



NANDHA ENGINEERING COLLEGE

(AUTONOMOUS)

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

ERODE – 638052 TAMIL NADU

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1.1.2 - Details of syllabus revision was carried out during the year

B.E Civil Engineering

S.No	Course Code	Course Name	% of Change
1	22CEP05	Design and Drawing Laboratory	30%
2	22MAN10R	Communication and Quantitative Reasoning	100%
3	22GEA01	Universal Human Values	100%
4	22CEC17	Pre Engineering Buildings	100%
5	22GED02	Internship / Industrial Training	100%
6	22CEX06	Introduction to Finite Element Method	100%
7	22CEX11	Construction Equipment and Management	100%
8	22CEX18	Contract Management	100%
9	22CEX23	Urban Planning and Development	100%
10	22CEX28	Transportation Economics	100%
11	22CEX31	Climate Change Adaptation and Mitigation	100%
12	22CEX32	Air and Noise Pollution Control Engineering	100%
13	22CEX34	Industrial Wastewater Management	20%
14	22CEX36	Plumbing (Water & Sanitation)	100%
15	22CEX37	Transport and Environment	100%
16	22CEX43	Site Investigation and Soil Exploration	100%
17	22CEX44	Slope Stability and Landslides	100%
18	22CEX45	Rock mechanics	100%
19	22CEX46	Geo Environmental Engineering	100%
20	22CEX52	Building Information Modeling	100%
21	22CEX55	AI in Civil Engineering	100%
22	22CEX56	Rainwater Harvesting	100%
23	22CEX58	Construction Economics and Finance	100%
Average			93.48%


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NANDHA ENGINEERING COLLEGE (AUTONOMOUS), ERODE – 638 052
REGULATIONS - 2022 **CHOICE BASED CREDIT SYSTEM**
B.E. CIVIL ENGINEERING

SEMESTER: I									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1	22MAN01	Induction Programme	MC	-	0	0	0	0	0
THEORY									
2	22EYA01	Professional Communication - I	HSMC	-	4	2	0	2	3
3	22MYB01	Calculus and Linear Algebra*	BSC	-	4	3	1	0	4
4	22CYB02	Chemistry for Engineers	BSC	-	3	3	0	0	3
5	22EEC01	Basic Electrical and Electronics Engineering	ESC	-	3	3	0	0	3
6	22MEC01	Engineering Graphics	ESC	-	4	2	0	2	3
7	22GYA01	தமிழர் மரபு / Heritage of Tamils	HSMC	-	1	1	0	0	1
PRACTICAL									
8	22GEP01	Engineering Practices Laboratory	ESC	-	4	0	0	4	2
9	22CYP01	Chemistry Laboratory*	BSC	-	2	0	0	2	1
Mandatory Non Credit Courses									
10	22MAN02	Soft/Analytical Skills - I	MC	-	3	1	0	2	0
11	22MAN03	Yoga - I*	MC	-	1	0	0	1	0
TOTAL					29	15	1	13	20

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SEMESTER: II										
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C	
THEORY										
1	22EYA02	Professional Communication- II	HSMC	22EYA01	4	2	0	2	3	
2	22MYB02	Partial Differential Equations and Transform Techniques*	BSC	-	4	3	1	0	4	
3	22PYB02	Advanced Materials and Nanotechnology	BSC	-	3	3	0	0	3	
4	22CSC01	Problem Solving and C Programming*	ESC	-	3	3	0	0	3	
5	22CEC01	Fundamentals of Engineering Mechanics	ESC	-	3	2	1	0	3	
6	22CYB08	Environment and Sustainability*	BSC	-	2	2	0	0	2	
7	22GYA02	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HSMC	-	1	1	0	0	1	
PRACTICAL										
6	22PYP01	Physics Laboratory*	BSC	-	2	0	0	2	1	
7	22CSP01	Problem Solving and C Programming Laboratory*	ESC	-	4	0	0	4	2	
Mandatory Non Credit Courses										
8	22MAN04	Soft/Analytical Skills - II	MC	-	3	1	0	2	0	
9	22MAN05	Yoga - II*	MC	-	1	0	0	1	0	
TOTAL					30	17	2	11	22	

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SEMESTER: III									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22MYB03	Statistics and Numerical Methods	BSC	-	4	3	1	0	4
2	22CEC02	Mechanics of Materials	ESC	22CEC01	3	3	0	0	3
3	22CEC03	Highway and Railway Engineering	PCC	-	3	3	0	0	3
4	22CEC04	Surveying	PCC	-	3	3	0	0	3
5	22CEC05	Construction Materials and Practices	PCC	-	5	3	0	2	4
6	22CEC06	Fluid Mechanics and Hydraulics Engineering	PCC	-	5	3	0	2	4
PRACTICAL									
7	22CEP01	Surveying Laboratory	PCC	-	4	0	0	4	2
8	22CEP02	Computer Aided Building Drawing - I	PCC	-	4	0	0	4	2
Mandatory Non Credit Courses									
9	22MAN07# / 22MAN07R ##	Soft / Analytical Skills - III	MC	-	3	1	0	2	0
TOTAL					34	19	1	14	25

Applicable for (2022-2026) Batch only

Applicable for (2023-2027) Batch only

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SEMESTER: IV									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22CEC07	Structural Analysis	PCC	22CEC02	4	3	1	0	4
2	22CEC08	Water Resources and Irrigation Engineering	PCC	-	3	3	0	0	3
3	22CEC09	Soil Mechanics	PCC	-	5	3	0	2	4
4	22CEC10	Design of Reinforced Concrete Elements	PCC	-	3	3	0	0	3
5	22CEC11	Concrete Technology	PCC	22CEC05	3	3	0	0	3
6	22CEC12	Environmental Engineering	PCC	-	5	3	0	2	4
PRACTICAL									
7	22CEP03	Computer Aided Building Drawing - II	PCC	-	4	0	0	4	2
Mandatory Non Credit Courses									
8	22MAN08#/ 22MAN08R##	Soft/Analytical Skills - IV	MC		3	1	0	2	0
9	22MAN09	Indian Constitution	MC	-	1	1	0	0	0
10	22GED01	Personality and Character Development	EEC	-	0	0	0	1	0
TOTAL					31	20	1	11	23

Applicable for (2022-2026) Batch only

Applicable for (2023-2027) Batch only

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SEMESTER: V									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22CEC13	Design of Reinforced Concrete Structures	PCC	22CEC10	3	3	0	0	3
2	22CEC14	Foundation Engineering	PCC	22CEC09	3	3	0	0	3
3	22CEC15	Design of Steel Structures	PCC	-	3	3	0	0	3
4	E1	Elective (PEC)	PEC	-	3	3	0	0	3
5	E2	Elective (PEC)	PEC	-	3	3	0	0	3
6	E3	Elective (PEC)	PEC	-	3	3	0	0	3
PRACTICAL									
7	22CEP04	Concrete Technology Laboratory	PCC	-	4	0	0	4	2
8	22CEP05	Design and Drawing Laboratory	PCC	-	4	0	0	4	2
Mandatory Non Credit Courses									
9	22MAN10R	Communication and Quantitative Reasoning	MC	-	3	1	0	2	0
TOTAL					29	19	0	10	22

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SEMESTER: VI										
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C	
THEORY										
1	22CEC16	Estimating and Costing	PCC	-	5	3	0	2	4	
2	22CEC17	Pre Engineering Buildings	PCC	-	3	3	0	0	3	
3	E4	Elective (PEC)	PEC	-	3	3	0	0	3	
4	E5	Elective (PEC)	PEC	-	3	3	0	0	3	
5	E6	Elective (PEC / OEC)	PEC / OEC	-	3	3	0	0	3	
6	E7	Elective (OEC)	OEC	-	3	3	0	0	3	
PRACTICAL										
7	22CEP06	Computer Aided Structural Design Laboratory	PCC	-	4	0	0	4	2	
8	22CEP07	Survey Camp	PCC	-	2	0	0	2	1	
TOTAL					26	18	0	8	22	

SEMESTER: VII										
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C	
THEORY										
1	22GEA01	Universal Human Values	HSMC	-	2	2	0	0	2	
2	EMI	Elective (Management)	HSMC	-	3	3	0	0	3	
3	E8	Elective (PEC)	PEC	-	3	3	0	0	3	
4	E9	Elective (PEC / OEC)	PEC / OEC	-	3	3	0	0	3	
5	E10	Elective (OEC)	OEC	-	3	3	0	0	3	
PRACTICAL										
6	22CED01	Design Project	EEC	-	4	0	0	4	2	
7	22GED02	Internship / Industrial Training	EEC	-	-	0	0	0	2	
TOTAL					18	14	0	4	18	

SEMESTER: VIII										
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C	
PRACTICAL										
1	22CED02	Project Work	EEC	-	20	0	0	20	10	
TOTAL					20	0	0	20	10	

(A) HSMC, BSC and ESC									
(a) Humanities and Social Sciences including Management Courses (HSMC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1.	22EYA01	Professional Communication - I	HSMC	-	4	2	0	2	3
2.	22GYA01	தமிழர் மரபு / Heritage of Tamils	HSMC	-	1	1	0	0	1
3.	22EYA02	Professional Communication- II	HSMC	22EYA01	4	2	0	2	3
4.	22GYA02	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HSMC	-	1	1	0	0	1
5.	22GEA01	Universal Human Values	HSMC	-	2	2	0	0	2
(b) Basic Science Courses (BSC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1.	22MYB01	Calculus and Linear Algebra	BSC	-	4	3	1	0	4
2.	22CYB02	Chemistry for Engineers	BSC	-	3	3	0	0	3
3.	22CYP01	Chemistry Laboratory	BSC	-	2	0	0	2	1
4.	22MYB02	Partial Differential Equations and Transform Techniques	BSC	-	4	3	1	0	4
5.	22PYB02	Advanced Materials and Nanotechnology	BSC	-	3	3	0	0	3
6.	22CYB08	Environment and Sustainability	BSC	-	2	2	0	0	2
7.	22PYP01	Physics Laboratory	BSC	-	2	0	0	2	1
8.	22MYB03	Statistics and Numerical Methods	BSC	-	4	3	1	0	4

(c) Engineering Science Courses (ESC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1.	22EEC01	Basic Electrical and Electronics Engineering	ESC	-	3	3	0	0	3
2.	22MEC01	Engineering Graphics	ESC	-	4	2	0	2	3
3.	22GEP01	Engineering Practices Laboratory	ESC	-	4	0	0	4	2
4.	22CSC01	Problem Solving and C Programming	ESC	-	3	3	0	0	3
5.	22CEC01	Fundamentals of Engineering Mechanics	ESC	-	3	2	1	0	3
6.	22CSP01	Problem Solving and C Programming Laboratory	ESC	-	4	0	0	4	2
7.	22CEC02	Mechanics of Materials	ESC	22CEC01	3	3	0	0	3

(B) Program Core Courses (PCC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1.	22CEC03	Highway and Railway Engineering	PCC	-	3	3	0	0	3
2.	22CEC04	Surveying	PCC	-	3	3	0	0	3
3.	22CEC05	Construction Materials and Practices	PCC	-	5	3	0	2	4
4.	22CEC06	Fluid Mechanics and Hydraulics Engineering	PCC	-	5	3	0	2	4
5.	22CEP01	Surveying Laboratory	PCC	-	4	0	0	4	2
6.	22CEP02	Computer Aided Building Drawing - I	PCC	-	4	0	0	4	2
7.	22CEC07	Structural Analysis	PCC	22CEC02	4	3	1	0	4

