

9th UG - Board of Studies Meeting in the department of Civil Engineering

for the programme

B.Tech – Civil Engineering

Venue

Seminar Hall
Sri Manakula Vinayagar Engineering College
Madagadipet, Puducherry – 605 107

08.03.2024 at 10.30 am

Hybrid mode

AGENDA OF THE MEETING

Item No. 01: BoS/UG/CIVIL 9.1

Welcome Address by BoS Chairman.

Item No. 02: BoS/UG/CIVIL 9.2

Review and confirm of 8th BoS Minutes of Meeting.

Item No. 03: BoS/UG/CIVIL 9.3

To appraise on the curriculum structure of Regulation 2023 for I to VI Semesters.

Item No. 04: BoS/UG/CIVIL 9.4

To discuss and approve the R2023 curriculum and syllabi for VII & VIII Semester under Regulation 2023 for B.Tech. Civil Engineering.

Item No. 05: BoS/UG/CIVIL 9.5

To appraise and approve the following chosen Elective Courses,

- i)Professional Elective courses for VI & VIII Semester under Regulation 2020 for the batches 2022 2026 and 2021-2025
- ii) Professional Elective courses for IV Semester under Regulation 2023 for the batch 2023 2027.
- iii) Open Elective courses for VI & VIII Semester under Regulation 2020 for the batches 2022 2026 and 2021-2025.

Item No. 06: BoS/UG/CIVIL 9.6

To appraise and approve on the following chosen Ability Enhancement Courses, Employability Enhancement Courses and Mandatory courses

- i) Ability Enhancement Courses Certification courses II & IV for semester II & IV under regulation 2023 for the Batch 2024 2028 and 2023-2027 and for Skill Enhancement courses for IV semester under Regulation 2023 for the batch 2023 2027.
- ii) Employability Enhancement Courses Certificate course VI and Skill Development Courses – 6, 7,8 and 9 under regulation 2020 for batches 2022-2026 and 2021-2025.
- iii) Mandatory Courses for semester II & IV under regulation 2023 for batches 2024-2028 and 2023-2027 and for Semester VI under regulation 2020 for batch 2022-2026.

Item No.07: BoS / UG/ CIVIL 9.7

To Approve the modifications in the curriculum & syllabus and evaluation pattern of Honours/Minors degree programme offered under Regulation 2023.

Item No. 08: BoS / UG / CIVIL 9.8

Any other item with the permission of chair.

Dr.S.Sundararaman

Chairman - BoS

MINUTES OF THE MEETING

Dr. S.Sundararaman, Chairperson, BoS opened the meeting by welcoming and introducing the external members, to the internal and co-opted members and thanked them for valuable presence in this 9th Board of Studies and the meeting thereafter deliberated on agenda items that had been approved by the Chairperson.

Item No. 1: BoS / UG / CIVIL 9.1

The Chairperson declared the meeting open and welcomed all the members. He highlighted on the group of colleges in SMVE Trust with the names of Management Representatives & Director cum Principal. The Vision and Mission Statement of the Institution and the Department was also apprised to all the members present in the meeting.

Item No. 2: BoS/UG/CIVIL 9.2

Chairperson BoS, apprised the minutes of 8th BoS, its implementation and then it is confirmed with the approval for the incorporation of minor revisions needed as mentioned below.

S.No	Suggestions	Action Taken
1	Suggestion given that for the course Design of	As per suggestion given by the expert
	Steel Structures, Unit - I can be split into 2	members, syllabus for the course Design
	units namely bolted and welded connections,	of Steel Structures in Sixth Semester
	Unit- III can have the tension members and the	under Regulation 2023 has been revised.
	IV and V unit can be with compression	
	members and design of beams respectively	
2	In the panel of Examiner list the criteria for	➤ Selection of examiners were based on
	selection of examiners can alone be presented	Academic qualifications and
	instead of the specialization and college/	experience
	University Name.	➤ Colleges were chosen based on NIRF
		Ranked Affiliated colleges, Universities
		and other reputed institutions.
3	It is also suggested by industrial expert to	As per suggestion given by the expert
	Incorporate Building Services Engineering as	members, Building Services Engineering
	one of the core paper or elective paper which	is in Professional Elective – I basket.
	will be of more important for students getting	
	jobs in future.	

(The details of suggestion and action taken of the meetings is attached in Annexure I)

Item No.3: BoS / UG / CIVIL 9.3

Chairperson BoS, apprised on the Curriculum structure of Regulation 2023 for I to VI Semesters.

(The details of R23, Curriculum I to VI Semesters is attached in Annexure II).

Item No. 4: BoS / UG / CIVIL 9.4

Discussed and approved the, Curriculum and Syllabi for VII & VIII Semester under Regulation 2023 for B.Tech. Civil Engineering.

(The details related to Curriculum and Syllabus for VII & VIII Semesters of Regulation 2023 is attached in Annexure III).

Item No. 5: BoS / UG / CIVIL 9.5

The board Chairperson apprised the following chosen Elective Courses and the same were approved by the BoS Members.

- Professional Elective courses for VI & VIII Semester under Regulation 2020 for the batches 2022 – 2026 and 2021-2025
- II. Professional Elective courses for IV Semester under Regulation 2023 for the batch 2023 2027.
- III. Open Elective courses for VI Semester under Regulation 2020 for the batch 2022 2026.

S.No	Regulation	Sem	Batch	Category	Course code	Course Name
1	2020	VI	2022- 2026	Professional Elective	U20CEE614	Municipal Solid Waste Management
2	2020	VIII	2021 - 2025	Professional Elective	U20CEE825	Prefabricated Structures
3	2020	VIII	2021 - 2025	Professional Elective	U20CEE828	Repair and Rehabilitation of Structures
4	2023	IV	2023 - 2027	Professional Elective	U23CEE405	Alternative Building Materials and Technologies
5	2020	VI	2022- 2026	Open Elective	U20EEO503	Conventional and Non- Conventional Energy sources

(The list of professional & open elective courses and syllabi for the chosen course has been attached in Annexure IV).

Item No. 6: BoS / UG / CIVIL 9.6

Discussed and approved the following Chosen Ability Enhancement Courses, Employability Enhancement Courses and Mandatory courses

- i) Ability Enhancement Courses Certification courses II & IV for semester II & IV under regulation 2023 for the Batch 2024 2028 and 2023-2027 and for Skill Enhancement courses for IV semester under Regulation 2023 for the batch 2023 2027.
- ii) Employability Enhancement Courses Certificate course VI and Skill Development Courses 6, 7,8 and 9 under regulation 2020 for batches 2022-2026 and 2021-2025.
- iii) Mandatory Courses for semester II & IV under regulation 2023 for batches 2024-2028 and 2023-2027 and for Semester VI under regulation 2020 for batch 2022-2026.

S.No	Regulation	Sem	Batch	Category	Course code	Course Name
1	2023	IV	2023 - 2027	Ability Enhancement Course	U23CES402	1) MS Office – Word, Excel, Power Point
2	2020	VI	2022 - 2026	Skill Development Course	U20CES606	Skill Development Course 6: Foreign Language/ IELTS - II
3	2020	VI	2022 - 2026	Skill Development Course	U20CES607	Skill Development Course 7: Technical Seminar
4	2020	VI	2022 - 2026	Skill Development Course	U20CES608	Skill Development Course 8: NPTEL / MOOC – I
5	2020	VI	2022 - 2026	Skill Development Course	U20CES809	Skill Development Course 9: NPTEL / MOOC - II
6	2023	II	2023- 2027	Chosen Mandatory Courses	U23CEM202	Sports Yoga and NSS
7	2023	IV	2023- 2027	Chosen Mandatory Courses	U23CEM404	Right to Information and Good Governance
8	2020	VI	2022- 2026	Chosen Mandatory Courses	U20CEM606	Essence of Indian Traditional Knowledge

Discussed and approved the B.Tech. degree NPTEL / MOOC & online certification courses of Batches 2023 – 2027 and 2022-2026.

(The list of Skill Development Courses and syllabi for the chosen course, list of Certification Course and List of NPTEL / MOOC has been attached in Annexure V)

Item No. 7: BoS / UG / CIVIL 9.7

Discussed and approved the Modifications in the Curriculum and Syllabus and evaluation pattern for Honours/ Minors Degree Programme Offered Under Regulation 2023.

(The details of R23, Curriculum and Syllabus of Honours/ Minors Degree Programme is attached in Annexure VI).

Item No. 8: BoS / UG / CIVIL 9.8

- Members suggested that In the VII Semester, for the course "Construction Technology and Management" the units can be rearranged to have better continuity.
- It is also Suggested that In the VII Semester for the course "Hydraulic and Water Resource
 Engineering" the topics such as sources of water and integrated water supply can be included in
 Unit -I. The unit IV can be renamed as Catchment Characteristic & Runoff.
- Members Suggested that in the professional Elective IV one of the course namely "Structural Health and Monitoring" the 1st unit can have introduction topics on Non-Destructive Evaluations rather than Structural Modelling and Finite Element Model.
- It is also suggested that for Professional Elective -IV in the course "Quality Control and Assurance" the syllabus need to have aspects related to construction rather than a general syllabus of quality control and assurance.
- For the professional elective course IV offered in VII Semester namely "Tunneling Engineering" the Unit III need to be shifted to Unit -V.
- For professional elective courses in Regulation 2023., the prerequisite need to be mentioned as "Knowledge gained in the Course" rather than mentioning only the course name.
- The IS Code Books mentioned in the syllabus need to carry the latest year of their reprints. The
 version of the software needs to be mentioned in all the Software related Civil Engineering
 laboratories.

The Meeting was concluded with vote of thanks by Dr.S.Sundararaman, Head of the Department, Department of Civil Engineering.

Dr. S.SundararamanChairperson - BoS



SRI MANAKULA VINAYAGAR



DEPARTMENT OF CIVIL ENGINEERING 9th BOARD OF STUDIES MEETING EXPERT MEMBERS

BoS Meeting Date:08.03.2025 Time: 10.30 AM Venue: Seminar Hall

SI.No	Name of the Member with Designation and official Address	Members as per UGC Norms	Signature
1 External	Dr. S.Sundararaman Professor and Head Department of Civil, SMVEC Members	Chairman	J. Ser
Externa	Members		
2	Dr.K.Baskar Professor, National Institute of Technology, Tiruchirappalli Specialization: Structural Engineering e-mail: drkbaskar@yahoo.co.in Cell:9790180736	Subject Expert (Pondicherry University Nominee)	G - MV Attended online
3	Dr. P. T. Ravichandran Professor & Head, Department of Civil Engineering, Faculty of Engineering and Technology, SRM Institute of Science and Technology, Kattankulathur Specialization: Geotechnical Engineering E-mail: ravichap@srmist.edu.in Cell: 9840798450	Subject Expert (Academic Council Nominee)	Remi
4	Dr. A. Latha Professor Department of Civil Engineering Velammal College of Engineering and Technology. Madurai. Specialization: Environmental Engineering E-mail: lathaganesan.a@gmail.com Cell: 9962602435	Subject Expert (Academic Council Nominee)	Hate
5	Dr. K. Srinivasamoorthy, Professor, Department of Earth Science, Pondicherry University, Puducherry — 605014 Email: moorthy.esc@pondiuni.edu.in Phone Number: 9443824903	Member	1. Sinvasyoutly

SI.No	Name of the Member with Designation and official Address	Members as per UGC Norms	Signature
6	Dr. S. Virapan Chairman & Managing Director Sanvir Associates Chennai Email: virapans@gmail.com Cell: 9444036627	Industry Representative	Mingay.
7	Er. K.Surya, (Alumni) Er. Surya Civil Engineering & Contractor Email: ksuryapondy@gmail.com Cell: 73972 44333	Alumni	K. Surya
Internal	Members	340 A 240	Λ
1	Dr.S.Jayakumar	Member	
2	Mrs.A.Kalyani	Member	1 hlye
3	Mr.K.Srinivasan	Member	Va
4	Mr.J.Subash Chandra Boss	Member	* Drawl
5	Mr.C.Raj Govind	Member	CF 1.
6	Mrs.D.Sathiyasree	Member	2.2.
7	Mr.G.Senthil Raj	Member	Pa h. h
8	Mr.R.Badhrinadhan	Member	Q R claim
9	Mr.S.Tiroumalai	Member	7
10	Mr.V.Murugappan	Member	of min
11	Mrs.J.Jayapriya	Member	Show
12	Mr.MCK. Jamenraja	Member	(1) (1) (1)
13	Mr.C. Karthikeyan	Member	CX AP. L
14	Mr.S. Sasidharan	Member	Gurdeni
15	Mrs.P.Saranya	Member	1. Sorrabanai
o-opted	Members		Veril
1	Mr. K. Raja		
2	Dr.K.Kathikeyan	Member	Mo
3	Dr.S.Jaichitra	Member	Apple may
4	Dr. K. Samuel	Member	fair
		Member	Toos among.

ANNEXURE I

Department	Civil	Engineering	Progran	nme: B	.Tech.				
Semester	VI		Course	Catego	ry Code	: PC End S	Semester	Exam Typ	e: TE
Course Code	U23C	=T640	Periods	/Week		Credit	Maxir	num Mark	S
	02301	=1010	L	Т	Р	С	CAM	ESE	TM
Course Name	Desig	n of Steel Structures	3	0	0	3	25	75	100
Prerequisite	Nil								
		mpletion of the course, the stud				an and beh	avior of st	(Hiọ Le	apping ghest vel) {3
	30.0	structural Joints using bolts.	prily iii oiiiipi	o praoti	ioai dooi	gir dild boll	avioi 01 01		
Course	CO2	Able to understand the design p		simple	practica	ıl design and	d behavio	r of P	< 3
Outcome	CO3	steel structural Joints using welds Able to understand the behavior		emher	and ablo	e to design	of compoi	ınd ı	< 3
	000	sections.	or torible in	CITIDOI	ana abi	o to doolgii	or compo	and r	13
	CO4	Able to understand the behavio laced and battened columns.	or of compres	ssion n	nember	and able to	design v	vith j	< 3
	CO5	Able to know the knowledge of member.	of beams ar	nd purli	ins and	able to de	esign flexu	ıral I	K 3
UNIT – I	STEEL	STRUCTURAL JOINTS- BOLTI	ED CONNEC	TIONS		Periods:09	9	<u>i</u>	
		nnections, terminologies, failures outt joint using bolts under axial lo				oints – lap j	oint, single	e cover bu	itt CO1
7		zatt jonnt donng bonto anidor axiar io	ading - Emci	oney or					
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COs/POs/PSOs Mapping

COs		Program Outcomes (POs)										Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	2	3	3	1	1	-	-	-	3	1	3	3	3	3
2	3	3	3	2	1	-	-	-	3	1	3	3	3	3
3	3	3	3	2	1	-	-	-	3	-	-	3	3	3
4	3	3	3	2	1	-	-	-	3	-	-	3	3	3
5	3	3	3	2	1	1	1	ı	3	-	ı	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Contin	uous Asse	ssment Marks (C	SAM)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*}Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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(An Autonomous Institution)

Puducherry

B.TECH. CIVIL ENGINEERING

ACADEMIC REGULATIONS 2023 (R - 2023)

CURRICULUM



COLLEGE VISION AND MISSION

Vision

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

Mission

MI: Quality Education

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation

To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship

To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT VISION AND MISSION

Vision

We envision a world where the civil engineering department will be a home to an intellectual community with good quality education embedded with practical knowledge by inculcating research, strong social commitment and ethical values from its students, staffs and alumni.

Mission

M1: Quality Education

To fulfill the requirements of construction industry, Civil Engineering profession and rural community through dissemination of technical services.

M2: Practical Knowledge

To impart quality and real-time education to the students with the knowledge & skills needed for Civil Engineering practice

M3: Work Efficiency

To encourage research, development and consultancy through sustained interaction with industry & research organization.

M4: Societal issues

To develop graduates to compete at the global level to deal with modern issues.

M5: Moral & Ethical

To insist ethical values and professionalism among the students.

PROGRAMME OUTCOMES (POs)

PO1: Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:

Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.

PO8: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication:

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning:

Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Fundamental Knowledge

To gain a thorough fundamental knowledge, problem solving skills, engineering experimental abilities, and design capabilities for a civil engineering career.

PEO2: Knowledge and Skills

To establish the knowledge and skills necessary for identifying and assessing design alternatives and the related social, economic, environmental, and public safety impacts.

PEO 3: Societal Implications

To develop the ability to deal effectively with ethical and professional issues, taking into account the broader societal implications of civil engineering

PEO 4: Competent Professionals

To create competent professionals who are trained in the design and development of Civil Engineering systems to engulf research and development activities

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Practical Knowledge

Inculcating practical knowledge in planning, analysis, design and construction management without much exploiting natural resources.

PSO 2: Critical Thinking

Imparting effective communicational skills, leadership attributes towards the team work and developing critical thinking abilities to find solutions for civil engineering problems of multi-disciplinary nature.

PSO 3: Challenging Employment

Ability to take up any challenging employment, entrepreneurship, research and development for sustainable civil society as a civil engineering graduate.

STRUCTURE FOR UNDERGRADUATE ENGINEERING PROGRAM

SI. No	Course Category	Breakdown of Credits
1	Humanities and Social Sciences including Management courses (HS)	15
2	Basic Science Courses (BS)	20
3	Engineering Science including workshop, drawing, basics of electrical / mechanical / computer etc. (ES)	28
4	Professional Core Courses (PC)	66
5	Professional Electives Courses (PE)	18
6	Open Electives Courses (OE)	9
7	Project Work and Internship (PA)	13
8	Ability Enhancement Courses (AEC*)	0
9	Mandatory Courses (MC*)	0
	Total	169

SCHEME OF CREDIT DISTRIBUTION - SUMMARY

SI.No	AICTE			Cred	lits pe	r Sem	ester			Total
31.NO	Suggested Course Category	I	II	III	IV	V	VI	VII	VIII	Credits
1	1 Humanities and Social Science (HS)		5	1	1	2	-	-	3	15
2	Basic Sciences(BS)	7	4	5	4	-	-	-	-	20
3	Engineering Sciences (ES)	11	5	4	4	4	-	-	-	28
4	Professional Core (PC)	1	7	13	10	8	15	12	-	66
5	Professional Electives (PE)	-	-	-	3	3	3	3	6	18
6	Open Electives (OE)	-	-	-	-	3	3	3	-	9
7	Project Work (PA)	-	-	-	-	1	1	2	8	12
8	Internship (PA)	-	-	-	-	-	-	1	-	1
9	9 Ability Enhancement Courses (AEC*)		-	-	-	-	-	-	-	0
10 Mandatory courses (MC*)		-	-	-	-	-	-	-	-	0
	Total	22	21	23	22	21	22	21	17	169

^{*} AEC and MC are not included for CGPA calculation

		SEM	IESTER – I							
SI. No	Course	Course Title	Catamami	Pe	erio	ds	Credits	Ma	ax. Marl	(S
NO	Code	Course Title	Category	L	L T P		Credits	CAM	ESM	Total
The	ory									
1	U23MATC01	Engineering Mathematics - I	BS	3	1	0	4	25	75	100
2	U23BSTC01	Physical Science for Engineers	BS	3	0	0	3	25	75	100
3	U23ESTC01	Basics of Civil and Mechanical Engineering	ES	3	0	0	3	25	75	100
4	U23ESTC02	Engineering Mechanics	ES	2	1	0	3	25	75	100
5	U23ESTC03	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	25	75	100
Theo	ry cum Practi	cal	·			I	l l			
6	U23ENBC01	Communicative English I	HS	2	0	2	3	50	50	100
Prac	ctical									
7	U23ESPC01	Basics of Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	50	50	100
8	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
9	U23CEP101	Civil Engineering Practice Laboratory	PC	0	0	2	1	50	50	100
Abil	ity Enhancem	ent Course								
10	U23CEC1XX	Certification Course – I**	AEC	0	0	4	-	100	-	100
Man	datory Cours	e					<u>'</u>			
11	U23CEM101	Induction Programme	MC	2 We	eek	- <u>-</u>	-	-	-	-
	ı		l	<u> </u>			22	425	575	1000

^{**} Certification courses are to be selected from the list given in Annexure III

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		SEME	ESTER - I	I						
SI.	Course Code	Course Title	Category	Pe	rio	ds	Credits	М	ax. Mar	ks
No.	Course Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total
The	ory									
1	U23MATC02	Engineering Mathematics - II	BS	3	1	0	4	25	75	100
2	U23CSTC01	Programming in C	ES	3	0	0	3	25	75	100
3	U23CET201	Mechanics of Solids - I	PC	3	0	0	3	25	75	100
4	U23CET202	Building Materials and Construction	PC	3	0	0	3	25	75	100
5	U23HSTC01	Universal Human Values - II	HS	2	0	0	2	25	75	100
Theo	ry cum Practical		<u>'</u>				Į.			
6	U23ENBC02	Communicative English II	HS	2	0	2	3	50	50	100
Prac	ctical						<u> </u>	<u> </u>		
7	U23CSPC01	Programming in C Laboratory	ES	0	0	2	1	50	50	100
8	U23ESPC03	Engineering Graphics using AutoCAD	ES	0	0	2	1	50	50	100
9	U23CEP202	Strength of Materials Laboratory	PC	0	0	2	1	50	50	100
Abil	ity Enhancemen	t Course							I	
10	U23CEC2XX	Certification Course – II**	AEC	0	0	4	0	100	-	100
Man	datory Course									
11	U23CEM202	Sports Yoga and NSS	MC	0	0	2	0	100	-	100
							21	525	575	1100

Dr.S. SUNDARARAMAN, M.Tech., Ph.S..

