Zeal Education Society's

ZEAL COLLEGE OF ENGINEERING & RESEARCH, PUNE–41

(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

NBA Accredited, NAAC Accredited with A+ Grade, ISO21001:2018

DEPARTMENT OF CIVIL ENGINEERING

Curriculum Structure and Syllabus of

S.Y. B. Tech. – Civil Engineering

(With effect from – Academic Year 2026-27)
(2025 Pattern)

VISION OF THE INSTITUTE

To be a premier institute in technical education by imparting academic excellence, research, social and entrepreneurial attitude.

MISSION OF THE INSTITUTE

- To achieve academic excellence through innovative teaching and learning process.
- To imbibe the research culture for addressing industry and societal needs.
- To inculcate social attitude through community engagement initiatives.
- To provide conducive environment for building the entrepreneurial skills.

DEPARTMENTOFCIVILENGINEERING

VISION:

To contribute to the field of Civil Engineering by focusing state of the art technical knowledge, promoting research, nurturing social responsibility and imparting entrepreneurial attitude.

MISSION:

M1: To strengthen academics with holistic teaching learning practices.
M2: To inculcate a research approach pertaining to the civil engineering domain.
M3: To foster students for the development of entrepreneurial skills.
M4: To nurture the sense of ethics, morality and social responsibility.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Graduates will be proficient in critical thinking and problem solving based on a broad range of civil engineering technical areas.
PEO2: Graduates will be good decision makers with a blend of ethical, global, regional and local concerns, effective communication and leadership.
PEO3: Graduates will be able to contribute to society by civic engagement.
PEO4: Graduates will attain the pursuit of professional development and ever learning.

PROGRAM OUT COMES (POs):

PO1: Engineering knowledge: Apply the knowledge of mathematics, natural science, computing, and engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2: Problem analysis: Identify, formulate, and analyze complex engineering problems, reaching substantiated conclusions with consideration for the holistic nature of the problem.
PO3: Design /development of solutions: Design creative solutions for complex engineering problems and design systems, components, or processes to meet identified needs — with consideration for public health and safety, and cultural, societal, and environmental factors. Sustainability is now intrinsic to design.
PO4: Conduct investigations of complex problems: Conduct investigations of complex engineering problems using research-based knowledge and research methods, including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5: Engineering tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling — recognizing their limitations — to solve complex engineering problems.

PO6: The engineer and the world: Analyze and evaluate societal and environmental aspects while solving complex engineering problems, considering their impact on sustainability with reference to economy, health, safety, legal frameworks, culture, and the environment.

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity, and inclusion; and adhere to relevant national and international laws

PO8: Individual and team work: Function effectively as an individual, and as a member or leader in diverse and multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and with society at large — comprehending and writing effective reports and design documentation, and making effective presentations — considering cultural, language, and learning differences.

PO10: Project management and finance: Apply knowledge and understanding of engineering management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects in multi-disciplinary environments.

PO11: Life-long learning: Recognize the need for, and have the preparation and ability for, independent and life-long learning, adaptability to new and emerging technologies, and critical thinking in the broadest context of technological change.

PROGRAMSPECIFICOUTCOMES (PSOs):

PSO1: Graduates will be able to develop the professional skills for analyzing and designing of structural, geotechnical, transportation, environmental, irrigation and hydraulic systems to cater societal and / or industrial needs.

PSO2: Graduates will be able to apply the knowledge pertaining to surveying, construction and / or management, town planning, estimation, valuation and soft computing tools to solve real time problems related to civil engineering.

LIST OF ABBREVIATIONS

Abbreviation	Description
BSC	Basic Science Course
ESC	Engineering Science Course
PCC	Program Core Course
PEC	Program Elective Course
MDM	Multidisciplinary Minor
OE	Open Elective-Other than a particular program
VSEC	Vocational and Skill Enhancement Course
AEC	Ability Enhancement Course
ENTR	Entrepreneurship
EC	Economics
MC	Management Courses
IKS	Indian Knowledge System
VEC	Value Education Courses
RM	Research Methodology
CEP	Community Engagement Project
FP	Field Project
PROJ	Project
INT	Internship
OJT	On Job Training
CC	Co-curricular Courses
HSSM	Humanities Social Science and Management
ELC	Experiential Learning Course
B. Tech	Bachelor of Technology
L	Lecture
P	Practical
T	Tutorial
H	Hours
CR	Credits
CIE	Continuous Internal Evaluation
ETE	End Term Evaluation
TW	Term Work
OR	Oral
PR	Project

DEPARTMENT OF CIVIL ENGINEERING

Second Year B. Tech. – Civil Engineering: Semester- III

Course Code	Course Type	Course Name	Teaching Scheme (hrs/Week)							Evaluation Scheme					
			L	P	T	H	CR			CIE	ETE	TW	PR	OR	Total
							TH	PR/Tut	Total						
25CEPC302	PCC	Structural Mechanics	3		-	3	3	-	3	40	60	-	-	-	100
25CEPC302P	PCC	Structural Mechanics Lab		2			-	1	1	-	-	-	-	25	25
25CEPC303	PCC	Geotechnical Engineering	3		-	3	3	-	3	40	60	-	-		100
25CEPC303P	PCC	Geotechnical Engineering Lab	-	2	-	2	-	1	1	-	-	-	-	25	25
25CEMD301	MDM	Mathematics for Civil Engineers	3	-	-	3	3	-	3	40	60	-	-	-	100
25ALOE301	OE	Open Elective - I#	2	-	-	2	2	-	2	-	-	50	-	50	100
25CEMC301	HSSM-MC	Project Management	3	-	-	3	3	-	3	40	60	-	-	-	100
25CEVS303	VSEC	Computer Aided Building Drawing	1	4	-	5	1	2	3	-	-	25	50	-	75
25CECE301	CEP	Project Based Learning	-	2	-	2	-	1	1	-	-	25	-	-	25
25CECC305	CC	Liberal Learning – III*	-	2	-	2	-	1	1	-	-	25	-	-	25
25CEIN301	ELC - INT	Internship - I*	4 Weeks				-	2	2	-	-	25	-	-	25
Total			**15**	**12**	**-**	**25**	**15**	**8**	**23**	**160**	**240**	**150**	**50**	**100**	**700**

BoS Chairman

ZES's Zeal College of Engineering & Research, Narhe, Pune-41, PU/PN/Engg./285/2007

Director
ZES's Zeal College of Engineering & Research
Narhe, Pune - 411041.

DEPARTMENT OF CIVIL ENGINEERING

Second Year B. Tech. – Civil Engineering: Semester- III

# - Select any one course from the given Open Elective Courses		
Course Code	**Course Type**	**Open Elective - I**
25ALOE301A	OEC	Digital Literacy and Applications
25ALOE301B		Environmental Studies
25ALOE301C		Green Energy and Sustainability
25ALOE301D		Basics of Consumer Electronics
25ALOE301E		Renewable Energy Systems

*** Liberal Learning – III: Choose any one from the following:**

Sr. No.	Course Code	Module	Sr. No.	Course Code	Module
1.	25CECC305A	Guitar	6.	25CECC305F	Basketball
2.	25CECC305B	Singing	7.	25CECC305G	Cricket
3.	25CECC305C	Cinematography	8.	25CECC305H	Rifle and Pistol Shooting
4.	25CECC305D	Dance	9.	25CECC305I	Volleyball
5.	25CECC305E	Synthesizer	10.	25CECC305J	Football

BoS Chairman

ZES's Zeal College of Engineering & Research Narhe, Pune-41 PU/PN/Engg./285/2007

Director
ZES's Zeal College of Engineering & Research
Narhe, Pune - 411041.

DEPARTMENT OF CIVIL ENGINEERING

Second Year B. Tech. – Civil Engineering: Semester - IV

Course Code	Course Type	Course Name	Teaching Scheme (hrs/Week)							Evaluation Scheme					
			L	P	T	H	CR			CIE	ETE	TW	PR	OR	Total
							TH	PR/Tut	Total						
25CEPC404	PCC	Fluid Mechanics	3	-	-	3	3	-	3	40	60	-	-	-	100
25CEPC404P	PCC	Fluid Mechanics Lab	-	2	-	2	-	1	1	-	-	-	-	25	25
25CEPC405	PCC	Surveying	3	-	-	3	3	-	3	40	60	-	-	-	100
25CEPC406	PCC	Structural Analysis	3	-	-	3	3	-	3	40	60	-	-	-	100
25CEMD402	MDM	Construction Management	3	-	-	3	3	-	3	40	60	-	-	-	100
25ALOE402	OE	Open Elective - II #	2	-	-	2	2	-	2	-	-	50	-	50	100
25CEAE402	HSSM-AEC	Generative AI	-	4	-	4	-	2	2	-	-	50	-	-	50
25CEVE401	VEC	Professional Communication Etiquette	-	2	-	2	-	1	1	-	-	25	-	-	25
25CEVS404	VSEC	Surveying Practices	-	4	-	4	-	2	2	-	-	-	50	-	50
25CECC406	CC	Liberal Learning – IV*	-	2	-	2	-	1	1	-	-	25	-	-	25
25CEIN402	ELC - INT	Internship - II*	4 Weeks				-	2	2	-	-	25	-	-	25
Total			**14**	**14**	**-**	**28**	**13**	**11**	**23**	**160**	**240**	**175**	**50**	**75**	**700**

BoS Chairman

ZES's Zeal College of Engineering & Research, Narhe, Pune-41 PU/PN/Engg./285/2007

Director
ZES's Zeal College of Engineering & Research
Narhe, Pune - 411041.

DEPARTMENT OF CIVIL ENGINEERING

Second Year B. Tech. – Civil Engineering: Semester - IV

# - Select any one course from the given Open Elective Courses		
Course Code	**Course Type**	**Open Elective - II**
25ALOE402A	OEC	Cyber Security and Laws
25ALOE402B		Sustainability and Climate Change
25ALOE402C		Energy Audit and Electrical Safety
25ALOE402D		Digital Marketing
25ALOE402E		Entrepreneurship and Innovations

*** Liberal Learning – IV: Choose any one from the following:**

Sr. No.	Course Code	Module	Sr. No.	Course Code	Module
6.	25CECC406A	Guitar	6.	25CECC406F	Basketball
7.	25CECC406B	Singing	7.	25CECC406G	Cricket
8.	25CECC406C	Cinematography	8.	25CECC406H	Rifle and Pistol Shooting
9.	25CECC406D	Dance	9.	25CECC406I	Volleyball
10.	25CECC406E	Synthesizer	10.	25CECC406J	Football

BoS Chairman

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DEPARTMENT OF CIVIL ENGINEERING

INDEX

Sr. No.	Course Code	Course Name	Page No.
Second Year B. Tech.: Semester III			
1.	25CEPC302	Structural Mechanics	1
2.	25CEPC302P	Structural Mechanics Lab	4
3.	25CEPC303	Geotechnical Engineering	6
4.	25CEPC303P	Geotechnical Engineering Lab	8
5.	25CEMD301	Mathematics for Civil Engineers	10
6.	25ALOE301	Open Elective – I #	12
7.	25CEMC301	Project Management	23
8.	25CEVS303	Computer Aided Building Drawing	25
9.	25CECE301	Project Based Learning	27
10.	25CECC305	Liberal Learning – III*	31
11.	25CEIN301	Internship - I*	51
Second Year B. Tech.: Semester IV			
12.	25CEPC404	Fluid Mechanics	54
13.	25CEPC404P	Fluid Mechanics Lab	56
14.	25CEPC405	Surveying	58
15.	25CEPC406	Structural Analysis	60
16.	25CEMD402	Construction Management	62
17.	25ALOE402	Open Elective - II #	64
18.	25CEAE402	Generative AI	76
19.	25CEVE401	Professional Communication Etiquette	78
20.	25CEVS404	Surveying Practices	80
21.	25CECC406	Liberal Learning – IV*	82
22.	25CEIN402	Internship - II*	102

DEPARTMENT OF CIVIL ENGINEERING

SYLLABUS

SEMESTER- III

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Structural Mechanics									**Code:**25CEPC302
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Fundamentals of Physics, Mathematics and Engineering Mechanics.

Course Objectives:

1. To enable students to analyze various types of stresses and strains developed in determinate and indeterminate structural members.
2. To develop students' ability to construct and interpret Shear Force and Bending Moment Diagrams for determinate beams.

Course Outcomes: After completion of this course students will be able to -

CO1	Analyze simple stresses and strains in determinate and indeterminate members including thermal stresses.
CO2	Construct shear force and bending moment diagrams for determinate beams under various loads.
CO3	Calculate shear and bending stresses in structural members using derived formulae.
CO4	Determine principal stresses and strains and identify critical planes in loaded members.
CO5	Evaluate load-carrying capacity and stress distribution in columns under axial and eccentric loads.
CO6	Compute slope and deflection of beams and trusses using Macaulay's and energy methods.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Simple Stresses and Strains** a) Materials used in construction and their nature, Hook's Law, Stress-Strain Diagram for elastic, plastic materials and brittle material, Idealized stress-strain diagram , Concept of axial stresses (compression, tension), strains(linear, lateral, shear and volumetric), Elastic constants and their relations. Stresses and strains due to change in temperature. b) Stresses, strains and deformations in determinate and indeterminate structures for homogeneous and composite structures under concentrated loads and temperature changes.	06
2.	**Shear Force and Bending Moment Diagram** Concept of shear force and bending moment. Relation between shear force, bending moment and intensity of loading. Shear force and bending moment diagrams for determinate beams due to concentrated, uniformly distributed, uniformly varying loads and couples. Bending moment and loading diagram from given shear force diagram.	07
3.	**Shear and Bending Stresses** a) Shear stresses in beams: concept of shear, complimentary shear, derivation of shear stress formula, shear stress distribution for various cross sections, maximum and average shear stress for circular and rectangular sections. b) Bending stresses in beams: theory of simple or pure bending, assumptions, derivation of flexure formula, bending stress distribution diagrams	08

4.	**Principal Stresses and Strains** Principal stresses and strains: concept of principal planes and principal stresses, normal and shear stresses on an oblique plane, magnitude and orientation of principal stresses and maximum shear stress.	06
5.	**Axially and Eccentrically Loaded Columns.** a) Axially loaded columns: concept of critical load and buckling, Euler's formula for buckling load with hinged ends, concept of equivalent length for various end conditions, Rankine's formula, safe load on column and limitations of Euler's formula. b) Effect of lateral force and self-weight. Resultant stress diagrams due to axial loads, uni-axial, and bi-axial bending. Concept of core of section for solid and hollow rectangular and circular sections.	06
6.	**Slope and Deflection of Beams and Trusses** Slope and deflection of determinate beams by Macaulay's method and Strain energy method, Castigliano's first theorem, Joint displacement of determinate trusses by Unit load method.	06
	TOTAL	**39**

Text Books:

1. Theory of Structures by S. Ramamrutham and R. Narayan, Dhanpat Rai Publishing Company (P) Ltd.
2. Structural Analysis-I & II by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd.
3. Structural Analysis: A Matrix Approach by G.S. Pandit and S. P. Gupta, Tata McGraw Hill Education Pvt. Limited.

Reference Books:

1. Intermediate Structural Analysis by C. K. Wang, Tata McGraw Hill Education Pvt. Ltd.
2. Mechanics of Structures Vol. II (Theory and Analysis of Structures) by Dr. H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.
3. Basic Structural Analysis by C. S. Reddy, Tata McGraw Hill Education Pvt. Ltd.
4. Structural Analysis by R. C. Hibbler, Pearson Education.

DEPARTMENT OF CIVILENGINEERING

E-Resources:

1. Understanding Stress-Strain Concepts in Various Structures
   NPTEL - Application of Stress/Strain
   https://www.youtube.com/watch?v=U7CPRj1T5n8

   NPTEL - Analysis of Stress
   https://www.youtube.com/watch?v=iNG4bLMyeFA

2. Calculating Shear Force and Bending Moment in Determinate Beams
   NPTEL - Shear Force and Bending Moment Diagram (Part 1 of 3):
   https://www.youtube.com/watch?v=yw6o79KdnFI

   NPTEL - Beams II
   https://www.youtube.com/watch?v=74pm8A0RJ-0

   Explaining Shear and Bending Stresses in Beams
   NPTEL - Stresses in Beams – III
   https://www.youtube.com/watch?v=7Lda4Bi5g_M

3. Applying Theory of Torsion and Understanding Principal Stresses
   NPTEL - Torsion – I
   https://www.youtube.com/watch?v=IQB0bJRCRxo

4. Examples on Principal Stresses - Engineering Video Lectures:
   https://engineeringvideolectures.com/video/15026

5. Analyzing Axially and Eccentrically Loaded Columns
   Design of Column with Uniaxial Moment | Eccentrically Loaded Column:
   https://www.youtube.com/watch?v=Oi5XZ8rC-HM

6. Initially Bent Columns - Class Central:
   https://www.classcentral.com/course/youtube-imperfect-columns-438036

7. Determining Slopes and Deflections in Beams and Trusses
   NPTEL - Deflection of Beams - I:
   https://www.youtube.com/watch?v=GUOKSExdjq8

   NPTEL - Slope Deflection Method (Part - 1):
   https://www.youtube.com/watch?v=dXvvhUrMfAU

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Structural Mechanics Lab									**Code:**25CEPC302P
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	-	25	-	25

Prerequisites:

Fundamentals of Physics, Mathematics and Engineering Mechanics.

Course Objectives:

1. To provide students with practical knowledge of the mechanical behavior and strength characteristics of steel, timber, plywood, bricks, and flooring materials through standard laboratory tests.
2. To develop students' ability to conduct, analyze, and interpret tension, shear, torsion, impact, compression, bending, compressive strength, and flexural strength tests.

Course Outcomes: After completing the Structural Mechanics Laboratory, students will be able to -

CO1	Select and conduct appropriate tests to evaluate the tensile, shear, torsional, impact, compressive, bending, and flexural properties of structural materials.
CO2	Analyze and interpret field and laboratory test results to assess the strength, quality, and suitability of steel, timber, plywood, bricks, and flooring tiles.
CO3	Compare structural materials based on their mechanical properties, performance, availability, and cost, and recommend suitable materials for construction applications.

List of Experiments: Perform any eight (8) Experiments

1. Tension test on mild and TMT steel.
2. Shear (Single & Double) test on mild steel.
3. Torsion test on mild steel.
4. Impact (Izod & Charpy) test on mild steel/aluminum/brass.
5. Compression test on timber (Parallel & Perpendicular)
6. Bending test on timber and plywood.
7. Field tests on bricks.
8. Compressive strength test on bricks
9. Flexural strength of flooring tiles.
10. Market survey of structural materials including its costing.

Reference Books:

1. Intermediate Structural Analysis by C. K. Wang, Tata McGraw Hill Education Pvt. Ltd.
2. Mechanics of Structures Vol. II (Theory and Analysis of Structures) by Dr. H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.
3. Basic Structural Analysis by C. S. Reddy, Tata McGraw Hill Education Pvt. Ltd.
4. Structural Analysis by R. C. Hibbler, Pearson Education.

DEPARTMENT OF CIVILENGINEERING

E-Resources:

1. Understanding Stress-Strain Concepts in Various Structures
   NPTEL - Application of Stress/Strain
   https://www.youtube.com/watch?v=U7CPRj1T5n8

   NPTEL - Analysis of Stress
   https://www.youtube.com/watch?v=iNG4bLMyeFA

2. Calculating Shear Force and Bending Moment in Determinate Beams
   NPTEL - Shear Force and Bending Moment Diagram (Part 1 of 3):
   https://www.youtube.com/watch?v=yw6o79KdnFI

   NPTEL - Beams II
   https://www.youtube.com/watch?v=74pm8A0RJ-0

   Explaining Shear and Bending Stresses in Beams
   NPTEL - Stresses in Beams – III
   https://www.youtube.com/watch?v=7Lda4Bi5g_M

3. Applying Theory of Torsion and Understanding Principal Stresses
   NPTEL - Torsion – I
   https://www.youtube.com/watch?v=IQB0bJRCRxo

4. Examples on Principal Stresses - Engineering Video Lectures:
   https://engineeringvideolectures.com/video/15026

5. Analyzing Axially and Eccentrically Loaded Columns
   Design of Column with Uniaxial Moment | Eccentrically Loaded Column:
   https://www.youtube.com/watch?v=Oi5XZ8rC-HM

6. Initially Bent Columns - Class Central:
   https://www.classcentral.com/course/youtube-imperfect-columns-438036

7. Determining Slopes and Deflections in Beams and Trusses
   NPTEL - Deflection of Beams - I:
   https://www.youtube.com/watch?v=GUOKSExdjq8

   NPTEL - Slope Deflection Method (Part - 1):
   https://www.youtube.com/watch?v=dXvvhUrMfAU

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Geotechnical Engineering									**Code:**25CEPC303
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Engineering Mathematics (Differentiation, Integration), Engineering Mechanics (Law of mechanics), Engineering Geology

Course Objectives:

1. To enable students to determine and classify the index and engineering properties of soil.
2. To develop students' ability to assess soil-water interaction and evaluate the effect of static and flowing water on soil strength.