8.	22CEC08	Water Resources and Irrigation Engineering	PCC	-	3	3	0	0	3
9.	22CEC09	Soil Mechanics	PCC	-	5	3	0	2	4
10.	22CEC10	Design of Reinforced Concrete Elements	PCC	-	3	3	0	0	3
11.	22CEC11	Concrete Technology	PCC	22CEC05	3	3	0	0	3
12.	22CEC12	Environmental Engineering	PCC	-	5	3	0	2	4
13.	22CEC13	Design of Reinforced Concrete Structures	PCC	-	3	3	0	0	3
14.	22CEC14	Foundation Engineering	PCC	22CEC09	3	3	0	0	3
15.	22CEC15	Design of Steel Structures	PCC	-	3	3	0	0	3
16.	22CEP04	Concrete Technology Laboratory	PCC	-	4	0	0	4	2
17.	22CEP05	Design and Drawing Laboratory	PCC	-	4	0	0	4	2
18.	22CEC16	Estimating and Costing	PCC	-	5	3	0	2	4
19.	22CEC17	Pre Engineering Buildings	PCC	-	3	3	0	0	3
20.	22CEP06	Computer Aided Structural Design Laboratory	PCC	-	4	0	0	4	2
21.	22CEP07	Survey Camp	PCC	-	2	0	0	2	1

(C) EEC & MC									
(a) Employability Enhancement Courses (EEC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1.	22CED01	Design Project	EEC	-	4	0	0	4	2
2.	22GED02	Internship / Industrial Training	EEC	-	-	0	0	0	2
3.	22CED02	Project Work	EEC	-	20	0	0	20	10
(b) Mandatory Courses (MC)									
1.	22MAN01	Induction Programme	MC	-	0	0	0	0	0
2.	22MAN02	Soft/Analytical Skills - I	MC	-	3	1	0	2	0
3.	22MAN03	Yoga - I	MC	-	1	0	0	1	0
4.	22MAN04	Soft/Analytical Skills - II	MC	-	3	1	0	2	0
5.	22MAN05	Yoga - II	MC	-	1	0	0	1	0
6.	22MAN07# / 22MAN07R ##	Soft / Analytical Skills - III	MC	-	3	1	0	2	0
7.	22MAN08#/ 22MAN08R##	Soft/Analytical Skills -IV	MC	-	3	1	0	2	0
8.	22MAN09	Indian Constitution	MC	-	1	1	0	0	0
9.	22GED01	Personality and Character Development	MC	-	0	0	0	1	0
10.	22MAN10R	Communication and Quantitative Reasoning	MC	-	3	1	0	2	0

(D) Programme Elective Courses (PEC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
VERTICAL I - STRUCTURES									
1.	22CEX01	Advanced Steel Design	PEC	22CEC15	3	3	0	0	3
2.	22CEX02	Prefabricated Structures	PEC	-	3	3	0	0	3

3.	22CEX03	Prestressed Concrete Structures	PEC	-	3	3	0	0	3
4.	22CEX04	Distress Monitoring and Rehabilitation of Structures	PEC	-	3	3	0	0	3
5.	22CEX05	Dynamics and Earthquake Resistant Structures	PEC	-	3	3	0	0	3
6.	22CEX06	Introduction to Finite Element Method	PEC	-	3	3	0	0	3
7.	22CEX07	Advanced Structural Analysis	PEC	22CEC07	3	3	0	0	3
8.	22CEX08	Steel Concrete Composite Structures	PEC	-	3	3	0	0	3
VERTICAL 2 - CONSTRUCTION ENGINEERING AND MANAGEMENT									
1.	22CEX11	Construction Equipment and Management	PEC	-	3	3	0	0	3
2.	22CEX12	Sustainable and Lean Construction	PEC	-	3	3	0	0	3
3.	22CEX13	Safety in Construction Practices	PEC	-	3	3	0	0	3
4.	22CEX14	Advanced Construction Techniques	PEC	-	3	3	0	0	3
5.	22CEX15	Energy Efficient Buildings	PEC	-	3	3	0	0	3
6.	22CEX16	Construction Planning and Scheduling	PEC	-	3	3	0	0	3
7.	22CEX17	Architecture and Town Planning	PEC	-	3	3	0	0	3
8.	22CEX18	Contract Management	PEC	-	3	3	0	0	3
VERTICAL 3 - INFRASTRUCTURE ENGINEERING									
1.	22CEX21	Airports and Harbours	PEC	-	3	3	0	0	3
2.	22CEX22	Traffic Engineering and Management	PEC	-	3	3	0	0	3
3.	22CEX23	Urban Planning and Development	PEC	-	3	3	0	0	3
4.	22CEX24	Smart cities	PEC	-	3	3	0	0	3
5.	22CEX25	Intelligent Transport Systems	PEC	-	3	3	0	0	3
6.	22CEX26	Pavement Engineering	PEC	-	3	3	0	0	3
7.	22CEX27	Transportation Planning Process	PEC	-	3	3	0	0	3
8.	22CEX28	Transportation Economics	PEC	-	3	3	0	0	3

VERTICAL 4 - ENVIRONMENT AND WATER RESOURCES									
1.	22CEX31	Climate Change Adaptation and Mitigation	PEC	-	3	3	0	0	3
2.	22CEX32	Air and Noise Pollution Control Engineering	PEC	-	3	3	0	0	3
3.	22CEX33	Environmental Impact Assessment	PEC	22CEC12	3	3	0	0	3
4.	22CEX34	Industrial Wastewater Management	PEC	-	3	3	0	0	3
5.	22CEX35	Solid and Hazardous Waste Management	PEC	-	3	3	0	0	3
6.	22CEX36	Plumbing (Water & Sanitation)	PEC	-	3	3	0	0	3
7.	22CEX37	Transport and Environment	PEC	-	3	3	0	0	3
8.	22CEX38	Groundwater Engineering	PEC	-	3	3	0	0	3
VERTICAL 5 - GEO TECHNICAL									
1.	22CEX41	Ground Improvement Techniques	PEC	-	3	3	0	0	3
2.	22CEX42	Engineering Geology	PEC	-	3	3	0	0	3
3.	22CEX43	Site Investigation and Soil Exploration	PEC	-	3	3	0	0	3
4.	22CEX44	Slope Stability and Landslides	PEC	-	3	3	0	0	3
5.	22CEX45	Rock mechanics	PEC	-	3	3	0	0	3
6.	22CEX46	Geo Environmental Engineering	PEC	-	3	3	0	0	3
7.	22CEX47	Offshore Engineering	PEC	-	3	3	0	0	3
8.	22CEX48	Advanced Foundation Engineering	PEC	-	3	3	0	0	3
VERTICAL 6 - DIVERSIFIED COURSE									
1.	22CEX51	Green Buildings	PEC	-	3	3	0	0	3
2.	22CEX52	Building Information Modeling	PEC	-	3	3	0	0	3
3.	22CEX53	Advanced Surveying	PEC	-	3	3	0	0	3
4.	22CEX54	Remote Sensing and GIS	PEC	-	3	3	0	0	3
5.	22CEX55	AI in Civil Engineering	PEC	-	3	3	0	0	3
6.	22CEX56	Rainwater Harvesting	PEC	-	3	3	0	0	3
7.	22CEX57	Disaster Preparedness and Planning	PEC	-	3	3	0	0	3
8.	22CEX58	Construction Economics and Finance	PEC	-	3	3	0	0	3

(E) Management Elective Courses									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1.	22GEA02	Principles of Management	HSMC	-	3	3	0	0	3
2.	22GEA03	Total Quality Management	HSMC	-	3	3	0	0	3
3.	22GEA04	Professional Ethics	HSMC	-	3	3	0	0	3

(F) Open Elective Courses (OEC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
1.	22CEZ01	Drinking Water Supply and Treatment	OEC	-	3	3	0	0	3
2.	22CEZ02	Waste Management	OEC	-	3	3	0	0	3
3.	22CEZ03	Building Services	OEC	-	3	3	0	0	3
4.	22CEZ04	Energy Conservation in Buildings	OEC	-	3	3	0	0	3

(G) Minor Degree Courses									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUI SITE	CONTACT PERIODS	L	T	P	C
ENVIRONMENT AND SUSTAINABILITY									
1.	22CEM01	Introduction to Sustainability	OEC	-	3	3	0	0	3
2.	22CEM02	Environment Ecology	OEC	-	3	3	0	0	3
3.	22CEM03	Environmental Health and Safety	OEC	-	3	3	0	0	3
4.	22CEM04	Green Technology	OEC	-	3	3	0	0	3
5.	22CEM05	Functional Efficiency in Buildings	OEC	-	3	3	0	0	3
6.	22CEM06	Water Conservation and Sustainability	OEC	-	3	3	0	0	3
7.	22CEM07	Sustainability and Lifecycle Assessment	OEC	-	3	3	0	0	3
8.	22CEM08	Global Warming and Climate Change	OEC	-	3	3	0	0	3

SUMMARY

Semester/ Category	HSMC	BSC	ESC	PCC	EEC	PEC	OEC	Total
1	4	8	8					20
2	4	10	8					22
3		4	3	18				25
4				23				23
5				13		9		22
6				10		6	6	22
7	5				4	3	6	18
8					10			10
Total	13	22	19	64	14	18	12	162
%	8.0	13.6	11.7	39.5	8.6	11.1	7.5	100
AICTE Credits Recommended	06	24	20	62	16	20	12	160
	3.8%	15%	12.4%	38.8%	10%	12.5%	7.5%	100

22CEP05 - DESIGN AND DRAWING LABORATORY

		L	T	P	C
		0	0	4	2
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To acquire hands on experience in design and preparation of structural drawings for concrete / steel structures normally encountered in Civil Engineering practice. 				
Course Outcomes				Cognitive Level	
The students will be able to					
CO1	Apply design principles and standards to detailed drawings of multi-storey framed structures, slab and retaining walls.			Ap	
CO2	Assess the compliance of design drawings with relevant codes and standards.			An	
CO3	Design and draw reinforcement details for RCC structures.			Ap	
CO4	Assess the structural integrity and stability of designed components under different loading conditions.			Ap	
CO5	Design the structural members with ethical responsibility.			C	

LIST OF EXPERIMENTS:

1. Design and drawing of multi storey framed structure (Beam, Column and Slab)
2. Design and drawing of RCC cantilever retaining walls
3. Design and drawing of one way and two way slab
4. Design of solid slab bridges for IRC loading and reinforcement details
5. Design and drawing of rectangular and circular RCC water tank
6. Design and drawing of elevated RCC water tank (Rectangular and Circular)
7. Design and detailing of Roof Truss
8. Design and detailing of Culvert
9. Design and detailing of Irrigation canal bridge
10. Design and detailing of Septic tank

TOTAL (P:60) = 60 PERIODS**REFERENCES:**

1. Krishnaraju. N "Structural Design and Drawing, Universities Press, 2009.
2. Punmia, B.C., Ashok Kumar Jain, Arun Kumar Jain, "Comprehensive Design of Steel Structures, Laxmi Publications Pvt. Ltd., 2015.

Note: Manual Design and CAD Drawing

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2								3		3	3	3
2	2	2												2
3	3		3		3							3	3	3
4	3	2										3	2	
5		3	3		3			3		3			3	3
CO (W.A)	2.8	2.2	3		3			3		3		3	2.8	2.8

Dr. N. Srinivasan

22MAN10R - COMMUNICATION AND QUANTITATIVE REASONING

L	T	P	C
1	0	2	0

PREREQUISITE : NIL

Course Objective:

- To enhance the proficiency of the students in both spoken and written communication
- To acquire skills required to solve quantitative aptitude problems

Course Outcomes		Cognitive Level	Weightage of COs in Continuous Assessment Test
The Student will be able to			
CO1	Converse and draft ideas clearly and persuasively in various contexts.	U	40%
CO2	Solve quantitative aptitude problems with confidence.	Ap	30%
CO3	Draw valid conclusions, identify patterns, and solve problems.	An	30%

UNIT I - LANGUAGE BOOSTERS

(5+10)

JAM - General Topic Presentation - Group Discussion - Mock Interview - E Mail Writing - Essay writing

UNIT II - APTITUDE

(5+10)

Mensuration - Area, Shapes, Perimeter - Races and Games - Data Interpretation on Multiple Charts.