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		SEMES	STER – III							
SI.	Course	Course Title	Category	Pe	rio	ds	Credits	Ma	ax. Mar	ks
No.	Code	Godiec Title	outogory.	L	T	Р	Orcans	CAM	ESM	Total
The	ory									
1	U23MATC03	Probability and Statistics	BS	3	1	0	4	25	75	100
2	U23ADTC01	Programming in Python	ES	3	0	0	3	25	75	100
3	U23CET303	Fluid Mechanics and Machinery	PC	3	0	0	3	25	75	100
4	U23CET304	Construction Technique, Equipment and Practices	PC	3	0	0	3	25	75	100
5	U23CET305	Mechanics of Solids-II	PC	3	0	0	3	25	75	100
Theo	ry cum Practio	cal								
6	U23CEB301	Surveying and Geomatics	PC	2	0	2	3	50	50	100
Prac	ctical									
7	U23ENPC01	General Proficiency I	HS	0	0	2	1	50	50	100
8	U23MAPC01	Engineering Mathematics Laboratory	BS	0	0	2	1	50	50	100
9	U23ADPC01	Programming in Python Laboratory	ES	0	0	2	1	50	50	100
10	U23CEP303	Fluid Mechanics and Machines Laboratory	PC	0	0	2	1	50	50	100
Abil	ity Enhanceme	ent Course								
11	U23CEC3XX	Certification Course – III**	AEC	0	0	4	0	100	-	100
12	U23CES301	Skill Enhancement Course - I*	SEC	0	0	2	0	100	-	100
Man	datory Course									
13	U23CEM303	Climate Change	MC	2	0	0	0	100	-	100
							23	675	625	1300

^{*} Skill Development Courses are to be selected from the list given in Annexure IV

Professor & Head

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		SEMES	TER – IV							
SI.	Course	Course Title	Catagony	P	erio	ds	Credits	Ma	ax. Mar	ks
No	Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total
The	ory									
1	U23MATC04	Numerical Methods and Optimization	BS	3	1	0	4	25	75	100
2	U23CSTC03	Data Structures	ES	3	0	0	3	25	75	100
3	U23CET406	Soil Mechanics	PC	2	1	0	3	25	75	100
4	U23CET407	Design of RC Elements	PC	2	1	0	3	25	75	100
5	U23CEE4XX	Professional Elective - I#	PE	3	0	0	3	25	75	100
The	ory cum Pract	ical								
6	U23CEB402	Concrete Technology	PC	2	0	2	3	50	50	100
Prac	ctical									
7	U23ENPC02	General Proficiency II	HS	0	0	2	1	50	50	100
8	U23CSPC02	Data Structures Laboratory	ES	0	0	2	1	50	50	100
9	U23CEP404	Geotechnical Engineering Laboratory	PC	0	0	2	1	50	50	100
Abili	y Enhanceme									
10	U23CEC4XX	Certification Course – IV**	AEC	0	0	4	0	100	-	100
11	U23CES402	Skill Enhancement Course - II*	SEC	0	0	2	0	100	-	100
Man	datory Course		,							
12	U23CEM404	Right to Information and Good Governance	МС	2	0	0	0	100	-	100
							22	625	575	1200

^{*} Professional Electives are to be selected from the list given in Annexure I

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		SEME	STER - V							
SI.	Course Code	Course Title	Categor	P	erio	ds	Credits	М	ax. Mar	ks
No			У	L	T	Р		CAM	ESM	Total
The	ory									
1	U23HSTC02	Research Methodology	HS	2	0	0	2	25	75	100
2	U23ITTC02	Programming in Java	ES	3	0	0	3	25	75	100
3	U23CET508	Foundation Engineering	PC	3	0	0	3	25	75	100
4	U23CET509	Water supply and Wastewater Engineering	PC	3	0	0	3	25	75	100
5	U23CEE5XX	Professional Elective - II#	PE	3	0	0	3	25	75	100
6	U23XXO5XX	Open Elective – I ^{\$}	OE	3	0	0	3	25	75	100
Prac	tical									
7	U23ITPC02	Programming In Java Laboratory	ES	0	0	2	1	50	50	100
8	U23CEP505	Water and Wastewater Engineering Laboratory	PC	0	0	2	1	50	50	100
9	U23CEP506	REVIT Architecture Laboratory	PC	0	0	2	1	50	50	100
Proj	ect Work	-	•	•						
10	U23CEW501	Micro Project	PA	0	0	2	1	100	-	100
Abil	ity Enhancemen	t Course								
11	U23CEC5XX	Certification Course – V**	AEC	0	0	4	0	100	-	100
Man	datory Course									
12	U23CEM505	Essence of Indian Traditional Knowledge	МС	2	0	0	0	100	-	100
							21	600	600	1200

^{\$}Open electives are to be selected from the list given in Annexure II

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		SE	MESTER -	VI						
SI.	Course	Course Title	Catagony	Р	erio	ds	Credits	M	ax. Mar	ks
No	Code	Course Title	Category	L	T	Р	Credits	CAM	ESM	Total
The	ory									
1	U23CET610	Design of Steel Structures	PC	3	0	0	3	25	75	100
2	U23CET611	Structural Analysis	PC	3	0	0	3	25	75	100
3	U23CET612	Transportation Engineering	PC	3	0	0	3	25	75	100
4	U23CEE6XX	Professional Elective - III#	PE	3	0	0	3	25	75	100
5	U23XXO6XX	Open Elective – II\$	OE	3	0	0	3	25	75	100
The	ory cum Pract	tical								
6	U23CEB603	Instrumentation and sensor Technologies for Civil Engineering Application	PC	2	0	2	3	50	50	100
Prac	ctical						1			
7	U23CEP607	STAAD PRO V8i Laboratory	PC	0	0	2	1	50	50	100
8	U23CEP608	Transportation Engineering Laboratory	PC	0	0	2	1	50	50	100
9	U23CEP609	Survey Camp	PC	0	0	0	1	50	50	100
Proje	ct Work									
10	U23CEW602	Mini Project	PA	0	0	2	1	100	-	100
Abil	ity Enhancen	nent Course								
11	U23CEC6XX	Certification Course – VI**	AEC	0	0	4	0	100	-	100
Man	datory Cours	e								
12	U23CEM606	Gender Equality	MC	2	0	0	0	100	-	100
							22	625	575	1200

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PROFESSIONAL ELECTIVE COURSES

Profess	sional Elective –	I (Offered in Semester IV)
SI. No.	Course Code	Course Title
1	U23CEE401	Composite Structures
2	U23CEE402	Environmental Law and Policy
3	U23CEE403	Building Services
4	U23CEE404	Remote Sensing and GIS
5	U23CEE405	Alternative Building Materials and Technologies
Profess	sional Elective –	II (Offered in Semester V)
SI. No.	Course Code	Course Title
1	U23CEE506	Advanced Design of RCC Structures
2	U23CEE507	Air and Noise Pollution
3	U23CEE508	Sustainable and Lean Construction
4	U23CEE509	Airport and Harbor Engineering
5	U23CEE510	Green Building Technology
Profess	sional Elective –	III (Offered in Semester VI)
SI. No.	Course Code	Course Title
1	U23CEE611	Advanced Structural Analysis
2	U23CEE612	Pollution Control and Monitoring
3	U23CEE613	Buildings Codes and Requirement
4	U23CEE614	Traffic engineering and Management
5	U23CEE615	Urban Planning and Development

Annexure – II OPEN ELECTIVE COURSES OFFERED BY CIVIL ENGINEERING

S. No	Course Code	Course Title
Open Ele	ective – I	
1	U23CEOC01	Energy and Environment
2	U23CEOC02	Energy Efficient Buildings
Open Ele	ective – II	
1	U23CEOC03	Disaster Management
2	U23CEOC04	Air Pollution and Solid Waste Management

Annexure -III

ABILITY ENHANCEMENT COURSES - CERTIFICATION COURSES

Semester	Course Code	R-2023 Course Title
I	U23CEC107	Autodesk AutoCAD - ACU
II	U23CEC248	Sketch Up
III	U23CEC360	Total Station
IV	U23CEC430	Fundamentals of Internet of Things
V	U23CEC511	Autodesk 3ds Max -ACU
VI	U23CEC656	MX Road

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Annexure - IV Skill Enhancement Courses

SI. No	Course Code	Course Title
		Skill Enhancement Course - I
1	1122055204	1) Basic Vasthu
'	U23CES301	2) Plane Table Surveying
		3) Auto level surveying
		Skill Enhancement Course - II
2	U23CES402	1) MS Office – Word, Excel, Power Point
2	U23CE34U2	2) Measurements and Conversion
		3) Traditional construction in modern age

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NPTEL COURSE LIST

SI.No.	List of Subjects
1	Geosynthetics and Reinforced Soil Structures
2	Principles of Construction Management
3	Introductory Field Structural Geology
4	Geotechnical Earthquake Engineering
5	Finite Element Method and Computational Structural Dynamics
6	Underground Space Technology
7	Environmental Chemistry
8	Sustainable Transportation Systems
9	Environmental Modeling and Simulation
10	Pavement Materials (Under Pavement Engineering)
11	Advanced Geomatics Engineering
12	Geometric Design of Highways
13	Plate Tectonics
14	Introduction to Engineering Seismology
15	Remote Sensing: Principles and Applications
16	Geotechnical Engineering - II
17	Environmental Geomechanics
18	Advanced Concrete Technology
19	Geotechnical Engineering Laboratory
20	Dynamics of Structures
21	Mechanics of Solids
22	Structural Geology
23	Reliability-Based Structural Design
24	River Engineering
25	Optimization Methods for Civil Engineering
26	Subsurface Exploration: Importance And Techniques Involved
27	Remote Sensing and GIS
28	Municipal Solid Waste Management
29	Fluid Mechanics
30	Bridge Engineering
31	Introduction to Multimodal Urban Transportation Systems (MUTS)
32	Rock Mechanics and Tunneling
33	Ground Improvement
34	Wastewater Treatment and Recycling
35	Sustainable Engineering Concepts and Life Cycle Analysis
36	Global Navigation Satellite Systems and Applications
37	Soil Mechanics/Geotechnical Engineering I
38	Railway Engineering
39	Geo Engineering
40	Earth Sciences for Civil Engineering Part - I & II
41	Foundation Engineering
42	Design Of Steel Structures

MOOC COURSE LIST

SI.No.	List of Subjects
1	Construction Project Management
2	Python fundamentals for beginners
3	Risk and safety in civil engineering
4	Energy literacy training
5	Architecture urban design
6	Autodesk certified professional: AutoCAD for Design and Drafting exam prep
7	Transportation, Sustainable Buildings, Green Construction
8	Al for everyone: Master the basics
9	Python Basics for Data Science
10	Introduction to Engineering Mechanics
11	Construction Project Management
12	Python fundamentals for beginners
13	Risk and safety in civil engineering
14	Energy literacy training
15	Architecture urban design
16	Autodesk certified professional: AutoCAD for Design and Drafting exam prep
17	Transportation, Sustainable Buildings, Green Construction
18	Al for everyone: Master the basics
19	Python Basics for Data Science
20	Introduction to Engineering Mechanics

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Department of Civil Engg Sri Manakula Vinayagar Engg. College Madagadipet, Puducherry, India

ANNEXURE III

	rtment	Civil E	ngineering	Progra	amme	: B.T e	ech.				
Seme	ester	VII		Cours PC	e Cate	egory	Code: End TE	Semester	Exam T	уре:	
Cours	e Code	U23CE	Г713	Perio	ds/We	ek	Credit	Maxi	mum Ma	arks	
Oodio				L	Τ	Р	С	CAM	ESE	TM	
Cours	se Name	Constru Manage	ction Technology and ment	3	0	0	3	25	75	100	
Prere	quisite	Constru	ction Techniques Equipmer	nt and Pra	ctice				····•		
		On com	pletion of the course, the st	udents wi	ll be a	ble to			BT Ma (Higi Lev	hest	
C	`auraa	CO1	Select and Operate Constru	ıction Equi	pment	t			K	2	
_	Course comes	CO2	Utilize Concreting and Mate	rial Proces	ssing E	Equipn	nent		K	2	
		CO3	Apply Construction Methods	s and Safe	ty Eng	jineeri	ng		K	K2	
		CO4	Understand Construction Pr	oject Man	ageme	ent			K	2	
		CO5	Analyze Cost and Resource Optimization							2	
UNIT	– I	CONST	TRUCTION EQUIPMENT				Perio	ds: 09	i		
			types of compaction rollers - F								
		ers - Grad equipmen	ers, scrapers, draglines, and o	clamshell b	oucket	s - Se	lection, ope	ration, an	d	CO1	
UNIT		CONC	RETING AND MATERIAL PR	OCESSIN	G		Perio	ds: 09		<u> </u>	
Cruchir	na nauinn	EQUIP	MENI r crushers, gyratory crushers, i	mnact crue	chore	Solo	ction and or	ooration o	f	CO2	
			ening of aggregates - Concre							COZ	
Consol	idation ar	nd finishin	g of concrete								
UNIT		<u>i</u>	TRUCTION METHODS AND S					ds: 09		T	
			methods - Piling and foundati lity control in construction proj							СОЗ	
constru		aco Qua	inty definition in definition dutient proj	coto care	iy ong	JII 10011	ng and nok	managen		000	
UNIT	– IV	CONST	TRUCTION PROJECT MANA	GEMENT			Perio	ds: 09			
		onetructio	n project management and its		- Qua	lities o	of a project	manager	_		
		, coordina	tion, scheduling, and monitorii	ng - Bar ch	narts a	nd mil		rts - Critic		CO4	
Method	d (CPM) -	, coordina Project E		ng - Bar ch lue (PERT	narts a)	nd mil	estone cha	rts - Critic		CO4	
Method UNIT Project	d (CPM) - – V : cost ana	, coordina Project E CO lysis and o	tion, scheduling, and monitoring valuation and Review Techniques of the control o	ng - Bar ch lue (PERT A GEMENT Im cost and	narts a) d optir	num re	Perio esources - I	ds: 09 Resource	al Path	CO4	
Method UNIT Project allocati	d (CPM) V cost ana on techni	, coordina Project E CO lysis and u ques - Co	tion, scheduling, and monitoring valuation and Review Techniques of the Control o	ng - Bar ch lue (PERT AGEMENT Im cost and mic consid	narts a) d optir	num re	Perio esources - I arthwork eq	ds: 09 Resource juipment -	al Path	CO4	
Method UNIT Project allocation and sel calcula	d (CPM) - V cost ana on techni lection cri tion	, coordina Project E CO lysis and u ques - Co	tion, scheduling, and monitoring valuation and Review Techniques of the control o	ng - Bar ch lue (PERT AGEMENT Im cost and mic consid	narts a) d optir	num re	Perio esources - I arthwork eq	ds: 09 Resource juipment -	al Path		
Method UNIT Project allocati and sel calcula Text B	d (CPM) V cost ana on techni lection cri tion ooks	, coordina Project E CO lysis and u ques - Co iteria - Tru	tion, scheduling, and monitoring valuation and Review Techniques of the Control o	ng - Bar ch lue (PERT AGEMENT Im cost and mic consid - rear dum	narts a) d optir leratio p truck	num rons - E	Perio esources - I arthwork equacities, and	d s: 09 Resource juipment - d producti	al Path - types on	CO5	
Method UNIT Project allocation and selection calculation Text Bottom 1.	cost ana cost ana on techni lection cri tion ooks	, coordina Project E CO lysis and u ques - Co iteria - Tru uction Plar	tion, scheduling, and monitoric valuation and Review Technique DST AND RESOURCE MANA updating - Crashing for optimus nstruction equipment – econocks and handling equipment – uning, Equipment and Methods	ng - Bar ch lue (PERT AGEMENT Im cost and mic consid - rear dum s' by Peurit	narts a) d optir leratio p truck	num rens - E	Perio esources - I arthwork equacities, and	rds: 09 Resource ruipment - d production	al Path types on ata Mcgr	CO5	
Method UNIT Project allocation and selection Calculation Text Both 1.	cost ana on techni lection crition ooks 'Constru	, coordina Project E CO lysis and u ques - Co iteria - Tru uction Plar	tion, scheduling, and monitoring valuation and Review Technique of the Control of	ng - Bar ch lue (PERT GEMENT Im cost and mic consider rear dump s' by Peurit Practice'by	narts a) d optir leratio p truck	num rens - E	Perio esources - I arthwork equacities, and exnayder, Seraj Jha (20	Resource quipment - d producti shapira, Ta	al Path - types on ata Mcgr	CO5	
Method UNIT Project allocati and sel calcula Text B 1. 2. 3.	cost ana cost ana con techni lection cri tion ooks 'Constru 'Constru	, coordina Project E CO lysis and u ques - Co iteria - Tru uction Plar uction Proj uction Tecl	tion, scheduling, and monitoric valuation and Review Technique DST AND RESOURCE MANA updating - Crashing for optimus nstruction equipment – econocks and handling equipment – uning, Equipment and Methods	ng - Bar ch lue (PERT GEMENT Im cost and mic consider rear dump s' by Peurit Practice'by	narts a) d optir leratio p truck	num rens - E	Perio esources - I arthwork equacities, and exnayder, Seraj Jha (20	Resource quipment - d producti shapira, Ta	al Path - types on ata Mcgr	CO5	
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Method UNIT Project allocation and selected alcula Text Borel 1. 2. 3. Refere 1.	cost analon technilection crition ooks 'Construt' 'Construt' 'Construt' 'Construt' 'Construt' 'Construt' 'Construt' 'Construt' 'Construt'	, coordina Project E CO lysis and u ques - Co iteria - Tru uction Plan uction Proj uction Tecl ks uction Proj	tion, scheduling, and monitoric valuation and Review Technique DST AND RESOURCE MANA updating - Crashing for optimus nstruction equipment – econocks and handling equipment – aning, Equipment and Methods ect Management Theory and I hnology' by Subir K. Sarkar arect Management - An Integrate	ng - Bar ch lue (PERT AGEMENT Im cost and mic considerear dump or rear dump or by Peurit Practice'by and Subhajit	narts a) d optir leratio p truck foy and Kuma Saras	mum rons - Exs., cap d Scholar Neelswati,	Perio esources - I arthwork equacities, and exnayder, Seraj Jha (20 Oxford Univ	Resource quipment - d production Shapira, Ta 11), Pears versity pre	al Path - types on ata Mcgr son. ess.	CO5	
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Method UNIT Project allocation and selected allocation allocation and selected allocation allocatio	cost analon technilection crition ooks 'Construt'	, coordina Project E CO lysis and u ques - Co iteria - Tru uction Proj uction Tecl ks uction Proj uction Proj uction Proj	tion, scheduling, and monitoric valuation and Review Technique DST AND RESOURCE MANA updating - Crashing for optimus nstruction equipment — econocks and handling equipment — ening, Equipment and Methods ect Management Theory and I hnology' by Subir K. Sarkar arect Management - An Integrating magement Emerging Trends are	ng - Bar ch lue (PERT AGEMENT Im cost and mic considerear dump or rear dump or by Peurit Practice'by and Subhajit	narts a) d optir leratio p truck foy and Kuma Saras	mum rons - Exs., cap d Scholar Neelswati,	Perio esources - I arthwork equacities, and exnayder, Seraj Jha (20 Oxford Univ	Resource quipment - d production Shapira, Ta 11), Pears versity pre	al Path - types on ata Mcgr son. ess.	CO5	
Method UNIT Project allocati and sel calcula Text Both 1. 2. 3. Refere 1. 2.	cost ana con techni lection cri tion coks 'Constru	, coordina Project E Co lysis and u ques - Co iteria - Tru uction Plan uction Tecl ks uction Proj uction Man es ptel.ac.in/	tion, scheduling, and monitoric valuation and Review Technique DST AND RESOURCE MANA updating - Crashing for optimus nstruction equipment – econocks and handling equipment – aning, Equipment and Methods ect Management Theory and I hnology' by Subir K. Sarkar arect Management - An Integrate	ng - Bar ch lue (PERT AGEMENT Im cost and mic considerear dump or rear dump or by Peurit Practice'by and Subhajit	narts a) d optir leratio p truck foy and Kuma Saras	mum rons - Exs., cap d Scholar Neelswati,	Perio esources - I arthwork equacities, and exnayder, Seraj Jha (20 Oxford Univ	Resource quipment - d production Shapira, Ta 11), Pears versity pre	al Path - types on ata Mcgr son. ess.	CO5	