Course Outcomes: After completion of this course students will be able to -

CO1	Determine index properties of soil and classify into different types of soil.
CO2	Evaluate the concept of permeability and apply it to solve seepage problems.
CO3	Differentiate compaction concepts and judge their application to field conditions.
CO4	Determine shear strength parameters using appropriate strength tests.
CO5	Determine the vertical stress, effective stress and its influence on soil behavior.
CO6	Compute the lateral thrust due to backfill on the retaining wall and classify the soil slopes.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Introduction and Index Properties of Soil** a) Basics of geotechnical engineering, its civil engineering applications, soil structure types, and objectives of soil exploration. b) Three-phase soil system, weight-volume relationships, determination and importance of index properties, and soil classification (IS &Unified systems).	06
2.	**Permeability and Seepage** a) Definition and importance of permeability, Darcy's law, influencing factors, lab tests (constant & falling head – IS 2720), field tests (pumping in/out – IS 5529 Part-I), and permeability in stratified soils. b) Seepage concepts, seepage pressure, quicksand and critical gradient, 2D flow equation (Laplace), flow nets – properties, uses, and construction (e.g., for earthen dams).	07
3.	**Compaction** a) Introduction, compaction vs. consolidation, compaction tests (Standard & Modified Proctor), zero air void line, factors affecting compaction, and its impact on soil properties. b) Field compaction methods and equipment for various soils, placement water content, field compaction control using lab test results and proctor needle.	08
4.	**Shear Strength of Soil** a) Introduction to shear strength, Mohr's circle, Mohr-Coulomb theory, effective stress concept, peak vs. residual strength, and influencing factors. b) Shear strength tests: direct shear, triaxial, unconfined compression, vane shear – suitability for soil types, drainage conditions, and properties like	06

	sensitivity and thixotropy in cohesive soils.	
5.	**Stress Distribution in Soils** a) Boussinesq's theory (point and circular load with assumptions and numerical), stress distribution on horizontal and vertical planes, pressure bulb concept and significance. b) Westergaard's theory, equivalent point load method, and approximate stress distribution methods	06
6.	**Earth Pressure and Stability of Slopes** a) Earth pressure basics, Rankine's theory (active, passive, at rest), effects of submerged backfill, surcharge, sloping backfill; Coulomb's wedge theory. b) Slope stability: slope types and failure modes, Taylor's stability number, infinite slopes in cohesive and cohesionless soils.	06
	TOTAL	**39**

Text Books:

1. Soil Mechanics and Foundation Engineering by B. C. Punmia, Laxmi Publications, 16th Edition, 2017.
2. Geotechnical Engineering by Shashi K. Gulhati & Manoj Datta, Tata McGraw Hill, 2017.
3. Principles of Soil Mechanics and Foundation Engineering by V.N.S. Murthy, UBS Publishers, 2018.
4. Soil Mechanics and Foundation Engineering by K. R. Arora, Standard Publisher, 7th Edition, 2019.

Reference Books:

1. Geotechnical Engineering by C. Venkatramaiah, New Age International Publishers, 5th Edition, 2017.
2. Principles of Geotechnical Engineering by Braja M. Das, Cengage Learning, 8th Edition, 2020.
3. Geotechnical Engineering by P. Purushothma Raj, Tata McGraw Hill, 2017.
4. Geotechnical Engineering by Principles & Practices by Donald. P. Coduto, Pearson Education, 2nd Edition, 2017.
5. Basic and Applied Soil Mechanics by Gopal Ranjan and A. S. R. Rao, Newage International, 3rd Edition, 2016.
6. Physical and Geotechnical Properties of Soils by Joseph E. Bowles, International Students Edition.

E-Resources:

1. Competency-Based Model for Predicting Construction Project Managers' Performance http://ascelibrary.org/page/books/sgsp.
2. NPTEL Video Lectures on Geotechnical Engineering https://nptel.ac.in/courses/105105168
3. NPTEL Geotechnical Course https://nptel.ac.in/courses/105101201

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Geotechnical Engineering Lab									**Code:**25CEPC303P
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	-	25	-	25

Prerequisites:

Engineering Mathematics (Differentiation, Integration), Engineering Mechanics (Law of mechanics), Engineering Geology

Course Objectives:

1. To provide students with practical knowledge of soil properties, classification, compaction, permeability, and shear strength through standard laboratory tests.
2. To develop students' ability to conduct, analyze, and interpret geotechnical laboratory experiments in accordance with relevant IS codes and procedures.

Course Outcomes: After completing the Geotechnical Engineering Laboratory, students will be able to:-

CO1	Select and apply appropriate methods to determine soil index properties, including water content, specific gravity, grain-size distribution, and consistency limits, and classify soils using relevant IS codes.
CO2	Evaluate and interpret soil density, permeability, compaction, swelling, and shear-strength characteristics using appropriate field and laboratory tests.
CO3	Analyze soil investigation reports and experimental results, compare soil properties, and recommend suitable soil parameters and testing methods for construction applications.

List of Experiments: (Any 08)

Perform any 8 practicals from the given list. Practical No. 13 is compulsory

1. Water content determination by two methods a) oven drying method, b) calcium carbide method
2. Specific gravity determination by pycnometer /density bottle.
3. Sieve analysis, particle size determination and IS classification as per I.S. Codes.
4. Determination of consistency limits and their use in soil classification as per I.S. Codes.
5. Field density test by a) core cutter b) sand replacement
6. Determination of coefficient of permeability by a) constant head and b) variable head method.
7. Direct shear test.
8. Unconfined compression test.
9. Vane shear test.
10. Standard proctor test / Modified proctor test.
11. Differential free swell test.
12. Triaxial test
13. Collection of sample soil investigation report for any construction project and write report about interpretation of index properties of soil.

Assignments:

1. Solution of problems on shear strength parameters using graph.
2. Rehbann's and Culmann's graphical method for determination of earth pressure.
3. Flow net construction for sheet pile or earthen dam.

Reference Books:
1. Geotechnical Engineering by C. Venkatramaiah, New Age International Publishers, 5th Edition, 2017. 2. Principles of Geotechnical Engineering by Braja M. Das, Cengage Learning, 8th Edition, 2020. 3. Geotechnical Engineering by P. Purushothma Raj, Tata McGraw Hill, 2017. 4. Geotechnical Engineering by Principles & Practices by Donald. P. Coduto, Pearson Education, 2nd Edition, 2017. 5. Basic and Applied Soil Mechanics by Gopal Ranjan and A. S. R. Rao, Newage International, 3rd Edition, 2016. 6. Physical and Geotechnical Properties of Soils by Joseph E. Bowles, International Students Edition.
E-Resources:
1. Competency-Based Model for Predicting Construction Project Managers' Performance http://ascelibrary.org/page/books/sgsp. 2. NPTEL Video Lectures on Geotechnical Engineering https://nptel.ac.in/courses/105105168 3. NPTEL Geotechnical Course https://nptel.ac.in/courses/105101201

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Mathematics for Civil Engineering									**Code:**25CEMD301
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Differential equations of first order and first degree, Integral calculus and vector calculus, Elementary algebra, introductory probability and statistics concepts.

Course Objectives:

1. To equip students with essential mathematical tools and techniques required for solving engineering problems.
2. To develop a strong foundation in partial and ordinary differential equations, their applications in physical systems, and numerical methods for solving complex equations.

Course Outcomes: After completion of this course students will be able to -

CO1	Solve partial differential equations such as the one-dimensional wave and heat equations, and apply them to model physical phenomena like vibrating strings and heat conduction
CO2	Select and apply numerical methods such as Gauss Elimination, Gauss-Seidel, Euler, and Runge-Kutta to solve systems of equations arising in engineering problems.
CO3	Solve higher-order linear differential equations with constant coefficients using appropriate analytical methods and apply them to solve physical and engineering problems.
CO4	Analyze and solve practical engineering problems related to structural mechanics, including bending of beams and buckling of columns, using differential equations.
CO5	Interpret data using descriptive and inferential statistical techniques, and evaluate measures of central tendency, dispersion, correlation, and regression.
CO6	Apply probability theory and statistical inference to model and analyze random processes, including hypothesis testing using Chi-Square test and studying various probability distributions.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Linear Differential Equations (LDE)** Linear Differential Equations (LDE) of nth order with constant coefficients, Complementary function and particular integral, Method of Variation of Parameters, Cauchy's and Legendre's Differential Equation, Symmetric and Simultaneous Differential Equations.	06
2.	**Applications of Differential Equations** Bending of Beams: Freely supported and cantilever beams. Buckling of Columns, rods and Struts.	06
3.	**Numerical Solutions to Linear Systems:** Gauss Elimination Method, Gauss-Seidel Method: Numerical Solutions of Ordinary Differential Equations (ODEs): Euler's Method, Modified Euler's Method, Runge-Kutta Method (4th Order), Predictor-Corrector Methods (Milne's or Adams-Bashforth).	09
4.	**Statistics:** Descriptive Statistics: Measures of Central Tendency: Mean, Median, Mode, Measures of Dispersion: Standard Deviation and Coefficient of Variation,	06

	Higher-Order Statistics: Moments (up to fourth order), Skewness and Kurtosis, Bivariate Data Analysis: Correlation and Linear Regression Analysis.	
5.	**Probability** Definition and Theorems of Probability, random variable, Continuous and Discrete Probability distribution: Binomial Distribution, Poisson Distribution and Normal (Gaussian) Distribution. Statistical Inference: hypothesis testing Chi-Square test for goodness-of-fit.	06
6.	**Partial Differential Equation and its Applications** Partial Differential Equations (PDE), Solution of PDE by Variation of Parameter, modeling and solution of Vibrating String, One and Two-dimensional Heat flow problems	06
	TOTAL	**39**

Text Books:

1. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, Delhi, 40th Edition, 2008.
2. P. N. Wartikar and J. N. Wartikar, "Applied Mathematics, Volume I and II", Pune Vidyarthi Griha Prakashan, Pune.
3. B. V. Ramana, "Engineering Mathematics", Tata McGraw-Hill.
4. H. K. Das, "Higher Engineering Mathematics", S. Chand Publication.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th edition, Wiley Publications, 2015.
2. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, 5e, by (Elsevier Academic Press)
3. B.V. Raman, Engineering Mathematics by (Tata McGraw-Hill).
4. Wylie C.R. Barrett L.C., Advanced Engineering Mathematics, (McGraw-Hill, Inc.)
5. Joel Hass, Christopher Heil, Maurice Weir, "Thomas' Calculus", Pearson India, (13th Edition), (2016).

E-Resources:

1. NPTEL Partial Differential Equation
   https://nptel.ac.in/courses/111108144
2. NPTEL – Numerical Methods
   https://nptel.ac.in/courses/111107105
3. MIT Differential Equations Course
   https://ocw.mit.edu/courses/18-03-differential-equations-spring-2010/
4. NPTEL – Strength of Materials
   https://nptel.ac.in/courses/105105108
5. NPTEL – Probability and Statistics
   https://nptel.ac.in/courses/111105090

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** III
Course: Open Elective – I (Digital Literacy and Applications)									**Code:**25ALOE301A
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Basic computer knowledge, Familiarity with using internet and mobile devices

Course Objectives:

1. To introduce students to fundamental digital skills and online applications.
2. To enhance understanding of modern information and communication technologies (ICT).

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate proficiency in using essential digital tools for everyday tasks.
CO2	Apply safe and secure practices while using the internet and online services.
CO3	Utilize online collaboration platforms for communication and teamwork.
CO4	Develop simple digital content (documents, presentations, basic websites).
CO5	Leverage emerging digital applications for academic, professional, and social needs.
CO6	Create a simple web application and explain emerging technologies in everyday life.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Introduction to Digital Literacy** Evolution of Digital Technology – Role of ICT in modern life – Hardware and Software basics – Overview of digital devices (Computers, Smartphones, Tablets) – Operating Systems and Applications.	05
2.	**Internet and Web Fundamentals** Basics of Internet – Web Browsers – Search Engines – Online Communication Tools (Email, Chat, Video Conferencing) – Netiquette – Cloud Storage and File Sharing.	05
3.	**Digital Tools for Productivity** Word Processing (MS Word/Google Docs) – Spreadsheet Fundamentals (MS Excel/Google Sheets) – Presentation Tools (PowerPoint/Canva) – Templates and Online Collaboration (Google Workspace, MS Teams).	04
4.	**Cyber Safety and Digital Ethics** Online Security Threats, Password Management, Safe Browsing, Data Privacy, Cyber bullying, Digital Footprint, Intellectual Property Rights in the digital era.	04
5.	**Social media and Online Applications** Role of social media in Communication – Online Professional Networking (LinkedIn) – Blogging and Content Sharing Platforms – Basics of Digital Marketing – E-Governance and Online Services (Banking, Payments, Education Portals).	04
6.	**Introduction to Web and Mobile Applications** Creating a Simple Blog/Portfolio Website (Using WordPress/Wix) – Overview of Mobile Apps for Education and Productivity – Emerging Technologies (Cloud Computing, IoT, AI) in everyday life.	04
	TOTAL	**26**

DEPARTMENT OF CIVILENGINEERING

Text Books:

1. Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Rajaraman, "Fundamentals of Computers", PHI Learning.

Reference Books:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology in Action", Pearson Education.
2. Daniel Scott, "Digital Literacy Unpacked", Facet Publishing.

E-Resources:

1. NPTEL – Digital Media Literacy

https://onlinecourses.swayam2.ac.in/e-learning/preview/nou26_ge34

2. Digital Literacy Course, Google

https://learndigital.withgoogle.com

3. Microsoft Learn

https://learn.microsoft.com

4. W3Schools Basics

https://www.w3schools.com

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** III
Course: Open Elective -I (Environmental Studies)									**Code:**25ALOE301B
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Engineering Chemistry

Course Objectives:

1. To understand the structure and functions of ecosystems and the importance of biodiversity.
2. To study advanced energy systems and their role in sustainable development.

Course Outcomes: After completion of this course students will be able to -

CO1	Understand the structure and functions of major ecosystems and the significance of biodiversity conservation.
CO2	Evaluate various advanced energy systems in terms of their merits, demerits, and global applications.
CO3	Apply concepts of natural resource management and disaster management using relevant case studies.
CO4	Analyze the sources, impacts, and control measures of environmental pollution and waste management practices.
CO5	Assess global environmental concerns and suggest sustainable solutions for issues like climate change and groundwater depletion.
CO6	Utilize environmental management tools and prepare environmental impact assessments following legislative guidelines.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Ecosystems (Structure and Function)** Forest, Desert, Wetlands, River, Oceanic and Lake, Biodiversity: Types, Value; Hot-spots; Threats and Conservation of biodiversity, Forest Wealth and Deforestation.	05
2.	**Advances in Energy Systems** (Merits, Demerits, Global Status and Applications): Hydrogen, Solar, OTEC, Tidal and Wind, Natural Resource Management (Concept and case-studies): Disaster Management, Sustainable mining, case studies, and Carbon Trading.	05
3.	**Environmental Pollution** (Sources, Impacts, Corrective and Preventive measures, Relevant Environmental Acts, Case-studies): Surface and Groundwater Pollution; Noise pollution; Soil Pollution and Air Pollution. Waste Management & Public Health Aspects: Bio-medical Wastes; Solid waste; Hazardous wastes; E-wastes; Industrial and Municipal Sludge.	04
4.	**Global Environmental Concerns(Concept, policies and case-studies)** Groundwater depletion/recharging, Climate Change; Acid Rain; Ozone Depletion; Radon and Fluoride problem in drinking water; Resettlement and rehabilitation of people, Environmental Toxicology.	04

5.	**Latest Developments in Environmental Pollution Mitigation Tools (Concept and applications)** G.I.S. & Remote Sensing, Environmental Management Systems, ISO14001; Environmental Stewardship- NGOs. Field work: Visit to an Environmental Engineering Laboratory or Green Building or Water Treatment Plant or Wastewater treatment Plant; ought to be Followed by understanding of process and its brief documentation.	04
6.	**Environmental Assessment, Management and Legislation** Aims and objectives of Environmental Impact Assessment (EIA). Environmental Impact Statement (EIS). EIA Guidelines. Impact Assessment Methodologies. Procedure for reviewing EIA of developmental projects. Life-cycle analysis, cost benefit analysis. Guidelines for Environmental Audit.	04
	TOTAL	**26**

Term Work:

1. Select one terrestrial ecosystem (Forest/Desert) and one aquatic ecosystem (River/Lake/Wetland/Ocean). Prepare a study report covering structure, abiotic and biotic components, food chain/web, energy flow, ecological services, threats and conservation measures.
2. Select one Indian biodiversity hotspot/forest region and study its biodiversity, threats, and causes of deforestation and conservation measures.
3. Study Hydrogen, Solar, Wind, Tidal and OTEC energy systems. Compare their working principles, energy potential, advantages, limitations, environmental impacts, applications and global status. Identify the most suitable technology for a selected Indian location/application and justify the selection.
4. Prepare a case study on a disaster/sustainable mining project and explain the concept and mechanism of carbon trading/carbon credits with an Indian example.
5. Study any two types of pollution with sources, pollutants, impacts, standards, preventive/corrective measures and relevant Indian environmental legislation.
6. Prepare a waste-management plan for an educational institution/municipality, covering segregation, collection, treatment, disposal, recycling and public-health aspects.
7. Select one global/regional environmental concern and prepare a detailed case study covering causes, impacts, policies, mitigation and Indian context.
8. Explain the application of GIS/Remote Sensing in environmental protection. Include one practical case study and role of an environmental NGO.
9. Prepare a detailed technical report on one environmental pollution mitigation system or environmental management practice. The report should include the process/technology, working principle, process flow diagram, applications, environmental benefits, limitations and a relevant Indian case study.
10. Prepare a mini EIA report for a proposed project such as highway, residential complex, industrial estate, dam or mining project, including impact identification, mitigation and environmental management plan.

Text Books:

1. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T., "Environmental Encyclopedia", Jaico Publications House, 1st edition, 2000, ISBN-13: 978-8172247867
2. Agarwal, K.C, "Environmental Biology", Nidhi Publishers, 2nd edition ,2008, ISBN-13978-

8189153021

Reference Books:

1. Bharucha Erach, "The Biodiversity of India", Mapin Publishing Pvt. Ltd., 1st edition, 20021, ISBN-108188204064
2. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
3. Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
4. Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. Principals of Conservation Biology. Sunderland: Sinauer Associates, 2006.
5. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339:36-37.
6. McCully, P.1996. Rivers no more: the environmental effects of dams (pp.29-64). Zed

E-Resources:

1. NPTEL video lecture on Environmental Impact Assessment
   https://www.youtube.com/watch?v=_iLdyhgFv1U
2. Sustainability Concepts - Innovations and Challenges
   https://www.youtube.com/watch?v=A9PGRnkLubE&list=PLbRMhDVUMngd2jPdQSk3QNBTf2n7FxXU&index=2
3. Natural Resources Management
   https://www.youtube.com/watch?v=vsXv3anIBSU&list=PLwdnzlV3ogoV162m7Q1rCQamsvKWT9D08
4. Biodiversity & conservation
   https://www.youtube.com/watch?v=eJBfZGEzUfA&list=PLwdnzlV3ogoV162m7Q1rCQamsvKWT9D08&index=9

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** III
Course: Open Elective – I (Green Energy and Sustainability)									**Code:**25ALOE301C
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Renewable energy, power generation technology

Course Objectives:

1. To study cleaner production and life cycle assessment.
2. To understand green fuels.

Course Outcomes: After completion of this course students will be able to -

CO1	Understand green technology principles, green chemistry, and process intensification for sustainable industries.
CO2	Evaluate the benefits, challenges, and environmental impact of green fuels compared to conventional fossil fuels.
CO3	Apply cleaner production principles and life cycle assessment for sustainability.
CO4	Assess waste types, audits, and management strategies with focus on health and environmental impact.
CO5	Explain sustainable technologies considering ecological, economic, and social dimensions.
CO6	Analyze practical challenges, case studies, and laws in implementing green technologies.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Principles of Green Technology and Green Engineering** Processes and products for green safe and economically acceptable to the society, green chemistry and Process intensification. Green Industrial Processes: Pollution statistics from various industries. A greener approach towards all these industries.	05
2.	**Green Fuels** Definition of Green Fuels, their benefits and challenges, comparison of green fuels with conventional fossil fuels with reference to environmental, economic and social impacts, public policies and market driven initiatives, Biomass energy: Concept of biomass energy utilization, types of biomass.	05
3.	**Cleaner Production** Definition, Importance, Principles of Cleaner Production and its Benefits, Role of industry, clean development mechanism, Reuse, Recovery, Recycle, Raw material substitution Wealth from waste. Role of CP in Achieving Sustainability, Benefits, Role of Industry, Government and Institutions, Environmental Management, Pollution Prevention and Cleaner Production Awareness Plan, Environmental Statement, Carbon credit, Carbon trading. Introduction to Life Cycle Assessment (LCA) and Elements of LCA.	04
4.	**Waste Management** Waste stream assessment (WSA), Waste generation and composition, Waste characteristics (physical and chemical), Waste audit, Health and Environmental effects (public health and environmental), Comparative assessment of waste	04

	generation and Composition of developing and developed nations, a case study results from an Indian city, Handouts on solid waste compositions, E-waste generation.	
5.	**Sustainable Technology** Understand Sustainable Technology, Three principle dimensions: the ecological, the economic and the social dimension, including intergenerational justice; use a systems perspective, to describe sustainability challenges and possibilities for major technical systems and for their transformation to meet sustainability requirements.	04
6.	**Challenges and Practical Implementation** Responsibilities and potentials of companies for action. Green Productivity and emerging technologies. Implementation of the practical applications of Green emerging technologies and sustainable development. Case studies in Green Technology. Green laws compliance.	04
	TOTAL	**26**

Text Books:

1. Matlack A.S., "Introduction to Green Chemistry", Marcel Dekker Publication.
2. Modak P., Visvanathan C. and Parasnis M., "Cleaner Production Audit Environmental System Reviews", Asian Institute of Technology Publication.
3. Anastas P.T. and Warner J.C., "Green Chemistry: Theory and Practice", Oxford University Press.
4. Bishop P. L., "Pollution Prevention: Fundamentals and Practice", McGraw-Hill Publication, Boston.
5. Clark J.H. and Macquarie D.J., "Handbook of Green Chemistry and Technology", Wiley Blackwell Publication.

Reference Books:

1. Sawyer C.N, McCarty P.L and Parkin G.F., "Chemistry for Environmental Engineering and Science", 5th ed. McGraw-Hill Professional Publication.
2. Paul L Bishop, "Pollution Prevention: Fundamentals and practice", McGraw-Hill International Publication.
3. Das A. K, "Environmental Chemistry with Green Chemistry", Books and Allied (P) Ltd. Publication.
4. V.K. Ahluwalia, "Green Chemistry Environmentally Benign Reactions", springer publication.
5. V.K. Ahluwalia, Ane. "Green Chemistry: Environmentally Benign Reactions", springer publication.
6. Mike Lancaster, "Green Chemistry: An Introductory Text", Royal Society of Chemistry publication.