UNIT III - REASONING

(5+10)

Venn diagram - Syllogism - Data Sufficiency - Cubes & Embedded Images.

TOTAL (L:15, P:30) : 45 PERIODS

REFERENCES:

1. Rizvi, M.Ashraf. "Effective Technical Communication", Tata McGraw-Hill Education, 2017.
2. Aggarwal R S. "Quantitative Aptitude for Competitive Examinations." S.Chand Publishing Company Ltd(s), 2022.
3. Arun Sharma. "How to Prepare for Quantitative Aptitude for the CAT", Tata McGraw - Hill Publishing, 2022.
4. Praveen R V., "Quantitative Aptitude and Reasoning", PHI Learning Pvt. Ltd., 2016.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1									2	3				
2		2		2										
3		2		2										
CO (W.A)		1		1					1	1				

**22GEA01 UNIVERSAL HUMAN VALUES
(For Common to All Branches)**

L	T	P	C
2	0	0	2

PREREQUISITE : NIL

Course Objective:

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity.
- To facilitate the development of a holistic perspective among students towards life and profession.
- To highlight plausible implications of holistic understanding in terms of ethical human conduct.
- To understand the nature and existence.
- To understand human contact and holistic way of living

Course Outcomes The Student will be able to		Cognitive Level	Weightage of COs in End Semester Examination
CO1	Evaluate the significance of value inputs in formal education and start applying them in their life and profession.	E	Internal Assessment
CO2	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual.	Ap	
CO3	Analyze the value of harmonious relationship based on trust and respect in their life and profession.	An	
CO4	Examine the role of a human being in ensuring harmony in society and nature.	Ap	
CO5	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.	Ap	

UNIT I - INTRODUCTION - BASIC HUMAN ASPIRATION, ITS FULFILLMENT THROUGH ALL - ENCOMPASSING RESOLUTION

(6)

The basic human aspirations and their fulfillment through Right understanding and Resolution, Right understanding and Resolution as the activities of the Self, Self being central to Human Existence; All-encompassing Resolution for a Human Being, its details and solution of problems in the light of Resolution

UNIT II - RIGHT UNDERSTANDING (KNOWING)- KNOWER, KNOWN & THE PROCESS

(6)

The domain of right understanding starting from understanding the human being (the knower, the experiencer and the doer) and extending up to understanding nature/existence – its interconnectedness and co-existence; and finally understanding the role of human being in existence (human conduct).

UNIT III - UNDERSTANDING HUMAN BEING

(6)

Understanding the human being comprehensively as the first step and the core theme of this course; human being as co-existence of the self and the body; the activities and potentialities of the self; Basis for harmony/contradiction in the self

UNIT IV - UNDERSTANDING NATURE AND EXISTENCE

(6)

A comprehensive understanding (knowledge) about the existence, Nature being included; the need and process of inner evolution (through self-exploration, self-awareness and self-evaluation), particularly

awakening to activities of the Self: Realization, Understanding and Contemplation in the Self (Realization of Co-Existence, Understanding of Harmony in Nature and Contemplation of Participation of Human in this harmony/ order leading to comprehensive knowledge about the existence).

UNIT V - UNDERSTANDING HUMAN CONDUCT, ALL-ENCOMPASSING RESOLUTION AND HOLISTIC WAY OF LIVING

(6)

Understanding Human Conduct, different aspects of All-encompassing Resolution (understanding, wisdom, science etc.), Holistic way of living for Human Being with All- encompassing Resolution covering all four dimensions of human endeavor viz., realization, thought, behavior and work (participation in the larger order) leading to harmony at all levels from Self to Nature and entire Existence

TOTAL (L:30) = 30 PERIODS

TEXT BOOKS:

1. R R Gaur, R Asthana, G P Bagaria, 2019 (2nd Revised Edition), “A Foundation Course in Human Values and Professional Ethics”. ISBN 978-93-87034-47-1, Excel Books, New Delhi

REFERENCES:

1. Ivan Illich, 1974, “Energy & Equity”, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, “Small is Beautiful: a study of economics as if people mattered”, Blond & Briggs, Britain.
3. Sussan George, 1976, “How the Other Half Dies”, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, “Limits to Growth - Club of Rome’s report”, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, “Science and Humanism”, Commonwealth Publishers.
7. A N Tripathy, 2003, “Human Values”, New Age International Publishers
8. E G Seebauer& Robert L. Berry, 2000, “Fundamentals of Ethics for Scientists & Engineers”, Oxford University Press
9. M Govindrajran, S Natrajan& V.S. Senthil Kumar, “Engineering Ethics (including Human Values)”, Eastern Economy Edition, Prentice Hall of India Ltd.
10. Subhas Palekar, 2000, “How to practice Natural Farming”, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati
11. B P Banerjee, 2005, “Foundations of Ethics and Management”, Excel Books
12. B L Bajpai, 2004, “Indian Ethos and Modern Management”, New Royal Book Co., Lucknow. Reprinted 2008.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1						2	2	3	2	2		3		
2						2	2	3	2	2		3		
3						2	2	3	2	2		3		
4						2	2	3	2	2		3		
5						2	2	3	2	2		3		
CO (W.A)						2	2	3	2	2		3		

22CEC17 - PRE ENGINEERING BUILDINGS					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective :		<ul style="list-style-type: none"> To analyze design requirements and to create effective pre-engineered building solutions. To evaluate structural and functional performance to ensure that designs meet industry standards and project specifications. 			
Course Outcomes The students will be able to		Cognitive Level	Weightage of COs in End Semester Examination		
CO1	Use industry guidelines and standards to select appropriate structural systems.	Ap	20%		
CO2	Analyze the various framing systems in pre-engineered Building (PEB) structures.	An	40%		
CO3	Apply pre-engineering knowledge to design, analyze, and solve problems in building construction and materials.	Ap	20%		
CO4	Apply techniques for estimating structural reactions and analyze methods for managing lateral forces in building systems.	Ap	20%		
CO5	Observe real-life applications and construction techniques and prepare a detailed report on the construction process and system implementation.	An	Internal Assessment		
UNIT I - BASICS OF METAL BUILDING SYSTEMS					(9)
Introduction to metal building systems - Origin - Advantages and disadvantages - Industry groups - MBMA - MBCEA - NAIMA - MCA - NRCA - Structural loads - Loads and load combinations - Structural behavior - Structural system selection criteria.					
UNIT II - PRIMARY FRAMING					(9)
Available systems - Tapered beams - Single span rigid frame - Multi span rigid frame - Single span and continuous trusses - Framing systems - Lean to framing - Role of frame bracing.					
UNIT III - SECONDARY FRAMING					(9)
Girts and Purlins - Types of purlins for metal building systems - Design of cold-formed framing - Cold - formed steel purlins - Purlin bracings - Cold-formed steel girts - Hot rolled steel girts.					
UNIT IV - METAL ROOFING AND WALL MATERIALS					(9)
Types of metal roofs - Seam configurations - Through fastened Roofing - Structural standing-seam roof - Insulated structural panels - Architectural metal roofing - Panel finishes - Site - formed metal panels - Wind uplift ratings of metal roofs. Wall Materials - Metal panels - Hard walls - Single - Wythe Masonry - Brick veneer walls - Combination walls - Concrete Materials.					

UNIT V - FOUNDATION FOR METAL BUILDING SYSTEMS**(9)**

Soil investigation program - Difference between conventional foundation and foundation for metal building system - Estimation of column reaction - Methods of resisting lateral reactions - Anchor bolt and base plates - Design of slabs on grade.

TOTAL (L :45) = 45 PERIODS**TEXT BOOK:**

I. Alexander Newman, "Metal Building Systems", 3rd Edition, McGraw Hill, 2014.

REFERENCES:

1. Subramanian N, "Design of Steel Structures Limit States Method", 2nd Edition, Oxford University Press, New Delhi, 2016.
2. Bhavikatti S.S., "Design of Steel Structures", 5th Edition, I.K. International Publishing House Pvt. Ltd., New Delhi, 2017.
3. Duggal S., "Design of Steel Structures", 3rd Edition, McGraw Hill Education, 2017.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2													2
2		2												
3	3		2	2									3	2
4	3		2					3						3
5		3						2	3	3		3	3	3
CO (W.A)	2.7	2.5	2	2				2.5	3	3		3	3	2.5



22GED02 - INTERNSHIP / INDUSTRIAL TRAINING

	L	T	P	C
	0	0	0	2

PREREQUISITE : NIL

Course Objective:	<ul style="list-style-type: none"> To apply the theoretical knowledge gained in academic courses to real-world industrial or professional settings. To obtain a broad understanding of the emerging technologies in Industry.
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Course Outcomes		Cognitive Level
The students will be able to		
CO1	Engage in Industrial activity which is a community service.	U
CO2	Prepare the project report, three minute video and the poster of the work.	Ap
CO3	Develop new ideas into feasible projects, enhancing their problem-solving and project development skills.	C
CO4	Develop problem-solving skills and innovative thinking.	Ap
CO5	Assess the effectiveness of industry practices.	E

During semester breaks, students are encouraged to engage in industrial training or undergo internship in an industry related to the field of study. The duration of the activity shall be of 4 weeks (28 days). The work carried out in the semester break is assessed through an oral seminar accompanied by a written report. It is expected that this association will motivate the student to develop simple civil (or other) products to make their life comfortable and convert new ideas into projects.

Every student is required to complete 4 weeks of internship (with about 28days), during the Summer/Winter semester breaks. The Internships are evaluated through Internship Reports. The internships can be taken up in an industry, a government organization, a research organization or an academic institution, either in the country or outside the country, that include activities like:

- Successful completion of Internships/ Value Added Programs / Training
- Programs/ workshops organized by academic Institutions and Industries
- Soft skill training by the Placement Cell of the college
- Active association with incubation/ innovation /entrepreneurship cell of the institute;
- Participation in Inter-Institute innovation related competitions like Hackathons
- Working for consultancy/ research project within the institutes
- Participation in activities of Institute's Innovation Council, IPR cell, Leadership
- Talks, Idea/ Design/ Innovation contests
- Internship with industry/ NGO's/ Government organizations/ Micro/ Small/
- Medium enterprises
- Development of a new product/ business plan/ registration of a start-up

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1									2		2		3	3
2	3								2	3	3	3	3	3
3	3									2		2	3	3
4			2			3					2	3	3	3
5	2												3	3
CO (W.A)	2.7		2			3			2.5	2.5	2.3	2.7	3	3

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22CEX06 - INTRODUCTION TO FINITE ELEMENT METHOD

L	T	P	C
3	0	0	3

PREREQUISITE : NIL

Course Objective:

- To impart basic knowledge on the various steps involved in finite element analysis.
- To introduce various types of one - two - three - dimensional elements.

Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination
The students will be able to			
CO1	Apply the concepts of finite element method to solve engineering problems.	Ap	20%
CO2	Employ the direct stiffness matrix method for analysis of structural elements.	Ap	20%
CO3	Form the shape function and stiffness matrix for one dimensional element.	An	20%
CO4	Apply numerical methods for various isoparametric elements.	Ap	20%
CO5	Analyze the structural elements of framed structures.	An	20%

UNIT I - INTRODUCTION

(9)

Historical Background - Mathematical Modeling of field problems in Engineering - Governing Equations - Discrete and continuous models - Boundary, Initial and Eigen Value problems - Weighted Residual Methods - Variational Formulation of Boundary Value Problems - Ritz Technique - Basic concepts of the Finite Element Method.

UNIT II - STIFFNESS MATRIX FORMULATION

(9)

Introduction to discrete and continua elements - Discrete Elements - Direct stiffness method - Special characteristics of stiffness matrix - Assemblage of elements - Boundary condition & reaction - 2D - truss element - 2D - beam element - Analysis of framed Structures - Basic steps in finite element analysis - Differential equilibrium equations - strain displacement relation - linear constitutive relation - Numerical methods in finite element analysis- Gauss elimination method.

UNIT III - ONE DIMENSIONAL PROBLEMS

(9)

One Dimensional Second Order Equations - Discretization - Element types- Linear and Higher order Elements - Continua Elements - Displacement models - convergence requirements. Natural coordinate systems - Shape function. Interpolation function. Linear and quadratic elements - Lagrange and Serendipity elements. Strain displacement matrix - element stiffness matrix and nodal load vector. Natural frequencies of longitudinal vibration and mode shapes.

UNIT IV - TWO DIMENSIONAL PROBLEMS

(9)

Two dimensional isoparametric elements - Four node quadrilateral elements - triangular elements. Computation of stiffness matrix for isoparametric elements - numerical integration (Gauss quadrature) Convergence criteria for isoparametric elements.

UNIT V - ANALYSIS OF FRAMED STRUCTURES**(9)**

Stiffness of Truss Members-Analysis of Truss-Stiffness of Beam Members-Finite Element Analysis of Continuous Beam-Plane Frame Analysis-Analysis of Grid and Space Frame.

TOTAL (L:45) : 45 PERIODS**TEXTBOOKS:**

1. Rao, S.S., "The Finite Element Method in Engineering", 6th Edition, Butterworth Heinemann 2018.
2. Reddy, J.N. "Introduction to the Finite Element Method", 4th Edition, Tata McGrawHill, 2018.

REFERENCES:

1. David Hutton, "Fundamentals of Finite Element Analysis", Tata McGraw Hill Publishing Company Limited, New Delhi, 2005.
3. G.R. Liu and S. S. Quek, "Finite Element Method: A Practical Course", Butterworth-Heinemann; 1st edition (21 February 2003).
4. Chennakesava R. Alavala, "Finite Element Methods: Basic Concepts and Applications", Prentice Hall Inc., 2010.
5. S. S. Bhavikatti, "Finite Element Analysis", New Age Publishers, 2007.
6. Krishnamoorthy, C. S, "Finite Element Analysis - Theory and Programming", McGraw - Hill, 1995.

Mapping of COs with POs / PSOs

Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3													
2	2												2	
3		2												2
4	2			2										
5		2		2									2	
CO (W.A)	2	2		2									2	2



22CEX11 - CONSTRUCTION EQUIPMENT AND MANAGEMENT

	L	T	P	C
	3	0	0	3

PREREQUISITE : NIL

Course Objective: • To impart knowledge in selection strategies of various equipment based on the requirement of the project at optimum cost and time.

Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination
The students will be able to			
CO1	Select suitable equipment required for building construction.	U	20%
CO2	Choose appropriate equipment for specific tasks in different scenarios.	Ap	40%
CO3	Recommend the most effective equipment for various concreting tasks based on project-specific requirements.	Ap	20%
CO4	Categorize the modern equipment's needed for surveying.	An	20%
CO5	Explain type of equipment and its applications through independent learning in a team and give oral presentation.	An	Internal Assessment

UNIT I - EQUIPMENT MANAGEMENT

(9)

Identification - Factors in selection of equipment - Planning Equipment Utilization - Renting strategies - Capital cost - Investment alternatives - Elements of operating and owning - Bidding costs - Replacement decisions - Rent and Lease considerations - Safety management.

UNIT II - EARTHWORK EQUIPMENT

(9)

Tractors - Motor Graders - Scrapers - Front end Loaders - Earth movers -Equipment for Dredging and Trenching- Tunnelling methods and equipments - Compaction Equipment - Diaphragm wall equipment - Pile Driving Equipment - Drilling and Blasting.

UNIT III - EQUIPMENTS FOR SCREENING AND TRANSPORTING

(9)

Forklifts and related equipment - Portable Material Bins - Material handling cranes - Conveyors - Aggregate Crushers - Feeders - Screening Equipment - Gantry girder.

UNIT IV - CONCRETING EQUIPMENT

(9)

Batching and Mixing Equipment - Hauling equipment - RMC- Modern Formwork Techniques - Shuttering - Types of pumps used for Construction - Boom placer- Equipment for Grouting and Dewatering - 3D Concrete Printing.

UNIT V - SURVEYING EQUIPMENT

(9)

Modern electronic surveying equipments - Digital levels - Digital theodolite - Advanced Total station - Lasers and sensors in Surveying - Remote sensing - Geographical Information System.

TOTAL (L:45) = 45 PERIODS

TEXTBOOK:

1. Sharma.S. C., "Construction Equipment and Management", 1st Edition, Khanna Book Publishing Co. (P) Ltd., India, 2019.

REFERENCES:

1. Peurifoy R.L., "Construction Planning, Equipment and Methods", 7th Edition, McGraw Hill, Singapore, 2013.
2. Leonid Nadolinets, "Surveying Instruments and Technology", 1st Edition, CRC Press, 2017.

Mapping of COs with POs / PSOs

Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2													2
2	2			2									2	3
3	3			2										2
4		2											2	
5		3		3					3	3	3	3	3	3
CO (W.A)	2.3	2.5		2.3					3	3	3	3	2.3	2.5

Dr. M. S. Ravi

22CEX18 - CONTRACT MANAGEMENT				
			L	T
			P	C
			3	0
			0	3
PREREQUISITE : NIL				
Course Objective:	<ul style="list-style-type: none"> To impart knowledge on tender preparation, tendering process, arbitration procedure and laws, Intellectual property requirements and Labour Regulations. 			
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination	
The students will be able to				
CO1	Apply the principles of the Indian Contract Act to ensure that construction agreements meet legal requirements and are enforceable.	Ap	20%	
CO2	Apply the concept of bidding and evaluate tenders based on procedure.	Ap	20%	
CO3	Ensure the follow of arbitration act and practice ethical code of conduct in IPR, copy rights and design patent.	Ap	40%	
CO4	Choose the laws applicable to labour legislation in construction industry.	Ap	20%	
CO5	Prepare a report on contract management strategies by analyzing case studies and evaluating effective approaches for contract creation, execution, and oversight.	E	Internal Assessment	

UNIT I - CONSTRUCTION CONTRACTS	(9)
Indian contract Act - Need - Provisions - Scope for modifications / improvement - Contract specifications - Types of contract documents used in construction - Contract procurement - Selecting a contractor - Introduction to BOT and BOOT projects - EPC contracts.	
UNIT II - TENDERS	(9)
Tender request for proposals - Bids & Proposals - Bid evaluation - Contract conditions and specifications - Critical / Red flag conditions - Contract award and Notice to proceed - Variations and changes in contracts - Differing site conditions - Cost escalation - Delays, Suspensions & Terminations - Wrong practices in contracting (Bid shopping, Bid fixing, Cartels).	
UNIT III - ARBITRATION	(9)
Arbitration and litigation procedure - preparation, settlement, evidence - Comparison of actions and laws - Agreements ,subject matter violations - Appointment of arbitrators - Conditions of arbitrations - Powers and duties of arbitrator - Enforcement of award – costs - Arbitration and conciliation act 1996 - Case studies.	

UNIT IV - LAW RELATING TO INTELLECTUAL PROPERTY	(9)
Introduction - meaning of intellectual property - main forms of IP- Copyright - Trademarks, patents and designs, secrets - Law relating to Copyright in India - Meaning of copyright - Ownership of copyrights and assignment - Criteria of infringement - Piracy in internet - Remedies and procedures in India - Law relating to patents under Patents Act - Process of obtaining patent - Application, examination, opposition and sealing of patents.	
UNIT V - LAWS APPLICABLE TO CONSTRUCTION ACTIVITY	(9)
Industrial disputes act - Workmen's compensation act - Employer's liability act - Payment of wages act - Contract labour act - Minimum wages act - Inter-state migrant workmen act - BOCW Act - other acts introduced time to time.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOKS:
1. Gajaria G.T., "Laws Relating to Building and Engineering Contracts in India", 4th Edition, M.M.Tripathi Pvt. Ltd., Bombay, 2000.
REFERENCES:
1. Joseph T. Bockrath, "Contracts and the Legal Environment for Engineers and Architects", 7th Edition, McGraw-Hill, New York 2010.
2. Jimmie Hinze, "Construction Contracts", 3rd Edition, McGraw-Hill, New York, 2010.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2													2
2	2										2			2
3		2						2			2		2	2
4		2												2
5		3						2	2	2	2		2	2
CO (W.A)	2	2.3						2	2	2	2		2	2

22CEX23 - URBAN PLANNING AND DEVELOPMENT					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To impart knowledge on planning process and to introduce about the regulations and laws related to urban planning. To apply the knowledge of implementation of urban concepts in city area. 				
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Identify the issues involved in urban areas and the challenges in implementing new initiatives under government sectors.	U	20%		
CO2	Apply the different concepts to plan the urban area and city development.	Ap	20%		
CO3	Evaluate the planning and development methods of urban projects.	Ap	40%		
CO4	Apply the regional planning process by identifying and summarizing the key steps according to established standards and norms.	Ap	20%		
CO5	Examine various town and country planning acts and their functions.	An	20%		
UNIT I - INTRODUCTION					(9)
Definition of Human settlement, Urban area, Town, City, Metropolitan City, Megalopolis, Urbanization, Urbanism, Suburbanization, Urban sprawl, Peri - urban areas, Urban Agglomeration, Classification of urban areas - Atal Mission for Rejuvenation and Urban Transformation (AMRUT)					
UNIT II - PLANNING PROCESS					(9)
Principles of Planning - Objectives, Draft Plans, Final Plan. Planning Theories - Garden City Concept, Geddesian Triad by Patrick Geddes, Modernism Concept by Le-Corbusier, Theories of Ekistics, Bid-rent Theory by William Alonso.					
UNIT III - DEVELOPMENT PLANS, PLAN FORMULATION AND EVALUATION					(9)
Types of plans - Regional Plan, Master Plan, Structure Plan, Detailed Development Plan, New Town/ Satellite town- Development Plan, Smart City Plan - Scope and Methodologies for the preparation of Regional Plan (RP), Master Plan (MP), and Detailed Development Plan (DDP).					
UNIT IV - IMPLEMENTATION OF PLANS					(9)
Planning Standards, Project Formulation and evaluation; Project Report preparation and presentation; Legal and Financial constraints - Problems due to multiple laws - Urban planning agencies and their functions in the plan formulation and implementation.					

UNIT V - URBAN AND REGIONAL PLANNING LEGISLATIONS, REGULATIONS AND DESIGNS**(9)**

Town and Country Planning, Local Bodies and Land Acquisition Acts, Development and Building Rules, Site analyses, Layouts and Buildings Design.

TOTAL (L:45)= 45 PERIODS**TEXT BOOKS:**

1. M.Pratap Rao, "Urban Planning: Theory and practice", CBS Publishers and Distributors, 2009.
2. Peter Hall, Mark Tewdwr-Jones., "Urban and Regional Planning", Routledge; 5th Edition, 2010.