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)											Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	3	3	2	-	-	-	-	-	-	3	3	3
CO2	3	3	2	3	3	2	-	-	-	-	-	-	3	3	3
CO3	3	3	2	3	3	2	-	-	-	-	-	-	3	3	3
CO4	3	3	2	3	3	2	-	-	-	-	1	-	3	3	3
CO5	3	2	2	3	3	2	-	-	-	-	-	-	3	3	3

Correlation Level: 1-Low, 2-Medium, 3- High

Evaluation Methods

		Conti	nuous Assess	End Samueter	Total		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

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	Civil E	ngineering	Progra	amme :	B.Tech.						
Semester	VII		Cours	e Categ	ory Code	e: PC End S	emester	Exam T	ype: TE		
Course	U23CE	T711	Per	iods/We	eek	Credit	Maxir	num Ma	ırks		
Code	02301	-1/17	L	Τ	Р	С	CAM	ESE	TM		
Course Name	Engine		3	0	0	3	25	75	100		
Prerequisite	Water	supply and Waste water Engineerin	ng								
	On completion of the course, the students will be able to Understand the hydrologic cycle, precipitation measurement, and infiltration										
Course	CO1	filtration	ration K2								
	CO2	effective	^{/e} K3								
Outcomes	соз	es, well	well K2								
	CO4	esource	source K3								
	CO5	engineering for efficient water mar Evaluate hydraulic structures, s watershed management technique	s, and K3								
UNIT- I	Hydro	logy and Precipitation			0011		Perio	ds: 09			
	<u>: </u>	es and measurement of precipitation	n, gauge ne	tworks,	average	depth of pred					
		curves, intensity duration curves - I			_		•		1		
		s, evaporation, transpiration – and ir					_				
UNIT II	Runo	ff and Streamflow					Perio	ds: 09			
Factors affec	ting rur	off, Hydrograph analysis – Unit h	ydrograph	theory	and ana	alysis, Space	distribut	ion and			
variability of rι	unoff, st	ream flow measurement - selection	of site, velo	ocity and	d dischar	ge measuren	nents – ba	ase flow	CO2		
separation me		flood routing (Muskingum method),	and reserv	oir routi	ng.						
UNIT III	<u>.</u>	ndwater Hydrology						ds: 09			
		ement of ground water - Permeab	•		-	•					
yield - Aquifer		neir types - Infiltration wells and Infi	-			ment of yield	l - Recupe	eration	CO3		
	a test —	Steady flow analysis only - Artificial				•					
	· v · · · · · · · · · · · · · · · · · · ·	Steady flow analysis only - Artificial		- Metho	ds.	,	-		ł		
UNIT IV	Wate	Resource Engineering & Irrigation	on				Perio	ds: 09	I		
UNIT IV Water demand drip – Crop w Reservoirs an	Water d and p rater red		on / – Irrigatio – Canal de	n metho	ods: surfa	ace, subsurfa nedy's and L	Perio ce, sprink acey's the	der, and eories –	CO4		
UNIT IV Water demand drip – Crop w Reservoirs an measures.	Water d and p rater red d stora	Resource Engineering & Irrigation Ianning – Irrigation and its necessity Indicated the recessity Resource of the recession of the recessity Resource of the recession of the recess	on / – Irrigatio – Canal de s of dams –	n metho	ods: surfa	ace, subsurfa nedy's and L	Perio ce, sprink acey's the odes, and	der, and eories – I control	CO4		
UNIT IV Water demanderip – Crop we Reservoirs and measures. UNIT V	Water d and p rater rec d stora	Resource Engineering & Irrigation lanning – Irrigation and its necessity puirement: duty, delta, base period ge structures – Types and functions aulic Structures & Water Conservatures & Water Conser	on / – Irrigatio – Canal de s of dams – ation	n metho esign us · Seepa	ods: surfa sing Keni ge analy:	ace, subsurfa nedy's and L sis, failure m	Perio ce, sprink acey's the odes, and	der, and eories – d control ds: 09	CO4		
UNIT IV Water demanderip — Crop we Reservoirs and measures. UNIT V Design and co	Water d and p rater rec d stora Hydra	Resource Engineering & Irrigation Idanning – Irrigation and its necessity Idanning – Irrigation Idan	on / – Irrigatio – Canal de s of dams – ation ays (types a	n methoesign us Seepa	ds: surfa ing Keni ge analy ctions), E	nce, subsurfa nedy's and L sis, failure m	Perio ce, sprink acey's the odes, and Perio ators and	kler, and eories – I control ds: 09 stilling	CO4		
UNIT IV Water demanderip — Crop we Reservoirs and measures. UNIT V Design and contains, Weirs	Water d and p rater rec d stora Hydra compone s and b	Resource Engineering & Irrigation lanning – Irrigation and its necessity quirement: duty, delta, base period ge structures – Types and functions aulic Structures & Water Conservents of hydraulic structures – Spillwaterrages – Design criteria and functions	on y – Irrigatio – Canal de s of dams – ation ays (types a	n methoresign us Seepa	ods: surfa sing Keni ge analy stions), E sinage w	nce, subsurfa nedy's and L sis, failure mo nergy dissipa rorks – Aquo	Perio ce, sprink acey's the odes, and Perio ators and educts, S	der, and eories – d control ds: 09 stilling Syphon	CO4		
UNIT IV Water demanderip — Crop we Reservoirs and measures. UNIT V Design and contains, Weirs aqueducts, C	Water d and p rater rec d storag Hydra Dmpone s and b anal es	Resource Engineering & Irrigation lanning – Irrigation and its necessity puirement: duty, delta, base period ge structures – Types and functions audic Structures & Water Conservents of hydraulic structures – Spillwaterrages – Design criteria and funcapes. Water conservation technic	on y — Irrigatio — Canal de s of dams — ation ays (types a nctions, Cr	n methorsesign use. Seepa	ods: surfa ing Keni ge analy ctions), E ninage w harvestir	nce, subsurfa nedy's and L sis, failure ma nergy dissipa vorks – Aquang, check da	Perio ce, sprink acey's the odes, and Perio ators and educts, S ms, perc	der, and eories – deories	CO4		
UNIT IV Water demanderip — Crop water demandering and measures. UNIT V Design and compassions, Weirstanks, contout	Water d and p rater rec d stora Hydra compone s and b anal es ur bund	Resource Engineering & Irrigation lanning – Irrigation and its necessity quirement: duty, delta, base period ge structures – Types and functions aulic Structures & Water Conservants of hydraulic structures – Spillwaterrages – Design criteria and functions water conservation technicing, and watershed management.	on y — Irrigatio — Canal de s of dams — ation ays (types a nctions, Cr	n methorsesign use. Seepa	ods: surfa ing Keni ge analy ctions), E ninage w harvestir	nce, subsurfa nedy's and L sis, failure ma nergy dissipa vorks – Aquang, check da	Perio ce, sprink acey's the odes, and Perio ators and educts, S ms, perc	der, and eories – deories	CO4		
UNIT IV Water demanderip — Crop water demandering and measures. UNIT V Design and compassions, Weirstanks, contout	Water d and p rater rec d stora Hydra ompone s and b anal es ur bund sustaina	Resource Engineering & Irrigation lanning – Irrigation and its necessity quirement: duty, delta, base period ge structures – Types and functions audic Structures & Water Conservents of hydraulic structures – Spillwaterrages – Design criteria and functions. Water conservation technical general and watershed management, ble water resource development.	on y – Irrigatio – Canal de s of dams – ation ays (types a nctions, Cr ques – Rai . Role of	n methorsesign use. Seepa	ods: surfa sing Keni ge analy stions), E sinage w harvestir al and	nce, subsurfa nedy's and L sis, failure ma nergy dissipa vorks – Aquang, check da	Perio ce, sprink acey's the odes, and Perio ators and educts, S ms, percer conser	der, and eories – deories	CO4		
UNIT IV Water demanderip — Crop water demanders and measures. UNIT V Design and combasins, Weirs aqueducts, Contous structures in second	Water d and p rater rec d stora Hydra ompone s and b anal es ur bund sustaina	Resource Engineering & Irrigation lanning – Irrigation and its necessity quirement: duty, delta, base period ge structures – Types and functions audic Structures & Water Conservents of hydraulic structures – Spillwaterrages – Design criteria and functions. Water conservation technical general and watershed management, ble water resource development.	on y – Irrigatio – Canal de s of dams – ation ays (types a nctions, Cr ques – Rai . Role of	n methorsesign us Seepa	ods: surfa sing Keni ge analy stions), E sinage w harvestir al and	nce, subsurfa nedy's and L sis, failure ma nergy dissipa vorks – Aquang, check da	Perio ce, sprink acey's the odes, and Perio ators and educts, S ms, percer conser	kler, and eories – I control ds: 09 stilling Syphon olation rvation	CO4		
UNIT IV Water demanderip — Crop we Reservoirs and measures. UNIT V Design and control basins, Weirs aqueducts, Contoustructures in secture Peters Text Books	Water d and p rater rec d storage Hydra compone s and b anal es ur bund sustaina	Resource Engineering & Irrigation lanning – Irrigation and its necessity quirement: duty, delta, base period ge structures – Types and functions audic Structures & Water Conservents of hydraulic structures – Spillwaterrages – Design criteria and functions. Water conservation technical general and watershed management, ble water resource development.	on y - Irrigatio - Canal desorber ation ays (types anctions, Craues - Rai . Role of	n methoresign use. Seepa	ods: surfa ing Keni ge analy stions), E ainage w harvestir al and	nce, subsurfa nedy's and L sis, failure mo nergy dissipa orks – Aquo ng, check da modern wate	Perio ce, sprink acey's the odes, and Perio ators and educts, S ms, perce er conser	kler, and eories – I control ds: 09 stilling Syphon olation rvation	CO4		
UNIT IV Water demanderip — Crop we Reservoirs and measures. UNIT V Design and control basins, Weirs aqueducts, Contout structures in secture Peters Books 1. Hydrology	Water d and prater record storage Hydra ompone s and b anal es ur bund sustaina eriods:	Resource Engineering & Irrigation lanning – Irrigation and its necessity quirement: duty, delta, base period ge structures – Types and functions aulic Structures & Water Conservants of hydraulic structures – Spillways arrages – Design criteria and functions. Water conservation technicing, and watershed management ble water resource development. Tutorial Periods: -	on y - Irrigatio - Canal desof dams - ation ays (types anctions, Cr ques - Rai . Role of Practions	n methoresign uses Seeparand functions drawater traditions the contractions at Periods the contractions the	eds: surfacing Kenige analystions), Estions), Estions where the transfer of transfer of the transfer of transfer o	nce, subsurfa nedy's and L sis, failure mo nergy dissipa vorks – Aquo ng, check da modern wate	Perio ce, sprink acey's the odes, and Perio ators and educts, S ms, percer consel Total	der, and eories – decrived decrived decriped dec	CO4		
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UNIT IV Water demandrip — Crop water demandrip — Crop water demandres. UNIT V Design and compassions, Weirs aqueducts, Contous tructures in same Lecture Peter Books 1. Hydrology 2. Engineerin 3. Applied Hyrigh Reference B	Water d and p rater rec d storag Hydra Dimpone s and b anal es ar bund sustaina eriods: and Wa g Hydro rdrology ooks	Resource Engineering & Irrigation lanning – Irrigation and its necessity quirement: duty, delta, base period ge structures – Types and functions audic Structures & Water Conservents of hydraulic structures – Spillways arrages – Design criteria and functions, and water shed management water resource development. Tutorial Periods: - ter Resources Engineerin by S.K. Colog by K. Subramanya, 4th Edition,	on y - Irrigatio - Canal design of dams - ation ays (types anctions, Crapues - Rai - Role of - Praction - Prac	n methorsesign uses Seepa and functions drawater traditions the control of the co	eds: surfacing Kenige analysistions), Edinage wharvestired and and 2011 by I by Tata	nce, subsurfa nedy's and L sis, failure mo nergy dissipa vorks – Aquo ng, check da modern wate Khanna Publi McGraw-Hill blished in 198	Perio ce, sprink acey's the odes, and Perio ators and educts, S ms, percer conser Total ishers. Education	der, and eories — decries	CO4		

2016 by McGraw-Hill Education.

- 3. Hydrology and Water Resource Systems Analysis by Maria A. Mimikou, Evangelos A. Baltas, Vassilios A. Tsihrintzis, and Haris Nakos, 1st Edition, published in 2016 by CRC Press.
- 4.Introduction to Water Engineering, Hydrology, and Irrigation" by Mohammad Albaji, 1st Edition, published in 2022 by CRC Press.
- 5. Water Resources Engineering by Ray K. Linsley, Joseph B. Franzini, David L. Freyberg, and George Tchobanoglous, 4th Edition, published in 1992 by McGraw-Hill.

Web References

- 1. https://www.youtube.com/watch?v=iohKd5FWZ74
- 2. https://www.youtube.com/watch?v=0TjTz-HsPjs
- 3. https://www.youtube.com/watch?v=0uJpsuRbfUo

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
1	2	2	1	3	2	-	-	-	-	-	-	1	3	1	2	
2	2	3	1	2	2	-	-	-	-	-	-	1	3	1	-	
3	3	3	3	2	2	-	-	-	-	-	-	1	2	3	-	
4	3	3	2	2	3	-	-	-	-	-	-	1	2	2	3	
5	3	3	2	2	3	-	-	-	-	-	-	1	1	2	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	End Semester	Total			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks	
Marks	5	5	5	5	5	75	100	

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z..
Professor & Head

Bepartment of Civil Engg Sri Manakula Vinayagar Engg. Cellege Madagadipet, Puducherry, India

Course Code Course Name	VII U23CE		Cours	- 0-4		- BA -						
Code Course Name	U23CE		Course Category Code: PC End Semester Exam Ty									
Code Course Name	U23CE	-T-4 <i>-</i>		iods/W		Credit	···;······	ximum Ma				
Name		=1 / 15	L	Т	Р	С	CAM	ESE	TM			
D		ricated Structures	3	0	0	3	25	75	100			
Prerequisite	Const	ruction Technology and Managem	nent									
	On c	ompletion of the course, the stu	dents will b	e able	to			(Hi	apping ghest evel)			
:	CO1 Gain knowledge of maintenance and various assessment techniques											
	CO2	Understand the methods of non-	destructive te	esting s	ystems			K2				
Outcomes	CO3	Understand the types and propert	ies of repair	materia	al			K2				
•	CO4 Understand the corrosion and damaged structures											
	CO5	Gain knowledge of strengthening	of structures						K3			
i		DDUCTION					Per	iods: 09				
<u></u>		on – Principles – Materials – Modu	ılar coordina	tion – S	tandariz	ation – Syst			- 004			
Transportation		•				,			CO1			
UNIT II	PREF	ABRICATED COMPONENTS					Per	iods: 09	<u>t</u>			
3ehaviour of st	ructura	al components – Large panel const	tructions – Co	onstruc	tion of ro	of and floor	slabs – W	/all panels	S CO2			
- Columns - S	hear w	/alls							COZ			
UNIT III	DESI	GN PRINCIPLES					Per	iods: 09				
Disuniting of s	tructur	es – Design of cross section bas	sed on efficie	ency of	materia	l used – Pr	oblems i	n design	CO3			
pecause of join	nt flexib	oility – Allowance for joint deforma	tion.						603			
UNIT IV	JOIN	IN STRUCTURAL MEMBERS					Per	iods: 09				
Joints for diffe	rent st	ructural connections – Dimensions	s and detailin	ıg – De	sign of e	xpansion jo	ints		CO4			
		GN FOR ABNORMAL LOADS										
		 Code provisions – Equivalent 				ng abnorma	l effects	such as	CO5			
		s, etc., – Importance of avoidance					7					
Lecture Per	iods:	45 Tutorial Periods: -	Practio	al Peri	ods: -		Tota	al Period	s: 45			
Text Books												
	m I. M	odi and Chirag N. Patel, "Repair	and Rehabil	itation (of concre	ete structure	es", PHI L	_earning	Pvt. Ltd.			
2015. 2. P.C.Va	rahoc	e, "Maintenance, Repair & Rehabi	litation & Mir	or Wor	ks of Ru	ildinge" D⊔	LLograina	Dut Itd	2014			
		naidi, Robin Kalfat, "Rehabilitation										
Deans			i di Conciett	Soliuci	luies wii	.11 1 1001-1701	illorceu r	Olyllici ,	Mathrey			
Reference Bo												
		S.C. Edwards, and J.D.N. Sha	aw, "The R	epair o	f Concr	ete Structu	res", Bla	ckie Aca	demic 8			
Profes												
		va-Araya. Oladis T. De Rincon an		arada C)'Neill, "l	Repair and	Rehabilia	tion of Re	einforced			
		uctures", ASCE Publications, 1997		uoturo!	Dobobil	itation of O	d buildis -	o" Carin	nor 201			
		, Joao Miranda Guedes, Humberto							-			
		a,"Repair, Rehabiliation and Mai , American Concrete Institute, 200		COHCIC	ste Ottu	ciures, and	mnovado	nis iii de	sign and			
		r, "Concrete Durability", CRC Pres										
Web Reference		-										
1. <u>https://</u>	nptel.a	ac.in/courses/105/106/105106202/	-									
2. <u>https://onlir</u>	nelibra	ry.wiley.com/doi/abs/10.1002/pse.	<u>140</u>									
3. https://onlir	nelibra	ry.wiley.com/doi/abs/10.1002/9780	0470015902	.a00214	403.pub	<u>2</u>						

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3		
1	3	2	3	2	1	2	-	-	-	-	-	-	2	3	3		
2	3	2	3	3	1	2	-	-	-	-	-	-	2	3	3		
3	3	3	3	3	1	2	-	-	-	-	-	-	2	3	3		
4	3	3	3	3	1	2	-	-	-	-	-	-	2	3	3		
5	3	3	3	3	1	2	-	-	-	-	-	-	2	3	3		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Somostor	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z..