E-Resources:

1. NPTEL Course on "Energy Resources, Economics and Sustainability", By Prof. Pratham Arora, IIT Roorkee,
   https://onlinecourses.nptel.ac.in/noc25_hs86/preview

2. NPTEL Course on "Sustainable Energy Technology", By Prof. Sayak Banerjee, IIT Hyderabad.
   https://onlinecourses.nptel.ac.in/noc23_me138/preview

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** III
Course: Open Elective – I (Basics of Consumer Electronics)									**Code:**25ALOE301D
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Basic understanding current, voltage, and electronics components

Course Objectives:

1. Understand principles and components of audio, video, and communication systems.
2. Develop practical skills in installation, operation, and maintenance of electronics.

Course Outcomes: After completion of this course students will be able to -

CO1	Understand the working principles and components of basic audio systems and home theatre setups.
CO2	Explain the functioning of modern video display technologies and remote-control operations.
CO3	Identify and describe the types, specifications, and working of projectors and CCTV systems.
CO4	Describe satellite communication principles and DTH system setup and components.
CO5	Explain the construction, working, and common issues in basic household appliances like washing machines, mixers and induction cook tops.
CO6	Understand the operation and features of kitchen and office equipment such as microwave ovens, printers, and scanners.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Audio Systems** Introduction to audio systems, Audio amplifier, Microphone, Loudspeaker, Public address system, DJ system: concept and components, Audio as Data and Signal, Digital Audio Processes: Time Compression & Expansion, Block diagram and working of home theatre system.	05
2.	**Video Systems and Display Technologies** Elements of TV communication system, Scanning process and its necessity, Comparison: CRT, LCD, and LED TVs, LCD and LED TV: principles and section-wise working, 3D TV: Basic working principle, IPS panels and features, Interfaces: HDMI, USB, RGB, etc., TV remote control: types, IR code transmission/reception, functions, faults.	05
3.	**Projectors and Surveillance Systems** LCD vs. LED Projectors: differences and specs, working principle and faults in LED projectors, CCTV Cameras: types and specifications, CCTV setup and components, Digital Video Recorders: types and working.	04
4.	**Satellite Communication and DTH Technology** Basics of satellite communication, Merits, demerits, and applications, Satellite types, orbits, frequency bands, Components of DTH: PDA, LNBC, satellite receiver, dish alignment, Cable types, impedance, MDU design, Set Top Box: block diagram, features, I/O ports, Cable modem termination system, software, CPE.	04

5.	**Domestic Appliances: Part I** Washing Machines: types, parts, block diagrams, timers, motors, Vacuum Cleaner: block diagram, working, features, motors, circuits, Mixer/Grinder: parts, speed control, auto overload protection, Electric Iron & Steam Iron: principle, thermostat, parts, Water Purifiers: RO/UV principles, components, faults, Immersion Heater: working, insulation, Induction Cooktop: principle, tubes, heat sinking, fault identification	04
6.	**Domestic Appliances: Part II and Office Equipment** Microwave Oven: types, block & wiring diagram, microwave generation, Food Processors: parts and working, Printers: dot matrix, inkjet, laser; advantages, disadvantages, connectivity, Digital Electronic Lock, Xerox Machine, Scanner, Fax Machine	04
	TOTAL	**26**

Text Books:

1. S. P. Bali, "Consumer Electronics", 1st Edition, Paperback, English.
2. B. R. Gupta, "Consumer Electronics", Paperback, English.
3. Dr. J. S. Chitode, "Consumer Electronics – A Conceptual Approach".
4. Douglas Kinney, "A Beginner's Guide to Consumer Electronics Repair: Handbook and Tutorial".
5. Anand, "Consumer Electronics".
6. H. Davidson, "Troubleshooting Consumer Electronics Audio Circuits".

Reference Books:

1. Dennis Roddy, "Satellite Communications", McGraw Hill.
2. R. G. Gupta, "Audio Video Systems – Principles, Maintenance and Troubleshooting", Tata McGraw-Hill.
3. David A. Bell, "Electronic Devices and Circuits", Oxford University Press.
4. S. P. Sharma, "Appliance Servicing and Repair Guide", Katson Books

E-Resources:

1. Audio System Engineering (IIT Kharagpur),
   https://nptel.ac.in/courses/117/105/117105133

2. Satellite Communication & DTH
   NOC: Satellite Communication Systems (IIT Kharagpur)
   https://archive.nptel.ac.in/courses/117/105/117105131/

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Common to all Programs)									**Semester:** III
Course: Open Elective – I (Renewable Energy Systems)									**Code:**25ALOE301E
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Fundamentals of Mechanical Engineering, Physics, Thermodynamics

Course Objectives:

1. Discuss the global and national energy scenarios and environmental impacts and sustainability concerns associated with fossil fuel use.
2. Identify and explain the working principles of solar radiation measuring instruments including pyrheliometers, pyranometers, and sunshine recorders.

Course Outcomes: After completion of this course students will be able to -

CO1	Identify and describe the main types of renewable energy sources and their respective limitations.
CO2	Compare various types of solar collectors based on design and performance.
CO3	Identify and explain factors affecting wind characteristics and wind energy generation.
CO4	Interpret the advantages and limitations of biomass energy in comparison with other renewable sources.
CO5	Apply energy conversion principles to assess the feasibility of alternative energy systems.
CO6	Compare the suitability of renewable energy technologies (like fuel cells) for specific applications.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Introduction to Renewable Energy** Environmental consequence of fossil fuel, Limits Of Fossil Fuel, Energy Scenario, Classification of Energy Sources, types of renewable energy sources, limitations.	05
2.	**Solar Energy** Environmental impacts of solar energy, Solar radiation measurements, Solar constant, Solar Radiation Measuring Instruments (Radiometers): Pyrheliometers, Pyranometers, Sunshine recorder, classification of solar collectors.	05
3.	**Wind Energy** Factors affecting the wind, Classification of Wind-mills, Main Components of a wind-mill, wind speed prediction, Advantages of Fixed and variable speed systems.	04
4.	**Biomass Energy** Introduction, Biomass Conversion, Types of biogas plants: Floating dome type, Fixed dome type, Biodiesel, Significance of biodiesel.	04
5.	**Other Forms of Renewable Energy Sources** Introduction, hydro energy, geothermal energy, wave & tidal energy, Energy Conversion Principles, Environmental considerations.	04
6.	**Applications of Renewable Energy Sources** Photovoltaic (PV) cell, Solar water heater, Crop and Grain Drying, Space and Water Heating, Solar Energy Applications for Agriculture, Fuel Cell.	04

TOTAL	**26**

Text Books:

1. S. P. Sukhatme and J. K. Nayak, "Solar Energy: Principles of Thermal Collection and Storage", 3rd Edition, Tata McGraw-Hill Education Pvt. Ltd., 2008.
2. J. Twidell and Tony Weir, "Renewable Energy Resources", 2nd Edition, Taylor & Francis, 2006.
3. B. H. Khan, "Non-Conventional Energy Resources", 2nd Edition, Tata McGraw-Hill Education Pvt. Ltd., 2009.
4. Prabir Basu, "Biomass Gasification, Pyrolysis and Torrefaction", Academic Press, Elsevier, 2013.

Reference Books:

1. O. P. Gupta, "Energy Technology", Khanna Book Publishing, New Delhi.
2. V. V. N. Kishore, "Renewable Energy Engineering and Technology: Principles and Practice", Routledge, 1st Edition, 2019.
3. N. Jenkins and J. Ekanayake, "Renewable Energy Engineering", Cambridge University Press, 1st Edition, 2017.
4. G. Boyle, "Renewable Energy", OUP Oxford, 2nd Edition, 2009.

E-Resources:

1. Physics of Renewable Energy Systems
   https://onlinecourses.nptel.ac.in/noc22_ph44/preview
2. Renewable Energy Engineering: Solar, Wind And Biomass Energy Systems, IIT Guwahati
   https://nptel.ac.in/courses/103103206
3. Renewable Energy Technology and Their Uses
   https://onlinecourses.swayam2.ac.in/nou22_ge71/preview
4. Renewable Energy Specialization
   https://www.coursera.org/specializations/renewable-energy
5. Exploring Renewable Energy Schemes
   https://www.coursera.org/learn/exploring-renewable-energy
6. Renewable Energy You Tube
   https://www.youtube.com/watch?v=VfowJHJz6-s

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Project Management									**Code:**25CEMC301
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Fundamentals of Management.

Course Objectives:

1. To familiarize students with the principles, functions, and significance of project and scientific management, enabling them to judge their role in construction success.
2. To develop students' ability to formulate project plans using WBS, Gantt charts, and evaluate the suitability of CPM and PERT techniques.

Course Outcomes: After completion of this course students will be able to -

CO1	Analyze the significance of project management, roles, and organizational structures in construction success.
CO2	Formulate project schedules using WBS and Gantt charts and evaluate the suitability of CPM and PERT techniques for project control.
CO3	Apply resource allocation, levelling, and crashing techniques to optimize project execution and monitor costs.
CO4	Analyze material management principles, planning, and Inventory Control Techniques for construction projects.
CO5	Formulate and justify a Total Quality Management (TQM) implementation plan for construction, including quality control and process improvement.
CO6	Evaluate the economic terms and financial considerations associated with project management decisions.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Introduction to Project Management:** Importance, objectives & functions of management, principles of management, modern scientific management (Fayol. F.W, Taylor), role and responsibilities of a project manager, importance of organizational structure, types of organization, importance of effective project management in the construction industry, PMBOK	06
2.	**Project Planning and Scheduling** Project planning process and its components, work breakdown structure, introduction to Gantt/ Bar charts & limitations, network planning, network analysis, components of network basic terminology, types of networks, network rules, analysis of CPM & PERT.	06
3.	**Project Execution and Monitoring** Resource Allocation, Resource Smoothening, Resource Levelling, Crashing Network, Updating of Network.	09
4.	**Material Planning & Management** Definition and significance of material management, material requirement planning, material scheduling, raising of indents, erp software, inventory control,	06

	inventory classification, inventory management, inventory models, economic order quantity, ABC analysis, MS Project.	
5.	**Total Quality Management** Importance of Total Quantity Management in Construction Process, Steps, Involved in TQM in Construction, Concept of Quantity Control, Quality Assurance, Method Statement, SOP Checklist	06
6.	**Project Economics** Introduction to project economics - definition, principles, importance in construction industry, annuities and its types, sources of project finance. study of project feasibility report and detailed project report (DPR), role of project management consultants in pre-tender and post-tender.	06
	TOTAL	**39**

Text Books:

1. Project planning and Control with PERT and CPM by DR. B.C. Punmia and K.K. Khadelwal Publisher: Firewall Media, Laxmi publication New Delhi.
2. Project management Principles and Techniques by B.B. Goel Publisher: Deep and Deep publisher

Reference Books:

1. Project Management, Khatua, Oxford University
2. Construction Project Management-Planning, Scheduling and Controlling by K. K. Chitkara, Tata McGraw Hill Publishing Company, New Delhi.
3. Construction Management and Planning by B. Sengupta and H. Guha, Tata McGraw Hill Publishing Company, New Delhi.
4. The Essentials of Project Management by Dennis Lock, Gower Publishing Ltd. UK.
5. Essentials for Decision Makers by Asok Mukherjee, Scitech Publication, New Delhi.
6. Total Quality Management, Dr. S. Rajaram and Dr. M. Sivakumar, Biztantra
7. Total Engineering Quality Management, Sunil Sharma, Macmillan India Ltd.
8. Engineering Economics by R. Panneerselvam Publisher-PHI Learning; 2nd edition (2014)

E-Resources:

1. NPTEL – Course On CPM & PERT, IIT Kharagpur
   https://nptel.ac.in/courses/123105004
2. NPTEL- Course On Project Management, IIT Roorkee
   https://nptel.ac.in/courses/110107430

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course:: Computer Aided Building Drawing									**Code:**25CEVS303
Teaching Scheme				**Evaluation Scheme**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**PR**	**OR**	**Total**
01	04	-	03	-	-	25	50	-	75

Prerequisites:
Basic Civil Engineering, Basics of building planning and drawing, Units and unit conversions

Course Objectives:
1. To familiarize students with CAD software fundamentals and enable them to select appropriate tools for engineering drawing applications.
2. To develop students' proficiency in creating, editing, and managing 2D drawings using CAD software.

Course Outcomes: After the completion of course, students will be able to:

CO1	Apply basic CAD drawing commands and navigate the CAD interface effectively.
CO2	Select object-selection methods and organize layers and properties in CAD drawings.
CO3	Apply advanced drawing commands and precision techniques to create detailed CAD drawings.
CO4	Apply modifying tools and dimensioning to edit and annotate CAD drawings accurately.
CO5	Formulate layouts of structural components using AutoCAD.
CO6	Create and evaluate comprehensive building drawings using AutoCAD.

Unit	**Course Contents**	**Duration (Hrs.)**
1.	**Introduction to CAD and Basic Drawing Commands** Introduction to CAD and CAD Software, Overview of CAD and its applications, Introduction to various CAD software tools. Understanding the CAD Interface, Workspace, command line, and toolbars, Navigating the CAD interface. Units and Measurement, setting up units, Understanding measurement systems in CAD. Basic Drawing Commands, Line, Circle, Arc, Rectangle, Polygon. Editing Commands, Erase, Move, Copy, Mirror, Rotate.	03
2.	**Object Selection and Layer Management** Object Selection Methods, Selecting objects: Select, Window, Crossing, Fence, Using selection filters and quick select. Using Layers and Properties, creating layers, assigning colors, line types, and line weights, Managing layer properties.	02
3.	**Advanced Drawing Commands and Precision Techniques** Advanced Drawing Commands, Polyline, Hatch, Region. Working with Blocks and Attributes, Creating, inserting, and editing blocks, Understanding and using attributes.	02
4.	**Modifying Tools and Dimensioning** Introduction to Modifying Tools, Stretch, Scale, Trim, Extend, Inquiry Commands, Distance, Area. Dimensioning Basics, Linear dimensions, aligned dimensions, Radius and Diameter dimensions, Annotation Tools, Text, Multiline Text, Leaders, Adding and managing annotations.	02
5.	**Structural Component Layouts in AutoCAD** Detailed layouts of Simply supported beam, Cantilever beam, Continuous beam, columns and footings.	02

6.	**Comprehensive Building Drawings Using AutoCAD** Develop plan, elevation, and section for a single residential building including plumbing, sanitary, and electrical layouts, preparing schedule of opening.	02
	TOTAL	**13**

List of Experiments:

1. Drawing Simple Shapes: Create basic geometric shapes such as squares, circles, and triangles using line, circle, and polyline tools.
2. Practice various object selection methods (Select, Window, Crossing, Fence, Quick Select) and effectively create, manage, and organize layers with appropriate colors, line types, and visibility settings in AutoCAD
3. Utilize advanced AutoCAD drawing tools—Polyline, Hatch, Region—and efficiently create, insert, and edit blocks with attributes to produce organized and reusable drawing components.
4. Execute modified commands (Stretch, Scale, Trim, Extend), employ inquiry tools (Distance, Area), and apply dimensioning methods (linear, aligned, radius/diameter) along with annotation tools like text, multiline text, and leaders for precise and well-annotated AutoCAD drawings
5. Produce detailed AutoCAD layouts for footings, columns, simply supported, cantilever, and continuous beams, following RCC detailing standards and Detailed hardcopy of output for each structural component.
6. Develop detailed AutoCAD drawings for plan, elevation, and section of a single residential building—including plumbing, sanitary, and electrical layouts—and prepare a schedule of openings in compliance with building standards and Detailed hardcopy of output for each structural component.

Text Books:

1. Bhatt, N. D. and Panchal, V. M., (2016), "Engineering Drawing", Charotar Publication
2. K. Venugopal, K, (2015), "Engineering and Graphics", New Age International

Reference Books:

1. AUTOCAD® 2019, BEGINNING AND INTERMEDIATE, Munir M. Hamad, Autodesk Approved Instructor, Mercury Learning And Information LLC. ISBN: 978-1-683921-76-9

E Resources :

1. AutoCAD Quick Start Guide – https://www.autodesk.com/learn/ondemand/curated/autocad-quick-start-guide

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Project Based Learning									**Code:**25CECE301
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	50	-	-	50

Prerequisites:

Basic knowledge of civil engineering concepts, Teamwork and communication skills, Report writing and presentation skills, Basic research and ICT (computer) skills.

Course Objectives:

1. To enable students to identify learning needs and formulate self-directed strategies within a constructive learning environment.
2. To develop students' critical thinking to analyze civil engineering problems and evaluate sustainable solutions.

Course Outcomes: After completion of this course students will be able to -

CO1	Identify the community/ practical/ societal needs and convert the idea into a product/ process/ service.
CO2	Analyze and design the physical/ mathematical/ ICT model in order to solve identified problem/ project.
CO3	Create; work in team and apply the solution in practical way to specific problem.

Course Contents:

Introduction to Project Based Learning, Traditional vs. Cognitive Learning, Why PBL? Principles of Problem Design, Seven Steps of Problem Design, Online PBL Applications and Research Trends Case Studies in Civil Engineering.

Group Structure:

Working in mentor-monitored groups. The students identify, plan, manage and complete a task/ project/ activity which addresses the stated problem related to civil engineering.
There should be team/group of maximum four students.
A supervisor/ mentor faculty teacher assigned to individual groups.

Selection of Project/Problem:

At start of course revision of PBL significance, guidelines and evaluation parameters should be discussed commonly at onset of semester. In this exercise basic plan, in brief research methodology points relevant to PBL, sample case studies related to civil engineering and brief information about project, problem and publications should be given.
Selection of project, problem or any technical aspect of civil engineering should be encouraged. If any Project/ problem selected in first year engineering related to civil engineering can be continued if feasible in second year after preliminary discussion. The project or problem can be project/ design problem/ case study/ product/ process/ software etc.
It is expected that the project/problem selected could have different alternative solutions which could be theoretical, mathematical modelling, experimental or software models. Projects should be based on real life problems encountered in professional or daily life. Projects can be product, service mainly practical, scientific or applied domain. It is recommended to include hands-on activities, reading, analysis, field visits, and experimental work to learn and explore new trends of technologies. Proper representation of project/ problem, outcome and report on results and conclusions is important for assessment of course.

Assessment:

The faculty/ mentor is committed to assessing and evaluating both students' performance and students' learning process in every phase of PBL. It is monitored regularly on weekly basis. It is expected that the faculty/ mentor should assess the progress and report both quality of the group work and each student's individual contribution. Rubrics for measurement and assessment should be prepared and be part of assessment of term work. For this purpose, it is recommended that Civil Engineering Department is required to prepare guidelines related to:

- Selection of Project/ Problem
- Rubrics for Assessment and evaluation
- Supervision and Students monitoring sheet
- PBL Log Book format

Departmental level assessment panel should support students in this activity and should assess students on the basis of the guidelines mentioned and assessment rubrics. At least two intermediate reviews should be held with progress monitoring in terms of performance and submission. Intermittent review sheet and status of each group should be done after six weeks from the start of semester. Proper log has to be maintained and weekly report has to be verified and signed by mentor. Each group should submit their progress and outcome in the form of documented project/ report. Individual log is to be maintained for each student (including individual work, role and activities in the project). Group assessment (roles defined, distribution of work, intra-team and inter-team collaboration).

Evaluation and Continuous Assessment:

Prepare "PBL Log Book" which includes record of activities performed and evaluation carried out with proper signatories. Maintain regular record on weekly basis. Records and observations must also be maintained at student level. Continuous assessment sheet must be prepared by each faculty which consists assessment made on weekly basis also performance made during mid-review and end-review. PBL log book must be maintained as a record even after completion of semester. It will serve as document which will reflect the punctuality, accountability, technical writing ability and project workflow.

Recommended parameters for assessment, evaluation and weightage:

Evaluation criteria and respective percentage weightage for marks.

Idea/ Selection of problem and product and of course = 50% (individual assessment and team assessment)

Documentation in the form of PBL report (typed, hard copy) = 15%

Presentation/ involvement during mid PPT review = 10%

Participation/ involvement in group activity = 10%

Continuous assessment on technical parameters based on the given evaluation parameters for excellent, meritorious, acceptable and not acceptable = 15%

References:

1. M. Savin-Baden and C. Howell Major, "Foundations of Problem-Based Learning", McGraw-Hill Education, 2004.
2. R. A. Reiser, D. A. Stepich, J. D. Lehman, and J. D. Russell, "Instructional Technology and Media for Learning: Instructional Design Integrating Computers and Using Media", Merrill/Macmillan, Columbus, OH, 1996.
3. Anjali Khirwadkar, "Educational Technology: Teaching and Learning Methods and Development", Neelkamal Publications, Hyderabad, 2011.
4. Erik Graaff, Ronald Ulrich, and Anette Olmos, "PBL in Engineering Education: International Perspectives on Curriculum Change", Sense Publishers, 2007.
5. Mahendra R. Gaikwad and Nisha Dabhade, "The Wiley Handbook of Problem-Based Learning",

Wiley, 2019.
6. Larmer, Krauss, and Suzanne K. Boss, "Project Based Teaching", ASCD, 2018.
7. John Larmer, David Ross, and John R. Mergendoller, "Project Based Learning (PBL) Starter Kit: To-the-Point Advice, Tools and Tips for Teachers", 2015.
8. John Larmer and Suzie Boss, "Setting the Standard for Project Based Learning: A Proven Approach to Rigorous Classroom Instruction", 2015.
9. William N. Bender, "Project Based Learning: Differentiating Instruction for the 21st Century".
10. Suzie Boss and John Larmer, "Transforming Schools Using Project-Based Learning, Performance Assessment, and Common Core Standards".
11. Suzie Boss, "Implementing Project-Based Learning Strategies", ASCD Resources, www.ascd.org.

E-Resources:

1. PBL Works
   https://www.pblworks.org/

2. Power School
   https://www.powerschool.com/products/classroom/learning-management/

Format of PBL report: Sequence of pages:

1. Front Cover Page
2. Certificate
3. Acknowledgement
4. Synopsis
5. Contents
6. List of Figures
7. List of Tables
8. Notations

Chapters:

Chapter 1 Introduction (This consists of: 1.1 Introduction of the Project Work; 1.2 Problem Statement; 1.3 Objectives and 1.4 Scope of the Project Work; 1.5 Research Methodology; 1.6 Limitations of study; 1.7 Expected Outcome)

Chapter 2 Literature Review (It shall include theoretical support, details regarding work done by various persons, methods established, any new approach.)