REFERENCES:

1. S.K.Kulshrestha, "Urban and Regional Planning in India", SAGE Publications India Pvt Ltd, 2012.
2. Goel, S.L Urban Development and Management, Deep and Deep publications, New Delhi 2002.
3. Arthur B. Gallion, "The Urban Pattern" 5th Edition, CBS Publishers & Distributors, 2003.
4. Thooyavan, K.R., Human Settlements - A Planning Guide to Beginners, M.A Publications, Chennai, 2005.
5. Urban and Regional Development Plans Formulation & Implementation Guidelines", Ministry Urban Affairs & • Employment, Govt. of India, New Delhi, 2014.
6. Town and Country Planning organization in India - <http://tcpo.gov.in/>.
7. Ministry of Housing and Urban Affairs Government of India <http://.moud.gov.in>
8. Tamil Nadu Town and Country Planning Act 1971, and Rules made there under, Government of Tamil Nadu, Chennai.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1		2												2
2	2													2
3	3			2							2	2	2	2
4	3			2								2		2
5		2									2		2	2
CO (W.A)	2.7	2		2							2	2	2	2

22CEX28 - TRANSPORTATION ECONOMICS					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To understand the concept and evaluation of economics in various transportation projects. 				
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Identify and apply the different methods for economic evaluation.	Ap	20%		
CO2	Evaluate the components, and factors to assess the impact of route switching mechanisms when developing new infrastructure.	An	20%		
CO3	Analyse the demand supply concept in metropolitan cities.	Ap	20%		
CO4	Analyze various costs of public and private transportation schemes.	An	20%		
CO5	Apply financial decision making in transportation projects.	An	20%		
UNIT I - ECONOMIC EVALUATION					(9)
Need for economic evaluation of urban transport projects - Principles of economic analysis - Methods of economic evaluation - Comparison of various methods - Application of simulation modelling in evolving suitable evaluation techniques.					
UNIT II - MODELING OF ROAD USER COSTS					(9)
Components of vehicle operating cost - Factors affecting vehicle operating cost - Value of travel time saving - Accident cost - Concept of route switching mechanism - Ripple effects in developing new infrastructure.					
UNIT III - TRANSPORT DEMAND SUPPLY CONCEPT					(9)
Transport demand and supply concepts - Status of transport demand supply in metropolitan cities - Demand and Supply equilibrium - Subsidy in Transport demand - Supply augmentation and saturation consideration.					
UNIT IV - TRANSPORT PRICING					(9)
Transport costs - Elasticity of demand - Average cost and marginal cost pricing - Market pricing and market segmentation - Second best pricing - Pricing policy - Congestion pricing - Public and private transport pricing.					
UNIT V - FINANCING TRANSPORT SYSTEM					(9)
Characteristics of transportation infrastructure - Trends in transportation infrastructure - Investment needs, options and budgetary support in transport sector - Existing financing practices - Principles of build, operate and transfer (BOT) - BOT variants and its applicability.					
TOTAL (L:45) = 45 PERIODS					

TEXT BOOK:

1. Khanna, S.K., Justo C.E.G. and Veeraragavan A. "Highway Engineering", New Chand and Brothers, Roorkee, Revised 10th Edition, 2018.

REFERENCES:

1. Kadiyali, L.R. and Lai, N.B. "Highway Engineering (Including Expressways and Airport Engineering)", Khanna Publishers, New Delhi, 5th Edition, 2013.
2. Kadiyali L.R. "Traffic Engineering and Transport Planning", Khanna Publishers, Delhi, 10th Edition, 2016.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2													
2		2				2					2			2
3	2										3	2		2
4		2												2
5	2					2					2		2	
CO (W.A)	2	2				2					2.3	2	2	2

Dr. N. S. Reddy

22CEX31 - CLIMATE CHANGE ADAPTATION AND MITIGATION					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To impart knowledge on the global warming, the impact of climate change on society and the adaptation and mitigation measures. 				
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Examine key climate parameters to identify their impact on weather patterns.	Ap	40%		
CO2	Analyze the elements related to climate change to understand their causes, impacts, and mitigation strategies.	An	20%		
CO3	Mitigate the factors influencing climate change and suggest suitable remedial measures.	Ap	20%		
CO4	Evaluate various energy sources and audit practices to promote a sustainable energy environment.	An	20%		
CO5	Analyze real-world examples of adaptation and mitigation efforts in different regions and prepare a report.	An	Internal Assessment		

UNIT I - INTRODUCTION	(9)
Atmosphere - weather and Climate - climate parameters - Temperature, Rainfall, Humidity, Wind - Global ocean circulation - El Nino and its effect - Carbon cycle.	
UNIT II - ELEMENTS RELATED TO CLIMATE CHANGE	(9)
Greenhouse gases - Total carbon dioxide emissions by energy sector - industrial, commercial, transportation, residential - Impacts - air quality, hydrology, green space - Causes of global and regional climate change - Changes in patterns of temperature, precipitation and sea level rise - Greenhouse effect.	
UNIT III - IMPACTS OF CLIMATE CHANGE	(9)
Effects of Climate Changes on living things - health effects, malnutrition, human migration, socioeconomic impacts - tourism, industry and business, vulnerability assessment- infrastructure, population and sector - Agriculture, forestry, human health, coastal areas.	
UNIT IV - MITIGATING CLIMATE CHANGE	(9)
IPCC Technical Guidelines for Assessing Climate Change Impact and Adaptation - Identifying adaption options - designing and implementing adaption measures - surface albedo environment - reflective roofing and reflective paving - enhancement of evapo transpiration - tree planting programme - green roofing strategies - energy conservation in buildings - energy efficiencies - carbon sequestration.	

UNIT V - ALTERNATE FUELS AND RENEWABLE ENERGY**(9)**

Energy source - coal, natural gas - wind energy, hydropower, solar energy, nuclear energy, geothermal energy - biofuels - Energy policies for a cool future - Energy Audit.

TOTAL (L:45) = 45 PERIODS**TEXT BOOKS:**

1. Ruddiman W.F, freeman W.H. and Company, "Earth's Climate Past and Future", 2001
2. Velma. I. Grover,"Global Warming and Climate Change Vol I an II", Science Publishers, 2005.
3. Dash Sushil Kumar, "Climate Change - An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007.

REFERENCES:

1. Maximilian Lackner, BaharakSajjadi and Wei-Yin Chen, "Handbook of Climate Change Mitigation and Adaptation", Third Edition, Springer Nature, 2022.
2. IPCC Sixth Assessment Report, 2021.
3. Kendal McGuffie, Ann Henderson, "A Climate Modelling" Primer 4th Edition, John Wiley & Sons, Ltd, Chichester, UK 2014.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2										2			2
2		3										2		3
3		3										2		
4		2											2	
5		3				3	3		3	3		3		3
CO (W.A)	2	2.8				3	3		3	3		2.3	2	2.3

Dr. N. S. Narayana

22CEX32 - AIR AND NOISE POLLUTION CONTROL ENGINEERING					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To acquire fundamental knowledge of the sources, effects, dispersion of air pollutants, its mitigation and quality management, and basics of noise pollution. 				
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Explain the air quality standards and its management.	Ap	20%		
CO2	Classify the various air and noise pollutants and identify their sources.	Ap	40%		
CO3	Apply air sampling techniques and interpret the results using meteorological data.	Ap	20%		
CO4	Evaluate the appropriate air pollution control methods.	An	20%		
CO5	Analyze real-life air or noise pollution incidents and discuss the causes and consequences.	An	Internal Assessment		
UNIT I - GENERAL				(9)	
Atmosphere as a place of disposal of pollutants - Air Pollution - Definition - Global Climate - Units of measurements of pollutants - Air emission and quality standards - Air pollution indices - Air quality management in India.					
UNIT II - SOURCES, CLASSIFICATION AND EFFECTS				(9)	
Sources and classification of air pollutants - Man made - Natural sources - Type of air pollutants - Pollution due to automobiles - Analysis of air pollutants - Chemical, Instrumental and biological methods. Air pollution and its effects on human beings, plants and animals.					
UNIT III - SAMPLING, METEOROLOGY AND AIR QUALITY MODELLING				(9)	
Sampling and measurement of particulate and gaseous pollutants - Ambient air sampling - Meteorology - temperature lapse rate and stability - Adiabatic lapse rate - Wind Rose - Wind velocity and turbulence - Dispersion of air pollutants.					
UNIT IV - AIR POLLUTION CONTROL MEASURES				(9)	
Control - Control equipment's - Particulate control methods - Bag house filter - Settling chamber - cyclone separators - inertial devices - Electrostatic precipitator - Absorption - Absorption equipment's.					
UNIT V - NOISE POLLUTION AND ITS CONTROL				(9)	
Sources of noise - Units and Measurements of Noise - Characterization of Noise from Construction, Mining, Transportation and Industrial Activities, Airport Noise - auditory effects, non-auditory effects. Prevention and Control of Noise Pollution.					
TOTAL (L:45) = 45 PERIODS					

TEXT BOOKS:

1. C. S. Rao, "Environmental Pollution Control Engineering", Wiley Eastern Limited, 2006.
2. M. N. Rao, H. V. N. Rao, Air pollution, Tata McGraw Hill Pvt Ltd, New Delhi, 2017
3. Dr. Y. Anjaneyulu, "Air Pollution and Control Technologies", Allied publishers Pvt. Ltd., 2019.

REFERENCES:

1. Lawrence K.Wang, Norman C.Pereira, Yung-Tse Hung, "Advanced Air and Noise Pollution Control", 2nd Edition 2010, Humana Press, United States.
2. W.L. Heumann, "Industrial Air Pollution Control Systems", McGraw-Hill, New York, 2015.
3. Peavy S.W., Rowe D.R. and Tchobanoglous G, "Environmental Engineering", McGraw-Hill, New Delhi, 2015.
4. Mahajan S.P, "Pollution Control in Process Industries", Tata McGraw-Hill Publishing Company, New Delhi, 2015.
5. Garg, S.K, "Environmental Engineering Vol. II", Khanna Publishers, New Delhi, 1979.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2					2								2
2	2												2	
3	2	2												
4		3				2							2	2
5		3			2	3	3		3	3	3			3
CO (W.A)	2	2.7			2	2.3	3		3	3	3		3	2.3

Dr. Anjaneyulu

22CEX34 - INDUSTRIAL WASTEWATER MANAGEMENT					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To analyze the physical, chemical, and biological characteristics of wastewater from different industrial sources. To imparts knowledge on the significance of industrial waste water and solid waste treatment techniques for ensuring environmental sustainability. 				
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Apply the hierarchy principles to minimizing waste generation and promoting sustainable waste management practices.	Ap	20%		
CO2	Analyze the characteristics of industrial wastewater.	An	20%		
CO3	Apply techniques to stabilize industrial wastewater flow and pollutant load.	Ap	20%		
CO4	Evaluate the management and disposal strategies for residuals generated from industrial wastewater treatment processes.	Ap	20%		
CO5	Analyze industrial wastewater management practices in real-world case studies to identify challenges and solutions.	An	20%		

UNIT I - INTRODUCTION	(9)
Industrial scenario in India - Uses of water by industry - Sources, characteristics and types of industrial waste water - Nature and Origin of Pollutants - Industrial wastewater monitoring and sampling - Industrial Wastewater generation rates - Toxicity of Industrial effluents and Bioassay tests.	
UNIT II - INDUSTRIAL POLLUTION PREVENTION AND WASTE MINIMISATION	(9)
Prevention Control of Industrial Pollution - Benefits and Barriers - Waste management Hierarchy - Source reduction techniques - Evaluation of Pollution Prevention Options - Cost benefit analysis - Pay-back period - Recycle, reuse and byproduct recovery.	
UNIT III - INDUSTRIAL WASTEWATER TREATMENT	(9)
Flow and Load Equalisation - Solids Separation - Removal of Fats, Oil and Grease - Neutralisation - Removal of Inorganic Constituents - Precipitation, Heavy metal removal, Nitrogen & Phosphorous removal, Ion exchange, Adsorption, Membrane Filtration, Electro dialysis & Evaporation.	
UNIT IV - WASTEWATER REUSE AND RESIDUAL MANAGEMENT	(9)
Individual and Common Effluent Treatment Plants - Zero effluent discharge systems - Quality requirements for Wastewater reuse , Industrial reuse , Present status and issues - Disposal on water and land - Residuals of industrial wastewater treatment.	