Department	Civil I	Engineering	Programme : B.Tech.									
Semester	VII		Course	e Categ	ory Code	e: PC End	Semeste	r Exam T	ype: LE			
Course	11230	EP710	Per	iods/We	eek	Maximum Marks						
Code	0230	EF / IV	L	Т	Р	С	CAM	ESE	TM			
Course Name	Simula	ation Software Laboratory (Ansys)	3	0	0	3	25	75	100			
	On c		BT Mapping (Highest Level)									
	CO1	MATLAB to solve simple problems in	vibratior	1				K4				
Course	CO2	Analyze the structural components us		K5								
Outcomes	CO3	Analysis using link elements in Trusses, cables							5			
	CO4	Vibration analysis of spring-mass sys		K3								
	CO5	Model analysis of beams							3			

A. Simulation

- 1. MAT LAB basics, dealing with matrices, Graphing-functions of one variable and two variables
- 2. Use of MATLAB to solve simple problems in vibration
- 3. Mechanism Simulation using multi body dynamic software

B. Analysis

- 1. Force and stress analysis using link elements in Trusses, cables etc.
- 2. Stress and deflection analysis in beams with different support conditions.
 - (i) Shear force and Bending Moment diagram of simply supported beam with Point Load
 - (ii) Shear force and Bending Moment diagram of cantilever beam with end point load
- 3. Stress analysis of flat plates and simple shells.
- 4. Vibration analysis of spring-mass systems.
- 5. Model analysis of beams.
- Fixed and Free Column Buckling Analysis

Lecture Periods: 30	Tutorial Periods: -	Practical Periods: -	Total Periods: 30
Web References			
1. https://www.youtub	e.com/watch?v=xK1B61Xfq0	<u>QU</u>	
2. https://www.youtuk	oe.com/watch?v=VKRGtG_h	pig	

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)													ecific 'SOs)
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12												PSO2	PSO3
1	2	3	3	1	1	-	-	-	-	-	-	-	3	3	3
2	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3
3	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3
4	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3
5	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Dr.S. SUNDARARAMAN, M. Tech., Ph. ... Professer & Head Department of Civil Engs
Sri Manakula Vinayagar Engg. Cellege
Madagadipet, Puducherry, India

Department	Civil Engineering	Programme: B.Tech.									
Semester	VII	Course Category Code: PC End Semester Exam Type: LI									
Course	U23CEP711	Pe	riods/W	eek	Credit	Maximum Marks					
Code		L	Т	Р	С	CAM	ESE	TM			
Course Name	Estimation Costing and Valuation Engineering	3	0	0	3	25	75	100			

Prerequisite	Wate	r supply and Waste water Engineering							
	On c	completion of the course, the students will be able to	BT Mapping (Highest Level)						
	CO1	Measure and estimate various elements in Civil Engineering works (K2)							
Course	CO2	Prepare Detailed Estimate for a given building (K3)	K3						
Outcomes	CO3	Rate analysis for different types of works (K2)	K2						
	CO4	Estimate the material quantities, prepare a bill of quantities and tender documents of project (K2)	K2						
	CO5	Prepare value estimates and report for a residential building. (K3)	К3						

LIST OF EXPERIMENTS

- 1. Introduction about Estimation, Costing and Valuation
- 2. To prepare a detailed and abstract estimate of Single roomed building for substructure (Load Bearing Structure)
 - a. Earthwork Excavation for foundations
 - b. P. C. C. (1:4:8) for foundations
 - c. Brick Masonry in CM (1:5) for foundation and basement
 - d. River sand filling for basement
 - e. Plinth beam
- To prepare a detailed and abstract estimate of Single roomed building for superstructure (Load Bearing Structure)
 - a. Brick Masonry in CM (1:6) for superstructure
 - b. R.C.C (1:2:4) for lintels, beams etc.
 - c. R.C.C (1:2:4) for slabs
 - d. Cement concrete (1:5:10) flooring
 - e. Flooring with mosaic tiles
 - f. Plastering with CM (1:6) for superstructure
 - g. Plastering with CM (1:5) for ceiling
 - h. White washing with two coats
 - i. Color washing with two coats
 - j. Supply and fixing of doors and windows
- 4. To prepare a detailed and abstract Estimate of Single storied Residential Building (Framed Structure)
- 5. Estimate of Septic tank with Soak pit
- 6. Estimate of Isolated column and Footing
- 7. Estimate of Box Culvert
- Estimate of Underground Rectangular Water Tank
- 9. Estimation of Bar bending schedule
- 10. Analysis of Rates
- 11. Valuation

<u> </u>		·	
Lecture Periods: 30	Tutorial Periods: -	Practical Periods: -	Total Periods: 30

Reference Books

- 1. D.D Kohli and R.C Kohli, "A Text Book of Estimating and Costing (Civil)", S. Chand and Company Ltd., 2013
- 2. V. N. Vazirani, S. P. Chandola, Civil Engineering Estimating, Costing & Valuation, Khanna Publishers, 1968
- 3. Rangwala, Estimation, Costing and Valuation, Charotar Publishing house Pvt Ltd, 17th Edition, 2017
- 4. S.P. Mahajan, Sanjay Mahajan, Quantity Surveying and Valuation book, Tech India Publication series, 2017 Govt of Tamil Nadu PWD "Standard Schedule of Rates", 2017-18

- 1. https://mis.wbprd.gov.in/Engineering/Document/BoxCulvertorMinorBridgeSampleEstimate.pdf
- 2. https://www.cphbooks.in/product/estimating-costing-and-valuation/
- 3. https://www.flipkart.com/estimating-costing-civil-engineering-theory-practice-including-specification-valuation

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)											Program Specific Outcomes (PSOs)				
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12										PO12	PSO1	PSO2	PSO3		
1	2	3	3	1	1	-	-	-	-	-	-	-	3	3	3		
2	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3		
3	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3		
4	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3		
5	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3		

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Dr.S. SUNDARARAMAN, M.Tech., Ph.z.. Professor & Head

Department	Civil I	ngineering Programme: B.Tech.											
Semester	VII		Cours	e Categ	jory Cod	e: PC End	Semeste	r Exam T	ype: LE				
Course	LIOSC	EP712	Pe	riods/W	eek	Credit	Max	Maximum Marks					
Code	UZSC	-EF / 12	L	Т	Р	С	CAM	ESE	TM				
Course Name	Mode	ling and Analysis Laboratory	3	0	0	3	25	75	100				
Prerequisite	Prerequisite Water supply and Waste water Engineering												
	On co	ompletion of the course, the students	e to				BT Mapping (Highest Leve						
	CO1	Demonstrate the basic features of a	K3										
Course	CO2	Analyze the structure using E-TABS	software					ŀ	(3				
Outcomes	es CO3 Design the structure using E-TABS software												
	CO4	Performing analysis and interpretation		K3									
	CO5	Students would have gained knowledge on the usage of the software											

LIST OF EXPERIMENTS

- 1. Introduction to Structural Analysis and Design using ETABS
- 2. Introduction to various commands of ETABS and their applications in detail.
- 3. Analysis and Design of Trusses
- 4. Analysis and Design of continuous beams with fixed at both ends
- 5. Analysis and Design of continuous beams with simply supported at both ends
- 6. Analysis and Design of Plane Frames
- 7. Modeling Analysis and Design of G+1 Story building
- 8. Modeling and Analysis of G+5 Story building
- 9. Analysis and Design of 2D Reinforced Concrete Frame
- 10. Seismic Analysis and Design of 10 Story RC building

Software Required

ETABS

Lecture Periods: 30	Tutorial Periods: -	Practical Periods: -	Total Periods: 30

Reference Books

- 1. D.D Kohli and R.C Kohli, "A Text Book of Estimating and Costing (Civil)", S. Chand and Company Ltd., 2013
- 2. V. N. Vazirani, S. P. Chandola, Civil Engineering Estimating, Costing & Valuation, Khanna Publishers, 1968
- 3. Rangwala, Estimation, Costing and Valuation, Charotar Publishing house Pvt Ltd, 17th Edition, 2017
- 4. S.P. Mahajan, Sanjay Mahajan, Quantity Surveying and Valuation book, Tech India Publication series, 2017 Govt of Tamil Nadu PWD "Standard Schedule of Rates", 2017-18

Web References

- 1. https://mis.wbprd.gov.in/Engineering/Document/BoxCulvertorMinorBridgeSampleEstimate.pdf
- 2. https://www.cphbooks.in/product/estimating-costing-and-valuation/
- 3. https://www.flipkart.com/estimating-costing-civil-engineering-theory-practice-including-specification-valuation

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)													ecific 'SOs)
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	3	3	1	1	-	-	-	-	-	-	-	3	3	3
2	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3
3	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3
4	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3
5	3	3	3	2	1	-	-	-	-	-	-	-	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Dr.S. SUNDARARAMAN, M.Tech., Pa.s...
Professor & Head
Department of Civil Engs
Sri Manakula Vinayagar Engg. College
Madagadipet, Puducherry, India

Department	Civil Engineering	Engineering Programme: B. Tech.							
Semester	VII	Course Category Code: PA *End Semester Exam Typ						Exam Type: -	
Course	U23CEW703	Pe	riods / \	Maximum Marks					
Code	U23CEVV/U3	L	Т	Р	2	CAM	ESE	TM	
Course Name	Project Phase II	0	0	4		50	50	100	
Prerequisite									
	On completion of the course	e, the students wi	ll be ab	le to				BT Mapping (Highest Level)	

Project work may be assigned to a group of students not exceeding 4 per group, under the supervision of project supervisor(s). Each student batch shall be required to undertake a suitable project in industry / research organization / department in consultation with the Head of the Department and the supervisor. A student shall register for the Project Phase I and II in 7th and 8th semester respectively. The project team and the project title can be decided in the 6th semester itself.

Choose the proper Methodology as per the requirement of the project.

Identify the problem statement for the project work through the literature survey

K2

K2

Criteria for Assessment of Project Work

CO1

CO2

Course

Outcomes

- Interim project report shall be submitted before the project review with the approval of the supervisor. The Project Report prepared according to the approved guidelines and duly signed by the supervisor and the Head of the Department shall be submitted as per the timeline announced by the department.
- The End Semester Examination for the project work shall consist of an evaluation of the final project report by an
 external examiner, followed by a viva-voce examination conducted by a committee consisting of the external examiner
 and an internal examiner. The Controller of Examinations (CoE) shall appoint Internal and External Examiners for the
 End Semester Examination of the Project Work. Internal Evaluation 50 Marks and External Evaluation 50 marks.

Evaluation Method

SI. No		Description		Weightage
1	Continuous Assessmer	nt Marks		
	Daviou 4	Review Committee#	10	15
а	Review 1	Supervisor	5	15
h	Daview 2	Review Committee#		45
b	Review 2	Supervisor	5	15
	Review 3	15	20	
С	Review 3	Supervisor	5	20
		·	Total CAM	50
2	End Semester Marks			
а	Evaluation of Phase I	Report	15	50
	report and Viva-voce	Presentation and Viva	20	30
		Demonstration	15	
			Total ESM	50
	<u> </u>		Total Marks	100

Lecture Periods: - Tutorial Periods: - Practical Periods: 60 Total Periods: 60

Dr.S. SUNDARARAMAN, M.Tech., Pa.s...
Professor & Head
Department of Civil Engg
Sri Manakula Vinayagar Engg. Cellege
Madagadipet, Puducherry, India

Department	Civil Engineering Programme: B. Tech.								
Semester	VII	Course Category Code: PA *End Semester Exam						xam Type: -	
Course	HOOCEWZO4	Pe	eriods / \	Neek	Maximum Marks				
Code	U23CEW704	L	Т	Р	С	CAM	ESE	TM	
Course Name	Internship / Implant Training	0	0	2	1	100	-	100	
		CIVIL					······································		
Prerequisite	Civil Engineering, C Programming)							
Course Outcomes	On completion of the course, the		BT Mapping lighest Level)						

The student is required to undergo 'internship' in industry / research laboratory / higher learning institution for a minimum period of 4 weeks during vacations and shall complete the internship before the completion of 7th semester.

- (i) The internship carries 1 credit.
- (ii) Each spell of internship shall be for a period not less than 2 weeks.
- (iii) The main purpose of internship is to enhance the general professional outlook and capability of the student to advance his/her chances of improving the career opportunities. The student should get prior approval from the Head of the Department and Training and Placement cell in the college before undertaking the internship and need to submit a detailed report after completion for the purpose of assessment. The internship marks will be given in 7th semester mark sheet.

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 200	Total Periods: 200

Dr.S. SUNDARARAMAN, M.Tech., Ph.z..
Professor & Head

\$	Civil I	Engineerii	ng		Progra	amme :	B.Te	ech.						
Semester	VIII				Course Category Code: PC End Semester Exam Typ								Type: TE	
Course		OTO00			Pe	riods/W	/eek		Cre		,	/larks		
Code	U23H	STC03			L	Т	···•	Р	(CAM	ESE	TM	
Course Name	•	reneursh Jement	ip and Busir	ness	3	0	(0		3	25	75	100	
Prerequisite	-													
	On c	ompletio	n of the cou	se, the stude	ents will b	e able	to						lapping est Level)	
	CO1	Examine	the types and	d importance o	of entrepre	eneursh	nip						K4	
Course	CO2	Demonsti	ate about Sn	nall Scale Ent	terprise								K2	
Outcomes	CO3	Analyse v	arious entre	oreneurial opp	ortunities								K4	
												K5		
	1.												K6	
UNIT- I	CO5 Elaborate on Women Entrepreneurship and Rural Entrepreneurship Introduction to Entrepreneurship Periods:											<u>i</u>		
Entrepreneur			<u> </u>		e of Entre	enrenei	ırshiı	n- Fr	trepre	neur	<u>i</u>			
Characteristic		•	•			•					•			
Growth and R	٠.			•		•					•	•	-,	
UNIT II			-	s Idea for Mi	-							riods: 10	<u> </u>)	
Sources of Ne										ion –	Types -	- Definitio	on	
& Classificati				•				•						
Establishing E	Evaluati	on Criteria	a - Micro and	Small-Scale	Enterprise	: Definit	tion,	Char	acteri	stics -	Steps i	nvolved	to CO2	
start SSE - Pr	roblems	of SSE			·									
UNIT III	Form	ulation of											i	
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COs/POs/PSOs Mapping

COs		Program Outcomes (POs)											Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	3	2	1	-	-	-	-	-	-	-	3	3	3
2	3	1	2	1	2	-	-	-	-	-	-	-	3	3	3
3	2	2	3	2	3	-	-	-	-	-	-	-	3	3	3
4	2	1	3	1	3	-	-	-	-	-	-	-	3	3	3
5	2	-	3	2	2	-	-	-	-	-	-	-	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

	Continu	ious Ass	essment	Marks (CAM)		End Semester	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	10	25	5	100*	100

Dr.S. SUNDARARAMAN, M.Tech., Ph.z.. Professor & Head

Department	Civil E	ingineering	Prog	ramme:	B. Tec	h.			
Semester	VII		Cour	se Cate	emester	ster Exam Type: -			
Course	LIOOOI	-1M702	Pe	riods / V	Veek	Credit	Maximum Marks		
Code	UZ3CE	EW703	L	Т	Р	С	CAM	ESE	TM
Course Name	Projec	et Phase II	0	0	4	2	50	50	100
Prerequisite			······································					•	
	On c	ompletion of the course, the st	tudents wi	l be ab	le to			(BT Mapping (Highest Level)
Course Outcomes	CO1	Take up any challenging practical problems and find solution by formulating proper methodology K2							
	CO2	To arrive at the conclusions of the findings from the project.							

Project work may be assigned to a group of students not exceeding 4 per group, under the supervision of project supervisor(s). Each student batch shall be required to undertake a suitable project in industry / research organization / department in consultation with the Head of the Department and the supervisor. A student shall register for the Project Phase II in 8th semester. The project team and the project title can be decided in the 6th semester itself.

Criteria for Assessment of Project Work

- Interim project report shall be submitted before the project review with the approval of the supervisor. The Project Report prepared according to the approved guidelines and duly signed by the supervisor and the Head of the Department shall be submitted as per the timeline announced by the department.
- The End Semester Examination for the project work shall consist of an evaluation of the final project report by an
 external examiner, followed by a viva-voce examination conducted by a committee consisting of the external examiner
 and an internal examiner. The Controller of Examinations (CoE) shall appoint Internal and External Examiners for the
 End Semester Examination of the Project Work. Internal Evaluation 50 Marks and External Evaluation 50 marks.

Evaluation Method

SI. No		Description		Weightage
1	Continuous Assessment	Marks	•	
	Review 1	Review Committee#	10	15
а	Review I	Supervisor	5	13
b	Review 2	Review Committee#	10	15
D	Review 2	5	15	
С	Doviou 2	Review Committee#	15	20
C	Review 3 Supervisor		5	20
			Total CAM	50
2	End Semester Marks			
	Evaluation of final report	Report	20	
a	and Viva-voce	Presentation and Viva	40	80
	and viva vocc	Demonstration	20	
b	Expected Outcome from	Publication / communication of p	apers /	20
U	the project ##	prototypes/ patents etc		20
			Total ESM	100
	-	1	otal Marks	150**

Review committee consists of internal faculty members nominated by the Head of the Department. The Supervisor of the student being examined shall not be part of the committee.