Chapter 3 Planning Schedule/ Flow Chart for Completion of Project

Chapter 4 Conclusion

References and Bibliography (The references and bibliography shall include either a book/manual/book title, title of paper/read manual/book, name of the journal, month & year of publication, volume number/ISBN number, page number x-y. The references and bibliography shall be as per universal standards as mentioned in any international journal of professional body).

DEPARTMENT OF CIVILENGINEERING

Report Printing Details:

1. Report shall be typed on A4 size Executive Bond paper with single spacing preferably on both sides of paper.
2. Margins: Left Margin: 35 mm, Right Margin: 25 mm, Top Margin: 25 mm, Bottom Margin: 25 mm
3. Page number at bottom margin at center.
4. Size of Letters: Chapter Number: 16 font size, Times New Roman in Capital Bold Letters, Chapter Titles (1.1, 1.2 etc.) Bold Letters, Main Titles (1.1.1, 1.1.2 etc.) 16 Font size in Bold Letters. Sub Titles in sentence case (1.1.1.5, 4.5.1 etc.) 14 Font size in Bold Letters Sentence case but neither in bold nor in italics.
5. Blank line left in between paragraphs.
6. Figure name: 12 Font in sentence case Bold- Below the figure.
7. Table title - 12 font size in sentence case. Bold-Above the table.

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Guitar)									**Code:**25CECC305A
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Basic knowledge of Indian classical music and Guitar musical instrument.

Course Objectives:

1. To develop advanced guitar techniques through scales, arpeggios, fingerstyle, and lead guitar exercises.
2. To strengthen students' understanding of music theory, chord construction, and harmonic progressions.

Course Outcomes: After completion of this course students will be able to -

CO1	Perform advanced scales, arpeggios, and chord progressions with technical accuracy.
CO2	Apply music theory concepts to lead guitar playing and improvisation.
CO3	Demonstrate fingerstyle and melodic solo performance with confidence and technical proficiency.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Revision of Semester II concepts, Warm-up & Finger Independence	02
2.	Major & Minor Scale Revision (Two Octaves)	02
3.	Pentatonic Scales & Blues Scale	02
4.	Arpeggios and Picking Exercises	02
5.	Chord Construction & Extended Chords (7th, Maj7, m7)	02
6.	Chord Progressions in Different Keys	02
7.	Fingerstyle Techniques – Patterns & Independence	02
8.	Lead Guitar Techniques – Hammer-ons, Pull-offs, Slides	02
9.	Improvisation Using Pentatonic Scale	02
10.	Genre-based Playing (Blues, Rock, Pop)	02
11.	Ensemble Playing & Rhythm Coordination	02
12.	Solo Performance Practice & Individual Corrections	02
13.	Mock Performance & Stage Preparation	02
	TOTAL	**26**

Text Books:

1. Hal Leonard Corporation, "Hal Leonard Guitar Method – Complete Edition", Hal Leonard Publications.
2. Mel Bay, "Modern Guitar Method – Grades 1, 2 & 3", Mel Bay Publications.
3. William Leavitt, "A Modern Method for Guitar (Books 1–3)", Berklee Press.
4. Richard Chapman, "The Complete Guitar Manual", DK Publishing.
5. Ralph Denyer, "The Guitar Handbook", Knopf Publishing.

Reference Books:

1. Troy Stetina, "Fretboard Mastery", Hal Leonard Publications.
2. Tom Kolb, "Music Theory for Guitarists", Hal Leonard Publications.
3. Don Latarski, "Practical Theory for Guitar", Alfred Music.
4. Bruce Buckingham, "Scales and Modes for Guitar", Hal Leonard Publications.
5. Mark Phillips and Jon Chappell, "Guitar For Dummies", Wiley Publishing.

E-Resources:

1. Berklee Online – Guitar lessons, music theory, ear training and performance resources.
   https://online.berklee.edu

2. Justin Guitar–Structured guitar lessons from beginner to advanced.
   https://www.justinguitar.com

3. Fender Play – Interactive lessons on chords, scales, techniques, and songs.
   https://www.fender.com/play

4. True Fire – Professional online guitar courses covering multiple genres and techniques.
   https://truefire.com

5. Ultimate Guitar – Tabs, chord charts, scales, and community resources.
   https://www.ultimate-guitar.com

6. Muse Score – Free music notation software and sheet music library.
   https://musescore.org

7. Music Theory.net–Interactive music theory lessons and exercises.
   https://www.musictheory.net

8. Yamaha Music India – Educational resources on guitar fundamentals and musicianship.
   https://in.yamaha.com

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Singing)									**Code:**25CECC305B
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Basic knowledge of Indian classical music in singing.

Course Objectives:

1. To develop a comprehensive understanding of the prescribed ragas and talas through theoretical and practical study.
2. To enhance students' vocal skills by practicing Alankars in Shuddha and Vikrit (Komal) Swaras.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate understanding of prescribed ragas, talas, and Alankars through accurate vocal performance.
CO2	Apply rhythmic patterns such as BhajaniTheka and Jhaptal in prescribed vocal compositions.
CO3	Perform festival songs, ghazals, and vocal compositions with proper pitch, voice control, musical expression, and stage confidence.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Detailed Study of Prescribed Ragas: Raga Bageshree ,Raga Des, Raga Khamaj.	06
2.	Study of Prescribed Talas: BhajaniTheka, Jhaptal	04
3.	Basic theory concepts	02
4.	Identification of Raga Characteristics and Tala Structure	02
5.	Festival Songs	02
6.	Gazals	02
7.	Soulful / Light Vocal Songs	02
8.	Interpretation and Presentation of Different Song Styles	02
9.	Practice of Ten Alankars in Shuddha/ Komalswaras	02
10.	Alankars based on the Prescribed Ragas	02
	TOTAL	**26**

Text Books:

1. V. N. Bhatkhande, "KramikPustakMalika (Vol. III & IV)", Publications.
2. V. D. Paluskar, "SangeetBalPrakash", Publications.

Reference Books:

1. V. N. Bhatkhande, "Hindustani SangeetPaddhati (Vol. I–IV)", Publications.
2. Ashok Da. Ranade, "Hindustani Music: Tradition in Transition", Publications.
3. S. N. Ratanjankar, "AbhinavGeetManjari", Publications.

E-Resources:

1. SangeetNatakAkademi - All India Radio (Akashvani)
   https://prasarbharati.gov.in/akashvani/

2. Swar Ganga Music Foundation
   https://www.swarganga.org/

3. YouTube – SangeetNatakAkademi Channel
   https://www.youtube.com/c/sangeetnatak

4. Digital Tanpura and Tabla Applications (e.g., Tanpura, Riyaz, NaadSadhana)

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Cinematography)									**Code:**25CECC305C
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

A basic understanding of film theory, Camera operation, Lighting techniques and visual storytelling is essential for cinematography.

Course Objectives:

1. To identify and operate camera equipment while understanding camera functions and exposure settings.
2. To create visual stories through different photography genres and creative image-making.

Course Outcomes: After completion of this course students will be able to -

CO1	Operate cameras confidently and use various camera settings effectively.
CO2	Compose visually appealing photographs using principles of composition and design.
CO3	Capture photographs in different genres such as portrait, landscape, product, event, and wildlife photography.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Introduction to Videography	02
2.	Basics of Video Camera operations	02
3.	Techniques for steady shooting (Tripod, Gimble)	02
4.	Basics shot types (Wide, Medium, Close-up)	02
5.	Basics shot types (Wide, Medium, Close-up)	02
6.	Camera Movement (Pan, Tilt, Roll)	02
7.	Practical	02
8.	Composition Technique – Focus and Depth of field	02
9.	Natural vs artificial lighting	02
10.	Practical	02
11.	Filming Techniques	02
12.	Audio Recording	02
13.	Practical Session	02
	TOTAL	**26**

Text Books:
1. Peterson, B., "Understanding Exposure – Theory + Fundamentals", Amphoto Books. 2. Kelby, S., "The Digital Photography Book – Practical + Shooting", Rocky Nook.
Reference Books:
1. Langford, M., "Langford's Basic Photography – Technical Concepts", Focal Press. 2. Freeman, M., "The Photographer's Eye – Composition, Visual Balance, Framing, Perspective", Ilex Press.
E-Resources:
1. YouTube StudioBinder (production management solution that helps video and photo productions create call sheets, shot lists, shooting schedules, breakdowns, storyboards, moodboards and more.) https://www.youtube.com/@StudioBinder/videos 2. Learn Cinematography Specialization https://www.coursera.org/specializations/learn-cinematography 3. Cinematography Courses https://www.udemy.com/topic/cinematography/

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Dance)									**Code:**25CECC305D
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Good stamina, flexibility and familiarity with simple rhythmic patterns and beats.

Course Objectives:

1. To strengthen students' technical proficiency through advanced Adavus, Jathis, and rhythmic patterns.
2. To develop expressive skills (Abhinaya) by interpreting simple classical compositions.
3. To enhance coordination, balance, posture, and stage presence through regular practical training.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate dance techniques with improved precision, posture, balance, and rhythmic accuracy.
CO2	Apply musicality, synchronization, expression, and storytelling in solo and group performances.
CO3	Create and perform dance combinations using basic choreography principles.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Introduction to forms and previous year revision	02
2.	Choreography on song/ composition	06
3.	Application and introduction to emotions for better understanding of movements	04
4.	Rhythm and rhythmic movements	06
5.	Introduction to different forms other than the teaching format	02
6.	Insights to choreographies and partner motions in folk forms	04
7.	Mock performance training and presentation with costumes	02
	TOTAL	**26**

Text Books:

1. Bharata Muni, "NatyaShastra", translated by ManomohanGhosh, Asiatic Society, Kolkata.
2. Nandikeshvara, "AbhinayaDarpana", translated by ManomohanGhosh.
3. Balasaraswati, T., "Bharatanatyam", Madras Music Academy.
4. Krishna Iyer, E., "Bharatanatyam", Ganesh & Co., Chennai.

Reference Books:

1. Kothari, Sunil, "Bharatanatyam", Marg Publications, Mumbai.
2. Vatsyayan, Kapila, "Classical Indian Dance in Literature and the Arts", SangeetNatakAkademi.
3. Subramaniam, Padma, "Bharata's Art: Then and Now", BharataIlango Foundation.
4. Vatsyayan, Kapila, "Indian Classical Dance", Publications Division, Government of India.
5. Srinivasan, Priya, "Sweating Saris: Indian Dance as Transnational Labor", Temple University Press.
6. SangeetNatakAkademi, "Bharatanatyam – A Reader", SangeetNatakAkademi, New Delhi.

DEPARTMENT OF CIVILENGINEERING

E-Resources:

1. SrideviNrithyalaya - Bharathanatyam Dance
   https://youtu.be/XONKu803dAk?si=LkLbNKPUvKpfZJkF

2. TheerumanamAdavu - Bharathanatyam Dance
   https://youtu.be/D0Ow529EHSo?si=upTtBpNp1lODzHMq

3. RAMAVATARA KOUTHUVAM by HarinieJeevitha - SrideviNrithyalaya - Bharathanatyam Dance
   https://youtu.be/JDfYT3Ax7mE?si=Q9VYWj95cnLikw2V

4. Hip hop dance with four foundations
   https://youtu.be/GcZJMiHds3U?si=AXAMwJ37YuDEVbTF

5. MAHAGANAPATHIM | Vrinda Mohan | GANESH CHATURTHI SPECIAL | Bharatanatyam | Shankar Mahadevan
   https://youtu.be/2j9KmG25l8g?si=zH9rKV-VY7RPirgD

6. Certificate in Dance & Cultural Management
   https://iisdt.in/product/certificate-in-dance-cultural-management/

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Synthesizer/Keyboard)									**Code:**25CECC305E
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Basic knowledge of Indian classical music and Keyboard musical instrument.

Course Objectives:

1. To reinforce students' understanding of major and minor scales, chords, chord progressions and inversions through systematic revision and practical application.
2. To introduce students to Western Staff Notation and strengthen their ability to read and perform music using both Indian and Western notation systems.

Course Outcomes: After completion of this course students will be able to -

CO1	Apply scales, chords, chord progressions, and inversions in keyboard performance.
CO2	Perform musical compositions using Indian and Western Staff Notation with suitable accompaniment techniques.
CO3	Demonstrate technical proficiency, musical interpretation, ensemble coordination, and stage confidence.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Revision of all Major Scales	02
2.	Revision of all Minor Scales (Natural, Harmonic &Melodic)	02
3.	Revision of Major and Minor Chords	02
4.	Revision of Chord Progression, Family chords, Chords Inversion	02
5.	Playing Simple Songs with Indian Notation	02
6.	Introduction to Staff Notation	02
7.	Understanding the Difference between Indian and Western Staff Notation	02
8.	Reading and Playing Simple Melodies from Staff Notation	02
9.	Playing Songs using Both Indian and Staff Notation	02
10.	Fundamentals of Keyboard Accompaniment	02
11.	Accompaniment using Major and Minor Chords	02
12.	Accompaniment with Scales and Simple Songs	02
13.	Group Performance	02
	TOTAL	**26**

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Text Books:

1. Aaron, M., "Michael Aaron Piano Course – Grade 2", Alfred Music.
2. Thompson, J., "John Thompson's Modern Course for the Piano – Second Grade", Willis Music.
3. Hanon, C. L., "The Virtuoso Pianist in Sixty Exercises", G. Schirmer.
4. Agay, D., "Learning to Play Piano – Book 2", Yorktown Press.

Reference Books:

1. Thompson, J., "Modern Course for the Piano", Willis Music.
2. Aaron, M., "Piano Course", Alfred Music.
3. Hanon, C. L., "The Virtuoso Pianist", G. Schirmer.
4. Harrison, M., "Contemporary Music Theory", Hal Leonard.
5. ABRSM, "Music Theory in Practice (Grades 1–5)", Associated Board of the Royal Schools of Music.

E-Resources:

1. The Complete Piano Keyboard Course | Tutorial for Beginners in Hindi | Free Online Piano Lessons

   https://www.youtube.com/watch?v=5nA245TZvBY

2. Keyboard - SIFF Young Artiste

   https://www.youtube.com/@Keysiffyoungartiste

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Basketball)									**Code:**25CECC305F
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To develop fundamental basketball skills, physical fitness, teamwork, and understanding of rules and strategies to enable effective participation and performance in the game.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate basic basketball skills such as dribbling, passing, shooting, and defensive fundamentals effectively.
CO2	Apply offensive and defensive strategies, including transition play, during gameplay and scrimmages.
CO3	Understand and implement basketball game rules and referee gestures accurately in practical situations.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Fundamentals Skill Review:** Refresh all core basketball skills. Perform all basic techniques confidently.	02
2.	**Skill Circuit:** Practice all basic skills in rotation. Improve overall basketball fundamentals.	02
3.	**Small Group Practice:** Apply skills in partner and group activities. Work effectively with teammates.	02
4.	**Player Stance & Footwork:** Improve movement and body balance. Apply proper stance during movement.	02
5.	**Passing Under Movement:** Practice passing while changing positions. Execute accurate passes while moving.	02
6.	**Dribbling Around Cones:** Improve control through obstacle drills. Maintain dribbling control in different directions.	02
7.	**Assessment- V**	02
8.	**Shooting Practice:** Practice shooting from different spots. Improve shooting accuracy.	02
9.	**Rebounding Drills:** Practice timing and ball recovery. Perform effective rebounding.	02
10.	**Individual Defense:** Practice defensive movement in simple drills. Apply defensive techniques effectively.	02
11.	**Body Technique:** Improve body positioning and balance. Demonstrate better body control.	02
12.	**Combined Fundamental Drills:** Integrate all basketball skills. Execute	02

	skills smoothly in sequence.	
13.	**Pair Practice:** Practice skills with a partner. Improve teamwork and communication	02
	TOTAL	**26**

Text Books:

1. FIBA, "Official Basketball Rules", International Basketball Federation (FIBA)
2. Dr. James Naismith, "Basketball: Its Origin & Development",
3. John R. Wooden, "Practical Modern Basketball", Allyn& Bacon

Reference Books:

1. James Naismith – Basketball: Its Origin and Development – University of Nebraska Press.
2. Jerry V. Krause & Don Meyer – Basketball Skills & Drills – Human Kinetics

E-Resources:

1. Rules of Basketball : How to Play Basketball : Basketball Rules for Beginners
   https://www.breakthroughbasketball.com/basics/basics

2. How To Dribble A Basketball For Beginners! Basketball Basics for Kids Basketball Training
   https://www.youtube.com/watch?v=CMQp0bwjokw

3. How To Shoot A Basketball For Beginners! Basketball Basics [SECRETS]
   https://www.youtube.com/watch?v=UcnB9e5O5NY

4. Basketball: Rebounding
   https://www.youtube.com/watch?v=gbb9CoEMF7s

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Cricket)									**Code:**25CECC305G
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To develop basic cricket skills. Fitness, teamwork, and knowledge of rules and strategies for effective game performance.

Course Outcomes: After completion of this course students will be able to -

CO1	Analyze batting, bowling, fielding, and match strategies across T20, ODI, and Test cricket formats.
CO2	Apply tactical decision-making, leadership, field placements, and performance analysis during competitive matches.
CO3	Demonstrate effective cricket performance by integrating sports psychology, nutrition, injury prevention, and technology in match situations.

Course Contents:

Sr. No.	Description	Duration (Hrs.)
1.	**Batting Strategies:** Build innings in different formats	02
2.	**Bowling Plans:** Field settings and tactical bowling	02
3.	**Captaincy & Leadership:** Decision-making and leadership	02
4.	**Match Strategy:** Powerplay, middle overs, death overs	02
5.	**T20 Cricket Strategies:** Aggressive tactics	02
6.	**ODI Cricket Strategies / Test Cricket Strategies:** Rotation of strike and partnerships / Patience and long-form tactics	02
7.	**Assessment – V**	02
8.	**Advanced Field Placements:** Offensive and defensive setups	02
9.	**Sports Psychology:** Confidence and concentration	02
10.	**Nutrition for Cricketers:** Performance nutrition	02
11.	**Injury Prevention & Recovery:** Basic sports medicine	02
12.	**Technology in Cricket:** DRS, Hawk-Eye, performance analysis	02
13.	**Assessment – VI**	02
	TOTAL	**26**

Text Books:

1. Sanjay Manjrekar, "Cricket Fundamentals", Orient BlackSwan
2. Ravi Shastri, "Winning Cricket: Skills and Strategies", Notion Press
3. R. Sridhar, "Coaching Beyond", Rupa Publications India

Reference Books:
1. Rob Eastaway, "Cricket Explained: From Grubbers to Googlies", St. Martin's Griffin 2. SurendraShrivastava, "Cricket – KhelAurNiyam", PrabhatPrakashan
E-Resources:
1. Sports and Performance Nutrition, IIT Madras https://nptel.ac.in/courses/109106402 2. How to Play Cricket https://coachtube.com/courses/cricket 3. Cricket rules explained in 2 minutes https://www.youtube.com/watch?v=wHEIT32ZEVs 4. Every Cricket Shot Explained in 21 Minutes https://www.youtube.com/watch?v=HQMZMc_bpg8

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Rifle and Pistol Shooting)									**Code:**25CECC305H
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To develop safe shooting skills, accuracy concentration, and proper shooting techniques in students. It also aims to build discipline, confidence and prepare shooters for competitive events.

Course Outcomes: After completion of this course students will be able to -

CO1	Explain safe rifle handling, range discipline, equipment, and match procedures.
CO2	Demonstrate proper shooting techniques, physical coordination, and shooting posture.
CO3	Apply mental focus, concentration, and scientific principles to improve shooting performance.
CO4	Demonstrate sportsmanship, discipline, and overall proficiency in competitive shooting.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Recoil Management:** How to avoid recoil	02
2.	**Loading and Unloading Procedures: P**rocedure to load a gun.	02
3.	**Malfunction Identification and Clearance:** What is malfunction and its solutions	02
4.	**Gun Cleaning and Maintenance:** Process to open a gun and clean it	02
5.	**Ammunition Types and Selection:** Selecting a perfect ammunition from different ammunition companies	02
6.	**Environmental Effects on Shooting:** Effect on a shot of environment	02
7.	**Assessment – V**	02
8.	**Scoring Systems:** How to read score.	02
9.	**Competition Rules:** Explaining the rules and commands	02
10.	**Match Preparation:** Physical and mental preparation of a shooter for match	02
11.	**Mental Conditioning and Concentration:** Making a shooter mentally strong and increasing concentration process	02
12.	**Time-Controlled Shooting:** Procedure to fire a shot in given time	02
13.	**Assessment – VI**	02
	TOTAL	**26**

DEPARTMENT OF CIVILENGINEERING

Text Books:

1. International Shooting Sport Federation (ISSF), "ISSF Official Statutes, Rules and Regulations", International Shooting Sport Federation (ISSF)
2. National Rifle Association (NRA), "The NRA Guide to the Basics of Pistol Shooting", National Rifle Association of America
3. National Rifle Association (NRA), "The NRA Guide to the Basics of Rifle Shooting", National Rifle Association of America

Reference Books:

1. National Rifle Association (NRA), "The Fundamentals of Rifle Marksmanship", National Rifle Association of America
2. International Shooting Sport Federation (ISSF), "ISSF Official Statutes, Rules and Regulations", International Shooting Sport Federation (ISSF)
3. National Rifle Association (NRA), "The NRA Guide to the Basics of Pistol Shooting", National Rifle Association of America
4. National Rifle Association (NRA), "The NRA Guide to the Basics of Rifle Shooting", National Rifle Association of America

E-Resources:

1. Introduction to Exercise Physiology & Sports Performance, IIT Madras,
   https://nptel.ac.in/courses/109106406

2. Open Sight Air Rifle Shooting Sports For Beginners. @TheGunzoneNetwork – YouTube
   https://www.youtube.com/watch?v=GMg970aTqgk

3. Basics of the Standing Position | Sauer Academy
   https://www.youtube.com/watch?v=eo_uINlK0KA

4. The Ideal Air Rifle Shooter with AbhinavBindra [IND]
   https://www.youtube.com/watch?v=Zj4dK8mOwsw

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Volleyball)									**Code:**25CECC305I
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To equip participants with the essential skills and knowledge of volleyball, enabling them to perform fundamental techniques, understand basic rules, and participate in basic gameplay scenarios confidently.

