and construct flow nets for various seepage problems
- To understand and apply the principles of effective stress, compaction, and consolidation to predict and mitigate soil deformation and settlement in engineering projects.
- To understand and evaluate the stresses and shear strength characteristics in soil masses to determine the stability and safety of geotechnical structures

Unit	Content	Teaching/ Lecture Hours
I	Soil Formation, Soil Types, Composition, Three-Phase System and Phase Relationships, Index Properties; Unified and Indian Standard Soil Classification System; Clay Minerals, Clay Water Relations, Field Identification Tests	8
II	Darcy's Law, Permeability - One-Dimensional Flow, Determination of Permeability, Equivalent Permeability in Stratified Soils, In-Situ Permeability Test Seepage Through Soils - Two - Dimensional Flow, Flow Nets, Uplift Pressure, Piping, Capillarity, Seepage Force, Confined and Unconfined Flows, Filter Criteria	9
III	Stresses in Soil Mass: Normal and Shear Stress on Plane, Geostatic Stresses, Stress Caused by point load, line load, and strip load, Vertical Stress due to embankment loading, vertical stresses below uniformly loaded circular area, vertical stress caused by rectangular loaded area, Boussinesq's Theory, Newmark's Influence Chart, Contact pressure	10
IV	Principle Of Effective Stress and Quicksand Condition; General Principles of Compaction, Compaction Tests, Factors Affecting Compaction, Field Compaction, Compaction Techniques; Fundamentals, 1-D Consolidation, Normally and Over-Consolidated Clays, Void Ratio - Pressure Relationships, Compressibility Characteristics, Time Rate of Consolidation, Coefficient of Consolidation, Settlement, Secondary Consolidation.	8
V	Shear Strength, Mohr's Circle, Effective and Total Shear Strength Parameters, Stress-Strain Characteristics of Clays and Sand; Mohr-Coulomb Failure Criterion, Direct Shear Test, Unconfined Compression Test, Triaxial Shear Test: Consolidated Drained, Consolidated Undrained, Unconsolidated Undrained, Vane Shear Test, Shear Strength of Clays and Sands, Critical Void Ratio, Stress Path, Pore-Pressure Coefficient.	8
Total Lecture Hours		43

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Scheme & Syllabus of B.Tech. (Civil Engineering) as Per NEP 2020

Course Outcomes: At the end of the course completion, a student is able

- CO1** To identify and classify different types of soils using the Unified and Indian Standard Soil Classification Systems and conduct field identification tests
- CO2** To measure and interpret permeability and seepage through soils, utilizing Darcy's Law, flow nets, and in-situ tests to determine soil filtration and drainage properties.
- CO3** To calculate stresses in soil masses using various theoretical approaches such as Boussinesq's Theory and Newmark's Influence Chart
- CO4** To demonstrate knowledge of compaction principles and consolidation processes to predict the behavior of normally and over-consolidated clays and calculate the settlement of the structure
- CO5** To perform and evaluate shear strength tests, including Direct Shear, Unconfined Compression, and Triaxial Shear Tests, to determine the stress-strain characteristics and failure criteria of clays and sands.

Text Books: -

- Das, B. M. (2018). Principles of Geotechnical Engineering (9th ed.). Cengage Learning.
- Craig, R. F. (2004). Soil Mechanics (7th ed.). CRC Press.
- Coduto, D. P., Kitch, W. A., & Yeung, M. R. (2010). Geotechnical Engineering: Principles and Practices (2nd ed.). Pearson.

Reference Books: -

- Holtz, R. D., Kovacs, W. D., & Sheahan, T. C. (2011). An Introduction to Geotechnical Engineering (2nd ed.). Pearson.
- Terzaghi, K., Peck, R. B., & Mesri, G. (1996). Soil Mechanics in Engineering Practice (3rd ed.). Wiley.
- Lambe, T. W., & Whitman, R. V. (1969). Soil Mechanics. Wiley.