Expected outcome from the project, in terns of paper publication, patents, product development and industry projects shall be awarded based on the document proof submitted by the student concerned

** To be weighted for 100 marks

Lecture Periods: - Tutorial Periods: - Practical Periods: 200 Total Periods: 200

Dr.S. SUNDARARAMAN, M.Tech., Ph.S.
Professor & Head
Department of Civil Engs
Sri Manakula Vinayagar Engs, Cellege
Madanadipet, Puducherry, India

Professional Elective - IV

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Department	Civil E	ingineeri:	ng	Program	nme: B.1	Tech.						
Semester	VII			Course	Categor	y Code: I	PE End	Semeste	r Exam T	ype: TE		
Course	U23CE	:E716		Perio	ds/Weel	k	Credit	Max	kimum Ma	ırks		
Code	UZJCL	,L / 10		L	Т	Р	С	CAM	ESE	TM		
Course	Structi	ural Hoalf	th Monitoring	3	0	0	3	25	75	100		
Name	Structi	Ji ai i icait	un Monitoring	J		U	3	25		100		
	1											
Prerequisite												
	On c	ompletio	n of the course, the s	tudents will b	e able t	to			BT Ma (Highes	pping t Level)		
	CO1	Able to m	nodel the structure to ur	nderstand the	behavio	ur			K	4		
Course	CO2	Understa	nding the type of senso	ors and its dat	a acquis	ition sys	tem		K	4		
Outcomes												
	CO3 Understanding the structural monitoring system for the condition assessment K CO4 Analyse the data procured and its interpretation											
	CO4 Analyse the data procured and its interpretation CO5 Able to conduct investigations to both new and aged structures											
UNIT- I		<u> </u>	. MODELLING AND FI					Per	iods: 09	4		
			lling and Finite Elemer				nge and coll	<u>:</u>				
			odelling, theoretical pre		_		igo ana con	apoo boi	iavioai oi	CO1		
UNIT- II			STEMS, SENSORS AN				TEMS	Per	iods: 09	<u> </u>		
	1	-	s and Data Acquisition					i		Ţ		
	_	-	transforms, modelling	-	-							
-		•	nethods for data acqu	•						CO2		
		•	ultrasonic sensors, pie	-				•	-	302		
			ues, imaging technique		J.10010 G	ina aotac	11010, 11010	puo oone	oro arra			
UNIT - III		-	SYSTEMS					Per	iods: 09	<u> </u>		
	<u> </u>		ic Techniques: Vibratio	n signature ar	alvsis. r	nodal an	alvsis, neur					
	_	-	ntegrated Health Moni	-	-		-					
			on techniques, extraction	• •		_		-	-	CO3		
			•	JII OI ICALUICS		casurciii	ents, trainir	ig and si		1		
UNIT - IV			ist algorithms for anom					-				
_	<u>:</u>	RMATION	ist algorithms for anom N TECHNOLOGY FOR	aly detection,	multiple	damage		and case				
	n Techr		N TECHNOLOGY FOR	aly detection, HEALTH MO	multiple NITORI	damage NG	detection,	and case	studies. iods: 09			
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- 1. https://www.nde-ed.org
- 2. https://www.nist.gov
- 3. https://www.techno-press.org/?journal=sss

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)										Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
2	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
3	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
4	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
5	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z... Professor & Head

Department	Civil E	ingineering	Progra	amme: I	B.Tech.				
Semester	VII		Cours	e Categ	ory Code	: PE E	nd Seme	ster Exam	Туре: ТЕ
Course	U23CE	E717	Pe	riods/W	· · · · · · · · · · · · · · · · · · ·	Cred		1aximum M	larks
Code			L	Т	Р	С	CAN	l ESE	TM
Course Name	Munici	pal Solid Waste Management	3	0	0	3	25	75	100
Prerequisite									
	On c	ompletion of the course, the stude	nts will b	e able	to				apping est Level)
	CO1	Understand the nature and character	istics of r	nunicipa	al solid wa	astes.			K4
Course	CO2	Understand the concept of reduction,	reuse ar	nd recyc	ling of wa	iste.			K2
Outcomes	соз	Plan and design systems for storage, of municipal solid Waste	collectio	n, trans	port, proc	essing a	and dispos	sal	K3
	CO4	Understand the issues on solid waste	e manage	ment fr	om an int	egrated	source		K4
	CO5	Design and operate sanitary landfill							K3
UNIT- I	00111	RCES AND CHARACTERISTICS						eriods: 09	
integrated UNIT- II Waste Mar storage me and econor	Municip SOUF nagementhods - thods - mic as	ent rules (2016) -Role of public and pal Solid Waste Management Plan. RCE REDUCTION, WASTE STORAGE ent Hierarchy –3R-Reduction, Reuse - Effect of storage, materials used for opects of open storage – case studies a solition wastes.	SE AND F and Rec	RECYCI ycling - s - segre	LING source re egation of	eductior	Po of waste	eriods: 09 - On-site	CO2
UNIT - III	COLL	ECTION AND TRANSFER OF WAS	TES				Р	eriods: 09	<u>.</u>
– Analysis	of wast	ential and commercial waste collection e collection systems; Transfer station – Field problems- solving				•			1
UNIT - IV	PROC	CESSING OF WASTES					P	eriods: 09	
• ,	e -com	ste processing – Physical Processing posting and biomethanation; Therm						-	
UNIT - V	WAS	TE DISPOSAL					Р	eriods:09	
•		solid waste- Sanitary landfills – site anagement of leachate and landfill gas		•			-		CO5
Lecture Pe	riods:	45 Tutorial Periods: -	Practio	al Peri	ods: -		Т	otal Period	ds: 45
Text Books									

- 1. William A. Worrell, P. AarneVesilind (2012) Solid Waste Engineering, Cengage Learning, 2012.
- 2. John Pitchel (2014), Waste Management Practices-Municipal, Hazardous and industrial CRC Press, Taylor and Francis, New York.
- 3. George Tchobanoglouset.al., "Integrated Solid Waste Management", McGraw-Hill Publishers, 1993.
- 4. B.Bilitewski, G.HardHe, K.Marek, A.Weissbach, and H.Boeddicker, "Waste Management", Springer, 1994

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- 1. CPHEEO (2014), "Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization. Government of India, New Delhi.
- 2. George Tchobanoglous and FrankKreith (2002). Handbook of Solid waste management, McGraw Hill, New York.
- Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 2000
- 4. R.E.Landreth and P.A.Rebers, "Municipal Solid Wastes problems and Solutions", Lewis Publishers, 1997.
- 5. CPHEEO (2014), "Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization. Government of India, New Delhi.

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- 1. https://nptel.ac.in/courses/120108005/
- 2. http://cpheeo.gov.in/upload/uploadfiles/files/Part1
- 3. https://nptel.ac.in/content/storage2/courses/104103022

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)					ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	2	3	3	3	3	3	3	2	3	3	3	3	2
2	3	3	2	3	3	3	3	2	3	2	2	3	3	3	3
3	3	3	3	2	2	2	3	3	3	3	2	3	3	3	2
4	2	3	2	3	2	3	2	3	3	2	2	3	3	3	3
5	3	3	3	2	3	3	3	3	3	2	3	3	3	3	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	M)	End Semester	Total		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination Marks (ESE) Marks			
Marks	5	5	5	5	5	75	100		

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.a...
Professor & Head

	Civil	Engineering	Progra	amme	e: B. 1	Tech.			
Semester	VII		Course Code: I		gory	*En TE		ster Exa	m Type:
			Period	ds / W	/eek	Credit	Ма	ıximum N	Marks
Course Code	U230	CEE718	L	Т	Р	С	CAM	ESE	TM
Course Name		ity Control and Assurance onstruction	3	0	0	3	25	75	100
Prerequisite	-Nil-							· · · · · · · · · · · · · · · · · · ·	
Course	On c	ompletion of the course, the	e studei	nts w	ill be	able to	0	(H	//apping ighest evel)
Outcome	CO1	Achieve the knowledge of qu quality circles.	ality ma	nagei	ment	guidelii	nes, and		K2
	CO2	Apply the quality standard	ds for	prepa	ring	Quality	/ systei	m	K2
		documents.							
	CO3	Explain the skill of preparing	inspecti	on pr	oced	ures for	quality		K2
		planning.							
	CO4	Select the techniques and to		Qualit	y Ass	surance	and		K2
	COS	Control in Construction Indus Achieve knowledge of quality		emen	t tecl	nniques			K2
UNIT-I	i	LITY MANAGEMENT	IIIpiov	CITIOII	······································	Periods			114
		itions and objectives – Dim	ensions	of o				luencino	1
		- Responsibilities and authori							
Process - Qual	ity pla	n – Quality Management Guid	delines -	- Qua	lity c	ircles.			
UNIT-II		LITY SYSTEMS				Periods			
		of standards - Quality system		ard –	ISO 9	9000 far	milv of s	tandards	CO2
- Redillizamon	TC		~			. 124			
		Preparing Quality System [lated tr	aining –	
Implementing a	a Qual	ity system – Third-party Certif			ssion	Norms	lated tr – BS N	aining –	
Implementing a UNIT-III	Qual	ity system – Third-party Certif LITY PLANNING	ication -	- Emi	ssion F	Norms Periods	lated tr - BS N : 09	aining – orms.	-
UNIT-III Quality Policy, 0 Ergonomics - T	QUAl QUA Objectime of	ity system – Third-party Certif LITY PLANNING tives and methods in the Cons Completion - Statistical tolera	ication - struction nce – Ta	- Emi indus aguch	ssion F stry - ni's co	Norms Periods Consur Oncept o	lated tr - BS N : 09 ners sati	aining – orms. sfaction – Codes	, CO3
UNIT-III Quality Policy, Cergonomics - Tend Standards	a Qual QUA Objectime of S - [ity system – Third-party Certif LITY PLANNING tives and methods in the Cons Completion - Statistical tolera Occuments – Contract and	ication - struction nce – Ta constru	indus	ssion F stry - ni's co prog	Norms Periods Consur Pncept of	lated training and the second training to the second training to the second training to the second training to the second training trainin	aining – orms. sfaction – Codes	, CO3
Implementing a UNIT-III Quality Policy, Gergonomics - T and Standards procedures - P	QUAL QUA Objectime of S — E rocess	ity system – Third-party Certif LITY PLANNING tives and methods in the Constitutes and methods in the Constitutes and toleration - Statistical tolerations of Completion - Contract and the ses and products – Total QA /	ication - struction nce – Ta constru QC pro	indus aguch ction gram	ssion f stry - ni's co proo me a	Norms Periods Consur Procept of Grammin Cost	lated tr. – BS N : 09 ners sati f quality ng – In implicat	aining – orms. sfaction – Codes	, CO3
Implementing a UNIT-III Quality Policy, Gergonomics - T and Standards procedures - P UNIT-IV	Qual QUA Objectime of S — E rocess	ity system – Third-party Certif LITY PLANNING tives and methods in the Constitutes and methods in the Constitutes and toleration occuments – Contract and the constitutes and products – Total QA / LITY ASSURANCE AND CO	ication - struction nce – Ta constru QC pro NTROL	indus aguch ction gram	ssion Featry - ni's co prog me a	Norms Periods Consur Oncept of grammin nd cost Periods	lated tr. – BS N : 09 ners sati f quality ng – In implicat : 09	aining – orms. sfaction – Codes spection ion	, CO3
Implementing a UNIT-III Quality Policy, Ergonomics - T and Standards procedures - P UNIT-IV Objectives - Ro methods - Teo Factors influen analysis, - Sta	QUAL QUA Objectime of s — E rocess QUA egular chnique of ability	ity system – Third-party Certification LITY PLANNING tives and methods in the Constitutes and methods in the Constitutes and products – Contract and ses and products – Total QA / LITY ASSURANCE AND CO ity agent, owner, design, contest and needs of QA/QC – Econstruction quality – Critical methods and tools, optimu	ication - struction nce - Ta constru QC pro NTROL tract, and ifferent , major	indus aguch ection gram d con aspe failur	ssion stry - ni's co prog me a struc cts of	Periods Consurencept of grammind cost Periods tion-orief quality pects a	lated tr BS N : 09 ners sati f quality ng - In implicat : 09 ented ob y - App and failu	aining – orms. sfaction – Codes spection ion ojectives raisals – re mode	, CO3
Implementing a UNIT-III Quality Policy, Ergonomics - T and Standards procedures - P UNIT-IV Objectives - Re methods - Tec Factors influen	QUAL QUA Objectime of s — E rocess QUA egular chnique acing cability reliab	ity system – Third-party Certification LITY PLANNING tives and methods in the Constitutes and methods in the Constitutes and products – Contract and ses and products – Total QA / LITY ASSURANCE AND CO ity agent, owner, design, contest and needs of QA/QC – Econstruction quality – Critical methods and tools, optimu	struction - struction nce – Ta constru QC pro NTROL cract, and different , major m desig	indus aguch iction gram d con aspe failur gn –	ssion stry - ni's co proc me a struc cts of e as Relia	Periods Consurencept of grammind cost Periods tion-orief quality pects a	lated tr. - BS N : 09 ners sati f quality ng - In implicat : 09 ented ob y - App and failu esting,	aining – orms. sfaction – Codes spection ion ojectives raisals – re mode	, CO3
Implementing a UNIT-III Quality Policy, Ergonomics - T and Standards procedures - P UNIT-IV Objectives - Re methods - Tec Factors influen analysis, - Sta coefficient and UNIT-V Selection of ne Bid preparation - Natural cause	QUA QUA Objectime of section of the content of th	ity system – Third-party Certificatives and methods in the Constitutes and methods in the Constitutes and methods in the Constitutes – Contract and ses and products – Total QA / LITY ASSURANCE AND CO ity agent, owner, design, contest and needs of QA/QC – Construction quality – Critical methods and tools, optimulative prediction	ication - itruction ince - Ta constru QC pro NTROL iract, and ifferent i, major m desig i, detailir tal safet	indus aguch action gram d con aspe failur gn —	ssion Fatry - ni's co programe a Fatructs of e as Relia Feccificial ar	Periods Consument of cost Periods Ition-ories The pects a sability the cost Periods The pects a sability the cost of c	lated tr BS N : 09 ners sati f quality ng - In implicat : 09 ented ob y - App and failu esting, : 09 standard onmenta	aining – orms. sfaction – Codes spectior ion ojectives raisals – re mode reliability	, CO3
Implementing a UNIT-III Quality Policy, Ergonomics - T and Standards procedures - P UNIT-IV Objectives - Re methods - Tec Factors influen analysis, - Sta coefficient and UNIT-V Selection of ne Bid preparation	QUA QUA Objectime of s — E rocess QUA egular chnique of s ability reliab QUA w material	ity system – Third-party Certificatives and methods in the Constitutes and methods in the Constitutes and methods in the Constitutes and products – Total QA / LITY ASSURANCE AND CO ity agent, owner, design, contest and needs of QA/QC – Econstruction quality – Critical methods and tools, optimulity prediction LITY IMPROVEMENT TECH iterials – Influence of drawings instruction activity, environments speed of construction – Life construction – L	ication - itruction ince - Ta constru QC pro NTROL iract, and ifferent i, major m desig i, detailir tal safet	indusaguchiction gram d con aspe failur gn — ng, sp y, soc ting —	ssion Fatry - ni's co proof me a Fatructs of re as Relia Faccific cial ar Value	Periods Consur Consur Concept of Grammin Cost Periods f quality pects a ability t Periods Cation, s and envir	lated tr. - BS N : 09 mers sati f quality ng - In implicat : 09 ented ob y - App and failu esting, : 09 standard onmentaleering a	aining – orms. sfaction – Codes spectior ion ojectives raisals – re mode reliability	, CO3
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Implementing a UNIT-III Quality Policy, Ergonomics - T and Standards procedures - P UNIT-IV Objectives - Re methods - Tec Factors influen analysis, - Sta coefficient and UNIT-V Selection of ne Bid preparation - Natural cause analysis Lecture Period Text Books 1. Hutching Success	QUA Objectime of section of the content of the cont	ity system – Third-party Certification, Viva Books Pvt. Lt. SO 9000: A Comprehensive Certification, Viva Books Pvt. Lt.	struction - struction - nce - Ta constru QC pro NTROL cract, and offerent , major m design NIQUES r, detailir tal safet ycle cos Practica Guide to d., 1994	indus aguch ection gram d con aspe failur gn – S ng, sp y, soc eting – Regi	ssion Fatry - ni's co proome a Fatructs of the control of the co	Norms Periods Consur Oncept of Grammin Ind cost Periods Ition-orio If quality pects a ability t Periods Cation, s and envir III e engin III - T On, Aud	lated tr. - BS N : 09 mers sati of quality ng - In implicat : 09 ented ob y - App and failu esting, : 09 standard onmentateering a otal Per	aining – orms. sfaction – Codes spection ion ojectives raisals – re mode reliability ization – al factors and value riods: 45	CO4
Implementing a UNIT-III Quality Policy, Gergonomics - Tand Standards procedures - Policy Objectives - Romethods - Tectors influent analysis, - Standards of the standards of th	a Qual QUA Objectime of second a construction of	ity system – Third-party Certification, Viva Books Pvt. Lt. Tutorial Periods: Tutorial Periods: Tity system – Third-party Certification, Viva Books Pvt. Lt. Tity and Tity	struction - struction Ince - Ta constru QC pro NTROL Tract, and Different I, major m desig NIQUES I, detailir tal safet ycle cos Practica Guide to d., 1994 Handbo	indusaguchiction gram d con aspe failurgn – Sang, spy, sociting – Regination Reginatio	ssion Fatry - il's co prog me a Fatruc cts of e as Relia Foecific valu riods strati	Norms Periods Consur Oncept of Grammin nd cost Periods Ition-orie of quality pects a ability t Periods Cation, s and envir ue engin Cuality Cuality Ces in co	lated tr. - BS N : 09 mers sati f quality ng - In implicat : 09 ented ob y - App ind failu esting, : 09 standard onmentateering a otal Per It Guide	aining - orms. sfaction - Codes spection ion ojectives raisals - re mode reliability ization - al factors and value riods: 45	CO3
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3. Steven McCabe, Quality Improvement Techniques in Construction, Addison Wesley Longman Ltd, 1998

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- 2. https://www.slideshare.net/kumudajayaram/iso-9000-87352949
- 3. https://docs.builderscollege.edu.in/Downloads/naac/ssr/C1/1.3.2_mecem_2019_20.pdf

COs/POs/PSOs Mapping

Cos					Prog	ram Oı	utcom	es (PO	s)					ram Spe	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	1	-	-	-	-	-	-	-	-	-	3	2	2
2	2	2	1	-	-	-	-	-	-	-	-	-	2	2	2
3	1	2	1	-	-	-	-	-	-	-	-	-	1	2	2
4	2	2	3	-	-	-	-	-	-	-	-	-	3	2	2
5	1	2	1	-	•		-	-	-	-	-	-	1	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	(Contin	uous As:	sessment Mark	s (CAM)	End	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

* Application-oriented / Problem-solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z..
Professor & Head

	Civil	Engineering	Pro	gramn	ne: I	3.Tech	•		
Semester	VII			ırse Ca de: PE	ateg		nd Seme ype: TE	ester Exa	ım
Course Code	U23(CEE719	Per We	iods ek	1	Credi	t Ma	ximum N	Marks
			L	T	Р	С	CAM	ESE	ГМ
Course Name	Tunr	neling Engineering	3	0	0	3	25	75	100
Prerequisite								DTM	
	On c	completion of the course, the s	tudent	s will	be a	able to		BT Ma (Highes	
Course Outcome	CO1	Describe the different types of ι applications	undergr	ound s	struc	ctures a	and their		
	CO2	Identify the excavation methods			on c	of unde	rground	K	2
		structures in different In – situ o						1.7	
	CO3	Analyze the underground struct and elastoplastic stress–strain l					•	K	2
	CO4	Design the underground structu						K	2
		numerical approaches							
	ļi	Solve underground problems by	y using	codes				K	2
UNIT-I		duction	F		<u>L</u>	Periods		Di	
		cation of underground openin onal aspects - Size and shapes,							CO1
UNIT-II	Exca	avation Methods			F	Periods	s: 09		
design, Drilling	meth	eakage, Excavation methods, E ods and machines, Blast hole tin avation mechanics, Geological co	ming, Ť	BM tu	nne	ling, Fa	ctors inf		
UNIT-III	Desi				······································	Periods			
		alytical methods, Empirical met	hods b					systems.	
avanuation for	e and	ck support interaction analysis, (Observa	ational	me	thod- N	IATIVI, S	tability of	
	·	Tunnel portals. Use of appropria			acka	age		tability of	
UNIT-IV	Anal	Tunnel portals. Use of appropria	ite soft	ware p	acka F	age P <mark>eriod</mark> s	s: 09		F I
UNIT-IV Stresses and o	Anal deform	Tunnel portals. Use of appropria ysis nations around openings, Stress	ite soft es and	ware post	acka F natio	age Periods ons arc	s: 09 ound tun		F
UNIT-IV Stresses and o	Anal deform compos	Tunnel portals. Use of appropria	ite soft es and	ware post	acka F nation	age Periods ons arc	s: 09 ound tun		F I
UNIT-IV Stresses and cogalleries with counit-V Tunnels, Energ	Anal deform compose Case gy stor	Tunnel portals. Use of appropriallysis nations around openings, Stressiste lining due to internal pressur	es and re, Clos	ware posterior deformation def	acka F mation m so	age Periods ons arc olutions Periods	s: 09 ound tun s s: 09	nels and	CO4
UNIT-IV Stresses and cogalleries with counit-V Tunnels, Energ	Anal deform compose Case gy stored	Tunnel portals. Use of appropriatysis nations around openings, Stress site lining due to internal pressure Studies rage caverns, Nuclear waste disce installations	es and re, Clos	deforr sed for eposite	acka nation m so F ories	age Periods ons arc olutions Periods s, Metr	s: 09 ound tun s s: 09	nels and	CO4
UNIT-IV Stresses and orgalleries with orgalized UNIT-V Tunnels, Energichambers and Lecture Perio	Anal deform compose Case gy stored defendeds: 45	Tunnel portals. Use of appropriatysis nations around openings, Stress site lining due to internal pressure Studies rage caverns, Nuclear waste disce installations Tutorial Periods: - P	es and re, Clos sposal r	ware posite	acka Fination ories	ege Periods ons arcolutions Periods s, Metri	s: 09 bund tun s s: 09 os, Unde	nels and erground	CO4
UNIT-IV Stresses and orgalleries with orgalleries with orgalier. UNIT-V Tunnels, Energichambers and Lecture Perioforms. 1. Saxe Delhi	Anal deform compose Case gy stor defends: 45	Tunnel portals. Use of appropria ysis nations around openings, Stress site lining due to internal pressur e Studies rage caverns, Nuclear waste dis ce installations Tutorial Periods: - P C., (Year) Tunneling and Tunne	es and re, Clos sposal r Practica	deformed formed	acka Fination Fories ods	ege Periods ons arcolutions Periods s, Metro : - 1	s: 09 bund tun s s: 09 bos, Unde fotal Per t Rai Pu	nels and erground riods: 4!	CO4 CO5 S, New
UNIT-IV Stresses and orgalleries with orgalleries with orgalieries with orgalieries with orgalieries with orgalieries and orgalieries and chambers and chambers and chambers and chambers and chambers are chambers. 1. Saxe Delhi 2. Chap Press	Anal deform compose Case gy stor defendeds: 45	Tunnel portals. Use of appropriatysis nations around openings, Stressiste lining due to internal pressure Studies rage caverns, Nuclear waste disce installations Tutorial Periods: - F C., (Year) Tunneling and Tunneling and Tunneling Stark, T., (2) or & Francis Group, London.	es and re, Clos posal re Practica el Engi 010) Ir	deformed formed	acka Fination Fination Fination	ege Periods ons arcolutions Periods s, Metr : - 1 Dhanpa to Tui	s: 09 bund tun s s: 09 bos, Unde fotal Per t Rai Pu	nels and erground riods: 45	CO4 CO5 S, New
UNIT-IV Stresses and orgalleries with orgalleries with orgalleries with orgalized under the company of the comp	Anal deforms composed gy stored defendeds: 45 cma, S. cman, s, Tayl B.N., shers,	Tunnel portals. Use of appropriatysis nations around openings, Stressiste lining due to internal pressure E Studies rage caverns, Nuclear waste disce installations Tutorial Periods: - P C., (Year) Tunneling and Tunnel D., Metje, N., and Stark, T., (2 or & Francis Group, London. (Year) Handbook on Tunnels a New Delhi.	es and re, Clos sposal re Practica el Engi 010) Ir	deformed formed	acka Fraction Fraction Fraction Fraction Fraction	Periods ons arcolutions Periods s, Metr : - 1 Dhanpa to Tui	s: 09 bund tun s s: 09 bos, Unde total Per t Rai Pu nnel Cor , New A	nels and erground riods: 49 blication astruction ge Intern	CO4 CO5 S, New
UNIT-IV Stresses and orgalleries with orgalleries with orgalleries with orgalleries with orgalleries with orgalleries and unitarian extenses and organization extenses and unitarian ext	Anal deforms composition of the	Tunnel portals. Use of appropriatysis nations around openings, Stressiste lining due to internal pressure Studies rage caverns, Nuclear waste disce installations Tutorial Periods: - P C., (Year) Tunneling and Tunnel D., Metje, N., and Stark, T., (2 for & Francis Group, London. (Year) Handbook on Tunnels a	es and re, Clos sposal rel Engi 010) Ir nd Unc	deformed formed	acka F matie m so F cories F cories	Periods ons arcolutions Periods s, Metro : - 1 Ohanpa to Tui Works ques, k	s: 09 bund tun s s: 09 bos, Unde t Rai Pu nnel Cor , New A	nels and erground riods: 4!	CO4 CO5 S, New n, CRC nationa