Course Outcomes: After completion of this course students will be able to -

CO1	Explain the official rules, referee signals, and scoring procedures of volleyball.
CO2	Demonstrate advanced volleyball skills, fitness components, and position-specific techniques.
CO3	Apply offensive, defensive, and tactical strategies effectively during competitive play.
CO4	Demonstrate proficiency in officiating, teamwork, sportsmanship, and overall match performance.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Double Blocking Technique:** Introduction to double blocking, stance and ready position, footwork for lateral movement, timing the jump with the attacker, hand positioning over the net, coordination between middle and wing blocker, drills on blocking angles and recovery.	02
2.	**Advance Digging:** Advanced defensive posture, digging against hard-driven spikes, rolling and diving techniques, pancake save, anticipation and reading the attacker, transition from defense to offense, reaction drills**.**	02
3.	**Advance Setting:** Jump setting, back setting, quick setting, setting accuracy under pressure, decision-making, communication with hitters, setter movement and transition drills.	02
4.	**Cross Court And Line Spiking:** Approach mechanics, body positioning, wrist action, cross-court attack, line attack, shot placement, attacking against blockers, controlled hitting drills**.**	02
5.	**Advanced Blocking:** Single, double and triple blocking strategies, reading setter intentions, block coverage, penetration over the net, transition after blocking, tactical blocking drills.	02
6.	**Libero Skills:** Role and responsibilities of the libero, serve receive, defensive positioning, emergency setting, court communication, floor defense techniques, specialized libero drills.	02
7.	**Assessment – V**	02
8.	**Offensive Systems (5-1):** Introduction to the 5–1 offensive system, player	02

	rotations, setter responsibilities, transition from defense to offense, positional responsibilities, team coordination.	
9.	**Offensive Combinations:** Quick attacks, tandem attack, slide attack, combination plays, synchronization between setter and attackers, offensive communication and execution drills.	02
10.	**Team Defensive System:** Perimeter defense, rotational defense, block-defense coordination, defensive coverage, court positioning, communication, transition to counterattack.	02
11.	**Tactical Serving:** Float serve and jump serve placement, serving strategies against different formations, targeting weak receivers, serving under pressure, tactical decision-making.	02
12.	**Competitive Match Practice:** Full competitive matches following official rules, tactical implementation, referee signals, teamwork, leadership, sportsmanship, and post-match performance evaluation.	02
13.	**Assessment – VI**	02
	TOTAL	**26**

Text Books:

1. FédérationInternationale de Volleyball (FIVB), "Official Volleyball Rules", FIVB Publications
2. Bonnie Kenny & Cindy Gregory, "Volleyball: Steps to Success", Human Kinetics
3. Anita Bean, "The Complete Guide to Sports Nutrition", Bloomsbury Sport
4. Ian Jeffreys, "The Warm-Up", Human Kinetics

Reference Books:

1. Pete Waite, "Aggressive Volleyball", Human Kinetics
2. Bob Bertucci, "Volleyball Drill Book", Human Kinetics

E-Resources:

1. Volleyball Rules: How to Play Volleyball: The Rules of Volleyball EXPLAINED!
   https://www.youtube.com/watch?v=9g7nYQv-kPM

2. 6 Basic Skills in Volleyball – YouTube
   https://www.youtube.com/watch?v=4vnD991J22g

3. Everything You Need to Know About the Game of Volleyball – YouTube
   https://www.youtube.com/watch?v=OyyeRGunDn4

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – III (Football)									**Code:**25CECC305J
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To enhance football players' technical skills, tactical understanding, physical fitness, teamwork, and sportsmanship, fostering a comprehensive understanding and appreciation of the game.

Course Outcomes: After completion of this course students will be able to -

CO1	Explain attacking, defensive, formation, and set-piece principles in football.
CO2	Apply possession, counter-attacking, and transition strategies in match situations.
CO3	Analyze performance using psychology, nutrition, injury management, and technology.
CO4	Demonstrate teamwork, decision-making, and tactical skills during matches.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Principles of Attack:** Understand and apply the principles of attack, including creating space, supporting teammates, progressing the ball, and creating goal-scoring opportunities.	02
2.	**Principles of Defense**: Understand and apply the principles of defense, including pressure, cover, balance, marking, and communication to effectively prevent opponents from scoring.	02
3.	**Team Formations:** Understand and apply different team formations to improve player positioning, tactical organization, and overall team performance.	02
4.	**Transition Play:** Understand and apply effective transition play by quickly switching between attacking and defensive phases to maintain team advantage.	02
5.	**Possession-Based Football:** Develop possession-based football skills by improving ball retention, passing accuracy, movement, and decision-making to control the game effectively.	02
6.	**Counter-Attacking Football:** Understand and apply counter-attacking principles by transitioning quickly from defense to attack through speed, movement, and effective decision-making.	02
7.	**Assessment-V**	02
8.	**Set-Piece Organization**: Understand and apply set-piece organization by developing effective attacking and defensive strategies for free kicks, corners, and restarts.	02
9.	**Nutrition for Football Players:** Understand the importance of proper	02

	nutrition and hydration strategies to support energy, recovery, performance, and overall fitness for football players.	
10.	**Injury Management**: Understand basic injury management practices, including prevention, immediate care, recovery strategies, and safe return-to-play procedures for football players.	02
11.	**Technology in Football:** Understand the role of technology in football by exploring tools for performance analysis, player development, match decisions, and injury prevention.	02
12.	**Full Match Analysis:**Analyze full match performance by evaluating tactics, player decisions, team organization, strengths, and areas for improvement.	02
13.	**Assessment-VI**	02
	TOTAL	**26**

Text Books:

1. FédérationInternationale de Football Association (FIFA), "Laws of the Game", FIFA
2. International Football Association Board (IFAB), "Laws of the Game", IFAB

Reference Books:

1. Charles Hughes, "The Winning Formula in Soccer", Meyer & Meyer Sport
2. FédérationInternationale de Football Association (FIFA), "Laws of the Game", FIFA
3. International Football Association Board (IFAB), "Laws of the Game", IFAB

E-Resources:

1. Udemy – Soccer Courses
   https://www.udemy.com/topic/soccer/

2. Beginner's guide to football | Football for dummies
   https://www.youtube.com/watch?v=Phnt5QZ7X7o

3. Every position in soccer explained
   https://www.youtube.com/watch?v=xCXGhvPdXYc&t=52s

4. Rules Of Soccer : How to play Soccer : Soccer Rules for Beginners
   https://www.youtube.com/watch?v=cTCgU4Vz0rE

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** III
Course: Internship – I									**Code:**25CEIN301
Teaching Scheme (Hrs/week)				**Evaluation Scheme(Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
4 Weeks			02	-	-	25	-	-	25

Preamble:

Internships serve as vital educational and career development experiences, offering practical exposure in a specific field. Employers seek individuals who possess the necessary skills and an understanding of industry environments, practices, and cultures. This internship is designed as a structured, short-term, supervised training program, often centered on specific tasks or projects with clear timelines. The primary goal is to immerse technical students in an industrial setting, providing experiences that cannot be replicated in the classroom. This exposure aims to develop competent professionals who understand the social, economic, and administrative factors influencing the operations of industrial organizations.

Course Objectives:

1. To expose students to the industrial environment, enabling them to assess professional practices not available in the classroom.
2. To develop students' ability to evaluate and apply technical knowledge in real industrial situations.

Course Outcomes: After completion of this course students will be able to -

CO1	Assess industry practices and judge how academic concepts are applied in professional settings.
CO2	Evaluate and demonstrate effective communication and teamwork skills within a work environment.
CO3	Analyze and improve problem-solving and time-management skills by working in real-world industry settings.

Internship Requirements:

1. **Internship Duration**: It is mandatory for all students to undergo an internship after every semester during vacations for the duration of 4 weeks. Internships completed during this period will be considered for the assessment of Term Work (TW).
2. **Internship Opportunities:** Students can explore various opportunities for internships at:
   a. Industries
   b. Research labs or organizations
   c. Collegiate clubs
   d. In-house research projects
   e. Online internships
3. **Support and Assistance:** Students can seek assistance for securing internships from:
   a. The Training and Placement cell, along with departmental coordinators
   b. Department or institute faculty members
   c. Personal contacts
   d. Directly connecting with industries or organizations
4. **Request Letter:** Once an industry, research organization, or collegiate club is identified, students must obtain a request letter from the concerned department or placement office. This letter, in the standard format must be duly signed by the authority, should be addressed to the HR manager or relevant authority.

5. **Confirmation Letter:** Students must submit the confirmation letter from the industry, research organization, or collegiate club to the Internship Coordinator and the Head of Department (HOD) office.
6. **Joining Report:** Upon commencing the internship, students must submit the joining report, joining letter, or a copy of the confirmation email to the Internship Coordinator and the HOD office.
7. **Faculty Mentor:** A faculty member will be assigned as a mentor to a group of students. The mentor will be responsible for monitoring, evaluating, and assessing student internship activities. The faculty mentor is also required to visit the internship location and submit formal feedback to the Internship Coordinator.
8. **Faculty Visits:** Faculty members are advised to visit the internship site once or twice during the internship period to monitor progress.
9. **Progress Report:** Students must submit progress report fortnightly to their faculty guide and the final internship report to the Internship Coordinator and department office.
10. **Evaluation Report:** After the completion of the internship, the mentor, along with the assessment panel members, should submit the evaluation report of the students to the department office and the Internship Coordinator.
11. **Internship Certificate:** Students must receive the Internship Certificate from the industry and submit it to the Internship Coordinator and department office.
12. **Presentation and Assessment:** Students are required to give a presentation on their internship work as part of the term work. The internship diary and report will also be verified and assessed.

DEPARTMENT OF CIVIL ENGINEERING

SYLLABUS

SEMESTER- IV

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Fluid Mechanics									**Code:**25CEPC404
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Fundamentals of Physics, Mathematics and Engineering Mechanics.

Course Objectives:

1. To enable students to evaluate fluid properties and apply dimensional analysis to practical problems.
2. To develop students' ability to apply principles of continuity, momentum, and energy to analyze fluid motion.

Course Outcomes: After completion of this course students will be able to -

CO1	Apply fluid properties and dimensional analysis to solve fluid-flow problems.
CO2	Analyze and solve fluid-statics problems.
CO3	Evaluate and measure fluid pressure using appropriate techniques.
CO4	Select and calibrate flow-measuring instruments such as the venturimeter and orifice meter.
CO5	Analyze pipe networks and determine flow characteristics.
CO6	Apply the knowledge of uniform flow and depth-energy to solve problems on open channel flow.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Properties of Fluids & Dimensional Analysis** Definition of fluid, physical properties of fluids. Newton's law of viscosity, classification of fluids, Dynamic and kinematic viscosity, compressibility, cohesion, adhesion, surface tension, capillarity, vapour pressure. Dimensions of physical quantities, dimensional homogeneity, dimensional analysis using Buckingham's π theorem method, geometric kinematic and dynamic similarity, important dimensionless parameters and their significance , Model Laws	07
2.	**Fluid Statics** The basic equation of hydrostatics, concept of pressure head, measurement of pressure (absolute, gauge), application of the basic equation of hydrostatics, Pressure measuring devices, Centre of pressure, total pressure on plane and curved surfaces, practical applications.	07
3.	**Fluid Kinematics** Methods of describing the motion of fluid, velocity and acceleration, and their components in Cartesian co-ordinates, stream line, stream tube, path line, and streak line, control volume. Classification of flow, Equation of continuity for three dimensional flow in Cartesian co-ordinates, flow net, methods of drawing flow net, uses.	07
4.	**Fluid dynamics** Forces acting on fluid mass in motion, Euler's equation of motion along a streamline and its integration, assumptions of Bernoulli's equation, Modified	06

	Bernoulli's equation, its applications and limitations, Hydraulic grade line and total energy line, Application of Bernoulli's equation.	
5.	**Laminar flow and Flow Through Pipes** Characteristics of laminar flow, laminar flow through a circular pipe: Hagen Poiseuille equation, Hazen-Williams formula. Characteristics of turbulent flow, Darcy-Weisbach Equation, Moody's diagram, Major and minor losses of energy in pipes, flow through pipes, Dupit's equation, Introduction to pipe network and design.	06
6.	**Introduction to Open Channel** Introduction to Open channel flow: Classification of channels, channel flows and geometric elements of channel, Velocity distribution in open channel flow and hydraulic jump. Uniform flow in open channels: Uniform flow formulae: Chezy's and Manning's formulae; Factors affecting Manning's roughness coefficient. Most efficient channel sections: rectangular, trapezoidal. Depth-Energy Relationships in Open Channel Flow: Specific energy and Specific force diagram, Depth discharge Diagram, Critical depth, Conditions for occurrence of critical flow; Froude's number, flow classification based on it, Introduction to channel transition.	06
	TOTAL	**39**

Text Books:

1. Hydraulics & Fluid Mechanics by Dr. P. N. Modi and Dr. S. M. Seth, Standard Book House.
2. Fluid Mechanics and Hydraulic Machines by McGraw Hill Education (India).

Reference Books:

1. Fluid Mechanics by Yunus Cengel, Jhon Cimbala, Tata Macgraw Hill, New Delhi.
2. Fluid Mechanics by R. J. Garde, A.J Mirajgaonkar, SCITECH Publication.
3. Fluid Mechanics by Streeter & Wylie, Tata McGraw Hill.
4. Fluid Mechanics by Dr. A. K. Jain, Khanna Publishers.
5. Fluid Mechanics by K. Subramanya, McGraw Hill.
6. Fluid Mechanics by Frank White, McGraw Hill.
7. Fluid Mechanics and Fluid Machinery by R. K. Bansal, Laxmi Publications.

E-Resources:

1. NPTEL Course on Fluid Mechanics, IIT Kanpur
   https://nptel.ac.in/courses/112104118
2. NPTEL Video Lecture on Fluid Mechanics, IIT Bombay
   https://nptel.ac.in/courses/105101082

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Fluid Mechanics Lab									**Code:**25CEPC404P
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	-	25	-	25

Prerequisites:

Fundamentals of Physics, Mathematics and Engineering Mechanics.

Course Objectives:

1. To provide students with practical knowledge of fluid properties, pressure measurement, fluid flow behavior, and stability of floating bodies through laboratory experiments.
2. To develop students' ability to conduct and interpret experiments related to Bernoulli's theorem, flow measurement, flow patterns, and energy losses in pipe systems.

Course Outcomes: After completing the Fluid Mechanics Laboratory, students will be able to: -

CO1	Select and apply appropriate instruments and methods to measure fluid properties, pressure, flow rates, and stability of floating bodies.
CO2	Analyze and interpret fluid flow behavior using Bernoulli's theorem, flow measurement devices, flow patterns, and laminar–turbulent flow characteristics.
CO3	Evaluate energy losses and flow resistance in pipe systems, and recommend suitable methods, instruments, and parameters for practical fluid-flow applications.

List of Experiments:

The term work shall consist of a journal giving details of a minimum 8 out of the following experiments.

1. Measurement of viscosity by Redwood viscometer.
2. Measurement of pressures using different pressure measuring devices (including transducers /state of arts digital instruments also).
3. Determination of stability of floating bodies using ship models.
4. Experimental verification of Bernoulli's theorem with reference to loss of energy
5. Calibration of Venturimeter / Orifice meter.
6. Drawing flow net by electrical analogy for flow below weir (with & without sheet pile)
7. Plotting the pattern of laminar flow using Reynolds apparatus or Heleshaw's apparatus.
8. Transition of Laminar and turbulent flow through pipes.
9. Determination of, minor loss in a pipe system/friction factor for a given pipe.
10. Measurement of surface tension.
11. Demonstration of fluid flow through appropriate VCD/Audio visual / PPT's.

Assignments: any two of the following

1. Solve three reservoir problem / pipe network analysis using Excel or any programming language.
2. Determination of friction factor for a pipe using any programming language.
3. Application of any fluid mechanics software to analyze the problem.
4. Developing a demo model related to any fluid flow phenomenon (physical model/ soft model).
5. Assignment on drawing of flow net graphically.

Reference Books:
1. Fluid Mechanics by Yunus Engel, Jhon Cimbala, Tata Macgraw Hill, New Delhi. 2. Fluid Mechanics by R. J. Garde, A.J Mirajgaonkar, SCITECH Publication. 3. Fluid Mechanics by Streeter & Wylie, Tata McGraw Hill. 4. Fluid Mechanics by Dr. A. K. Jain, Khanna Publishers. 5. Fluid Mechanics by K. Subramanya, McGraw Hill. 6. Fluid Mechanics by Frank White, McGraw Hill. 7. Fluid Mechanics and Fluid Machinery by R. K. Bansal, Laxmi Publications.
E-Resources:
1. NPTEL Course on Fluid Mechanics, IIT Kanpur https://nptel.ac.in/courses/112104118 2. NPTEL Video Lecture on Fluid Mechanics, IIT Bombay https://nptel.ac.in/courses/105101082

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Surveying									**Code:**25CEPC405
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Basic Civil Engineering. (Principles of survey, applications of survey, scale, use of tape, dumpy level etc., is essential)

Course Objectives:

1. To develop students' ability to apply knowledge of mathematics, science, and engineering to evaluate measurement techniques in surveying.
2. To enable students to select and apply appropriate techniques, methods, and equipment for linear and angular measurement in horizontal and vertical planes.

Course Outcomes: After completion of this course students will be able to -

CO1	Apply Plane Table Surveying techniques and evaluate a plan depicting all significant field details accurately.
CO2	Determine Reduced Levels and evaluate accurate contour maps for the designated terrain.
CO3	Apply angular-measurement and theodolite-traversing methods, and evaluate coordinate computation, traverse balancing, and area calculation.
CO4	Apply angular-measurement and theodolite-traversing methods, and evaluate coordinate computation, traverse balancing, and area calculation.
CO5	Select and set out simple circular curves using linear and angular methods.
CO6	Evaluate and apply advanced surveying techniques using Electronic Total Stations (ETS) and GPS for various field applications.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Introduction and Plane Table Surveying** a) Purpose, principles of surveying, classification, scale and its types, plan and maps, Traverse and its types, checks b) Plane table surveying – principle, equipment and uses, temporary adjustments: orientation, methods, advantages and limitations.	07
2.	**Leveling and Contouring** a) Levelling – Basics, types of levels, dumpy level components and adjustments, reciprocal levelling, corrections for curvature and refraction, visible horizon distance. b) Contouring – Contour interval, horizontal equivalent, contour maps and their uses, methods of contouring.	07
3.	**Theodolite Surveying** a) Types and uses of theodolite, parts and functions of transit theodolite, vernier reading, key terms, fundamental axes, adjustments (temporary & permanent),measurement of horizontal angles (direct & repetition methods), error elimination, and vertical angle measurement. b) Theodolite traversing – computation of consecutive and independent coordinates, Balancing of closed traverse by Bowditch's rule and transit rule,	07

	Gale's traverse table. Checks, omitted measurements, area calculation by independent coordinates	
4.	**Tacheometry** Tacheometry – Principle of stadia tacheometry, finding tacheometric constants, Methods, Fixed hair method with vertical staff to determine horizontal distances and elevations of points, Tacheometric contouring	06
5.	**Curves** Necessity and types of curves, simple circular curves, notations and properties setting out of a simple circular curve by linear methods such as offsets from the long chord, offsets from chord produced, radial and perpendicular offsets from tangents, angular methods: Rankine's method of deflection angles.	06
6.	**Advanced Surveying Techniques and Applications** a) Electronic Distance Measurement: study and use of electronic total station (ETS), its types, remote elevation and distance measurements, and area measurement. b) Global Positioning System (GPS): components – space, control, and user segments; reference systems, satellite orbits, GPS observations, and applications, applications: setting out works (buildings), profile levelling, cross-sectioning, and pipeline surveying	06
	TOTAL	**39**

Text Books:

1. N.N. Basak, "Surveying and Levelling", Tata McGraw-Hill.
2. B.C. Punmia, "Surveying", Vol. I, II, and III, Laxmi Publications, New Delhi.
3. T.P. Kanetkar, S.V. Kulkarni, "Surveying and Leveling", Vol. I & II, Pune Vidyarthi Griha Prakashan.

Reference Books:

1. A.M. Chandra, "Plane Surveying", New Age International Publishers.
2. James M. Anderson, Edward M. Mikhail, "Surveying: Theory and Practice", Tata McGraw-Hill.
3. David Clark, "Plane and Geodetic Surveying for Engineers, Vol. I", Constable.

E-Resources:

1. NPTEL Video lecture on "Surveying",
   https://nptel.ac.in/courses/105104101
2. NPTEL web lecture on "Surveying"
   https://nptel.ac.in/courses/105107122

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Structural Analysis									**Code:**25CEPC406
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Fundamentals of Physics, Mathematics, Engineering Mechanics and Mechanics of Structures

Course Objectives:

1. To enable students to apply concepts from Engineering Mechanics and Mechanics of Structures to analyze indeterminate structures.
2. To develop students' ability to evaluate and select appropriate methods for the analysis of real-life indeterminate structures.