UNIT V - CASE STUDIES	(9)
Industrial manufacturing process - source reduction options and waste treatment flow sheet for Textiles - Tanneries - Pulp and paper - metal finishing - Sugar and Distilleries.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> Rao M.N. and Datta A.K., "Wastewater Treatment", 3rd Edition, Oxford - IBH Publication, New Delhi, 2017. Soli. J. Arceivala, Shyam. R. Asolekar, "Waste water Treatment for pollution control and reuse" Tata McGraw Hill, 2007.
REFERENCES:
<ol style="list-style-type: none"> Stanley N Barton "Industrial Waste: Management, Assessment and Environmental Issues (Waste and Waste Management)", 1st Edition, Nova science publishers Inc, New Delhi, 2016. Nelson Leonard Nemerow, "Industrial waste treatment - contemporary practice and vision for the future", Elsevier, Singapore, 2007.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2					2								2
2		2					2						2	
3	3					2					3			
4	3			3									2	
5		3		3		2	2			2	2	3		3
CO (W.A)	2.7	2.5		3		2	2			2	2.5	3	2	2.5

Dr. M. S. Narayana

22CEX36 - PLUMBING (WATER & SANITATION)

L	T	P	C
3	0	0	3

PREREQUISITE : NIL

Course Objective:	<ul style="list-style-type: none"> To identify different types of pipes used in water supply and sanitary and drainage work.
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Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination
The students will be able to			
CO1	Apply national and international codes, including the NBC and other relevant codes, to building design and construction.	Ap	20%
CO2	Select proper plumbing materials and systems.	An	20%
CO3	Apply appropriate pipe materials and jointing methods based on system requirements	Ap	20%
CO4	Identify water supply and Sanitary fitting used in installation	An	20%
CO5	Apply strategies for reducing and reusing water in building systems and projects	Ap	20%

UNIT I - IMPORTANCE OF CODES AND STRUCTURAL COORDINATION	(9)
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Scope and purpose - codes and standards in the building industry - NBC and other codes, Local Municipal Laws, approvals, general regulations, standards - water supply, sewerage system, drainage system, workmanship, water conservation - protection of pipes and structures - waterproofing.

UNIT II - PLUMBING TERMINOLOGY	(9)
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Plumbing Fixtures - accessible, readily accessible, aerated fittings, AHJ, bathroom group, carrier, flood level rim, floor sink, flushometer valve, flush tanks, lavatories, macerating toilet, plumbing appliances, and plumber. Traps - indirect waste, vent, blow off, developed length, dirty arm, FOG, receptors, slip joints, trap, and vent. Drainage: adapter fitting, adjusted roof area, AAV, air break, air gap, area drain, base, bell and spigot joint, building drain, branch, DFU, grease interceptor, joints, roof drain, smoke test, stack.

UNIT III - SANITARY DRAINAGE AND STORM DRAIN	(9)
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One pipe and two pipe systems, different pipe materials and jointing methods, special joints, hangers and supports, protection of pipes and structures, alternative materials, workmanship, prohibited fittings and practices, hydraulic jump, change in direction of flow, T and Y fittings, cleanouts, pipe grading, fixtures below invert level, suds relief, testing, building sewers, trenching, testing, sumps and pumps, introduction to Drainage Fixture Units (DFU) and sizing of horizontal and vertical pipes. Rain Water Harvesting (RWH) definition, need, catchment, NBC requirements and advantages of RWH.

UNIT IV - WATER SUPPLY, GRAY AND RECLAIMED WATER	(9)
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Sources of water, potable and non-potable water, reclaimed water, calculating daily water requirement and storage, hot and cold water distribution system, backflow prevention, air gap, cross connection control, pressure and velocity, pipe materials and jointing methods, alternative materials, hangers and

supports, workmanship, prohibited fittings and practices - protection of pipes and structures - Water Supply Fixture Units (WSFU) and sizing. Gray water - approvals, specifications and drawings, safety.

UNIT V - INTRODUCTION TO WTP AND STP

(9)

Introduction to Net Zero concept, need to reduce and reuse, rating of Water Efficient Plumbing fixtures and fittings, 24x7 water supply, metering and sub-metering, typical daily water and wastewater calculations for a project. Sources - utility and treatment of water - parameters of water quality, parts of water treatment plant (WTP), disinfection methods, storage conditions, RO water systems, rainwater harvesting treatment, desalination - characteristics of domestic sewage, sewage treatment methods, aerobic and anaerobic treatment, level of treatment, reclaimed water, comparison of various methods.

TOTAL (L:45) = 45 PERIODS

TEXT BOOKS:

1. O.P. Gupta, "Elements of Water Pollution Control Engineering", Khanna Book Publishing, New Delhi.
2. Uniform Illustrated Plumbing Code-India (UIPC-I) published by IPA and IAPMO (India).

REFERENCES:

1. Water Efficient Products-India (WEP-I) published by IPA and IAPMO (India).
2. "A Guide to Good Plumbing Practices", published by IPA.
3. IS 17650 Part 1 and Part 2 for "Water Efficient Plumbing Products".

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3												3	2
2		2		2		3							2	3
3	3					2								2
4		2		2										3
5	3	2		2		3							3	2
CO (W.A)	3	2		2		2.7							2.7	2.4

Signature

22CEX37 - TRANSPORT AND ENVIRONMENT					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To create an awareness / overview of the impact of transportation projects on the environment and society. 				
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Apply EIA guidelines to assess the environmental impacts of transportation projects.	Ap	20%		
CO2	Analyze various methods used for environmental impact analysis in project assessments.	An	20%		
CO3	Implement Indian Roads Congress (IRC) guidelines to ensure compliance in transportation project planning and execution.	Ap	20%		
CO4	Evaluate methods for reducing global warming through project design and execution.	An	20%		
CO5	Analyze Environmental Impact Assessments (EIA) of highway and railway projects to understand their environmental and social implications.	An	20%		
UNIT I - INTRODUCTION					(9)
Environmental Inventory, Environmental Assessment, Environmental Impact Assessment (EIA), Environmental Impact of Transportation Projects, Need for EIA, EIA Guidelines for Transportation Project, Historical Development.					
UNIT II - METHODOLOGIES					(9)
Elements of EIA - Screening and Scoping - Methods of Impact Analysis - Applications - Appropriate methodology.					
UNIT III - ENVIRONMENTAL IMPACT, PREDICTION AND ASSESSMENT					(9)
Prediction and Assessment of Impact of Transportation Project at various stages on water, air, noise, land acquisition and resettlement, Socio economic impact, indigenous people, aesthetics, health and safety, energy studies, traffic impact studies, IRC guidelines.					
UNIT IV - ENVIRONMENTAL MITIGATION AND MANAGEMENT PLAN					(9)
Mitigation of the impact on Natural and Man-made Environment, Health, Water, Land, Noise, Air, Public participation, Environmental Management Plan, Energy Conservation, Methods to reduce Global Warming.					
UNIT V - CASE STUDIES					(9)
EIA Case Studies on Highway, Railway - EIA Case Studies on Transit Oriented Development (TOD), Compact Cities, Non-Motorised Transport (NMT).					
TOTAL (L:45) = 45 PERIODS					

TEXT BOOKS:

1. P. Meenakshi, Elements of Environmental Science and Engineering, Prentice Hall of India, New Delhi, 2006
2. Thirumurthy A.M., Introduction to Environmental Science and Management, Shroff Publishers, Bombay, 2005.

REFERENCES:

1. Indian Road Congress (IRC), Environmental Impact of Highway Projects, IRC, Delhi, 1998.
2. EIA Guidance Manual- Highway- MOEF & Govt of India, 2010
3. Indian Road Congress (IRC), Environmental Impact of Highway Projects, IRC, Delhi, 1998.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3													2
2		2					2							2
3	3			2									2	2
4		2					2						2	2
5		3		3					2			3		3
CO (W.A)	3	2.3		2.5			2		2			3	2	2.2



22CEX43 - SITE INVESTIGATION AND SOIL EXPLORATION				
			L	T
			P	C
			3	0
			0	3
PREREQUISITE : NIL				
Course Objective:	<ul style="list-style-type: none"> To understand the principles and importance of site investigation and soil exploration for engineering and construction projects. 			
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination	
The students will be able to				
CO1	Apply geophysical investigation methods to assess subsurface conditions.	Ap	20%	
CO2	Utilize sampling and exploration techniques and interpret results to assess subsurface conditions.	An	40%	
CO3	Analyze results from various field tests to determine soil properties and behavior for engineering purposes.	Ap	20%	
CO4	Apply the principles and applications of various instrumentation techniques used in soil engineering.	An	20%	
CO5	Prepare comprehensive reports detailing the soil sampling and field testing methods.	C	Internal Assessment	

UNIT I - PLANNING OF EXPLORATION AND GEOPHYSICAL METHODS	(9)
Site investigation - Scope and objectives - activities involved in site investigation - Preliminary desk studies - Subsurface exploration - General considerations - Objectives - Planning an exploration programme - Location - Spacing and depth of borings - Soil Profile - Bore logs - Data Presentation - Soil investigation and exploration reports - Geophysical investigation.	
UNIT II - EXPLORATION TECHNIQUES	(9)
Open pits and trenches - Different methods of boring and drilling - Stabilization of bore holes - Cleaning of bore hole - Geophysical exploration and interpretation - non-displacement and displacement methods - Drilling in difficult subsoil conditions.	
UNIT III - SOIL SAMPLING	(9)
Sampling Techniques - Quality of samples - Factors influencing sample quality - disturbed and undisturbed soil sampling - advanced sampling techniques, shallow penetration samplers, preservation and handling of samples.	
UNIT IV - FIELD TESTING IN SOIL EXPLORATION	(9)
Field tests - Importance of field tests in soil exploration - Penetration testing - Standard Penetration Test - Static Cone Penetration Test - Dynamic cone penetration test - Plate load test - Field Vane shear test - Cyclic plate load test - Block vibration test - Field Permeability test.	
UNIT V - INSTRUMENTATION	(9)
Instrumentation in soil engineering, Strain gauges, Resistance and inductance type, Load cells, Earth pressure cells, Pore pressure measurements - Slope indicators, Sensing units - case studies.	
TOTAL (L:45) = 45 PERIODS	

TEXTBOOKS:

1. Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt.Ltd., New Delhi, 2017.
2. Dr. K. R. Arora., "Soil Mechanics and Foundation Engineering", Standard Publisher, New Delhi, 7th ed., 2017.
3. Gopal Ranjan and Rao A.S.R. "Basic and Applied soil mechanics", New Age International (P) Ltd, New Delhi, 2006.
4. Clayton C.R, Matthews M.C, Simons N.E, "Site Investigation", 2nd edition, Trans Tech Publications Ltd, 1995.