- Reference Books
 - 1. Zhao, J., and Shirlaw, J.N., (Year) Modern Tunneling Science and Technology, World Scientific Publishing, Singapore.

 - Golser, M., (Year) Construction Methods in Tunnel Engineering, Ernst & Sohn, Germany.
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- 2. https://ocw.mit.edu/courses/civil-and-environmental-engineering/
- 3. https://ocw.tudelft.nl/courses/

COs/POs/PSOs Mapping

					_										
					Progr	am Oı	utcom	es (P	Os)						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	SPO 2	PSO 3
1	3	3	2	-	-	3	-	-	-	-	-	-	1	1	2
2	3	3	2	-	-	3	-	-	-	-	-	-	2	2	2
3	3	3	2	-	-	3	-	-	-	-	-	-	2	2	2
4	3	3	2	-	-	3	-	-	-	-	-	-	3	3	3
5	3	3	2	-	-	3	-	-	-	-	-	-	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	(Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

^{*} Application-oriented / Problem-solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z.,
Professor & Head

Department	Civil Engineering	Program						
Semester	VII	Course (Code: P	E		Ту	pe: TE	ester Exa	
Caumaa Cada	1122055720	Periods	/ Wee	ek	Credit	M	aximum N	Marks
Course Code	U23CEE720	L	T	Р	С	CAM	ESE	ΓМ
Course Name	Architecture and Town Planning	3	0	0	3	25	75	100
Prerequisite				<u> </u>				
Course	On completion of the course, the						(Hiợ Le	apping ghest vel)
Outcome	CO1 Understand the history and ar	chitectura	ıl dev	elop	ments		ŀ	⟨ 2
	CO2 Comprehend the past, follows	present, a	scen	dan	ce the f	uture	ŀ	< 2
	CO3 Design interior building service	s					ŀ	(3
	CO4 Understand and plan for site de	evelopme	nt				ŀ	(3
	CO5 Plan and design sustainable c	ities and t	town				ŀ	〈 3
UNIT-I	ARCHITECTURE AND ITS DEVEL	OPMENT	_	F	Periods	: 09		
Egyptian, Gree styles; vernaci	alley, Vedic, Buddhist, Indo-Aryan, ek, Roman, medieval and renaissan ular and traditional architecture. Ard adustrial revolution; influence of mode	ce period chitectural	s- co I dev	nstri elop	uction a	and arc	hitectura	CO1
UNIT-II	SKILLS FOR AN ARCHITECTURA UNDERSTANDING	\L		F	Periods	: 09		<u>i</u>
Roman, Europ	the construction methods and mate ean, Indian Architectural History - Nay - Philosophical Understanding from	Modern A	rchite	ctur	e Think	king & A	Analytica	l
UNIT-III	BUILDING SERVICES				Periods			
systems, princ buildings, inte	sewerage and drainage systems; iples of internal & external drainag lligent buildings; elevators & esc stems; firefighting systems, building	je system alators, t	s, pr heir	incip stan	les of dards	electrif	cation of	F
UNIT-IV	TOWN PLANNING) a wi a da			I
nlanning Diffe				r	Periods	s: 09		
development –	Principles of Town Planning, Stages ent types of plan, land use pla lanning ideologies - Drainage and v Residential – Commercial – Indus	nning, Zo water sup	oning ply in	velop	ment (Princip select	Indian) les, ad ion of s	dvantage site for th	s, ^{1e} co4
development –	Principles of Town Planning, Stages ent types of plan, land use pla lanning ideologies - Drainage and v Residential – Commercial – Indus	nning, Zo water sup trial – Pu	oning ply in ublic	velop - n the - Tr	ment (Princip select	Indian) les, ad ion of s tation,	dvantage site for th	s, ^{1e} co4
development – services – Agric UNIT-V Evolution of cit and building neighbourhood considerations	Principles of Town Planning, Stages ent types of plan, land use plate lanning ideologies - Drainage and variety Residential - Commercial - Industrulture CITY, HOUSING AND LANDSCAP les; principles of city planning; types by plans, eco-city concept; sustains concept; Principles of landscape in landscape planning.	nning, Zowater sup trial – Pu PE PLANN of cities & able deve design a	oning ply in ublic IING new elopn nd si	relop	oment (Princip select ranspor Periods ns; plar Conc lanning	Indian) loles, action of station, s: 09 uning recept of g; envir	dvantage site for th Utility ar gulations housing onmenta	s, ne CO4
services – Agric UNIT-V Evolution of cit and building neighbourhood considerations Lecture Perio	Principles of Town Planning, Stages ent types of plan, land use platanning ideologies - Drainage and varieties - Commercial - Industriuture CITY, HOUSING AND LANDSCAP les; principles of city planning; types by plansing; eco-city concept; sustains concept; Principles of landscape in landscape planning.	nning, Zowater supported in the second in th	oning ply in ublic IING new elopn nd si	relop	oment (Princip select ranspor Periods ns; plar Conc lanning	Indian) loles, action of station, s: 09 uning recept of g; envir	dvantage site for th Utility ar gulations housing	s, ne CO4
development – services – Agric UNIT-V Evolution of cit and building neighbourhood considerations Lecture Perio Text Books	Principles of Town Planning, Stages ent types of plan, land use plas lanning ideologies - Drainage and ware Residential - Commercial - Industrulture CITY, HOUSING AND LANDSCAP les; principles of city planning; types by plans; eco-city concept; sustain concept; Principles of landscape in landscape planning. ds: 45 Tutorial Periods:	nning, Zowater supportrial — Puse PLANN of cities & able development and Practical	oning ply in ublic IING new elopm nd si	relop	oment (Princip select ranspor Periods ns; plar Conc lanning	Indian) loles, action of station, s: 09 uning recept of g; envir	dvantage site for th Utility ar gulations housing onmenta	s, ne CO4
Services – Agric UNIT-V Evolution of cit and building neighbourhood considerations Lecture Perio Text Books 1. De Cha 2. Vaishali	Principles of Town Planning, Stages ent types of plan, land use plate lanning ideologies - Drainage and variety Residential - Commercial - Industrulture CITY, HOUSING AND LANDSCAP les; principles of city planning; types by plans, eco-city concept; sustains concept; Principles of landscape in landscape planning.	nning, Zowater supportrial — Putrial	oning ply in ublic NING new elopm nd si I Peri	velop velop to the control of the co	ment (Princip select ranspor Periods ns; plar Conc lanning : - T	Indian) les, action of station, s: 09 uning recept of action; envir	dvantage site for th Utility ar gulations housing onmenta	s, ale CO4
Evelopment – Services – Agric UNIT-V Evolution of cit and building neighbourhood considerations Lecture Perio Text Books 1. De Cha 2. Vaishali Prakash 3. Satish (Principles of Town Planning, Stages ent types of plan, land use platanning ideologies - Drainage and variety Residential - Commercial - Industrulture CITY, HOUSING AND LANDSCAP Tes; principles of city planning; types by plans; eco-city concept; sustains concept; Principles of landscape in landscape planning. Tutorial Periods: Tia & Callender, Architecture, Mc. Grass. Limaye, Rajani Deshmukh, Su	nning, Zowater supportrial — Public PE PLANN of cities & able developed design at Practical aw Hill, (2) apriya.B, A	oning ply in ublic NING new elopm nd si I Peri	velop velop to the control of the co	ment (Princip select ranspor Periods ns; plar Conc lanning : - T	Indian) les, action of station, s: 09 uning recept of action; envir	dvantage site for th Utility ar gulations housing onmenta	s, ale CO4

6. V.S.Limaye, A.D.Pawar, Architectural Planning And Design Of Buildings, Nirali Prakashan Publication, Edition 2016

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- 1. Gallion, Urban pattern City planning and design, Charotar Publishing House, (2010).
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- 3. https://onlinecourses.swayam2.ac.in/cec20 ar01/preview

COs/POs/PSOs Mapping

					Progra	am Oı	utcom	es (P	Os)						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	SPO 2	PSO 3
1	-	-	-	-	-	2	1	2	-	-	-	3	3	1	2
2	-	-	-	1	1	2	1	1	1	-	-	2	3	1	-
3	2	2	2	1	2	2	1	1	-	-	1	2	2	3	-
4	1	1	1	1	2	1	2	2	1	-	-	2	2	2	3
5	3	2	2	-	2	1	2	1	-	-	1	3	1	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As	sessment Mark	s (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

* Application-oriented / Problem-solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.2..

Professional Elective - V

Department	Civil Engineering	· [B Toch				
Department	Civil Engineering			B.Tech.	. DE F	Cors = +	. Cva T	TF
Semester	VIII	}			: PE End	:	<u>.</u>	
Course	U23CEE821		iods/We		Credit	 	imum Maı	<u>T</u>
Code	D 1 Ol	L	Т	Р	С	CAM	ESE	TM
_	Precast Structures	3	0	0	3	25	75	100
Prerequisite	Structural Analysis, Design of RC Elem	ents					DTM	• • • • • • • • • • • • • • • • • • • •
	On completion of the course, the stude	ents will	be able	e to			BT Map	. •
							(Highest	
	CO1 Understand the applications, advanta			······			K	2
	co2 Identify and classify major precast eleprocesses.						K	2
Course Outcomes	Analyze and select appropriate pre- types.	cast stru	ıctural s	systems	for various	building	K	4
	Gain knowledge of precast production ensuring quality control.	n, storag	e, hand	ling, and	logistics pr	ocesses,	K	2
	CO5 Design joints and connections for loa erection methods.	d transfe	er and a	pply safe	handling a	nd	K	4
UNIT- I	Introduction to Precast					Peri	ods: 09	
Introduction	- current scenario and constraints, the dif	fference	betwee	n precas	st vs conve	ntional co	onstruction	า
Limitations,	eds, types, features, Advantages (for own Residential, Commercial & Industrial Applic	ers, arcl ations o	nitects, of f precas	engineer st, Mater	s, contracto als used, C	ors, end o Code prov	users) and risions and	CO1
clauses. UNIT- II	Precast Elements						Periods:	00
	nts (Beam, slab, wall, column, foundation,	etairease	roofo	lomonto	facada) : (laccificat		
-	, selection, application, erection, advantag						• •	
•	nel, culvert and sleeper, facia element, pave				a diams, c	idet barik	, baggagi	002
UNIT - III	Precast Structural Systems						Periods:	09
	/stem: Skeletal System, Portal Frame syste	m, Large	e Panel	system,	Cell Block	system a	nd hollow	
block syster	n, Guide lines of selection – Residential ructural Stability and Structural Behaviour.	_		-		-		CO3
UNIT - IV	Precast Production, Storage, & Logistic	S						
							Periods:	09
	roduction. Introduction - rypes & Process,	Producti	on – De	esign an	d shop dra	wings, ch		09
iviouiding, Ca	roduction: Introduction -Types & Process, asting and its types, Concreting, Curing, Der			_	d shop dra	wings, ch		
-	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of	moulding	and ins	spection.	·		eck lists,	
Storage, De	asting and its types, Concreting, Curing, Der	moulding equipm	and ins ent, liftir	spection.	es, Erection	and ins	eck lists,	
Storage, De	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of	moulding equipm	and ins ent, liftir	spection.	es, Erection	and ins	eck lists,	CO4
Storage, De Horizontal co UNIT - V Design of join	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of omponents, vertical components, special ele	moulding equipmonements, (and insent, liftir Quality I	spection. ng device nspectio n, and si	es, Erection n and Toler se erection	and ins	neck lists, tallation - Periods:	CO4
Storage, De Horizontal co UNIT - V Design of join	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of emponents, vertical components, special ele Connections, Handling & Erection ints and connections for load transfer. Lifting and alignment issues. Safety regulations dur	moulding equipmo ements, (g, trans ing hand	and insent, liftir Quality I	spection. ng device nspectio n, and sit d installa	es, Erection n and Toler se erection	and instance methods.	neck lists, tallation - Periods:	CO4
Storage, De Horizontal co UNIT - V Design of joi tolerances, a Lecture Peri	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of emponents, vertical components, special ele Connections, Handling & Erection ints and connections for load transfer. Lifting and alignment issues. Safety regulations dur	moulding equipmo ements, (g, trans ing hand	and insent, liftir Quality I portation	spection. ng device nspectio n, and sit d installa	es, Erection n and Toler se erection	and instance methods.	tallation - Periods: Stability,	CO4
Storage, De Horizontal co UNIT - V Design of joi tolerances, a Lecture Peri ext Books	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of emponents, vertical components, special ele Connections, Handling & Erection ints and connections for load transfer. Lifting and alignment issues. Safety regulations dur	moulding equipmonements, (ig, trans ing hand Practic	y and insent, liftir Quality I portation Iling and al Peri	spection. ng device nspectio n, and sit d installat ods: -	es, Erectior n and Toler te erection tion.	and instance methods.	tallation - Periods: Stability,	CO4
Storage, De Horizontal co UNIT - V Design of joi tolerances, a Lecture Peri ext Books 1. Elliott, k	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of omponents, vertical components, special electron ints and connections for load transfer. Lifting and alignment issues. Safety regulations durods: 45 Tutorial Periods: - Kim S. – "Precast Concrete Structures", Butt	moulding equipments, (ag, transe ing hance Practice erworth-	y and insection and insection of the contaction of the contaction of the contaction of the contact of the conta	spection. ng device nspectio n, and sit d installat ods: -	es, Erection n and Toler te erection tion.	and ins ance methods.	tallation - Periods: Stability,	CO4
Storage, De Horizontal co UNIT - V Design of joi tolerances, a Lecture Peri ext Books 1. Elliott, k 2. Nawy, E 3. Muthu,	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of emponents, vertical components, special electron ints and connections for load transfer. Lifting and alignment issues. Safety regulations during ods: 45 Tutorial Periods: -	moulding equipments, (or g, transping hand practice erworth-amental	y and insent, lifting and period and period Approa	spection. ng device nspectio n, and sit d installat ods: - ann, 201 ch", Prer	es, Erection and Toler e erection tion.	and ins ance methods. Tota	reck lists, tallation - Periods: Stability,	09 CO5
Storage, De Horizontal co UNIT - V Design of joi tolerances, a Lecture Peri ext Books 1. Elliott, k 2. Nawy, E 3. Muthu,	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of emponents, vertical components, special electron into and connections for load transfer. Lifting and alignment issues. Safety regulations during the code: 45 Tutorial Periods: - Kim S. – "Precast Concrete Structures", Butter and G. – "Prestressed Concrete A Fund K. U., Vijayanand, S., Iyer, N. R., & Sasidha Pro", I.K. International Publishing, 2018.	moulding equipments, (or g, transping hand practice erworth-amental	y and insent, lifting and period and period Approa	spection. ng device nspectio n, and sit d installat ods: - ann, 201 ch", Prer	es, Erection and Toler e erection tion.	and ins ance methods. Tota	reck lists, tallation - Periods: Stability,	CO4 09 CO5 : 45
Storage, De Horizontal co UNIT - V Design of joi tolerances, a Lecture Peri ext Books 1. Elliott, k 2. Nawy, E 3. Muthu, Staad F Reference Book	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of emponents, vertical components, special electron into and connections for load transfer. Lifting and alignment issues. Safety regulations during the code: 45 Tutorial Periods: - Kim S. – "Precast Concrete Structures", Butter and G. – "Prestressed Concrete A Fund K. U., Vijayanand, S., Iyer, N. R., & Sasidha Pro", I.K. International Publishing, 2018.	moulding equipments, () g, transping hance Practice erworth- amental ar, C. — ()	y and insent, lifting and Perion Heinem Approa	spection. ng device nspectio n, and sit d installat ods: - ann, 201 ch", Prer	es, Erection and Toler e erection tion. 6 Analysis &	n and ins ance methods. Tota	reck lists, tallation - Periods: Stability,	CO4 09 CO5 : 45
Storage, De Horizontal co UNIT - V Design of joi tolerances, a Lecture Peri Text Books 1. Elliott, k 2. Nawy, E 3. Muthu, Staad F Reference Boo 1. Precast	asting and its types, Concreting, Curing, Der livery, Handling- introduction and types of emponents, vertical components, special electrons, Handling & Erection ints and connections for load transfer. Lifting and alignment issues. Safety regulations during ods: 45 Tutorial Periods: - Kim S. – "Precast Concrete Structures", Butted and G. – "Prestressed Concrete A Fund K. U., Vijayanand, S., Iyer, N. R., & Sasidha Pro", I.K. International Publishing, 2018.	equipmonements, (in g, transling hand erworth-amental ar, C. — (in Design	y and insent, liftir Quality I portation all Perional Approar Basic S	spection. ng device nspectio n, and sit d installat ods: - ann, 201 ch", Prer structural	es, Erection n and Toler te erection tion. 6 htice Hall, 2 Analysis &	n and ins ance methods. Tota 010. Design of	tallation - Periods: Stability, Il Periods	CO4 09 CO5 : 45

- 1. https://bmtpc.org/DataFiles/CMS/file/PDF_Files/61_PAC_Urbaanic_Final.pdf
- 2. https://www.researchgate.net/publication/383095334_Precast_Concrete_Building_Construction_In_India
- 3. https://archive.nptel.ac.in/courses/105/105/105105105/