COs, POs, and PSOs Mapping (Geotechnical Engineering – I- CEUETT4)

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3									3	2	2
CO2	3	3	3	3									3	2	2
CO3	3	3	3	3									3	2	2
CO4	3	3	3	3									3	2	2
CO5	3	3	3	3									3	2	2



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Syllabus	Semester -V	Teaching Hours/Week	Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETP2	L T P	CIA	SEA	100	3	Nil
Course Name	Construction Project Planning and Systems	3 0 0	40	60			

Course Objectives:

- To understand the project management and different scheduling techniques.
- To expertise in PERT network analysis.
- To learn CPM network analysis and compare it with PERT.
- To understand time-cost analysis and resource scheduling.
- To understand the factors for equipment selection, cost of owning and operating, and basic knowledge of different equipment used in the construction industry.

Unit	Content	Teaching/ Lecture Hours
I	Introduction: Objectives and functions of project management, project feasibility reports, Planning for construction projects: Steps, factors, advantages, and disadvantages for the different stakeholders. Construction Finance and control. Scheduling: Scheduling job layout and line of balance, project management through networking, bar chart, linked bar chart, work breakdown structures, and activity-on-arrow diagrams.	8
II	PERT: Network analysis, critical path, probability of project.	8
III	CPM: Network analysis, Critical Path, Difference between CPM and PERT.	8
IV	Time-cost relationship: Direct and Indirect cost. Resource allocation: Resource smoothing and Resource leveling Construction safety management: Importance, causes of accidents, safety measures, responsibility for safety, and safety benefits to various parties.	9
V	Classification of construction equipment, Standard and special equipment, factors affecting selection of construction equipment, cost of owning and operating the Construction Equipment, Basics of Excavators, Lifting, Hauling, Converting, and concreting equipment. Time and Motion studies	9
Total Lecture Hours		42

Course Outcomes: At the end of the course completion, a student is able

- CO1** To apply the knowledge in managing and handling of different civil engineering project and also able to schedule the project.
- CO2** To do PERT analysis and able to find the project completion time and its probability.
- CO3** To do CPM analysis and able to find the project completion time and compare with PERT analysis.
- CO4** To do cost and time analysis and also resource allocation, scheduling and crashing for different activities of the network.
- CO5** To apply the knowledge in equipment selection and able to find cost of owning and operating, which help in comparisons of different equipment's.

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Text Books: -

- Seetharaman, S. (1997). Construction Engineering and Management. Umesh Publications.
- Punmia, B. C., & Khandelwal, K. K. (1997). PERT & CPM. Laxmi Publications.
- Sen Gupta, & Guha. (1995). Construction Management and Planning. Tata McGraw Hill

Reference Books: -

- Chitkara, K. K. (1998). Construction Project Management Planning, Scheduling and Control. Tata McGraw-Hill Publishing Co.
- Srinath, L. S. (2001). PERT and CPM Principles and Applications. Affiliated East-West Press.
- Hendrickson, C., & Au, T. (2000). Project Management for Construction – Fundamentals Concepts for Owners, Engineers, Architects and Builders. Prentice Hall.
- Moder, J., Phillips, C., & Davis, E. (1983). Project Management with CPM, PERT and Precedence Diagramming (3rd ed.). Van Nostrand Reinhold Co
- Halpin, D. W. (1985). *Financial and Cost Concepts for Construction Management*. John Wiley and Sons.

COs, POs, and PSOs Mapping (Construction Project Planning and System: CEUETP2)

PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO	CO1	CO2	CO3	CO4	CO5										
CO1	3	3	2	2		1								2	
CO2	3	3	2	1	1	1								2	
CO3	3	3	3	2		1				1				2	
CO4	3	3	3	2		1				1				2	
CO5	3	3	3	3									3	2	2



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Syllabus	Semester -V	Teaching Hours/Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETP3	L	T	P	CIA	SEA	100	3	Nil
Course Name	Infrastructure Planning & Management	3	0	0	40	60			

Course Objectives:

- To remember & understand various concepts of infrastructure.
- To understand the involvement of the private sector in infrastructure.
- To learn about challenges in successful infrastructure planning and implementation
- To apply strategies for successful infrastructure project implementation.
- To Understand sustainable development of infrastructure.