Course Outcomes: After completion of this course students will be able to -

CO1	Analyze the concept of static and kinematic indeterminacy and evaluate indeterminate beams.
CO2	Analyze redundant trusses and be able to perform approximate analysis of multi-story multi-bay frames.
CO3	Apply the slope-deflection method to analyze beams and portal frames.
CO4	Analyze beams and portal frames using moment distribution method.
CO5	Determine response of beams and portal frames using structure approach of stiffness matrix method.
CO6	Apply the concepts of plastic analysis in the analysis of steel structures.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Fundamentals of structure and analysis of redundant beams.** a) Types and classification of structures based on structural forms, concept of indeterminacy, static and kinematics degree of indeterminacy. b) Analysis of propped cantilever, fixed beam and continuous beams with indeterminacy up to second degree by strain energy method.	07
2.	**Analysis of redundant pin jointed frames and multi-storied multi-bay 2-D rigid jointed frames.** a) Analysis of redundant trusses by unit load method for external loading, lack of fit, sinking of support and temperature changes (indeterminacy up to second degree). b) Approximate methods of analysis of multi-storied multi-bay 2-D rigid jointed frames by Cantilever method and Portal method.	06
3.	**Slope-Deflection Method.** a) Slope-deflection equations, equilibrium equation of Slope-deflection method, application of Slope deflection method to beams with and without joint translation and rotation, yielding of support, application to non-sway rigid jointed rectangular portal frames, shear force and bending moment diagram. b) Sway analysis of rigid joint rectangular single bay single storey portal frames using Slope- deflection method. (Involving not more than three unknowns)	08

4.	**Moment Distribution Method.** a) Stiffness factor, carry over factor, distribution factor, application of Moment distribution method of analysis to beams with and without joint translation and yielding of support, application to non-sway rigid jointed rectangular portal frames, shear force and bending moment diagram. b) Sway analysis of rigid jointed rectangular single bay single storey portal frames using Moment distribution method (Involving not more than three unknowns).	06
5.	**Stiffness method.** a) Fundamental concepts of flexibility and stiffness, relation between them. Stiffness method of analysis- Structure approach only. Application to beams (Involving not more than three unknowns). b) Application of Stiffness structure approach to rigid jointed rectangular portal frames (Involving not more than three unknowns).	06
6.	**Plastic Analysis of Structure.** True and idealized stress-strain curve for mild steel in tension, stress distribution in elastic, elasto-plastic and plastic stage, concept of plastic hinge and collapse mechanism, static and kinematic methods of analysis, upper bound, lower bound and uniqueness theorem. Plastic modulus of section, Plastic moment, shape factor.	06
	TOTAL	**39**

Text Books:

1. Theory of Structures by S. Ramamrutham and R. Narayan, Dhanpat Rai Publishing Company Ltd.
2. Structural Analysis-I & II by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd.
3. Structural Analysis: A Matrix Approach by G. S. Pandit and S. P. Gupta, Tata McGraw Hill Education Pvt. Limited.

Reference Books:

1. Intermediate Structural Analysis by C. K. Wang, Tata McGraw Hill Education Pvt. Ltd.
2. Mechanics of Structures Vol. II (Theory and Analysis of Structures) by Dr. H. J. Shah and S.B. Junnarkar, Charotar Publishing House Pvt. Ltd.
3. Basic Structural Analysis by C. S. Reddy, Tata McGraw Hill Education Pvt. Ltd.
4. Structural Analysis by R. C. Hibbler, Pearson Education.
5. The Plastic Methods of Structural Analysis by B. G. Neal, Champman& Hall.

E-Resources:

1. NPTEL – Structural Analysis Course
   https://nptel.ac.in/courses/105101085
2. NPTEL – Structural Analysis Video Lectures
   https://www.youtube.com/playlist?list=PLUogGZJOiMtNOus85Tq1zNvg9EU3aJ8VO

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Construction Management									**Code:**25CEMD402
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
03	-	-	03	40	60	-	-	-	100

Prerequisites:

Project Management, Building Materials and Construction

Course Objectives:

1. To enable students to evaluate construction activities and assess the performance of construction projects.
2. To develop students' ability to judge situations involving labour laws and financial aspects of construction projects.

Course Outcomes: After completion of this course students will be able to -

CO1	Analyze and evaluate the overview and scope of the construction sector.
CO2	Formulate and evaluate construction schedules using work study and work-measurement techniques.
CO3	Assess and apply various labour laws and financial aspects of construction projects.
CO4	Evaluate elements of risk management and value engineering for construction decisions.
CO5	Select and justify material- and human-resource management techniques in construction.
CO6	Evaluate the application of artificial-intelligence techniques in civil engineering.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Overview of Construction Sector** Role of construction industry in infrastructure development, construction management, project management consultants, project overruns, project monitoring and reporting systems, managerial correspondence and communications, generation and identification of project investment opportunities.	07
2.	**Introduction to Construction Scheduling Software & BIM:** Introduction to Building Information Modeling (BIM),Construction Scheduling Softwares	07
3.	**Labour Laws and Financial Aspects of Construction Project** Need and importance of labour laws, study of some important labour laws associated with construction sector, workman's compensation act 1923, building and other construction workers act 1996, child labour act, the minimum wages act 1948. Capital investments, means of finance, working capital requirements, project cash flow projections and statements.	07
4.	**Risk Management and Value Engineering** Risk Management, origin, use of mathematical models, risk identification, mitigation of project risks, role of insurance in risk management. Value Engineering, Phases & Stages of Value Engineering in Construction,Construction safety Management (Formwork)	06

5.	**Material Management** Material, concept of material management, various phases of material flow system, role of material manager, role of material management in construction management, inventory control methods, EOQ Model, stores management and control, break even analysis, concept of logistics and supply chain management, role of ERP in material management and material resource information systems.	06
6.	**Work Study & Motion Study** Definition and objectives of work study & Motion Study, Various recording Techniques, Principles of Motion Economy, Techniques of work measurement, Time study, Time Study Procedure , Labour & Machinery	06
	TOTAL	**39**

Text Books:

1. Construction Management and Planning, B. Sengupta and H. Guha, Tata McGraw Hill Publications.
2. Total Project Management - The Indian Context, P. K. Joy, Mac Millian Publications.
3. Projects: Planning, Analysis, Selection, Implementation and Review, Prasanna Chandra, Tata McGraw Hill Publications.

Reference Books:

1. Civil Engineering Project Management, C. Alan Twort and J. Gordon Rees, Elsevier Publications
2. Principles of Construction Management, Roy Pilcher (McGraw Hill)
3. Human Resource Management, Biswajeet Pattanayak, Prentice Hall Publishers.
4. Materials Management, Gopalkrishnan & Sunderasan, Prentice Hall Publications.
5. Labour and Industrial Laws, S. N. Mishra, Central Law Publications.
6. Artificial Neural Network, Veganarayanan, Prentice Hall.

E-Resources:

1. Principles of Construction Management
   https://onlinecourses.nptel.ac.in/noc25_ce95/preview
2. Project Planning & Control
   https://onlinecourses.nptel.ac.in/noc22_ce59/preview
3. Construction Planning & Management Materials (NPTEL) –
   https://www.nptelprep.in/courses/105103093/materials
4. NPTEL Construction Planning and Management
   https://nptel.ac.in/courses/105103093

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** IV
Course: Open Elective – II (Cyber Security & Laws)									**Code:**25ALOE402A
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Foundational knowledge in computer science, networking.

Course Objectives:

1. To introduce the cyber world and cyber law in general.
2. To enhance the understanding of problems arising out of online transactions and provoke them to find solutions.

Course Outcomes: After completion of this course students will be able to -

CO1	Illustrate and discuss the basic concepts of cyber security, Devices.
CO2	Understand the aspects related to personal data privacy and security.
CO3	Understand the main components of cyber security plan.
CO4	Understand about the type and nature of cyber-crimes.
CO5	Articulate the well-known cyber-attack incidents, explain the attack scenarios, and explain mitigation techniques.
CO6	Explain the difference between Systems Cyber Security, Network Cyber Security, and Cryptography, Crypto-Protocols etc.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Introduction to Cyber Security** Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security.	04
2.	**Digital Devices Security, Tools and Technologies for Cyber Security** End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third-party software, Device security policy, Cyber Security best practices, Significance of host firewall, Wi-Fi security, Configuration of basic security policy and permissions.	04
3.	**Cyber security Management, Compliance and Governance** Cyber security Plan- cyber security policy, cyber crises management plan., Business continuity, Risk assessment, Types of security controls and their goals, Cyber security audit and compliance, National cyber security policy and strategy.	05
4.	**Cybercrimes** Targeting Computer systems and Mobiles- data diddling attacks, spyware, logic bombs, DoS, DDoS, APTs, virus, Trojans, ransomware, data breach Cyber squatting, Pharming, drug trafficking, human trafficking., Social Media Scams & Frauds- impersonation, identity theft Cyber Police stations, Crime reporting procedure, Case studies	05

5.	**Cybercrime** Illustrations, Examples and Mini cases, Real-life examples, Mini Cases-Social Engineering Attacks, Illustration of financial frauds in cyber domain, Digital Signature- Related Crime scenarios, Digital forensics case Illustrations, Online scams.	04
6.	**Cyber law** Cybercrime and legal landscape around the world, IT Act,2000 and its amendments. Limitations of IT Act, 2000. Cybercrime and punishments, Cyber Laws and Legal and ethical aspects related to new technologies- AI/ML, IOT, Block chain, Dark net and social media, Cyber Laws of other countries.	04
	TOTAL	**26**

Text Books:

1. Michael E. Whitman, Herbert J. Mattord, (2018),"Principles of Information Security", 6th edition, Cenage Learning, N. Delhi.
2. Chris Reed & John Angel, "Computer Law", OUP, New York, (2007).
3. Prasad R.S., "Cyber Crime an Introduction".
4. Ed. Kumar Krishna, "Cyber Laws".

Reference Books:

1. Angus M. Marshall, "Digital forensics: Digital evidence in criminal investigation", John – Wiley and Sons, 2008.
2. Sushma Arora, Raman Arora, "Cyber Crimes & Laws", 4thEdition 2021, Publisher: Taxmann,
3. N S Nappinai, "Technology Laws Decoded", 1stEdition, Publisher: Lexis Nexis.

E-Resources:

1. INTRODUCTION TO CYBER SECURITY
   https://onlinecourses.swayam2.ac.in/e-learning/preview/nou19_cs08
2. Cyber Security and Privacy - By Prof. Saji K Mathew (IIT Madras)
   https://onlinecourses.nptel.ac.in/e-learning/preview/noc25_cs116

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** IV
Course: Open Elective II **(**Sustainability and Climate Change)									**Code:**25ALOE402B
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Students should have knowledge about current environmental issues, various types of pollution and the concept of sustainable development.

Course Objectives:

1. To introduce the fundamental concepts and definitions of sustainability
2. To equip students with knowledge of sustainable construction solutions.
3. To develop an understanding of the Earth's climate system, assess the impacts of climate change, and evaluate the vulnerabilities of natural systems.

Course Outcomes: After completion of this course students will be able to -

CO1	Explain the fundamental concepts and global frameworks of sustainable development and interpret their significance in addressing environmental challenges and environmental legislation.
CO2	Identify and evaluate sustainable construction materials, energy-efficient practices, and green building frameworks to integrate environmental responsibility into infrastructure development.
CO3	Describe the components of the Earth's climate system and analyze the impact of human activities on climate change using scientific observations and climate scenarios.
CO4	Analyze the physical evidence and causes of climate change, and evaluate its impacts such as temperature rise, glacier melt, and extreme weather events, with reference to both global and Indian contexts.
CO5	Evaluate the sectoral impacts of climate change on natural and built systems such as agriculture, water resources, infrastructure, and human health, with emphasis on urban and coastal vulnerabilities.
CO6	Interpret international climate policies and evaluate technological and engineering mitigation strategies applicable to infrastructure for reducing environmental impacts.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Sustainable Development** Definitions & dimensions: sustainability, brundtland report, triple bottom line (economic, social, environmental), global & local environmental challenges: resource depletion, climate change, pollution, agenda 21, CDM, paris/kyoto protocols, clean development mechanism, environmental legislation & standards: ISO 14000 series, Indian water & air acts.	05
2.	**Sustainable Solutions** Green materials & techniques: low-voc paints, agro-waste bricks, bamboo, ferro-cement, stabilized soil blocks. energy& water efficiency: passive design, renewable/solar/wind energy, rainwater harvesting, EIA in construction. green building systems: LEED, GRIHA, ECBC, BREEM rating frameworks for sustainable infrastructure.	05

3.	**Climate & Climate Change Fundamentals** Earth's Climate System: Atmosphere structure, energy balance, greenhouse effect, climate zones, monsoons, El Niño/La Niña Human Influence: Greenhouse gas emissions, global warming trends, carbon cycle, RCP/SSP scenarios, Indian climate observations	04
4.	**Climate Change Impact** Climate Change Impact: Temperature shifts, sea-level rise, extreme weather, glacier melt, urban heat islands, Natural vs. anthropogenic causes; Milankovitch cycles, anthropogenic emissions Physical evidence: rising global temperatures, melting glaciers, sea-level rise, extreme weather trends in India and globally.	04
5.	**Impacts on Natural System** Sectoral impacts: agriculture, water resources, infrastructure, coastal zones, urban systems including heat islands, flooding, human health	04
6.	**Mitigation & Policy Measures** International policy processes: UNFCCC, IPCC, Kyoto/Montreal Protocols, CDM & carbon trading Technological and engineering mitigation: renewable energy, CCS, reflective surfaces (cool roofs), bioengineering (e.g., slope stabilization)	04
	TOTAL	**26**

Text Books:

1. Masters, Gilbert M., &Ela, Wendell P. *Introduction to Environmental Engineering and Science*, Pearson Education.
2. Murty, D. N. *Sustainable Development*, Himalaya Publishing House
3. Rogers, Peter P., Jalal, Kazi F., & Boyd, John A. *An Introduction to Sustainable Development*, Routledge, Earthscan Series.
4. Ravindranath, N. H., &Sathaye, Jayant, *Climate Change and Developing Countries*, Springer.

Reference Books:

1. K.S. Jagadish et al., Alternative Building Materials & Technologies
2. P.T. Anastas& J.B. Zimmerman, Principles of Green Engineering
3. Alternative Building Materials & Technologies by K.S. Jagadish et al.
4. Sustainability Engineering: Concepts, Design & Case Studies (Allen & Shonnard)
5. Dash S. Kumar, Climate Change – An Indian Perspective, Cambridge Univ. Press, 2007
6. Wallace & Hobbs, Atmospheric Science, Elsevier, 2006
7. Dash S. Kumar, Climate Change – An Indian Perspective
8. IPCC Assessments via Anna University syllabus

Environmental Legislations & Standards:

1. ISO 14001 Series for Environmental Management Systems
2. The Water (Prevention and Control of Pollution) Act, 1974
3. The Air (Prevention and Control of Pollution) Act, 1981

DEPARTMENT OF CIVILENGINEERING

E-Resources:

1. IGBC – Indian Green Building Council, Guidelines on green buildings, materials, and rating systems (LEED, GRIHA).
   https://igbc.in

2. GRIHA Council, India's green building rating system with case studies and manuals,
   https://www.grihaindia.org

3. MoEFCC – Ministry of Environment, Forest and Climate Change, Government of India, National policies, NAPCC missions, environmental acts (Air/Water Acts), and CDM projects,
   https://moef.gov.in

4. CPCB – Central Pollution Control Board, Air and water quality standards, EIA guidelines, ISO 14000 relevance,
   https://cpcb.nic.in,

5. SWAYAM / NPTEL, Free online courses by IITs/IISc on sustainability, energy systems, environmental engineering,
   https://swayam.gov.in

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** IV
Course: Open Elective – II (Energy Audit and Electrical Safety)									**Code:**25ALOE402C
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Concept of power & energy in three phase & single phase, Various electrical equipment & specifications

Course Objectives:

1. To Study the importance of energy security for sustainable development and the fundamentals of energy conservation.
2. To introduce performance evaluation criteria of various electrical and thermal installations to facilitate the energy management.

Course Outcomes: After completion of this course students will be able to -

CO1	Illustrate present state of energy security and its importance.
CO2	Identify and describe the basic principles and methodologies adopted in energy audit of utility.
CO3	Illustrate and analyze the Financial Analysis Techniques.
CO4	Evaluating the performance of some common thermal installations and list the energy saving opportunities.
CO5	Demonstrate awareness of the scope and significance of electrical safety in reducing risk and ensuring safe practices in electrical systems.
CO6	Identify and assess the potential risks and hazards associated with the installation process of electrical equipment.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Energy Scenario** Commercial and non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, Energy Conservation Act-2001 and its features, Re-structuring of the energy supply sector, energy strategy for the future, air pollution, climate change, Electricity Act, 2003.	05
2.	**Energy Management & Audit** Definition, need and types of energy audit. Energy management (audit) approach-understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel & energy substitution, energy audit instruments, Facility as an energy system, Energy analysis and the Sankey Diagram, Organizing - location of energy management, top management support, managerial function, roles and responsibilities of energy manager, force field analysis, Energy policies and its purpose.	05
3.	**Financial Management** Investment-need, appraisal and criteria, financial analysis techniques-simple payback period, return on investment, net present value, internal rate of return, cash flows, risk and sensitivity analysis; financing options, energy performance	04

	contracts and role of ESCOs, Defining monitoring & targeting, elements of monitoring & targeting, data and information-analysis, techniques -energy consumption, production, cumulative sum of difference (CUSUM).	
4.	**Energy Efficiency in Electrical Utilities** Electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors, energy conservation opportunities in Fans, Blower, Pumps, Lighting System.	04
5.	**Introduction to Electrical Safety, Shocks And Their Prevention** Terms and definitions, objectives of safety and security measures, Hazards associated with electric current and voltage, principles of electrical safety, Primary and secondary electrical shocks, causes of electrical shock and its severity, medical analysis of electric shocks and its effects, shocks due to flash/ Spark over's, prevention of shocks, safety precautions against contact shocks, flash shocks, burns in residential buildings and shops.	04
6.	**Safety During Installation of Plant and Equipment** Introduction, preliminary preparations, preconditions for start of installation work, risks during installation of electrical plant and equipment, safety aspects during installation, field quality and safety during erection, personal protective equipment for erection personnel, installation of a large oil immersed power transformer, installation of outdoor switchyard equipment, safety during installation of electrical rotating machines.	04
	TOTAL	**26**

Text Books:

1. Energy Audit and Management, Volume-I, IECC Press.
2. W.R. Murphy, G. McKay Butter worth," Energy management", Elsevier/bsp Books Pvt. Ltd., 2003.
3. Gupta B. R.: Generation of Electrical Energy, Eurasia Publishing House Pvt. Ltd., New Delhi, 2001
4. Prasanna Chandra, "Financial management", Tata McGraw Hill, 10th Edition, 2019.
5. Rao, S. and Saluja, H.L., "Electrical Safety, Fire Safety Engineering and Safety Management", Khanna Publishers, 1988.
6. Pradeep Chaturvedi, "Energy Management Policy, Planning & Utilization", Concept Publishing.

Reference Books:

1. Albert Thumann, P.E., C.E.M. William J. Younger, "Handbook of Energy Audits", River Publishers,
2. Paul O'Callaghan, "Energy management", McGraw-Hill Education, 1992.
3. CB Smith, "Energy Management Principles", Pergamon Press, New York.
4. W. C. Turner, "Energy Management Handbook". John Wiley and sons.

DEPARTMENT OF CIVILENGINEERING

E-Resources:

1. Basic Principles of Energy Management & Energy Audit – Course
https://onlinecourses.swayam2.ac.in/e-learning/preview/nou25_es14

2. Building Energy Systems and Auditing – Course
https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ar07

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** IV
Course: Open Elective – II (Digital Marketing)									**Code:**25ALOE402D
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Fundamentals of Business, Digital Tools

Course Objectives:

1. To understand digital marketing & process of website design.
2. To Study the various Digital Marketing Tools.
3. To learn the use of social media websites for Digital Marketing.

Course Outcomes: After completion of this course students will be able to -

CO1	Design web sites using free tools like word press and explore it for digital marketing.
CO2	Apply various keywords for a website & to perform SEO.
CO3	Understand the various SEM Tools and implement the Digital Marketing Tools.
CO4	Illustrate the use of Facebook, Instagram and YouTube for Digital Marketing in real life.
CO5	Use Linked in platform for various campaigning.
CO6	Understand the importance of recent trends in digital marketing.

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Digital Marketing Planning and Structure** Importance of Digital Marketing, Digital Marketing Vs. Traditional Marketing, Inbound vs Outbound Marketing, Understanding Demographics. WWW, Buying a Domain, Core Objective of Website and Flow, One Page Website, Strategic Design of Products & Services Page, Strategic Design of Landing Page, Segmentation & Targeting and Positioning to Digital Marketing, Portfolio, Gallery and Contact, Designing Wordpress Website.	05
2.	**Search Engine Optimization (SEO)** Fundamentals; Keywords and SEO Content Plan; SEO & Business Objectives; Writing SEO Content;On-site& off-site SEO; Optimize Organic Search Ranking, Website SEO Auditing. Introduction to Web Analytics.	05
3.	**Search Engine Marketing** Importance of Adwords, Google Ad Types, PPC Cost Formula, Ad Page Rank, Billing and Payments, Adwords User Interface, Keyword Planner, Creating Ad Campaigns, Creating Text Ads, Creating Ad Groups, Search Engine Marketing (SEM) Tools, Bidding Strategy for CPC. Case Studies. Conversion Tracking Code, Designing Image Ads, Creating Video Ads, Youtube Video Promotion.	04
4.	**Social Media Marketing (SMM) Part 1** B to C Perspective, B to B Perspective: Introduction; Major Social Media Platforms for Marketing; Developing Data-driven Audience & Campaign Insights; Social Media for Business. Facebook &Instagram Marketing: Understanding of Facebook Marketing, Types	04

	of Facebook Advertising, Creating first ad on Facebook, Setting Campaign and optimization, Facebook Power Editor, Facebook Video Marketing, Facebook App & Shopping Marketing. Youtube Marketing: YouTube Account Setup (Create a business account with a personal account), YouTube Monetization, YouTube Ads, YouTube Analytics.	
5.	**Social Media Marketing (SMM) Part 2** LinkedIn Advertising: How to use Linkedin Professionally, Types of LinkedIn Advertising, LinkedIn New feed Advertising, LinkedIn Message Pitching, Traffic and Leads Generation, Billing and Report. Email Marketing: Email Software and Tools, Importing Email Lists, Planning Email Campaign, Email Templates and Designs, Sending HTML Email Campaigns, Web Forms Lead Importing, Integrating Landing Page Forms, Campaign Reports and Insights, Segmentation Strategy, Responder Tracker.	04
6.	**Upcoming Trends in Digital Marketing** Podcast, OTT Platforms, Mob-Ad, No Click Searches, Google Verified Listing, Voice Search, Visual Search, Online Reviews, Automated and Smart Bidding, Chatbots, Affiliate Marketing.	04
	TOTAL	**26**

Text Books:

1. Cory Rabazinsky, "Google-Ad words for Beginners: A Do-It-Yourself Guide to PPC Advertising".
2. Ian Brodie, "Email Persuasion: Captivate and Engage Your Audience, Build Authority and Generate More Sales With Email Marketing".
3. Jan Zimmerman and Deborah, "Social Media Marketing All-In-One for Dummies".
4. Dave Chaffey, Fiona Ellis-Chadwick, Kevin Johnston, Richard Mayer, "Internet Marketing", Pearson Education.
5. Oliver J Rich, "Digital Marketing".
6. Gerry T. Warner and Joe Wilson Schaefer "Online Marketing".