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)					ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	3	2	2	3	2	2	3	3	1	2	3	2
2	3	2	2	3	2	2	3	2	2	3	3	1	2	3	2
3	3	2	2	3	2	2	3	2	2	3	3	1	2	3	2
4	3	2	2	3	2	2	3	2	2	3	3	1	2	3	2
5	3	2	2	3	2	2	3	2	2	3	3	1	2	3	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	M)	End Semester	Total
Assessment	cat 1		Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z...
Professor & Head

Department	Civil E	Engineering	Progra	amme :	B.Tech.				
Semester	VIII		Cours	e Cateo	jory Code	: PE End	Semeste	Exam T	ype: TE
Course	1123C	EE822	Per	iods/W	eek	Credit	Max	imum Ma	arks
Code	0200		L	Т	Р	С	CAM	ESE	TM
Course Name	Indust	rial Waste Disposal and Treatment	3	0	0	3	25	75	100
Prerequisite	Struc	ctural Analysis, Design of RC Elemer	nts						
	On c	completion of the course, the studen	ts will b	e able	to			(Hi	apping ghest evel)
	CO1	An ability to use the recent techniques	S.						K3
Course	CO2	Describe the importance of Pretreatme	ent Meth	ods					K3
Outcomes	CO3	Apply the various techniques for Treat	tment Me	ethods	of Industr	ial Wastes			K3
	CO4	Describe the solve problems related Disposal	to Indu	strial W	/aste Wa	ter manag	ement an	d	K3
	CO5	Carry out Industry and power plants st	tudies ca	ase stud	dies				K3
UNIT- I	PREC	CIPITATION					Peri	ods: 09	
common e waste wate	ffluent er treat	Industry - Sources and types of wastew treatment plants - Population equivaler ment plants		-			eams, lan	d, air and	
UNIT- II		REATMENT METHODS						ods: 09	·
		hods: Process modification – methods							1
		eeping etc. to reduce waste discharge	and stre	ngth of	the waste	e and estab	olished me	thods for	CO2
UNIT - III		very within the plant operations ATMENT METHODS OF INDUSTRIAL	WASTE	:0			Pori	ods: 09	
	. <u>i</u>	eutralization - Oil separation – Floatation			Adsorr	tion - Δero			<u> </u>
•	treatme	ent - High rate reactors. Chemical o		-					CO3
UNIT - IV		ATMENT METHODS OF RESIDUALS					Peri	ods: 09	<u>.i.</u>
		ustrial waste treatment – Characterist isposal of sludge.	tics of s	ludge -	- Thicker	ing, digest	tion, cond	itioning,	CO4
UNIT - V	CASI	STUDIES					Peri	ods: 09	. <u>i</u>
treatment f	flow she	ver plants - manufacturing process o eet for typical industries – Textiles – Tar al industries - Sugar and distilleries –Da	nneries -	- Pulp a	nd Paper	-Metal finis	shing – Pe	troleum	CO5
Lecture Pe	eriods:	45 Tutorial Periods: -	Practic	al Per	iods: -		Tota	l Period	s: 45
Text Books		i							
		W.W., Industrial Water Pollution Contr							
		J. Wastewater Treatment for Pollution (······································						
		nar Garg, Industrial Waste Disposal and	d Treatm	ent, Kh	anna Pul	olishers, 20)18.		
Reference B				<u></u>					
		L., Theories and Practices of Industrial					Wesley, 20)15.	
		F., Principles of Industrial Waste Treatr							
3. Varsh	iney, R	.S., Industrial Waste Disposal and Trea	atment,,	Nem C	nand & B	ros., 2017.			

COs/POs/PSOs Mapping

COs			• •		Prog	ram O	utcon	nes (P	Os)					ram Sp omes (F	
COS	РО	PO PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO10 PO11 PO10 PO10										PO12	PSO	PSO	PSO
	1												1	2	3
CO1	2	2	1	3	2	-	-	-			-	1	3	1	2
CO2	2	3	1	2	2	-	-	-	-	-	-	1	3	1	-
CO3	3	3	3	2	2	-	-	-	-	-	-	1	2	3	-
CO4	3	3	2	2	3	-	-	-	-	-	-	1	2	2	3
CO5	3	3	2	2	3	-	-	-	-	-	-	1	1	2	3

Correlation Level: 1-Low, 2-Medium, 3- High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Somostor	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M. Tech., Ph.2..

Department	Civil I	Engineering			3.Tech.				
Semester	VIII		Course	e Categ	ory Code	: PE End	Semeste	r Exam Ty	/pe: TE
Course	U23C	EE823	Per	iods/We	eek	Credit	Max	kimum Ma	rks
Code	0200		L	Τ	Р	С	CAM	ESE	TM
Course Name	Const	ruction Safety	3	0	0	3	25	75	100
Prerequisite	9								
	On c	ompletion of the course, the stud	dents will b	e able 1	to			, , -	apping ghest vel)
	CO1	Understand the fundamentals, cod	les of praction	ce and b	oridge fai	lures.		ľ	(4
Course	CO2	Understand the estimation of force	s for the de	sign brid	dge struc	tural eleme	ents	ľ	(4
Outcomes	CO3	Design of the slab and girder beam	n bridges us	ing app	ropriate r	nethod		ľ	(4
	CO4	Understand the design principles o	of long span	bridges				ŀ	(4
	CO5	Understand the design of substruc	ture compo	nents e	to model	the structu	ire to	L	(4
		understand the behaviour						r	\4
UNIT- I	<u> i</u>	ODUCTION TO CONSTRUCTION	_					ods: 09	
standards (O	SHA, B	in construction-Common hazards IS, NBC)- Roles and responsibilitie is and lessons learned.							
UNIT- II		ARD IDENTIFICATION AND RISK	ASSESSME	ENT			Peri	ods: 09	
(HAZOP, FM	EA, JSA	construction (physical, chemical,)-Risk assessment methods (qualit tion strategies.							
UNIT - III		TY MANAGEMENT AND ACCIDE	NT PREVE	NTION			Peri	ods: 09	
actors theor	y)-Pers	systems (SMS) and their implement onal protective equipment (PPE) ar Behavioral safety and safety culture	nd safety ge	ar-Eme					CO3
UNIT - IV		INOLOGY & ADVANCEMENTS IN			SAFETY	7	Peri	ods: 09	
	y inspe	nd robotics in construction safety-loction-Digital safety reporting and c							
UNIT - V		IECT-BASED SAFETY PRACTICE	ES & CASE	STUDIE	ES		Peri	ods:09	
planning and	execut	gh-rise buildings, tunnels, and bridgion-Best practices for contractor a							
safety implen Lecture P o			Practio	al Perio	ods: -		Tota	al Periods	: 45
Text Books		i	i				i		
1. Cons	truction	Safety Management and Engineer	ing – David	L. Goet	sch.				
2. Cons	truction	Safety Handbook – V.J. Davies & I	K. Tomasin.						
	nationa	Safety and Health in Construction	- OSHA Pu	ıblicatio	ns				
Reference E	Books								
Reference E 1. Cons preve	Books struction ention te	Safety and Health – Richard J. echniques in construction.	Coble Cov						
1. Cons preve 2. Cons safet	Books struction ention te struction y regula	chniques in construction. Safety Management and Engineeri tions, hazard identification, and saf	Coble <i>Cov</i> ng – David L fety manage	Goets ment.	ch <i>Provi</i> o	des in-dept	h knowled	lge of cons	struction
1. Conspreved 2. Conssafet 3. Cons	Books struction ention te struction y regula	chniques in construction. Safety Management and Engineeritions, hazard identification, and safety: A Guide for Managin	Coble <i>Cov</i> ng – David L fety manage	Goets ment.	ch <i>Provi</i> o	des in-dept	h knowled	lge of cons	struction
1. Conspreved 2. Conssafet 3. Consmana 4. Hand	Books struction ention te truction y regula struction agemen lbook o	chniques in construction. Safety Management and Engineeri tions, hazard identification, and saf	Coble Cov ng – David I fety manage ng Contracto	Goets ment. ors – Ri	ch <i>Provi</i> o	des in-dept	h knowled	lge of cons	structior or safety

- 1. https://www.osha.gov
- 2. https://www.ilo.org/safework
- 3. https://www.tandfonline.com/toc/tose20/current

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)					ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
2	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
3	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
4	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
5	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Semester	Total
Assessment					Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z..

Department	Civil E	Engineering	Progra	amme :	B.Tech.					
Semester	VIII		Cours	e Categ	ory Code	: PE	End	Semeste	r Exam T	ype: TE
Course	U23C	ET824	Pe	iods/W	eek		edit	÷	imum Ma	arks
Code		_	L	Т	Р	(2	CAM	ESE	TM
Course Name	Intellig	gent Transportation Systems	3	0	0		3	25	75	100
Droroguicito	Trans	sportation Engineering								
r rerequisite		ompletion of the course, the stud	ents will b	e able	to				(Hi	apping ghest evel)
_	CO1	Understand ITS fundamentals, roles	s, responsi	bilities,	security, a	and s	afety	issues.		K2
Course	CO2	Analyze ITS architecture, hardware	, sensors,	and veh	icle detec	tion t	echni	ques.		K2
Outcomes	CO3	Evaluate advanced traffic managem	nent (ANPI	R, video	detection	ı, DTA	۱, alg	orithms).		K3
	CO4	Understand smart route systems, tr	avel info d	ssemin	ation, and	busii	ness	scope.		K2
	CO5	Assess global ITS implementations	, automate	d highw	ays, and	vehic	le pla	tooning.		K3
UNIT- I	INTR	ODUCTION TO INTELLIGENT TRA	NSPORT	SYSTE	M			Peri	ods: 09	
Introduction to	Intellig	ent Transportation Systems (ITS) -D	efinition –	Role an	d Respon	sibiliti	es – A	Advanced	Travelle	r
	-	- Fleet Oriented ITS Services - Elec	tronic Toll	Collecti	on –					CO1
Critical issues		-								
UNIT- II	. <u>i</u>	RCHITECTURE AND HARDWARE							ods: 09	- T
		rchitecture Framework – Hardware	Sensors -	- Vehic	le Detecti	on –	Tech	niques –	Dynamic	CO2
	· •	RS – GPS – Toll Collection	NT OVOTE	- R.A				Dor	- d 00	
UNIT - III	<u>.i.</u>	ANCED TRANSPORT MANAGEME rtual Loop - Cameras - ANPR – IR Liç			Troffic M	anaa	mon		ods: 09	
		ent Strategies- ATMS – Advanced T		•		_				
	•	- Current – Predictive Guidance – D			-	•	,			CO3
		s – Algorithm.			,	,			5	
UNIT - IV	ADV	ANCED TRAVELLER AND INFORM	ATION S	STEM				Peri	ods: 09	
Travel Informa	ation – I	Pre-Trip and Enroute Methods- Basid	ATIS Cor	cepts –	Smart Ro	oute S	yster	n – Data (Collection	CO4
– Process – D	issemir	nation to Travelers – Evaluation of Inf	formation -	- Value	of Informa	ition –	- Busi	ness Opp	ortunities	5 004
UNIT - V	. <u>i</u>	STUDIES						i	ods: 09	··•
		Systems - Vehicles in Platoons - In	0			,	•		Programs	CO5
		iew of ITS implementations in develo				oping	cour			
Lecture Pe	eriods:	45 Tutorial Periods: -	Praction	al Peri	ods: -			Tota	l Period	s: 45
Text Books	inant T		- V //)-i+ D	المادين المادين	200	~ \			
		ransportation Systems – R. Srinivas						Vilov 201	5 \	
		ransport Systems: Technologies and ransportation Systems: Functional D							<u>ی</u>	
Reference B		ransportation Systems. I unctional E	resign – i v	beit G	Jidon (Sp	ıııgeı	, 201	0)		
		ansportation Systems: Theory and F	Practice – A	mit Kııı	nar Tvani	(Spri	nger	2023)		
		ansportation Systems: From Good F						······	ess. 201	6)
	_	echnologies for Intelligent Transports								
		ansportation Systems: Concepts and						·		s, 2022)
		Transportation Systems: New Princi								

- 1.http:// Intelligent Transportation Systems: Theory and Practice.nic.in
- 2. https://nptel.ac.in/noc/courses/noc670/SEM2/noc19-ge22/
- 3. http://www. Intelligent Transport Systems: Technologies and Applications.in/wp-content/uploads/2017/03/

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)				Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	-	-	-	3	-	-	-	-	-	1	3	-	-
2	-	3	3	-	3	-	-	-	-	-	-	1	-	3	-
3	-	-	3	3	-	-	3	-	-	-	-	1	3	3	-
4	-	-	-	-	3	3	-	-	3	-	-	1	3	-	-
5	-	-	-	-	-	-	3	3	3	-	-	1	-	3	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Somostor	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z.. Professor & Head

Department	Civil Engineering	Pro	gramr	ne: E	3.Tech	ı.		
Semester	VIII	Cou	<u> </u>	ateg	ory *E	nd Sem	ester Ex	am
Course Code	U23CEE825	Per We	iods/ ek		Cred	it Ma	aximum	Marks
		L	Т	Р	С	CAM	ESE	ГМ
Course Name	Interior Design	3	0	0	3	25	75	100
Prerequisite	-Nil-							
Course	On completion of the course, the stu	ıdent	s will	be a	able to)	(H	Mapping ighest evel)
Outcome	CO1 Understand the importance of into	erior o	desigr	1				K2
	CO2 Gain knowledge in different mate in the kitchen				/arious	s surface	s	K2
	CO3 Understand the concept and appl	icatio	n of c	olors	in int	eriors		K2
	CO4 Understand and learn the concep	ts of	lightin	g.				K2
	CO5 Know about the selection and arr	angei	ment (of fur	niture			K2
UNIT-I	Introduction of Interior Design			F	Period	ls: 09		
characteristics	eaning and Definition, Types – Stru , classification of decorative design - E e, form and shape, size, color, texture, pa	lemer	nts of	Des	ign –			
UNIT-II	Kitchen Design			F	Period	ls: 09		
kitchen – orier safety - Princip	ng – Functions performed in a kitchen, ntation and location, ventilation, storage lles of Design – Harmony, Balance, Rhyt iples in interiors.	need	ls, wo	rk tri	iangle	, colour,	İight an	ď
UNIT-III	Colour in Interior Design			F	Period	ls: 09		
Classification of	Colour — Colour wheel — Dimensior of colour - Prang color system, color harm nse - Related and contrasting color harn eriors.	nonie	s – Co	lour	Temp	erature a	and Moo	od
UNIT-IV	Lighting Design			L	Period			
	riors – importance, classification based ed in lighting for different areas of house		ources	s, use	es, illu	mination	, Factor	s CO4
UNIT-V	Furniture Design			F	Period	ls: 09		<u>i</u>
preferences, a arrangement –	eaning, need, and purpose. Factors informations in the property of the propert	n and n, din	d fina	ncial	limits	s - Šeled	ction an	id CO5
Lecture Perio			al Per	iods	: -	Total Pe	riods: 4	45
Text Books					L			
Pvt Limited. 2. Varghese a	an.P. ,Paannu.P , "Interior Design and D , Chennai India ,2009. nd Ogale, "Home Management", Wiley E Faulkner R, "Inside Today's Home", Rir	Easte	rn, Ne	w De	elhi, 19	994.		

- radiktiel 5, radiktiel K, illside roday's nortle, kine nart Publishing Company, Ne
 Caroline cliften et. al., "The Complete Home Decorator", Portland House New York.

Reference Books

- 1. Gandotra.V, Shukul.M, and Jaiswal.N, (2011) Introduction to Interior Design and Decoration, Dominant Publishers and Distributors New Delhi.
- 2. Pratap R.M (1988), "Interior Design Principles and Practice", Standard Publishers Distribution,
- 3. Goldstein, "Art in Everyday life", Oxford and IBH Publishing House.

- 1. https://ebooks.inflibnet.ac.in/hsp02/chapter/principles-of-design-application-of-design-principles-in-interior/
- 2. https://www.uou.ac.in/sites/default/files/slm/BHM-602CT.pdf
- 3. https://interiordesignstudent.com/study-notes/colour-in-interior-design/

COs/POs/PSOs Mapping

Cos					Prog	ram O	utcom	es (PO	s)				Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
2	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
3	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
4	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
5	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As:	sessment Mark	s (CAM)	End	Tatal
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	75	100	

^{*} Application-oriented / Problem-solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.a.. Professor & Head