Unit	Content	Teaching/ Lecture Hours
I	An Overview of Basic Concepts Related to Infrastructure: Introduction to Infrastructure, an overview with regards to Indian sectors(i) Power Sector, (ii) Water Supply and Sanitation Sector in India., (iii) Road, Rail, Air and Port Transportation Sectors, (iv) Telecommunications, (v) Urban Infrastructure (vi) Rural Infrastructure.	8
II	Private Involvement in Infrastructure: A Historical Overview of Infrastructure Privatization. The Benefits of Infrastructure Privatization, Problems with Infrastructure Privatization, Challenges in Privatization of Water Supply, Privatization of Infrastructure in India.	8
III	Challenges to Successful Infrastructure Planning and Implementation: Mapping and Facing the Landscape of Risks in Infrastructure Projects, Economic and Demand Risks, Socio-Environmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure, Challenges in Construction and Maintenance of Infrastructure.	9
IV	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.	9
V	Sustainable Development of Infrastructure: Information Technology and Systems for Successful Infrastructure Management, - Innovative Design and Maintenance of Infrastructure Facilities, Infrastructure Modeling and Life Cycle Analysis Techniques, Capacity Building and Improving the Governments Role in Infrastructure Implementation, An Integrated Framework for Successful Infrastructure Planning and Management - Infrastructure Management Systems and Future Directions.	10
Total Lecture Hours		44

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Course Outcomes: At the end of the course completion, a student is able

- CO1** To remember & understand the basic concepts related to Infrastructure Projects.
CO2 To understand the role of the private sector in infrastructure growth.
CO3 To apply the strategies for successful Infrastructure Project implementation.
CO4 To apply Infrastructure modelling and Life Cycle Analysis Techniques.
CO5 To Create Sustainable development plans for various Infrastructure projects.

Text Books: -

- Goodman, A. S., & Hastak, M. (2006). Infrastructure Planning Handbook: Planning, Engineering, and Economics. McGraw Hill/ASCE Press.
- Grigg, N. (1988). Infrastructure Engineering and Management. Wiley.

Reference Books: -

- Hudson, W., & Ralph. (1997). Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation, and Renovation. Tata McGraw Hill.
- Haas, R., Hudson, W. R., & Zaniewski, J. (1994). Modern Pavement Management. Krieger Publishing Company.
- Hudson, W. R., Haas, R., & Uddin, W. (1997). Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation, and Renovation. McGraw Hill.

COs, POs, and PSOs Mapping (Infrastructure Planning & Management: CEUETP3)

PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	1	1	2	1	1	3	1		3	2	2	2	
CO2	1	2	2		2	2	1	2	2		3	2	1	2	
CO3	1				2	1		2	1		3	1	1	2	
CO4	2	1	2	1	1		2				3		1	2	
CO5	1	1	2		1	2	3				1		1	2	



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Syllabus	Semester -V	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETP4	L	T	P	CIA	SEA	100	3	Nil
Course Name	Disaster Preparedness and Planning Management	3	0	0	40	60			

Course Objectives:

- To understand basic ideas in disaster management
- To know the definitions and terms used in disaster management
- To understand the types and classes of disasters.
- To know the challenges posed by disasters
- To understand the influences of disasters on skills

Unit	Content	Teaching/ Lecture Hours
I	Introduction - Concepts and definitions; disaster, hazard, vulnerability, resilience, risks severity, frequency and details, capacity, impact, prevention, mitigation.	6
II	Disasters - Disasters classification: natural disasters, floods, drought, cyclones, volcanoes, earthquakes, tsunamis, landslides, soil erosion, forest fires; manmade disasters; industrial pollution, nuclear disasters, chemical spills, biological disasters, structural failures-buildings, and bridges. Transportation accidents-air, rail & road, war & terrorism.	10
III	Disaster Impacts - Disaster impacts on environmental, physical, social, ecological, economic, political, health, and demographic aspects; hazard locations; global and national disaster trends and urban disasters. addressing the problem of climate change	8
IV	Disaster Risk - Its concept and phases; prevention, mitigation, preparedness, relief, and recovery; structural and non-structural, risk analysis, vulnerability and capacity assessment; disaster risk reduction and planning management, early warning systems, post-disaster environmental response, roles and responsibilities of government and community	10
V	Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land use changes, urbanization etc.), sustainable and environment friendly recovery; reconstruction and development methods.	8
Total Lecture Hours		42

Course Outcomes: At the end of the course completion, a student is able

- CO1** To apply disaster concepts to management
CO2 To analyze the relationship between development and disasters
CO3 To understand Categories of Disasters
CO4 To the realization of the responsibilities to society
CO5 To understand the impacts of disasters skills and application of disaster concepts to management.