REFERENCES:

1. Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers and Distributers Ltd., New Delhi, 2015.
2. Varghese, P.C., "Foundation Engineering", Prentice Hall of India Private Limited, New Delhi, 2012.
3. Das, B.M. "Principles of Foundation Engineering" (Eighth edition), Thompson Asia Pvt. Ltd., Singapore, 2017.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3			2								3	2	3
2		3				2								3
3		3											2	2
4	3			2								3		3
5		3					2		3	3		3	2	2
CO (W.A)	3	3		2		2	2		3	3	3	3	2	2.6

Dr. M. S. Ravi Kumar

22CEX44 - SLOPE STABILTY AND LANDSLIDES					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:	<ul style="list-style-type: none"> To analyze stability of finite and irregular slopes and to impart knowledge on mechanism of landslides and understand the importance of field instrumentation and remedial measures. 				
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Identify and describe the general characteristics and types of failures in structures and soils.	U	20%		
CO2	Analyse stability of slopes in cohesive and cohesionless soils.	An	20%		
CO3	Analysis of irregular slopes with different approaches.	Ap	20%		
CO4	identify and report the causes of landslides in different soil conditions.	An	20%		
CO5	Apply compaction techniques to new embankments to achieve desired density and stability.	Ap	20%		
UNIT I - STABILITY OF SLOPES				(9)	
Introduction - Importance - General characteristics - Types of failures - Causes of failures - Purpose of Stability computation - Investigation of failures - Procedure - Case studies.					
UNIT II - STABILITY ANALYSIS				(9)	
Stability analysis - Method of slices - Friction circle method - Soils with cohesion Soils with cohesion and angle of internal friction. Critical states for design for embankments - Stability computations - Evaluation of pore water pressure					
UNIT III - IRREGULAR SLOPES				(9)	
Non – uniform soils - Janbu’s analysis - Taylor’s analysis - Bishop’s analysis - Total stress and effective stress approaches - Composite surfaces of sliding - Block sliding.					
UNIT IV - LANDSLIDES				(9)	
General Characteristics - Sources - Stability of Hill side slopes - Open cuts - Engineering problems involving the stability of slopes - Cuts in sand - Cuts in loess - Homogeneous and soft clay slopes - Sudden spreading of clay slopes - Clay flows - Clays containing pockets and sand masses - Slides in stiff clay slopes on shale - Slopes on weathered rock; talus slopes, slopes on over consolidated clays - Slides along coastal areas and tropically weathered residual soils - Long term stability of clay slopes.					
UNIT V - FIELD OBSERVATIONS AND SLOPE STABILIZATION				(9)	
Field instrumentation - Observation studies during construction - Post construction, piezometers - Settlement plates - Inclinator - Case histories. Compaction of new embankments - Compaction of natural masses of soil and existing fills - Compaction of deep deposits of sand - Vibroflotation - Compaction of compressible soils - Drainage as a means of stabilization - Use of Geotextiles - Soil nailing.					
TOTAL (L:45) = 45 PERIODS					

TEXT BOOKS:

1. Duncan J. M., Wright S. G., and Brandon. T. L, "Soil Strength and Slope Stability" 2nd Edition, Wiley, 2014.
2. Chowdhury R, Flentje P and Bhattacharya G, "Geotechnical Slope Analysis", CRC Press, 2019.

REFERENCES:

1. McCarthy, D.F., "Essentials of Soil Mechanics and Foundations: Basic Geotechnics", Sixth Edition, Prentice Hall, 2002.
2. Anderson, M.G., and Richards, K.S., "Slope Stability", JohnWiley, 1987.
3. Cheng and Lau, "Slope Stability Analysis and Stabilization" , CRC press.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2													2
2		2											2	2
3		2									2			2
4		2		2									2	2
5	3												2	3
CO (W.A)	2.5	2		2							2		2	2

Dr. N. Srinivas Reddy

22CEX45 - ROCK MECHANICS					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:		<ul style="list-style-type: none"> To impart knowledge on fundamentals of rock mechanics and its application in solving simple problems associated with rock slopes and underground openings. To understand the mechanics of rock and its applications in underground structures and rock slope stability analysis. 			
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Identify and classify rocks based on geological characteristics and their engineering significance.	Ap	20%		
CO2	Apply rock mechanics principles to the design and stability analysis of underground openings.	Ap	20%		
CO3	Determine the strength and behavior of rock materials under different loading conditions.	An	20%		
CO4	Estimate initial stresses in rock formations using theoretical and empirical methods.	Ap	20%		
CO5	Compare and select appropriate methods for the excavation of tunnels based on geological conditions and project requirements.	An	20%		
UNIT I - CLASSIFICATION AND INDEX PROPERTIES OF ROCKS					(9)
Introduction - Scope of rock mechanics- Geological classification - Index properties of rock systems - Classification of rock masses for engineering purpose - Rock mass rating and Q System - Strength and modulus from classifications, Classification based on strength and modulus and strength and fracture strain, Geo engineering classification.					
UNIT II - ROCK STRENGTH AND FAILURE CRITERIA					(9)
Modes of rock failures - Strength of rock - Laboratory measurement of shear, tensile and compressive strength - Stress-strain behaviour of rock under hydrostatic compression and deviator loading - Mohr-Coulomb failure criteria.					
UNIT III - INITIAL STRESSES AND THEIR MEASUREMENTS					(9)
Estimation of initial stresses in rocks - Influence of joints and their orientation in distribution of stresses - Measurement of in-situ stresses - Hydraulic fracturing - Flat jack method - Over coring method.					
UNIT IV - APPLICATION OF ROCK MECHANICS IN ENGINEERING					(9)
Simple engineering application - Underground openings - Rock slopes - Bolting - Anchoring - Foundations and mining subsidence - Improvement of slope stability and protection.					
UNIT V - ROCK STABILIZATION					(9)
Rock support and rock reinforcement - Methods of excavation of tunnels - Control and maintenance- Tunnel ventilation - Grouting in rocks - Rock bolting - Rock anchor.					
TOTAL (L:45) = 45 PERIODS					

TEXTBOOKS:

1. Ramamurthy T. "Engineering in Rocks for Slopes Foundations and Tunnels", 3rd Edition, PHI Learning Pvt. Ltd, 2014.

REFERENCES:

1. Debasis & Verma Abhiram Kumar, "Fundamentals and Applications of Rock Mechanics" 1st Edition, PHI Learning Pvt. Ltd, 2016.
2. Nagaratnam Sivakugan, Sanjay Kumar Shukla and Braja M. Das, "Rock Mechanics - An Introduction", 1st edition CRC press, India, 2012.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2													2
2	3											3		3
3		2											2	
4		2											2	
5		2		2										2
CO (W.A)	2.5	2		2								3	2	2.3



22CEX46 – GEO ENVIRONMENTAL ENGINEERING

L	T	P	C
3	0	0	3

PREREQUISITE : NIL

Course Objective:	<ul style="list-style-type: none"> To impart knowledge on the Geotechnical engineering problems associated with soil contamination, safe disposal of waste and remediate the contaminated soils by different techniques thereby protecting environment.
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Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination
The students will be able to			
CO1	Identify the soil-pollutant interaction and assess the modification of soil properties.	Ap	20%
CO2	Categorize the process of contaminant transport and characterize the contaminated sites.	Ap	20%
CO3	Classify different techniques for the remediation of contaminated Sites.	Ap	20%
CO4	Design the cover system by identifying the suitable components of landfill.	An	20%
CO5	Analyze the possible utilization of waste based on their characteristics.	An	20%

UNIT I - INTRODUCTION	(9)
Role of Geo-environmental Engineering - sources, generation and classification of wastes- causes and consequences of soil pollution -factors influencing soil-pollutant interaction-modification of index-physical, chemical and engineering properties.	
UNIT II - CONTAMINANT TRANSPORT AND SITE CHARACTERISATION	(9)
Transport of contaminant in subsurface - advection, diffusion, dispersion - chemical process in subsurface - sorption, desorption, precipitation, dissolution, oxidation, complexation, ion exchange, volatilization - biological process in subsurface - characterization of contaminated sites.	
UNIT III - WASTE CONTAINMENT AND REMEDIATION OF CONTAMINATED	(9)
In situ containment - vertical and horizontal barrier - soil remediation - soil vapour extraction, electro kinetic remediation, soil heating, vitrification, bioremediation, phyto remediation - ground water remediation -pump and treat, In situ flushing, permeable reacting barrier.	
UNIT IV - LAND FILLS AND SURFACE IMPOUNDMENTS	(9)
Site selection for landfills - Components of landfills - liner system - soil, geomembrane, geosynthetic clay, geocomposite liner system - leachate collection-construction and operation of landfill-landfill cover - disposal of slurry waste in ponds and impoundments.	
UNIT V - UTILIZATION OF WASTE	(9)
Evaluation of waste materials - flyash, municipal sludge, plastics, scrap tire, blast furnace slag - physical, chemical and biological characteristics-geotechnical reuse of waste materials.	
TOTAL (L:45) = 45 PERIODS	

TEXTBOOKS:

1. Hari D. Sharma and Krishna R.Reddy, "Geo-Environmental Engineering", John Wiley and Sons, INC, USA, 2004.
2. Sharma H D and Reddy K R, "Geoenvironmental Engineering: Site remediation, Waste containment and Emerging Waste Management Technologies", John Wiley & Sons, Inc. Hoboken, New Jersey, 2004.

REFERENCES:

1. Westlake, K., "Landfill Waste pollution and Control", Albion Publishing Ltd., England, 2014.
2. Bagchi A, "Design of landfills and integrated solid waste management", John Wiley & Sons, Inc., USA 2004.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	2											2	
2		2									2		2	2
3	2													2
4		2									2	2	2	2
5		2		3		3	3				3	2		2
CO (W.A)	2	2		3		3	3				2.3	2	2	2

Dr. H. D. Sharma

22CEX52 - BUILDING INFORMATION MODELING					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:		<ul style="list-style-type: none"> • To highlight the use of BIM models based on real-world construction projects. • To explain the modelling and analysis using BIM software. • To give an overview of clash detection and avoidance using BIM. • To give an exposure on BIM 4D and 5 D models. 			
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Apply BIM tools to create and manage models for different types of buildings.	Ap	20%		
CO2	Identify clash and avoid its occurrence.	An	20%		
CO3	Apply specific modeling techniques in BIM to create detailed and integrated models.	Ap	20%		
CO4	Apply 2D drawing techniques in BIM to create precise technical drawings for architectural and structural elements.	Ap	20%		
CO5	Apply the concept of BIM 4D for project scheduling.	Ap	20%		
UNIT I - INTRODUCTION TO BIM					(9)
Building information Modeling - Introduction and Process- Evolution of BIM - BIM model of various buildings like commercial and residential, WTP, Transportation, Airports - Isometric view - Introduction - Examples and Problems - 3D Modeling.					
UNIT II - DESIGN AUTHORIZING AND VISUALIZATION					(9)
Design authoring - Work flow, Discipline based modeling, Architectural, Plumbing, Energy Analysis, Design review- Views in model, Visualization models, Walkthrough and fly through the model, Layers and Properties, AR,VR and MR.					
UNIT III - INTERFERENCE / CLASH CHECK					(9)
Clash check - types of clashes - Federated model - Clash avoidance process –Clash detection process – Introduction. Clash detection - Priority Marix, Clash detection - Rules, Clash detection - Report, Clash detection - Grouping. Clash detection - Roles and Responsibilities, Clash detection Process - Demo.					
UNIT IV - DOCUMENTATION, CDE AND LOE					(9)
2D drawings operation, cloud computing, COE - Level of detail and level of information, LOD- Structural elements - Chart and matrix.					
UNIT V - 4D AND 5D IN BUILDINGINFORMATION MODELLING					(9)
Project schedule - 4D MIM modeling - Construction analysis - 3D control and planning - BIM for safety - Disaster and risk analysis - digital fabrication- phase planning - As built / Record models - 5D in BIM - 5D BIM and quantity take off with UOM, Exercise and Demo, quantity take off, 5D - Estimation and analysis - Asset attributes and asset requirement - Infrastructure system - Information Exchange with faculty management.					
TOTAL (L:45) = 45 PERIODS					

TEXTBOOKS:

1. Karen kensek, Douglas Noble, "Building Information Modeling: BIM in Current and future practice", 2014.
2. Autodesk Revit 2023 - BIM Management template and family creation by ASCENT, ISBN 978-1-63057-528-1, 2023

REFERENCES:

1. Eastman C, Teichotz P, Sacks Rand Liston C, "BIM handbook: A guide to building information modeling for owners, managers, designers, engineers and contractors" John Wiley and Sons, 2011.
2. Hardin B and McCool D,"BIM and construction management proven tools, methods, and workflows", John Wiley and Sons, 2015.
3. Issa R R and Olbina S, "Building Information modeling Application and Practices", American Society of Civil Engineers, 2015.
4. Pittard S & Sell P, "BIM and Quantity Surveying" Routledge, 2016.