Reference Books:

1. Prof. Seema Gupta, "Digital Marketing", Mcgraw Hill Publications.
2. Judy Strauss, Adel Ansary, Raymond Frost, Prentice Hall, "E- Marketing".
3. Dr. Andy Williams,"WordPress for Beginners 2020: A Visual Step-by-Step Guide to Mastering WordPress".
4. Cecilia Figueroa, "Introduction To Digital Marketing 101", BPB Publications.
5. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson, Wiley; 1st edition (2016).
6. Digital Marketing For Dummies by Ryan Deiss and Russ Henneberry, For Dummies

E-Resources:

1. Digital Tools Certification- By Google.
   https://skillshop.exceedlms.com/student/catalog
2. Swayam Certification course on, "Digital Marketing", by Dr.Tejindarpal Singh Panjab University Chandigarh.
   https://swayam.gov.in/nd2_ugc19_hs26/preview

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Common to all Programs)									**Semester:** IV
Course: OpenElective – II (Entrepreneurship and Innovations)									**Code:**25ALOE402E
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
02	-	-	02	-	-	50	50	-	100

Prerequisites:

Professional Development, Quality Management System

Course Objectives:

1. To learn the students' various aspects of innovation and methods of fostering Innovation
2. To appreciate the importance of embarking on self-employment and has developed the confidence and personal skills for the same.

Course Outcomes: After completion of this course students will be able to -

CO1	Understand the key concepts of innovation
CO2	Identify and analyze opportunities for innovation
CO3	Recognize the potential and value of self-employment
CO4	Develop a viable business plan for a small enterprise
CO5	Apply financial principles to plan and structure engineering and automation projects effectively
CO6	Apply fundamental principles of management

Course Contents:

Unit	**Description**	**Duration (Hrs.)**
1.	**Introduction to Innovation** Creativity, Invention and innovation, Types of Innovation, Relevance of Technology for Innovation, The Indian innovations and opportunities, Promoting and managing innovation, Innovators and Imitators, Patents, Trademarks, Intellectual Property, Exploring, Executing, Leveraging and renewing innovation, Enhancing Innovation Potential & Formulating strategies for Innovation	05
2.	**Strategy for Commercializing Innovation** Innovation Process, Risks and barriers for introducing products and services, selecting a Strategy, setting up the Investment and establishing organization, Evaluating the Costs and impact of the Project	05
3.	**Entrepreneurship** Definition. Growth of industries in developing countries; role of industries in the national economy; characteristics; demand based and resources-based ancillaries and sub-control types. Government policies, stages in starting an industry, types (family business/start-ups etc.), Sources of finance	04
4.	**Project Identification and Accountancy** Assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, Accountancy: Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, preparation of financial reports, accounts and stores studies.	04

5.	**Project Planning and Control** The financial functions cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. Profit planning and programming, planning cash flow, capital expenditure and operations. Control of financial flows, control and communication.	04
6.	**Laws** Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. Role of various national and state agencies which render assistance to small scale industries.	04
	TOTAL	**26**

Text Books:

1. Rabindra N. Kanungo, "Entrepreneurship and Innovation", Sage Publications, New Delhi, 1998.
2. Donald F. Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning, 2014.
3. Peter F. Drucker, "Innovation and Entrepreneurship", Butterworth-Heinemann.

Reference Books:

1. Robin Lowe and Sue Marriott, "Enterprise: Entrepreneurship and Innovation – Concepts, Contexts and Commercialization", Butterworth-Heinemann.
2. S. S. Khanka, "Entrepreneurial Development", S. Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.
3. Joseph L. Massie, "Essentials of Management", Prentice Hall of India.

E-Resources:

1. MIT Entrepreneurship Course
   https://ocw.mit.edu/collections/entrepreneurship/
2. Entrepreneurship, Prof. C BhaktavatsalaRao, (IIT Madras)

   https://nptel.ac.in/courses/110106141

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Generative AI Tools in Civil Engineering									**Code:**25CEAE402
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	04	-	02	-	-	50		-	50

Prerequisites:

Basic Civil Engineering, Engineering Mathematics, Computer Fundamentals, Engineering Graphics/CAD

Course Objectives:

1. To familiarize students with the fundamentals of Generative AI, enabling them to evaluate its applications in engineering disciplines.
2. To develop students' ability to select and integrate AI tools into practical problem-solving and design workflows.

Course Outcomes: After completion of this course students will be able to -

CO1	Analyze the principles and types of Generative AI models and tools.
CO2	Formulate precise and structured prompts to interact with text-to-text, text-to-image, and other generative models.
CO3	Apply AI tools to Civil Engineering problems such as modeling, visualization, design optimization, and analysis.
CO4	Interpret and evaluate AI-generated content critically in the context of engineering design.
CO5	Evaluate opportunities to automate repetitive tasks and enhance productivity using prompt engineering.
CO6	Formulate mini projects that integrate generative AI into real-life Civil Engineering workflows.

List of Practicals:

1. Create content, synthesize information, Text summarization, word / pdf documents analysis, Text classification, using any one of the Generative AI tools like ChatGPT, Gemini, Claude, Copilot.
2. Create PPT on Civil Engineering topic by using any one of the Generative AI tools like Gamma, Canva.
3. AI Writing Tools: Automate writing tasks, generate effective copy, and integrate with Google Sheets/Excel using any one of the Generative AI tools like Claude-2 ,Grammarly, Buffer's AI assistant, Jasper.
4. Design Automation: Use ChatGPT to auto-generate project proposals, Bill of Quantities, or tender documents for a residential or public project.
5. AI-Enhanced Documentation:
   Prepare DPR (Detailed Project Reports) or structural reports using prompt-based text generation.
6. Infrastructure Ideation:
   Use generative tools to ideate designs for bridges, parking structures, or green buildings.
7. AI in Environmental Design:
   Create environmental impact layouts or green campus designs using AI image generation tools.
8. Mini Project:
   A small design or planning project integrating at least two types of generative tools (e.g., text + image, or text + 3D sketch), showing civil engineering feasibility.

Text Books:
1. James Phoenix ,Mike Taylor, "Prompt Engineering for Generative AI", Publisher(s): O'Reilly Media, Inc, May 2024 2. Nathan Hunter," "The Art of Prompt Engineering with ChatGPT: A Hands-on Guide ,Jan 2023
Reference Books:
1. Navveen Balani, "Prompt Engineering: Unlocking Generative AI: Ethical Creative AI for All" 2. Jack Wylder, "An Illustrated Guide to AI Prompt Mastery: for Mid Journey, DALL-E, Night Cafe, Deep Dream Generator 3. Samuel Inbaraja S, "A Practical and Short Textbook of Prompt Engineering"
E-Resources:
1. Udemy Generative AI Course https://www.udemy.com/topic/generative-ai/ 2. Open AI Dall-E 3 https://openai.com/index/dall-e-3/ 3. Open AI Chat GPT https://chatgpt.com/ 4. Online Audio Noise Reduction https://audiodenoise.com/

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Professional Communication Etiquettes									**Code:**25CEVE401
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Self-Awareness and Emotional Intelligence, Active Listening Skills, Basic Language Proficiency, Professional Attitude, Time Management and Promptness

Course Objectives:

1. To familiarize students with the basics of professional communication, enabling them to judge its significance in the workplace.
2. To develop students' confidence to evaluate and apply appropriate communication strategies in presentations, interviews, group discussions, and ethical workplace situations.

Course Outcomes: After completion of this course students will be able to -

CO1	Analyze the fundamentals of professional communication and identify barriers that affect effective communication.
CO2	Evaluate active-listening and note-taking techniques, and draft formal documents such as notices, agendas, and minutes of meetings.
CO3	Apply professional writing skills and judge the quality of resumes, cover letters, and formal business correspondence.
CO4	Select and apply appropriate communication strategies to deliver structured oral presentations and participate effectively in group discussions and debates.
CO5	Formulate various types of reports and technical documents with clarity, structure, and professional tone.
CO6	Evaluate professional ethics and apply organizational skills such as planning and time management in workplace scenarios.

List of Experiments:

The term work shall consist of a journal giving details of a minimum of 8 out of the following experiments.

1. Report on Role play or group discussion to demonstrate types and barriers of communication.
2. Listen to an audio/video in the language lab and make effective notes.
3. Prepare agenda and write minutes of a mock meeting.
4. Write a job application letter with a resume/CV for a given job role.
5. Draft a cover letter and Statement of Purpose (SOP) for higher studies or internships.
6. Write an enquiry letter and a complaint letter for given scenarios.
7. Participate in a group discussion (GD) on a technical or current topic.
8. Engage in a classroom debate focusing on clarity, tone, and argumentation.
9. Write an accident or investigation report based on a case study.
10. Face a mock interview with proper attire, resume, and interview etiquette Participate in a group discussion (GD) on a technical or current topic.

Assignments (Any 2)

1. Draw and explain the Communication Cycle with real-life examples.
2. Prepare notes using mind mapping, flowchart, or outline method on a technical topic.
3. Draft a notice and circular for a college or departmental event.

4. Demonstrate corporate etiquette through role play (dressing, dining, telephonic)
5. Deliver an oral presentation using the 7 C's of communication also write its report.

Text Books:

1. M. Ashraf Rizvi – Effective Communication Skills, Tata McGraw-Hill Publication
2. Sanjay Kumar & Pushp Lata – Communication Skills, Oxford University Press
3. C. Murlikrishna & Sunita Mishra – Communication Skills for Engineers, Pearson

Reference Books:

1. English for Engineers and Technologists (Combined edition, Vol. 1 and 2), Orient Blackswan 2010.
2. Meenakshi Raman and Sangeetha Sharma, "Technical Communication: Principles and Practice", 2nd Edition, Oxford University Press, 2011
3. Stephen E. Lucas, "The Art of Public Speaking", 10th Edition; McGraw Hill Education, 2012.
4. Ashraf Rizvi, "Effective Technical Communication", 2nd Edition, McGraw Hill Education, 2017.
5. William Strunk Jr. & E.B. White, "The Elements of Style", 4th Edition, Pearson, 1999.
6. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004. 7. Goodheart-Willcox, "Professional Communication", First Edition , 2017.
7. Training in Interpersonal Skills: Tips for Managing People at Work, Pearson Education, India, 6 edition, 2015.
8. The Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education; 1 edition, 2013.
9. Anand Ganguly, "Success in Interview", RPH, 5th Edition, 2016.
10. Raman Sharma, "Technical Communications", Oxford Publication, London, 2004.

E-Resources:

1. Conversations

   https://www.britishcouncil.in

2. Certification courses

   https://www.coursera.org

3. Communication skills training courses

   https://www.udemy.com

4. Dale Carnegie's free resources

   http://www.makeuseof.com

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Surveying Practices									**Code:**25CEVS404
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	04	-	02	-	-	-	-	50	50

Prerequisites:

Understanding of Units and Scales, Geometric and Trigonometric Foundations, Survey Calculations

Course Objectives:

1. To develop students' practical skills to apply conventional surveying techniques, including plane table surveying, levelling, theodolite surveying, tacheometry, and curve setting-out.

2. To familiarize students with the operation and adjustment of conventional and modern surveying instruments, enabling them to select the instrument suited to a given field application.

Course Outcomes: After completion of this course students will be able to -

CO1	Apply Plane Table Surveying techniques and evaluate a plan depicting all significant field details accurately.
CO2	Determine Reduced Levels and evaluate accurate contour maps for the designated terrain.
CO3	Apply angular-measurement and theodolite-traversing methods, and evaluate coordinate computation, traverse balancing, and area calculation.
CO4	Compute horizontal distances and elevations and evaluate tacheometric contour maps using principles of stadia tacheometry.
CO5	Select and set out simple circular curves using linear and angular methods.
CO6	Evaluate and apply advanced surveying techniques using Electronic Total Stations (ETS) and GPS for various field applications.

List of Experiments:

Perform any six (06) Experiments and Any 02 projects are mandatory.

a) Experiments:

1. Actual mapping of small structure/ area using the Radiation and intersection Method.
2. Differential leveling (with at least two change points) using auto / digital level.
3. Measurement of horizontal angles (by repetition method) using vernier transit theodolite.
4. Measurement of vertical angles using vernier transit theodolite.
5. Finding multiplying and additive constants of a tacheometer.
6. Setting out a building from a given foundation plan (minimum six coordinates).
7. Setting out a circular curve by Rankine's method of deflection angles.
8. Practical based on various special functions available in a total station such as remote elevation measurements, remote distance measurements and co-ordinate stakeout.

b) Projects

1. Road project using Auto level for a minimum length of 100 m including fixing of alignment, profile levelling, cross- sectioning, plotting of L section and Cross Section. (One full imperial sheet including plan, L-section and any three typical Cross- sections).
2. Tacheometric contouring project with at least two instrument stations about 60 m to 100 m apart and plotting contours (minimum contour interval 1 meter).
3. Total Station Traversing Practical

Text Books:

1. Surveying and Levelling by N. N. Basak , Tata McGraw Hill.
2. Surveying Vol. I, II and III by Dr. B. C. Punmia, Laxmi Publishers, New Delhi..
3. Surveying and Leveling Vol. I & II by T. P, Kanetkar and S. V. Kulkarni, Pune Vidhyarthi Gruha.

Reference Books:

1. Plane Surveying by A. M. Chandra, New Age International Publishers.
2. Surveying: Theory and Practice by James M. Anderson, Edward M. Mikhail, Tata McGraw Hill.
3. Plane and Geodetic Surveying for Engineers. Vol. I by David Clark,

E-Resources:

1. Virtual Labs Links - Ministry of Education
   https://sl-iitr.vlabs.ac.in/List%20of%20experiments.html
2. Virtual Labs Links - ZCOER
   https://zcoer.in/virtual-lab-comp/
3. Modern Tools & Techniques!
   https://acesse.one/vnPKx
4. Measurement of distances b/w points using Total Station: Surveying practical
   https://acesse.one/mofDR
5. Profile and cross sectional Levelling
   https://acesse.one/OKdrd

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Guitar)									**Code:**25CECC406A
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Basic knowledge of Indian classical music and Guitar musical instrument.

Course Objectives:

1. To develop advanced technical proficiency through complex repertoire and performance techniques.
2. To enhance creativity through improvisation, composition, and musical interpretation

Course Outcomes: After completion of this course students will be able to -

CO1	Perform advanced guitar repertoire with technical accuracy and musical expression.
CO2	Demonstrate proficiency in improvisation, composition, and stylistic interpretation.
CO3	Apply advanced harmony, rhythm, and performance techniques across different musical genres.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Revision of Semester III Concepts	02
2.	Advanced Chord Voicings& Inversions	02
3.	Modal Scales & Advanced Scale Applications	02
4.	Improvisation over Chord Progressions	02
5.	Advanced Fingerstyle& Hybrid Picking	02
6.	Guitar Solo Techniques – Bends, Vibrato, Legato	02
7.	Song Arrangement & Musical Interpretation	02
8.	Introduction to Composition & Melody Writing	02
9.	Ensemble Rehearsal & Musical Communication	02
10.	Genre-based Performance (Jazz, Rock, Blues, Contemporary)	02
11.	Stage Performance Techniques & Performance Psychology	02
12.	Mock Recital & Individual Feedback	02
13.	Final Rehearsal & Performance Preparation	02
	TOTAL	**26**

Text Books:

1. Hal Leonard Corporation, "Hal Leonard Guitar Method – Complete Edition", Hal Leonard Publications.
2. Mel Bay, "Modern Guitar Method – Grade 1, 2 & 3", Mel Bay Publications.
3. Leavitt, W., "A Modern Method for Guitar (Books 1–3)", Berklee Press.
4. Stetina, T., "Fretboard Mastery", Hal Leonard Publications.
5. Kolb, T., "Music Theory for Guitarists", Hal Leonard Publications.

Reference Books:

1. Chapman, R., "The Complete Guitar Manual", DK Publishing.
2. Latarski, D., "Practical Theory for Guitar", Alfred Music.
3. Denyer, R., "The Guitar Handbook", Knopf Publishing.
4. Buckingham, B., "Scales and Modes for Guitar", Hal Leonard Publications.

E-Resources:

1. Berklee Online – Guitar lessons, music theory, ear training and performance resources.
   https://online.berklee.edu

2. Justin Guitar–Structured guitar lessons from beginner to advanced.
   https://www.justinguitar.com

3. Fender Play – Interactive lessons on chords, scales, techniques, and songs.
   https://www.fender.com/play

4. True Fire – Professional online guitar courses covering multiple genres and techniques.
   https://truefire.com

5. Ultimate Guitar – Tabs, chord charts, scales, and community resources.
   https://www.ultimate-guitar.com

6. Muse Score – Free music notation software and sheet music library.
   https://musescore.org

7. Music Theory.net–Interactive music theory lessons and exercises.
   https://www.musictheory.net

8. Yamaha Music India – Educational resources on guitar fundamentals and musicianship.
   https://in.yamaha.com

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Singing)									**Code:**25CECC406B
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Basic knowledge of Indian classical music in singing.

Course Objectives:

1. To develop voice modulation and singing techniques for different musical genres.
2. To develop skills in microphone handling and studio recording practices.

Course Outcomes: After completion of this course students will be able to -

CO1	Apply proper voice modulation, pitch control and singing techniques in various musical styles.
CO2	Perform Vilambit Khayal, Drut Khayal, Semi-Classical and Folk compositions with appropriate musical expression.
CO3	Demonstrate knowledge of raga, tala, rasa and expression in practical performances.
CO4	Use microphones correctly and perform basic studio recording with proper recording techniques.
CO5	Demonstrate confidence in recording sessions and stage performances with professional presentation skills.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Voice range development and voice modulation, Pitch control and tonal accuracy	04
2.	Voice culture for studio singing	04
3.	Singing techniques in different genres: Light Music, Film Songs, Ghazals, Lavani etc., Expression according to song style	04
4.	Vilambit Khayal, Drut Khayal	04
5.	Semi-Classical Music, Folk Music	04
6.	Performance practice, Stage presentation skills	02
7.	Knowledge of Raga and Tala, Rasa and Musical Expression	02
8.	Studio setup, Microphone handling techniques, Microphone placement, Recording techniques, Recording practice	02
	TOTAL	**26**

Text Books:

1. V. N. Bhatkhande, "Kramik Pustak Malika (Vol. III & IV)", Publications.
2. V. D. Paluskar, "Sangeet Bal Prakash", Publications.

Reference Books:

1. V. N. Bhatkhande, "Hindustani Sangeet Paddhati (Vol. I–IV)", Publications.
2. Ashok Da. Ranade, "Hindustani Music: Tradition in Transition", Publications.
3. S. N. Ratanjankar, "Abhinav Geet Manjari", Publications.

E-Resources:

1. Sangeet Natak Akademi - All India Radio (Akashvani)
   https://prasarbharati.gov.in/akashvani/

2. Swar Ganga Music Foundation
   https://www.swarganga.org/

3. YouTube – Sangeet Natak Akademi Channel
   https://www.youtube.com/c/sangeetnatak

4. Digital Tanpura and Tabla Applications (e.g., Tanpura, Riyaz, Naad Sadhana)

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Cinematography)									**Code:**25CECC406C
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

A basic understanding of film theory, Camera operation, Lighting techniques and visual storytelling is essential for cinematography.

Course Objectives:

1. To develop proficiency in camera operation, exposure settings, and photographic composition.
2. To apply lighting techniques and visual storytelling principles across different photography genres.

Course Outcomes: After completion of this course students will be able to -

CO1	Operate cameras confidently and use various camera settings effectively.
CO2	Compose visually appealing photographs using principles of composition and design.
CO3	Capture photographs in different genres such as portrait, landscape, product, event, and wildlife photography.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Revision Session of Sem III	02
2.	Storyboarding and planning	02
3.	Short film Screening	02
4.	Short Film Project (Camera-Phone)	02
5.	Short Film Project	02
6.	Short Film Project	02
7.	Short Film Project	02
8.	Short Film Project	02
9.	Short Film Project Submission	02
10.	Introduction Video Editing	02
11.	Basic Knowledge of Editing Tools	02
12.	Basics Timeline, Color Correction, Transition, Effects	02
13.	Exam	02
	TOTAL	**26**

Text Books:

1. Peterson, B., "Understanding Exposure – Theory + Fundamentals", Amphoto Books.
2. Kelby, S., "The Digital Photography Book – Practical + Shooting", Rocky Nook.

Reference Books:

1. Langford, M., "Langford's Basic Photography – Technical Concepts", Focal Press.
2. Freeman, M., "The Photographer's Eye – Composition, Visual Balance, Framing, Perspective", Ilex Press.

E-Resources:

1. YouTube Studio Binder (production management solution that helps video and photo productions create call sheets, shot lists, shooting schedules, breakdowns, storyboards, mood boards and more.)
   https://www.youtube.com/@StudioBinder/videos

2. Learn Cinematography Specialization
   https://www.coursera.org/specializations/learn-cinematography

3. Cinematography Courses
   https://www.udemy.com/topic/cinematography/

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Dance)									**Code:**25CECC406D
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Good stamina, flexibility and familiarity with simple rhythmic patterns and beats.