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Text Books: -

- Rai, N., & Singh, A. K. (2021). Disaster Management in India: Perspectives, Issues and Strategies. New Royal Book Company.
- Bhattacharya, T. (2017). Disaster Science and Management. McGraw Hill Education (India) Private Limited.
- Sahni, P. (2004). Disaster Risk Reduction in South Asia. Prentice Hall.

Reference Books: -

- Singhal, J. P. (2019). Disaster Management. Laxmi Publications.
- Singh, J. (2013). Disaster Management: Future Challenges and Opportunities. K W Publishers Private Limited.
- Pandey, M. (2014). Disaster Management. Wiley India Private Limited.

COs, POs, and PSOs Mapping (Disaster Preparedness and Planning Management: CEUETP4)

PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	2									3		
CO2	3	2	1	2									3		
CO3	3	2	1	2									3		
CO4	3	2	1	2	3								3		1
CO5	3	2	1	2	3								3		1



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Syllabus	Semester -V	Teaching Hours/Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETP5	L	T	P	CIA	SEA	100	3	CEUCTT2, CEUDTT2
Course Name	Basics of Computational Hydraulics	3	0	0	40	60			

Course Objectives:

- To provide knowledge on the application of computational fluid mechanics to different Civil engineering problems.
- To Provide knowledge on conservation law and the numerical approach to solve by converting different forms of partial differential equations.
- To Provide some experience in the software engineering skills associated with the implementation of MATLAB computer programming and use of Computational Fluid Dynamics (CFD) software.
- To study the analysis of Open Channel Flow
- To learn about water surface profiles.

Unit	Content	Teaching/ Lecture Hours
I	Introduction, significance of computational hydraulics, discrete forms of mass, momentum, and energy conservation laws, examples of free surface flows.	8
II	Continuous forms of the conservation laws, lateral inflow's 1-D expansions, and contractions, homogeneous and stratified fluid flows.	9
III	Introduction to computer programming and computation with MATLAB and using of Computational Fluid Dynamics (CFD) software.	8
IV	Pipe flow analysis, Open channel flow: Types of Open Channel Flow, Estimation of normal and critical depth, uniform flow computations	9
V	Computation of water surface profile (WSP) gradually varied flow estimation using direct step methods.	8
Total Lecture Hours		42

Course Outcomes: At the end of the course completion, a student is able

- CO1** To evaluate the governing equations based on conservation principles in fluid flow problems
CO2 To apply the finite difference method to the fluid flow problems
CO3 To analyze model fluid dynamics using MATLAB and CFD software.
CO4 To apply the computational methods in open channel flow
CO5 To apply direct step methods on the water surface profile

Text Books: -

- Jayanti, S. (2018). Computational Fluid Dynamics for Engineers and Scientists. Springer.
- Hoffman, J. D. (2011). Numerical Methods for Engineers and Scientists. CRC Press, Special Indian Edition.
- Choudhary, M. H. (1997). Applied Hydraulic Transients. Van Nostrand Reinhold.

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Reference Books: -

- Abbot, M. B., & Minns, A. W. (1994). Computational Hydraulics. Ashgate Publication.
- Anderson, J. D. (1995). Computational Fluid Dynamics. McGraw Hill.

COs, POs, and PSOs Mapping (Basics of Computational Hydraulics: CEUETP5)

PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3		2									3		
CO2	3	3		2									3		
CO3	3	3		2	3								3	3	
CO4	3	3		2									3		
CO5	3	3		2									3		



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Syllabus	Semester -V	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUULT1	L	T	P	CIA	SEA	50	1	CEUETT3
Course Name	Highway Engineering Lab	0	0	2	25	25			

Course Objectives:

- To study the physical properties of road aggregate & their laboratory test.
- To determine the properties of bitumen and bituminous mix.
- To determine the CBR value for subgrade soil

List of Experiments (Minimum 10 experiments to be performed)

1. To determine the crushing value of the given aggregate sample.
2. To determine the abrasion value of the given aggregate sample by loss angles apparatus.
3. To determine the impact value of the given aggregate sample.
4. To determine the elongation index of the given aggregate sample.
5. To determine the flakiness index of the given aggregate sample.
6. To determine the water absorption of the given coarse aggregate.
7. To determine the specific gravity of the given coarse aggregate.
8. To determine the penetration value of the given bitumen material.
9. To determine the softening point of the given bitumen material.
10. To determine the ductility of the given bitumen material.
11. To determine the viscosity of the given bitumen material
12. To determine the optimum binder content of bituminous mix.
13. To determine the California Bearing Ratio (CBR) value of subgrade soil.