Mapping of COs with POs / PSOs

Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2									2				3
2		2												2
3	3				2							2	2	
4	2		2		2									2
5	3			2	3	3				3			2	3
CO (W.A)	2.5	2	2	2	2.3	3				2.5		2	2	2.5

for revision only

22CEX55 - AI IN CIVIL ENGINEERING					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objective:		<ul style="list-style-type: none"> To impart knowledge on application of AI tools and techniques to optimize design, construction, and maintenance processes in civil engineering projects. 			
Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination		
The students will be able to					
CO1	Explain the concept of AIN network and general algorithm.	U	20%		
CO2	Identify the techniques to assess the performance of geotechnical characteristics against safety and cost criteria.	An	20%		
CO3	Examine the structural elements by using AI.	An	20%		
CO4	Analyze the AI based construction activities and scheduling.	An	20%		
CO5	Apply the AI in traffic management system.	Ap	20%		

UNIT I - INTRODUCTION TO ARTIFICIAL INTELLIGENCE	(9)
Introduction to AI - Applications of AI in Engineering - Implementation of AI in Civil Engineering - Fundamentals of AIN Networks in AI - Genetic algorithm - Machine Learning - Regression model - Dimension Analysis - Simulation Theory - Game theory and its applications.	
UNIT II - APPLICATION OF AI IN GEOTECHNICAL ENGINEERING	(9)
Expert system for landslide hazard and risk management - Advisor on the selection of Earth retaining structures - Development of a prolonged based expert system for ground water control - Real time expert system for excavation - Knowledge based assistant for earthquake resistant design in AI - Case studies.	
UNIT III - APPLICATION OF AI IN STRUCTURAL ENGINEERING	(9)
Prolog standards for structural design - Expert system for conceptual design of bridges - structural design using intelligent objects - Expert system for design of offshore structures - knowledge based system for design of reinforced concrete walls - damage assessment based on fuzzy reasoning using AI - ANN - Expert system for base plates - Expert system for structural inspection and maintenance - case studies.	
UNIT IV - APPLICATION OF AI IN CONSTRUCTION MANAGEMENT	(9)
Knowledge based regulation processing for site development - Key approach to site layout problems - Duration of each activity forecasting techniques - Expert system for construction industry - A fuzzy expert system for priority ranking in network resource allocation - Expert system in network resource allocation - generation and scheduling of construction activities - case studies.	
UNIT V - APPLICATION OF AI IN TRANSPORTATION ENGINEERING	(9)
Traffic control system of non - autonomous vehicles at signalized road intersection - traffic lights - traffic patterns - improved safety services - application in traffic management system - application in health monitoring - case studies.	
TOTAL (L:45) = 45 PERIODS	

TEXTBOOKS:

1. Prateek J, "Artificial Intelligence with Python", Packt Publishing, Birmingham, 1st Edition, 2017.
2. Daugherty Paul R, and James Wilson H, "Human Machine Reimagining Working the Age of AI" Harvand Business Press, 2nd Edition, 2018.

REFERENCES:

1. Husai, Amir, "The sentient machine: The coming age of artificial Intelligence", Scribner publishing, 1st Edition, 2017.
2. Kaplan Jerry, "Artificial Intelligence: what everyone needs to Know", Oxford University Press, 1st Edition, 2018.
3. B.H Topping, "Artificial Intelligence Techniques and Application for Civil and Structural Engineers", Civil Compress press, Edinburgh, 1st Edition, 1989.
4. <https://nptel.ac.in/courses/106102220>.

Mapping of COs with POs / PSOs

Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2													2
2	2			2								2		2
3				2									2	2
4		2										2		2
5	2												2	
CO (W.A)	2	2		2								2	2	2



22CEX56 - RAINWATER HARVESTING

L	T	P	C
3	0	0	3

PREREQUISITE : NIL

Course Objective:

- To impart knowledge and skills relevant to water conservation and management towards achieving the sustainability in water resources.

Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination
The students will be able to			
CO1	Analyse the need and importance of water conservation through global and Indian practices of rainwater harvesting.	Ap	20%
CO2	Apply the concepts of hydrology and groundwater in the estimation of runoff and recharge potentials.	An	20%
CO3	Interpret the various types of rainwater harvesting methods and apply it on the field.	An	20%
CO4	Design the various RWH structures to harvest the rainwater in surface and subsurface.	An	20%
CO5	Explain the difficulties of RWH, evaluation methods and maintenance through various case studies.	Ap	20%

UNIT I - BASICS OF RWH

(9)

Water and its sources - Need for water conservation - Types of water demand - Conservation Methods - Global and Indian perspectives - National mission and goals towards rainwater harvesting - National water policy - Legislation on rainwater harvesting in India and Tamil Nadu.

UNIT II - HYDROLOGY AND GROUND WATER

(9)

Hydrological cycle - Precipitation - Rainfall measurement - Rain-gauges - Hyetograph - Infiltration - Runoff estimation - Rooftop runoff estimation. Ground water - Aquifer Properties - Darcy law and well hydraulics - Steady flow.

UNIT III - METHODS OF RAINWATER HARVESTING

(9)

Rainwater harvesting potential of an area - Traditional harvesting practices - Rooftop harvesting - Methods of RWH structures - Site selection for rainwater harvesting - Surface runoff Harvesting - Ground water recharge - Artificial recharge.

UNIT IV - DESIGN OF RAINWATER HARVESTING STRUCTURES

(9)

Design Considerations - Components of Rainwater harvesting system - Simple roof water collection system - Design of Storage structure - Design of Recharge structures - Recharge pit - Recharge trench - Recharge well - Gully plug - Contour bund - Percolation tank - Check dam - Recharge shaft - Efficiency of RWH system

UNIT V - MANAGEMENT OF RWH AND CASE STUDIES

(9)

Difficulties in RWH - At catchment level - At household level - Evaluation of RWH systems - Maintenance of RWH structures - Modernisation of RWH system - Case studies on best practice of RWH in urban - Success stories of Contemporary practices of RWH in India.

TOTAL (L:45) = 45 PERIODS

TEXTBOOKS:

1. Ramakrishnan S, "Ground Water", Scitech Publications (India) Pvt Ltd, 2010.
2. Jayarami Reddy P, "A Text book of Hydrology" Firewall media Publication, 2005.
3. Raghunath H M, "Ground Water" 3rd Edition, New Age International, 2007.

REFERENCES:

1. Rain water Harvesting Techniques to Augment Ground Water: Ministry of Water Resources Central Ground Water Board Faridabad, 2003.
2. Rainwater Harvesting: Indian Railway Institute of Civil Engineering Pune, October 2015.
3. A Manual on "Rainwater Harvesting and Conservation": Government of India, Consultancy Service Organization Central Public Works Department, New Delhi.
4. "A Water Harvesting Manual for Urban Areas" issued by Centre for Science and Environment.
5. "Traditional Water Harvesting Systems of India" C.P.R. Environmental Education Centre, Chennai, India (2004).
6. "Handbook on rainwater harvesting storage options", Ministry of Water and Environment, Uganda.

Mapping of COs with POs / PSOs

Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2										2			2
2	2			2		2	2					2		2
3		3		2			2				3	2	3	3
4		2					3				3	2		2
5	2			2		2			3	3		3	2	
CO (W.A)	2	2		2		2	2.3		3	3	2.7	2.3	2.5	2.3



22CEX58 - CONSTRUCTION ECONOMICS AND FINANCE

L	T	P	C
3	0	0	3

PREREQUISITE : NIL

Course Objective:

- To expose the students to the concepts of construction finance such as comparing alternatives proposals, evaluating alternative investments, cost estimating and management of accounting.

Course Outcomes		Cognitive Level	Weightage of COs in End Semester Examination
The students will be able to			
CO1	Apply time-value of money concept to compare alternatives.	Ap	20%
CO2	Apply these methods to compare different investment alternatives and determine the most financially viable option.	Ap	20%
CO3	Analyse equipment cost and replacement alternatives.	An	20%
CO4	Prepare different types of cost estimates.	An	20%
CO5	Apply the financial management procedures and estimate the financial ratios.	Ap	20%

UNIT I - ENGINEERING ECONOMICS

(9)

Basic principles - Time value of money, Quantifying alternatives for decision making, Cash flow diagrams, Equivalence - Single payment in the future (P/F, F/P), Present payment compared to uniform series payments (P/A, A/P), Future payment compared to uniform series payments (F/A, A/F), Arithmetic gradient, Geometric gradient. Funds - cash flow, sources of funds - Histograms and S - Curves - Earned Value.

UNIT II - COMPARISON OF ALTERNATIVES

(9)

Present, future and annual worth method of comparing alternatives, Rate of return, Incremental rate of return, Break - even comparisons, Capitalized cost analysis, Benefit - cost analysis. Depreciation, Inflation and Taxes.

UNIT III - EQUIPMENT ECONOMICS

(9)

Equipment costs, Ownership and operating costs, Buy/Rent/Lease options, Replacement analysis.

UNIT IV - COST ESTIMATING

(9)

Types of Estimates, Approximate estimates - Unit estimate, Factor estimate, Cost indexes, Parametric estimate, Life cycle cost.

UNIT V - FINANCIAL MANAGEMENT

(9)

Construction accounting, Chart of Accounts, Financial statements - Profit and loss, Balance sheets, Financial ratios, Working capital management.

TOTAL (L:45) = 45 PERIODS

TEXT BOOKS:

1. Bose, D. C., "Fundamentals of Financial management", 2nd ed., PHI, New Delhi, 2011.
2. Prasanna Chandra, "Projects: Planning, Analysis, Selection, Financing, Implementation and Review", McGraw- Hill Education, 2019.

REFERENCES:

1. Gould, F. E., "Managing the Construction Process", 4th ed., Pearson Education, 2012.
2. Harris, F. , McCaffer, R. and Edum-Fotwe, F., "Modern Construction Management", 6th ed., Wiley India, New Delhi, 2012.
3. Jha, K. N., "Construction Project Management, Theory and Practice", Pearson, New Delhi, 2015.
4. Peurifoy, R. L. and Oberlender, G. D., "Estimating Construction Costs", 6th ed., McGraw-Hill, 2015.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	3									2			2
2	2										2			2
3	3	3									2			3
4	2	3									2			2
5	3	3									2			2
CO (W.A)	2.4	3									2			2.2

Signature