Course Objectives:

1. To develop advanced dance techniques with precision, coordination, balance, flexibility, and rhythmic control.
2. To enhance expressive skills, musicality, stage presence, and overall performance quality.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate advanced dance techniques with precision, coordination, flexibility, balance, and rhythmic control.
CO2	Apply musicality, expression, synchronization, creativity, and stage presence in individual and group performances.
CO3	Create and present dance compositions using advanced choreography, formations, transitions, and stagecraft.
CO4	Plan, rehearse, and perform polished dance presentations for cultural events, competitions, and advanced training.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Revision of prior semester & Warm-up	02
2.	Introduction formatted story telling through dance	04
3.	Learning the First Half of the Composition ,	04
4.	Completion of Composition with Rhythm and introduction to live music dancing format	04
5.	Theme-Based Choreography – Planning and Concept Development	02
6.	Production introduction and choreography completion	04
7.	Lights and stage formative knowledge	04
8.	Final Practical Examination, Choreography Presentation & Viva	02
	TOTAL	**26**

Text Books:

1. Bharata Muni, "Natya Shastra", translated by Manomohan Ghosh, Asiatic Society, Kolkata.
2. Nandikeshvara, "Abhinaya Darpana", translated by Manomohan Ghosh.
3. Balasaraswati, T., "Bharatanatyam", Madras Music Academy.
4. Krishna Iyer, E., "Bharatanatyam", Ganesh & Co., Chennai.

Reference Books:

1. Kothari, Sunil, "Bharatanatyam", Marg Publications, Mumbai.
2. Vatsyayan, Kapila, "Classical Indian Dance in Literature and the Arts", Sangeet Natak Academy.
3. Payne, Helen, "Creative Dance and Movement in Groupwork", Routledge, 2021.

DEPARTMENT OF CIVILENGINEERING

E-Resources:

1. A retelling of epic Ramayana in the Margam format of Bharatanatyam
   https://youtu.be/VTrGVHvWfPA?si=AvKTenB7bpx302R6

2. Ganesa Sthuthi by Harinie Jeevitha – Sridevi Nrithyalaya - Bharatanatyam Dance
   https://youtu.be/pG0NmQDKspc?si=AEfhbRAEs9OjNErp

3. Hip Hop Dance Moves Tutorial – Mihran Kirakosian
   https://youtu.be/eg-3ybiL6UI?si=AOj0NuGXDupxD2Mt

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – IV (Synthesizer/Keyboard)									**Code:**25CECC406E
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Basic knowledge of Indian classical music and Keyboard musical instrument.

Course Objectives:

1. To strengthen understanding of fundamental keyboard concepts and techniques.
2. To develop proficiency in major and minor scales and arpeggios through practical exercises.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate improved technical proficiency through advanced practice of Major and Minor Scales.
CO2	Perform musical pieces based on Minor Scales with proper fingering, expression and dynamics.
CO3	Apply arpeggio patterns effectively in chord progressions and keyboard performance.
CO4	Demonstrate accompaniment, improvisation and jamming skills in solo and group performances.
CO5	Develop listening ability, rhythmic accuracy and musical confidence through ear training and ensemble practice.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	Revision of all Major Scales	02
2.	Revision of all Minor Scales (Natural, Harmonic & Melodic)	02
3.	Revision of Major and Minor Chords	02
4.	Revision of Chord Progression, Family chords, Chords Inversion	02
5.	Playing Simple Songs with Indian Notation	02
6.	Introduction to Staff Notation	02
7.	Understanding the Difference between Indian and Western Staff	02
8.	Notation	02
9.	Reading and Playing Simple Melodies from Staff Notation	02
10.	Playing Songs using Both Indian and Staff Notation	02
11.	Fundamentals of Keyboard Accompaniment	02
12.	Accompaniment with Scales and Simple Songs	02
13.	Group Performance	02
	TOTAL	**26**

Text Books:

1. Aaron, M., "Michael Aaron Piano Course – Grade 2", Alfred Music.
2. Thompson, J., "John Thompson's Modern Course for the Piano – Second Grade", Willis Music.
3. Hanon, C. L., "The Virtuoso Pianist in Sixty Exercises", G. Schirmer.
4. Agay, D., "Learning to Play Piano – Book 2", Yorktown Press.

Reference Books:

1. Thompson J., "Modern Course for the Piano", Willis Music.
2. Aaron M., "Piano Course", Alfred Music.
3. Hanon, C. L., "The Virtuoso Pianist", G. Schirmer.
4. Harrison, M., "Contemporary Music Theory", Hal Leonard.
5. ABRSM, "Music Theory in Practice (Grades 1–5)", Associated Board of the Royal Schools of Music.

E-Resources:

1. The Complete Piano Keyboard Course | Tutorial for Beginners in Hindi | Free Online Piano Lessons
   https://www.youtube.com/watch?v=5nA245TZvBY

2. Keyboard - SIFF Young Artiste
   https://www.youtube.com/@Keysiffyoungartiste

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** III
Course: Liberal Learning – IV (Basketball)									**Code:**25CECC406F
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To develop fundamental basketball skills, physical fitness, teamwork, and understanding of rules and strategies to enable effective participation and performance in the game.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate fundamental basketball skills including passing, dribbling, shooting, and rebounding.
CO2	Apply proper footwork, body control, and individual defensive techniques during play.
CO3	Integrate fundamental skills effectively through drills, small-sided games, and practice matches.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Complete Skill Revision:** Review all basketball fundamentals. Recall and perform all basic skills.	02
2.	**Passing & Receiving Practice:** Improve passing speed and accuracy. Demonstrate efficient passing skills.	02
3.	**Dribbling:** Enhance control and confidence. Maintain effective dribbling during movement.	02
4.	**Shooting:** Continue improving shooting technique. Achieve better shooting consistency.	02
5.	**Rebounding:** Reinforce rebounding fundamentals. Secure rebounds confidently.	02
6.	**Individual Defense:** Improve defensive positioning. Apply correct defensive techniques.	02
7.	**Assessment – VII**	02
8.	**Body Technique and Footwork:** Reinforce movement and balance. Demonstrate efficient basketball footwork.	02
9.	**Skill Integration:** Combine all fundamental skills. Execute basketball movements smoothly.	02
10.	**Partner Skill:** Develop teamwork through drills. Improve coordination with teammates.	02
11.	**Practice Match:** Reinforce practical learning. Participate confidently in basketball games.	02

12.	**Revision of all Skills:** Final practice of all techniques, Improve consistency across all skills.	02
13.	**Assessment - VIII**	02
	TOTAL	**26**

Text Books:

1. FIBA, "Official Basketball Rules", International Basketball Federation (FIBA)
2. Dr. James Naismith, "Basketball: Its Origin & Development",
3. John R. Wooden, "Practical Modern Basketball", Allyn& Bacon

Reference Books:

1. James Naismith – Basketball: Its Origin and Development – University of Nebraska Press.
2. Jerry V. Krause & Don Meyer – Basketball Skills & Drills – Human Kinetics

E-Resources:

1. Rules of Basketball : How to Play Basketball : Basketball Rules for Beginners
   https://www.breakthroughbasketball.com/basics/basics

2. How To Dribble A Basketball For Beginners! Basketball Basics for Kids Basketball Training
   https://www.youtube.com/watch?v=CMQp0bwjokw

3. How To Shoot A Basketball For Beginners! Basketball Basics [SECRETS]
   https://www.youtube.com/watch?v=UcnB9e5O5NY

4. Basketball: Rebounding
   https://www.youtube.com/watch?v=gbb9CoEMF7s

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Cricket)									**Code:**25CECC406G
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To develop basic cricket skills. Fitness, teamwork, and knowledge of rules and strategies for effective game performance.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate basic batting, bowling, and fielding skills with consistency.
CO2	Apply learned cricket skills, coordination, and decision-making during match situations.
CO3	Demonstrate basic umpiring knowledge, fair play, teamwork, and sportsmanship.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Revision of Batting Skills:** Strengthen all basic batting techniques.	02
2.	**Revision of Bowling:** Improve consistency and control in bowling.	02
3.	**Revision of Fielding Skills:** Enhance catching, throwing, and ground fielding.	02
4.	**Combined Skill Practice:** Practice batting, bowling, and fielding together.	02
5.	**Net Practice:** Improve performance through focused practice.	02
6.	**Team Coordination:** Develop communication during play.	02
7.	**Assessment - VII**	02
8.	**Match Awareness Practice Match I:** Understand basic match situations / Apply all learned skills in a game.	02
9.	**Practice Match II:** Improve decision-making during play.	02
10.	**Practice Match III:** Build confidence through match experience.	02
11.	**Basic Umpiring:** Learn simple umpiring signals and decisions.	02
13.	**Final Match:** Demonstrate overall cricket skills	02
13.	**Assessment - VIII**	02
	TOTAL	**26**

Text Books:

1. Sridhar, R., "Coaching Beyond", Rupa Publications India.

Reference Books:

1. Eastaway, R., "Cricket Explained: From Grubbers to Googlies", St. Martin's Griffin.

DEPARTMENT OF CIVILENGINEERING

E-Resources:

1. Sports and Performance Nutrition, IIT Madras
   https://nptel.ac.in/courses/109106402

2. How to Play Cricket
   https://coachtube.com/courses/cricket

3. Cricket rules explained in 2 minutes
   https://www.youtube.com/watch?v=wHEIT32ZEVs

4. Every Cricket Shot Explained in 21 Minutes
   https://www.youtube.com/watch?v=HQMZMc_bpg8

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Rifle and Pistol Shooting)									**Code:**25CECC406H
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To develop safe shooting skills, accuracy, concentration, and proper shooting techniques in students.
2. To build discipline, confidence and prepare shooters for competitive events.

Course Outcomes: After completion of this course students will be able to -

CO1	Explain safe rifle handling, range discipline, equipment, and match procedures.
CO2	Demonstrate proper shooting techniques, physical coordination, and shooting posture.
CO3	Apply mental focus and scientific principles to improve shooting performance.
CO4	Demonstrate discipline, sportsmanship, and overall shooting proficiency.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Shot calling:** Shot calling is the ability to mentally identify the exact location of the shot.	02
2.	**Maintain training diary:** To maintain notes given by coach	02
3.	**Pressure handling:** To handle pressure during match, shooters get tensed during match due to crowd or pressure about the performance	02
4.	**Full qualification matches:** Qualifying test match	02
5.	**Final match:** Final match between the qualified shooters	02
6.	**Dry firing test:** To do the whole process of firing the shot but the gun is not loaded	02
7.	**Assessment –VII**	02
8.	**Advanced Accuracy Drills:** It is a structured training exercise designed to improve precision, consistency, shot execution and mental control.	02
9.	**Mock Competition I:** It is a simulated shooting match conducted under actual competition conditions –match no.- **1**	02
10.	**Mock Competition II:** It is a simulated shooting match conducted under actual competition conditions –match no.- **2**	02
11.	**Equipment Inspection and Adjustment:** Learn to adjust the weapon according to the shooter	02
12.	**Comprehensive Revision (Theory & Practical)**	02
13.	**Assessment – VIII**	02
	TOTAL	**26**

DEPARTMENT OF CIVILENGINEERING

Text Books:

1. International Shooting Sport Federation (ISSF), "ISSF Official Statutes, Rules and Regulations", International Shooting Sport Federation (ISSF)
2. National Rifle Association (NRA), "The NRA Guide to the Basics of Pistol Shooting", National Rifle Association of America
3. National Rifle Association (NRA), "The NRA Guide to the Basics of Rifle Shooting", National Rifle Association of America

Reference Books:

1. National Rifle Association (NRA), "The Fundamentals of Rifle Marksmanship", National Rifle Association of America
2. International Shooting Sport Federation (ISSF), "ISSF Official Statutes, Rules and Regulations", International Shooting Sport Federation (ISSF)
3. National Rifle Association (NRA), "The NRA Guide to the Basics of Pistol Shooting", National Rifle Association of America
4. National Rifle Association (NRA), "The NRA Guide to the Basics of Rifle Shooting", National Rifle Association of America

E-Resources:

1. Introduction to Exercise Physiology & Sports Performance, IIT Madras, https://nptel.ac.in/courses/109106406
2. Open Sight Air Rifle Shooting Sports For Beginners. @TheGunzoneNetwork – YouTube https://www.youtube.com/watch?v=GMg970aTqgk
3. Basics of the Standing Position | Sauer Academy https://www.youtube.com/watch?v=eo_uINlK0KA
4. The Ideal Air Rifle Shooter with Abhinav Bindra [IND] https://www.youtube.com/watch?v=Zj4dK8mOwsw

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Volleyball)									**Code:**25CECC406I
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To equip participants with the essential skills and knowledge of volleyball, enabling them to perform fundamental techniques, understand basic rules, and participate in basic gameplay scenarios confidently.

Course Outcomes: After completion of this course students will be able to -

CO1	Explain the official rules, referee signals, and scoring procedures of volleyball.
CO2	Demonstrate advanced volleyball skills, fitness components, and position-specific techniques.
CO3	Apply offensive, defensive, and tactical strategies effectively during competitive play.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Official Volleyball Rules:** History and development of volleyball rules, Court dimensions and equipment specifications, Team composition and player positions, Rotation and substitution rules, Scoring system (Rally Point System), Faults, violations, and penalties, Service order and match regulations.	02
2.	**Referee Signals:** Duties of the first and second referee, Official hand signals for all game situations, Line judge signals, Communication between officials, Practical demonstration of referee signals.	02
3.	**Score Sheet And Match Procedures:** Components of the official score sheet, Recording player line-ups and substitutions, Recording time-outs, sanctions, and scores, Match protocol before, during, and after play, Practical score sheet filling	02
4.	**Physical Conditioning:** Volleyball-specific warm-up exercises, Strength development for upper and lower body, Core stability exercises, Endurance training, Cool-down and recovery methods.	02
5.	**Speed And Agility And Plyometric:** Sprint drills , Agility ladder exercises, Cone drills , Jump training (plyometrics) , Explosive movement drills for volleyball	02
6.	**Flexibility And Injury Prevention:** Dynamic and static stretching, Mobility exercises, Common volleyball injuries, Injury prevention techniques, Recovery and rehabilitation basics	02
7.	**Assessment - VII**	02
8.	**Position-Specific Training:** Setter responsibilities and drills, Outside hitter	02

	techniques, Middle blocker skills, Opposite hitter training, Libero defensive techniques, Position-based game practice.	
9.	**Complex Offensive System: 5**–1 offensive system, 6–2 offensive system, Quick attack combinations, Setter-hitter coordination, Transition offense, Team offensive strategies.	02
10.	**Full Match Simulation:** Complete match practice, Application of official rules, Tactical decision-making, Team coordination, Performance analysis and correction	02
11.	**Tournament Practice:** League and knockout match formats, Tournament scheduling, Team strategy under competition conditions, Match officiating practice, Sportsmanship and fair play.	02
12.	**Comprehensive Skill Revision:** Revision of all technical skills, Tactical system review, Fitness drills, Match-based practice, Error correction and performance improvement	02
13.	**Assessment - VIII**	02
	TOTAL	**26**

Text Books:

1. Fédération Internationale de Volleyball (FIVB), "Official Volleyball Rules", FIVB Publications
2. Bonnie Kenny & Cindy Gregory, "Volleyball: Steps to Success", Human Kinetics
3. Anita Bean, "The Complete Guide to Sports Nutrition", Bloomsbury Sport
4. Ian Jeffreys, "The Warm-Up", Human Kinetics

Reference Books:

1. Pete Waite, "Aggressive Volleyball", Human Kinetics
2. Bob Bertucci, "Volleyball Drill Book", Human Kinetics

E-Resources:

1. Volleyball Rules: How to Play Volleyball: The Rules of Volleyball EXPLAINED!
   https://www.youtube.com/watch?v=9g7nYQv-kPM

2. 6 Basic Skills in Volleyball – YouTube
   https://www.youtube.com/watch?v=4vnD991J22g

3. Everything You Need to Know About the Game of Volleyball – YouTube
   https://www.youtube.com/watch?v=OyyeRGunDn4

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech. (Civil Engineering)									**Semester:** IV
Course: Liberal Learning – IV (Football)									**Code:**25CECC406J
Teaching Scheme (Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
-	02	-	01	-	-	25	-	-	25

Prerequisites:

Proper health, Basic knowledge of rules of the game.

Course Objectives:

1. To enhance football players' technical skills, tactical understanding, physical fitness, teamwork, and sportsmanship, fostering a comprehensive understanding and appreciation of the game.

Course Outcomes: After completion of this course students will be able to -

CO1	Demonstrate advanced football skills, position-specific techniques, and physical conditioning.
CO2	Apply leadership, coaching, refereeing, and talent identification skills in football.
CO3	Analyze match statistics, player performance, and team effectiveness using appropriate methods.
CO4	Analyze match statistics, player performance, and team effectiveness using appropriate methods.

Course Contents:

Sr. No.	**Description**	**Duration (Hrs.)**
1.	**Principles of Attack:** Understand and apply the principles of attack, including creating space, supporting teammates, progressing the ball, and creating goal-scoring opportunities.	02
2.	**Principles of Defense**: Understand and apply the principles of defense, including pressure, cover, balance, marking, and communication to effectively prevent opponents from scoring.	02
3.	**Team Formations:** Understand and apply different team formations to improve player positioning, tactical organization, and overall team performance.	02
4.	**Transition Play:** Understand and apply effective transition play by quickly switching between attacking and defensive phases to maintain team advantage.	02
5.	**Possession-Based Football:** Develop possession-based football skills by improving ball retention, passing accuracy, movement, and decision-making to control the game effectively.	02
6.	**Counter-Attacking Football:** Understand and apply counter-attacking principles by transitioning quickly from defense to attack through speed, movement, and effective decision-making.	02
7.	**Assessment-V**	02
8.	**Refereeing & Match Officiating:** Understand the laws of the game and develop basic refereeing skills for fair and effective match officiating.	02

9.	**Match Statistics & Performance Analysis:** Analyze match statistics and performance data to evaluate player contributions, team effectiveness, and areas for improvement.	02
10.	**Fair Play & Professional Ethics:** Understand the importance of fair play, respect, discipline, teamwork, and ethical behavior in football.	02
11.	**Tournament Practical:** Apply technical, tactical, physical, and teamwork skills in a competitive tournament environment.	02
12.	**Final Competitive Match:** Demonstrate overall football development by applying skills, tactics, teamwork, and sportsmanship in a competitive match setting.	02
13.	**Assessment-VIII**	02
	TOTAL	**26**

Text Books:

1. Fédération Internationale de Football Association (FIFA), "Laws of the Game", FIFA
2. International Football Association Board (IFAB), "Laws of the Game", IFAB

Reference Books:

1. Charles Hughes, "The Winning Formula in Soccer", Meyer & Meyer Sport
2. Fédération Internationale de Football Association (FIFA), "Laws of the Game", FIFA
3. International Football Association Board (IFAB), "Laws of the Game", IFAB

E-Resources:

1. Udemy – Soccer Courses
   https://www.udemy.com/topic/soccer/

2. Beginner's guide to football | Football for dummies
   https://www.youtube.com/watch?v=Phnt5QZ7X7o

3. Every position in soccer explained
   https://www.youtube.com/watch?v=xCXGhvPdXYc&t=52s

4. Rules Of Soccer : How to play Soccer : Soccer Rules for Beginners
   https://www.youtube.com/watch?v=cTCgU4Vz0rE

DEPARTMENT OF CIVILENGINEERING

Program: B. Tech (Civil Engineering)									**Semester:** IV
Course: Internship – II									**Code:**25CEIN402
Teaching Scheme(Hrs/week)				**Evaluation Scheme (Marks)**					
Lecture	**Practical**	**Tutorial**	**Credit**	**CIE**	**ETE**	**TW**	**OR**	**PR**	**Total**
4 Weeks			02	-	-	25	-	-	25

Preamble:

Internships serve as vital educational and career development experiences, offering practical exposure in a specific field. Employers seek individuals who possess the necessary skills and an understanding of industry environments, practices, and cultures. This internship is designed as a structured, short-term, supervised training program, often centered on specific tasks or projects with clear timelines. The primary goal is to immerse technical students in an industrial setting, providing experiences that cannot be replicated in the classroom. This exposure aims to develop competent professionals who understand the social, economic, and administrative factors influencing the operations of industrial organizations.

Course Objectives:

1. To expose students to the industrial environment, enabling them to assess professional practices not available in the classroom.
2. To develop students' ability to evaluate and apply technical knowledge in real industrial situations.

Course Outcomes: After completion of this course students will be able to -

CO1	Assess industry practices and judge how academic concepts are applied in professional settings.
CO2	Evaluate and demonstrate effective communication and teamwork skills within a work environment.
CO3	Analyze and improve problem-solving and time-management skills by working in real-world industry settings.

Internship Requirements:

1. **Internship Duration**: It is mandatory for all students to undergo an internship after every semester during vacations for the duration of 4 weeks. Internships completed during this period will be considered for the assessment of Term Work (TW).
2. **Internship Opportunities:** Students can explore various opportunities for internships at:
   a. Industries
   b. Research labs or organizations
   c. Collegiate clubs
   d. In-house research projects
   e. Online internships
3. **Support and Assistance:** Students can seek assistance for securing internships from:
   a. The Training and Placement cell, along with departmental coordinators
   b. Department or institute faculty members
   c. Personal contacts
   d. Directly connecting with industries or organizations
4. **Request Letter:** Once an industry, research organization, or collegiate club is identified, students must obtain a request letter from the concerned department or placement office. This letter, in the standard format must be duly signed by the authority, should be addressed to the HR manager or relevant authority.

5. **Confirmation Letter:** Students must submit the confirmation letter from the industry, research organization, or collegiate club to the Internship Coordinator and the Head of Department (HOD) office.
6. **Joining Report:** Upon commencing the internship, students must submit the joining report, joining letter, or a copy of the confirmation email to the Internship Coordinator and the HOD office.
7. **Faculty Mentor:** A faculty member will be assigned as a mentor to a group of students. The mentor will be responsible for monitoring, evaluating, and assessing student internship activities. The faculty mentor is also required to visit the internship location and submit formal feedback to the Internship Coordinator.
8. **Faculty Visits:** Faculty members are advised to visit the internship site once or twice during the internship period to monitor progress.
9. **Progress Report:** Students must submit progress report fortnightly to their faculty guide and the final internship report to the Internship Coordinator and department office.
10. **Evaluation Report:** After the completion of the internship, the mentor, along with the assessment panel members, should submit the evaluation report of the students to the department office and the Internship Coordinator.
11. **Internship Certificate:** Students must receive the Internship Certificate from the industry and submit it to the Internship Coordinator and department office.
12. **Presentation and Assessment:** Students are required to give a presentation on their internship work as part of the term work. The internship diary and report will also be verified and assessed.