Course Outcomes: At the end of the course completion, a student is able

- CO1** To recognize the knowledge about different physical properties of aggregates by performing different tests on road aggregates
- CO2** To determine the various properties of bitumen by performing various tests on it.
- CO3** To compute the strength of subgrade soil by CBR test.

Text Books: -

- 1 Khanna, S.K. & Justo, C.E.G. (2015). Highway Material Testing. Nem Chand and Bros
- 2 Khanna, S.K., Justo, A. & Veeraragavan, A. (2013). Highway Materials and Pavement Testing. Nem Chand and Bros.

Reference Books: -

- 1 Indian Roads Congress, IRC. (2014). Handbook of Quality Control for Construction of Roads and Runways.
- 2 Kandhal, P.S. (2017). Bituminous Road Construction in India. PHI Learning Pvt. Limited.



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Syllabus	Semester -V	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUETT2	L	T	P	CIA	SEA	50	1	CEUETT4
Course Name	Geotechnical Engineering Lab	0	0	2	25	25			

Course Objectives:

- To Develop practical skills in conducting soil testing.
- To analyze various soil test results for design and analysis
- To demonstrate proficiency in using laboratory equipment and following standardized testing procedures.

List of Experiments (Minimum 10 experiments to be performed)

1. Visual identification and water content determination
2. To determine the specific gravity of soil solids by using a density bottle and pycnometer method.
3. To determine the particle size of the soil by the dry and wet methods.
4. To determine the particle size of the soil by the hydrometer analysis
5. To determine the Atterberg limit of the test.
6. To determine the compaction characteristics of soil.
7. To determine the maximum and minimum density of sand
8. To determine in-situ density by sand replacement and core cutter method
9. To determine the permeability of the soil by constant head and falling head test.
10. To determine the shear strength of the parameter of coarse-grained soil by direct shear test.
11. To determine the unconfined compressive strength test
12. To demonstrate triaxial UU test.
13. To demonstrate consolidation test.

Course Outcomes: At the end of the course completion, a student is able

- CO1** To identify and measure the basic soil properties such as visual identification and water content.
- CO2** To determine specific gravity, particle size distribution, and Atterberg limits of soil samples.
- CO3** To evaluate compaction characteristics and in-situ density using standard methods
- CO4** To assess permeability and shear strength parameters of soil through various tests.
- CO5** To perform advanced soil tests, including unconfined compressive strength, triaxial tests, and consolidation tests

Text Books: -

- 1 Das, B. M. (2013). Soil Mechanics Laboratory Manual (8th ed.). Oxford University Press.
- 2 Lambe, T. W. (1967). Soil Testing for Engineers. MIT Press.
- 3 Head, K. H. (2006). Manual of Soil Laboratory Testing. Whittles Publishing.

Reference Books: -

- 1 Bowles, J. E. (1992). Engineering Properties of Soils and Their Measurement (4th ed.). McGraw-Hill.
- 2 Germaine, J. T., & Germaine, A. V. (2009). Geotechnical laboratory measurements for engineers. John Wiley & Sons.



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Syllabus	Semester -V	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUEPF1	L	T	P	CIA	SEA	100	2	Nil
Course Name	Mini Project-II			4	50	50			



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Syllabus	Semester -VI	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUFLT1	L	T	P	CIA	SEA	50	1	CEUETT5
Course Name	Environmental Engineering Lab	0	0	2	25	25			

Course Objectives:

- To understand about the equipment used to conduct the test procedures and perform the experiments in the lab.
- To determine the physical, chemical and biological characteristics of water and waste water through practical tests.
- To determine optimum dosage of coagulant and other critical tests to find the quality of water.
- To examine and Estimate water, waste water and create Develop a report on the quality aspect of the environment.
- To compare the water with prescribed standards set by the local governments

Course Content:

- Determination of turbidity for a given sample of water.
- Determination of electrical conductivity for a given sample of water.
- Determination of Total Solids, Suspended Solids, Dissolved Solids and Volatile Solids in a given sample of water.
- Determination of pH for a given sample of water.
- Determination of carbonate, bi-carbonate and hydroxide alkalinity for a given sample of water.
- Determination of hardness for a given sample of water.
- Determination of concentration of Iron in a given sample of water.
- Determination of concentration of Chlorides in a given sample of water.
- Determination of the Optimum Alum Dose for a given sample of water through Jar Test.
- Determination of the Chlorine Demand and Break-Point Chlorination for a given sample of water.
- Determination of amount of Dissolved Oxygen (DO) in a given sample of water.
- Determination of the Biochemical Oxygen Demand (BOD) for a given sample of wastewater.
- Determination of the Chemical Oxygen Demand (COD) for a given sample of wastewater.
- Determination of Coliform Bacteria: presumptive test, Confirmative test and Determination of MPN.

Course Outcomes: At the end of the course completion, a student is able

- CO1** To develop a working knowledge about the laboratory test used for the determination of physical properties of water and waste water.
- CO2** To develop a working knowledge about the laboratory test used for the determination of chemical properties of water and wastewater
- CO3** To develop a working knowledge about the laboratory test used for the determination of

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biological properties of water and wastewater

- CO4** To evaluate the behavior based on lab results and classify water and wastewater as per IS specifications

- CO5** To assess the quality of water and wastewater for various purposes.

COs, POs, and PSOs Mapping (Environmental Engineering Lab: CEUFLT1)

PO \ CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2				1	3			2	2		2	1		1
CO2	2				1	3	2		2	2		2	1		1
CO3	1					3			2	3		2	1		1
CO4	1	1	1						2	2		2	2		1
CO5	2	1	2	2				2	2	2		2	2		1



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Syllabus	Semester -VI	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUFLT2	L	T	P	CIA	SEA	50	1	CEUDTT1, CEUETT1, CEUETT2
Course Name	Computer Applications in Civil Engineering Lab	0	0	2	25	25			

Course Objectives:

- To understand the need for software tools for analysis and design of Civil Engineering Structures.
- To use MS Excel tools for Analysis and Design of Civil Engineering Structures
- To use STAAD Pro for Modelling, Analysis and Design of Civil Engineering Structures
- To understand the need for software tools for analysis and design of Civil Engineering Structures.

Course Content:

Minimum 10 problems to be solved either by using STAAD Pro/Excel Programming

USING MS EXCEL Programs

- Analysis of simple beams
- Design of simply supported RCC beams
- Design of columns
- Design of isolated footing (Flat, stepped and sloped)
- Design of combined footings
- Design of cantilever retaining walls
- Design of slabs (One way and Two way)

USING STAAD Pro

- Analysis of simple beams and Frames (2-D)
- Analysis of multi storey frames for DL and LL
- Analysis of multi storey frames for DL, LL, WL/EQL
- Design of structural elements
- Analysis and design of combined footing
- Analysis and design of roof truss
- Analysis of simple beams for rolling loads

Course Outcomes: At the end of the course completion, a student is able

- CO1** To analyse 2D and 3D frames using MS EXCEL
CO2 To design RCC beams, columns, footing, cantilever retaining walls and slabs using MS EXCEL
CO3 To analyse beams and frames (2-D), multi-storey frames for DL, LL, WL/EQL using STAAD Pro
CO4 To design various RCC components of buildings using STAAD Pro
CO5 To analyse and design roof truss and simple beams for rolling loads using STAAD Pro

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COs, POs, and PSOs Mapping (Computer Applications in Civil Engineering Lab : CEUFLT2)

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3				3			3	3	3	3
CO2	3	3	2	2	3				3			3	3	3	3
CO3	3	3	2	2	3				3			3	3	3	3
CO4	3	3	2	2	3				3			3	3	3	3
CO5	3	3	2	2	3				3			3	3	3	3



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Syllabus	Semester -VI	Teaching Hours/ Week			Continuous Internal Assessment	Semester Examination Assessment	Total Marks	Credits	Pre-requisite Course(s)
Course Code	CEUFPF1	L	T	P	CIA	SEA	100	2	Nil
Course Name	Mini Project-III	0	0	4	50	50			