Professional Elective - VI

Department			····						
Sopartinont	Civil E	Engineering	Progra	amme: E	3.Tech.				
Semester			Cours	e Categ	ory Code:	: PE	End Seme	ester Exam T	ype: TE
Course	U23CI	=F826	Per	iods/We	eek	Cred	dit	Maximum Ma	arks
Code	3230I		L	Τ	Р	С	CAI	И ESE	TM
Course	Prestre	essed Concrete Structures	3	0	0	3	25	75	100
Name									
Prerequisite								DT Ma	
		ompletion of the course, the studen						BT Ma (Highes	
	CO1	Design a prestressed concrete beam	accounti	ng for lo	sses.			K	.3
Course	CO2	Design for flexure and shear.						K	3
Outcomes	CO3	Design the anchorage zone for post to	ensioned	membe	ers and de	eflectio	n in beam	ıs. K	. 3
	CO4	Design composite members and cont	inuous b	eams.				K	3
	CO5	Design water tanks, pipes and poles.						K	3
UNIT- I	INTR	DDUCTION					F	Periods: 09	
reinforced cor Freyssinet, Ma	ncrete agnel, l	nts – Basic principles of prestressing – Materials – High strength concret Lee-McCall and Gifford Udall anchora ncept and load balancing concept – L	e and h ge syste	igh tens ms – Aı	sile steel nalysis of	Metsection	thods of properties of the contract the cont	orestressing sses by stres	CO
UNIT- II	DESI	GN FOR FLEXURE AND SHEAR					F	Periods: 09	
		r calculating flexural stresses – Permis							
on IS1343-20	12 Cod	of Type I and Type II post-tensioned a e – Layout of cables in post-tensione ed on IS1343-2012 Code.							
UNIT - III	,	ECTION AND DESIGN OF ANCHOR	AGE ZO	NE			F	Periods: 09	
Factors influer	ncing de	eflections – Short term deflections of u	ncracked	l membe	ers – Pred	liction	of long ter	m deflections	
•		inkage – Check for serviceability limi		f deflect	tion. Dete	rminat	ion of and		'
1	ost-tens	· · · · · · · · · · · · · · · · · · ·						-	СО
anchorage zor		sioned beams by Magnel's method,	•			1343-2		-	СО
ļ	,	orcement – Check for transfer bond le	ength in p	re-tens		1343-2	012 code	– design of	СО
UNIT - IV	,		ength in p	re-tens		1343-2	012 code	-	СО
UNIT - IV Analysis and c	COMI design (ams – /	Forcement – Check for transfer bond le POSITE BEAMS AND CONTINUOUS of composite beams - Shrinkage strain Analysis for secondary moments – Co	ength in p BEAMS and its	ore-tens importa	ioned bea	1343-2 ams. thods o	012 code I of achievir	design of Periods: 09ng continuity	in co
UNIT - IV Analysis and continuous be	COMI design of ams — Anciples	Forcement – Check for transfer bond le POSITE BEAMS AND CONTINUOUS of composite beams - Shrinkage strain Analysis for secondary moments – Co	ength in p BEAMS and its	ore-tens importa	ioned bea	1343-2 ams. thods o	012 code In the second of achievirus ormation —	design of Periods: 09ng continuity	in CO
UNIT - IV Analysis and continuous be stresses – Prir UNIT - V Design of ten	COMI design of ams — A nciples MISC	Forcement – Check for transfer bond le POSITE BEAMS AND CONTINUOUS of composite beams - Shrinkage strain Analysis for secondary moments – Coof of design.	ength in p BEAMS n and its ncordant of sleep	importal cable a	nce – Met and linear bes and p	thods of transfo	012 code of achievirormation – Ferrial	- design of Periods: 09 ag continuity Calculation Periods: 09	in co
UNIT - IV Analysis and continuous be stresses – Prir UNIT - V Design of ten	comidesign of ams — Anciples MISC sion and thods of	Forcement – Check for transfer bond leads of composite beams - Shrinkage strain Analysis for secondary moments – Confederation of design. ELANEOUS STRUCTURES Indicate the compression members – Design for achieving partial prestressing, merits	ength in p BEAMS n and its ncordant of sleep and der	importal cable a	nce – Met and linear oes and p	thods of transfo	012 code of achievirormation – Fartial sing.	- design of Periods: 09 ag continuity Calculation Periods: 09	in CO of 4
UNIT - IV Analysis and continuous be stresses – Prir UNIT - V Design of ten Definition, met	comidesign of ams — Anciples MISC sion authods of	Forcement – Check for transfer bond leads of composite beams - Shrinkage strain Analysis for secondary moments – Confederation of design. ELANEOUS STRUCTURES Indicate the compression members – Design for achieving partial prestressing, merits	ength in p BEAMS n and its ncordant of sleep and der	importal cable a pers, pip	nce – Met and linear oes and p	thods of transfo	012 code of achievirormation – Fartial sing.	- design of Periods: 09 ag continuity Calculation Periods: 09 prestressing	in CO of 4
UNIT - IV Analysis and continuous be stresses – Prin UNIT - V Design of ten Definition, med Lecture Pe Text Books	design of ams — Anciples MISC sion althods of riods:	Forcement – Check for transfer bond leads of composite beams - Shrinkage strain Analysis for secondary moments – Confederation of design. ELANEOUS STRUCTURES Indicate the compression members – Design for achieving partial prestressing, merits	ength in p BEAMS and its ncordant of sleep and der Praction	importal cable a pers, pip merits of	ioned bea nce – Met and linear pes and p f partial pr	thods of transfo	of achievirormation – Partial sing.	- design of Periods: 09 ag continuity Calculation Periods: 09 prestressing	in CO of 4
UNIT - IV Analysis and continuous be stresses – Prir UNIT - V Design of ten Definition, met Lecture Pe Text Books 1. Krishna	design of ams – Anciples MISC sion all thods of riods: Raju N	Forcement – Check for transfer bond lead of composite beams - Shrinkage strain Analysis for secondary moments – Color design. ELANEOUS STRUCTURES and compression members – Design fachieving partial prestressing, merits are transfer for transfer and transfer for tr	ength in p BEAMS n and its ncordant of sleep and der Practio	importal cable a pers, pip merits of cal Peri	nce – Met and linear bes and p f partial pr ods: -	thods of transformations of transformations of the transformations of the transformation	of achievirormation – Partial sing.	- design of Periods: 09 and continuity Calculation Periods: 09 prestressing	in CO 4 - CO 5 s: 45
UNIT - IV Analysis and continuous bestresses – Prir UNIT - V Design of ten Definition, metological Lecture Periest Books 1. Krishna	design of ams — Anciples MISC sion althods of riods: Raju N. S. And	Forcement – Check for transfer bond leads of composite beams - Shrinkage strain Analysis for secondary moments – Confederation of design. ELANEOUS STRUCTURES Indicate compression members – Design frachieving partial prestressing, merits achieving partial Periods: - I., Prestressed concrete, Tata McGravers (1988)	ength in p BEAMS n and its ncordant of sleep and der Practio	importal cable a pers, pip merits of cal Peri	nce – Met and linear bes and p f partial pr ods: -	thods of transformations of transformations of the transformations of the transformation	of achievirormation – Partial sing.	- design of Periods: 09 and continuity Calculation Periods: 09 prestressing	in CO 4 - CO 5 s: 45
UNIT - IV Analysis and continuous be stresses – Prin UNIT - V Design of ten Definition, mel Lecture Pe Text Books 1. Krishna 2. Pandit.G. Reference Be	design of ams — Anciples MISC asion and thods of riods: Raju N S. And ooks	Forcement – Check for transfer bond leads of composite beams - Shrinkage strain Analysis for secondary moments – Confederation of design. ELANEOUS STRUCTURES Indicate compression members – Design frachieving partial prestressing, merits achieving partial Periods: - I., Prestressed concrete, Tata McGravers (1988)	ength in p BEAMS n and its ncordant of sleep and der Practic v Hill Cor BS Publis	importance cable a pers, piperits of cal Perimpany, shers an	nce – Met and linear bes and p f partial pr ods: -	thods of transformation of the stress of the	of achievirormation – Partial sing. 2. vt. Ltd., So	- design of Periods: 09 ag continuity Calculation Periods: 09 prestressing Fotal Periods	in CO of 4 - CO 5 s: 45
UNIT - IV Analysis and ocontinuous be stresses – Prin UNIT - V Design of ten Definition, met Lecture Pe Text Books 1. Krishna 2. Pandit.G. Reference Books 1. Lin T.Y. a 2. Rajagopala	design of ams — Anciples MISC sion and thods of riods: Raju N S. And ooks and Neclarity Properties	Forcement – Check for transfer bond lead of composite beams - Shrinkage strain Analysis for secondary moments – Coof design. ELANEOUS STRUCTURES and compression members – Design fachieving partial prestressing, merits Tutorial Periods: - I., Prestressed concrete, Tata McGrav Gupta.S.P. Prestressed Concrete, CE	ength in p BEAMS n and its ncordant of sleep and der Practic V Hill Cor SS Publis crete Strang House	important cable a cable a pers, piperents of cal Perimpany, shers an uctures, a, 2002.	nce – Met and linear bes and propertial prodes: - fifth editional Distribu	thods of transforms. cooles - restres in, 201 iters P	of achievirormation – Partial sing. 2. vt. Ltd., So	- design of Periods: 09 and continuity Calculation Periods: 09 prestressing Fotal Periods: econd edition ird Edition, 1	in CO of 4 - CO 5 s: 45
Analysis and ocontinuous be stresses – Prir UNIT - V Design of ten Definition, met Lecture Pe Text Books 1. Krishna 2. Pandit.G. Reference Books 1. Lin T.Y. a 2. Rajagopala 3. Dayaratnar	design of ams — Anciples MISC sion and thods of riods: Raju N S. And ooks and Necentle, Property of the control of the contr	Forcement – Check for transfer bond lead of composite beams - Shrinkage strain Analysis for secondary moments – Coof design. ELANEOUS STRUCTURES and compression members – Design frachieving partial prestressing, merits are transfer to the Tutorial Periods: - I., Prestressed concrete, Tata McGrav Gupta.S.P. Prestressed Concrete, CE	ength in p BEAMS n and its ncordant of sleep and der Practic V Hill Cor BS Publis crete Strang House res, Severes	importal cable a pers, pip merits of cal Peri mpany, shers an uctures, e, 2002.	nce – Met and linear foes and prodes: - fifth edition d Distribution, Oxfo	thods of transforms. cooles - restres in, 201 uters P ey and	of achievirormation – Partial sing. 2. vt. Ltd., So	- design of Periods: 09 and continuity Calculation Periods: 09 prestressing Fotal Periods: econd edition ird Edition, 1	in CO of 4 - CO 5 s: 45

- 1. https://nptel.ac.in/content/storage2/courses/105105109/pdf/m3l15.pdf
- 2. https://www.youtube.com/watch?v=uMuFpT1gFVI
- 3. https://youtu.be/6CLEWA2WNgM
- 4. https://nptel.ac.in/content/storage2/courses/105101085/downloads/lec-24.pdf
- 5. https://nptel.ac.in/content/storage2/courses/105105109/pdf/m2l12.pdf

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)				Program Specific Outcomes (PSOs)			
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
1	3	2	3	-	-	2	-	-	1	1	-	1	-	-	-	
2	3	2	3	-	-	1	-	-	1	1	-	1	1	1	1	
3	3	2	3	-	-	1	-	-	1	1	-	1	1	-	2	
4	2	2	3	-	-	1	-	-	1	1	-	1	-	1	-	
5	2	2	3	-	-	1	-	-	1	1	-	1	-	2	2	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.Z..
Professor & Head

	Civil E	Engineering	Progra	amme :	B.Tec	ch.				
Semester	VIII		Cours	e Cate	gory C	ode: F	E End	Semeste	r Exam 1	Гуре: ТЕ
Course	LIDOC	=T027	Per	iods/W	eek		Credit	Max	ximum M	arks
Code	0236	ET827	L	Т	Р		С	CAM	ESE	TM
Course Name		nmental Impact Assessment	3	0	0		3	25	75	100
Prerequisite	Envir	onmental Engineering								
	On c	ompletion of the course, the stud	ents will b	e able	to				(H	lapping ighest evel)
•	CO1	Understand the concept of Environr	mental prot	ection	laws					K2
Course	CO2	Understand about EIA methodologic	es							K2
Outcomes	CO3	Analyze the various mitigation meas	sures							K3
	CO4	Understand the concept of socio-ec	onomic im	pact as	sessm	nent				K2
	CO5	Assess the concept about economic	c profile of	the cor	nmuni	ty				K3
UNIT- I		and Acts						Per	iods: 9	
statement of Minimum Nati	the Go ional St	e of environmental protection laws an vernment of India. Legal and Regul andards – Bureau of Indian Standar	latory aspe	ects in	India -			imitations	s of EIA	
UNIT- II	<u>i</u>	odologies					. 6. 1		iods: 9	
	_	 Appropriate Methodologies, Quanti ninary assessment 	ification, -	Cost be	enefit a	analys	is - Risk	assessn	nent, Les	co2
UNIT - III	·····	uality Impact						Per	iods: 9	<u></u>
		al considerations and factors, air qu	uality impa	ct of ir	ndustry	/, tran	sport sy			
developmenta sound, the eff	al projects of	lity impact: Water quality criteria a cts –Land and soil quality impacts- noise on people, noise scales and ra	Soil fertilit							СОЗ
UNIT - IV			ating methor	ods, es				n noise i	mpact.	
		gy Impact			timatin	ıg tran	sportatio	n noise i Per	mpact. iods: 9	
Energy impac plants, Veget measures, alto	t consideration a	gy Impact derations, data sources, energy con nd Wild life impact: Biological cond es - Types, steps in performing socio	servation o	lata, El terms,	timatin IA of h impac	g tran ydro, et on	sportation thermal	n noise i Per and nucle I fauna,	mpact. iods: 9 ear powe mitigating	GO4
Energy impac plants, Veget measures, alto	et consideration a ernative impacts	gy Impact derations, data sources, energy con nd Wild life impact: Biological cond	servation of cepts and economic	lata, El terms,	timatin IA of h impac	g tran ydro, et on	sportation thermal	Per and nucle I fauna, s of public	mpact. iods: 9 ear powe mitigating	GO4
Energy impact plants, Veget measures, alto and facilities, UNIT - V Environmenta	et consideration a ernative impacts Sumr	gy Impact derations, data sources, energy con nd Wild life impact: Biological conc es - Types, steps in performing socio s, social impacts	servation of cepts and economic cts	data, E terms, impact	timatin IA of h impac asses	ydro, et on t sment	sportation thermal flora and , analysi	Perion noise in noise in Perion nuclei in Indian nuclei i	mpact. iods: 9 ear powe mitigating c service: iods: 9	CO4
Energy impact plants, Veget measures, alto and facilities, UNIT - V Environmenta	et consider to consider to compart to compart to compart to compare to compar	gy Impact derations, data sources, energy con nd Wild life impact: Biological con es - Types, steps in performing socio s, social impacts narization of Environmental Impact gement plan, public involvement - im ison of alternatives-Training	servation of cepts and economic cts	data, El terms, impact	timatin	ydro, to on to	sportation thermal flora and , analysi	Perion noise i Perion noise i I fauna, Is of public Perion	mpact. iods: 9 ear powe mitigating c service: iods: 9	CO4
Energy impac plants, Veget measures, alt and facilities, UNIT - V Environmenta information - c	et consider to consider to compart to compart to compart to compare to compar	gy Impact derations, data sources, energy con nd Wild life impact: Biological con es - Types, steps in performing socio s, social impacts narization of Environmental Impact gement plan, public involvement - im ison of alternatives-Training	servation of cepts and economic cts	data, El terms, impact	timatin	ydro, to on to	sportation thermal flora and , analysi	Perion noise i Perion noise i I fauna, Is of public Perion	mpact. iods: 9 ear powe mitigating c service: iods: 9 change c	CO4
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Energy impact plants, Vegets measures, altrand facilities, UNIT - V Environmenta information - c Lecture Pereceptate Books 1. Triv 2. S.R 3. Larr Reference B 1. Cant 2. Petts 3. Kual Developmenta S. June 4. John 5. 5. June Web Referen 1. http://	et consideration a ernative impacts Summal Mana- comparedi.P.R. Eriods: Exister, L.W. Exister (Consideration of the consideration of th	derations, data sources, energy connected wild life impact: Biological conces - Types, steps in performing sociols, social impacts marization of Environmental Impact gement plan, public involvement - imison of alternatives-Training 45 Tutorial Periods: - The Trivedi, P.R, Environmental Impact Assessment (1996) Environmental Impact Assessment (1996) Environmental Impact Assessment Centre. The Trivedia Periods: - T	servation of cepts and economic of the conomic of t	data, El terms, impact conomi cal Per ent, AP nental I w Hill p c Graw ment V elopme	timatin IA of h impact c profil riods: PH Pub mpact ublicat Hill. /ol.I an nt pro	ydro, ton ton to sment le of the le	sportation thermal in flora and in, analysi me comm g, 2011. ssment" in 995 blackwell United and Bool	Perion noise in Perion noise i	mpact. iods: 9 ear powe mitigating c services iods: 9 change c al Period London. Asia and	CO4 CO5 S: 45 Pacific

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)				Program Speci Outcomes (PSC			
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
1	2	2	3	2	2	-	-	-	-	-	-	1	2	2	3	
2	3	3	2	3	3	-	-	-	-	-	-	1	3	3	2	
3	3	3	3	3	3	-	-	-	-	-	-	1	3	3	3	
4	2	3	3	2	3	-	-	-	-	-	-	1	2	3	3	
5	3	3	3	3	3	-	-	-	-	-	-	1	3	3	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Somostor	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.2..
Professor & Head

Department	Civil Engineering	Prog	gramm	ne:	B.Tech) .				
Semester	VIII	Course Category *End Semester Exam								
Comocio			e: PE		·····	ype: TE				
		Peri			Credi	t M	aximum I	Иarks		
Course Code	U23CEE828	Wee			_		T			
N.		L	T	Р		CAM	ESE	ΓM		
Course Name	Natural Disaster and Mitigation	3	0	0	3	25	75	100		
Prerequisite										
Course	On completion of the course, the stu	ıdents	s will	be	able to	1	(Hiç	apping ghest vel)		
Outcome	CO1 Impart knowledge of causes of va	arious	disast	ter a	and its	impact.	ŀ	< 2		
	CO2 Identify the consequences and ur	nderst	and co	ontr	ol of di	sasters	ŀ	₹2		
	CO3 Understand disaster managemen	t cycle	e and	its 1	framew	ork	ŀ	₹2		
i	CO4 Recognize various disaster mana	geme	nt foll	owe	ed in In	dia.	ŀ	<2		
	CO5 Learn about applications of scien management & mitigation	_					r I	(2		
UNIT-I	Fundamentals of Disaster Managem	ent		I	Period	s: 09	i			
Definitions and	types of disasters (natural and man-ma	de). C	Conce	pts	of haza	ard, vuln	erability,	CO1		
•	city - Relationship between disaster and	devel	opmer	nt -	Overvi	ew of di	saster			
management p				<u>-</u>						
UNIT-II	Types and Trends of Disasters			<u>I</u>	Period					
	dro-meteorological, biological, technolog						s - Globa	CO2		
UNIT-III	and emerging risks - Impact of climate Disaster Management Cycle and St				n disa: Period					
	e disaster management cycle - Pre-disas			<u>i</u>			reie - Riek	്രാ		
	ention, and mitigation strategies - Earl					-		1		
	esponse mechanisms including search									
	ers, and incident command systems - I									
Yokohama Stra	ategy, and Hyogo Framework.									
UNIT-IV	Disaster Management Framework in	ı India	a	l	Period	s: 09				
Disaster profile	of India including mega disasters and	lessor	ns leai	rne	d - Disa	aster Ma	anageme	nt		
Act of 2005 - Ir	nstitutional and financial mechanisms for	r disas	ster m	ana	gemer	it in Indi	a - Role	of CO4		
	GOs, and inter-governmental agencies i		ster re			00				
UNIT-V	Technology and Mitigation in Disast Management	er			Period	s: 09				
Role of geo_inf	ormatics in disaster management - Disas	ster co	mmııı	nics	ation ev	etame -	l and use			
_	development regulations for disaster re				-			((())		
mitigation mea							- II - I - I - I - I - I - I - I - I -			
Lecture Perio		actica	l Peri	ods	s: -	Γotal Pe	eriods: 4	<u>i</u> 5		
Text Books	1				<u> </u>					
2. Introduc	r Management Guidelines (GOI-UND Di ction to International Disaster Managem					•	•	erworth		
	ann. r Management and Risk Reduction: Rol ar, S. Chatterjee (2013), Narosa Publish			nme	ntal Kr	owledg	e by A.K.	Gupta,		
	r Management by D.B.N. Murthy (2012),	-		ер	Publica	ations.				
	ng Natural Disasters by S. Modh (2010)			-						
3	-									

- 1. Natural Hazards and Disaster Management: Vulnerability and Mitigation by R.B. Singh.
- 2. Disaster Management: Approaches in India by Paritosh Srivastava.
- 3. Management and Mitigation of Natural Disasters by Rajan Kumar Sahoo.

Web References

- 1. https://www.unisdr.org/
- 2. http://www.fema.gov/about/regions/regionii/toolkit_risk.shtm.
- 3. http://www.colorado.edu/hazards/dr/currentdr.html

COs/POs/PSOs Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	2	1	2	3	1	-	1	3	2	2	1
CO2	2	1	1	-	2	1	2	3	1	-	1	3	2	2	1
CO3	1	2	2	3	3	3	2	2	2	2	1	3	3	3	2
CO4	2	1	1	2	3	2	3	2	2	1	3	3	2	3	2
CO5	2	2	2	-	1	3	3	2	1	-	-	-	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As:	sessment Mark	s (CAM)	End	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

^{*} Application-oriented / Problem-solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph.z.. Professor & Head

Department of Civil Engs Sri Manakula Vinayagar Engg. College Madagadipet, Puducherry, India

Department	Civil E	Engineering	Progra	amme : I	3.Tech.				
Semester	VIII		Cours	e Categ	ory Code	: PE End	Semeste	er Exam T	уре: ТЕ
Course	H23C	EE829	Pe	riods/We	eek	Credit	Ma	ximum Ma	arks
Code	0200		L	Т	Р	С	CAM	ESE	TM
Course Name	Bridge	Engineering	3	0	0	3	25	75	100
Prerequisite							T		
	On c	ompletion of the course, the stude	ents will b	oe able	to			BT Ma _l (Highes	
	CO1	Understand the fundamentals, code	s of practi	ice and l	bridge fail	lures.		K	2
Course	CO2	Understand the estimation of forces	for the de	sign bri	dge struc	tural eleme	ents	K	2
Outcomes	CO3	Design of the slab and girder beam l	bridges us	sing app	ropriate r	nethod		K	4
	CO4	Apply principles to design long-span	bridges a	and mod	dern bridg	ge		K	3
		Design of substructure components						K	
UNIT- I		duction					Per	iods: 09	•
	<u>i</u>	estigations and planning, choice of t	ype, I.R.C	C. specif	ications f	or road bri			9
		s acting on bridges, general design o	• •				J ,		CO1
UNIT- II	Load	s on Bridges					Per	iods: 09	
Indian Ro	ad Cong	gress (IRC) bridge codes – dimension	s – dead a	and live I	loads – im	pact effect	– wind a	nd seismi	C
forces -	longitud	inal and centrifugal forces - hydra	ulic force	s – ear	th pressu	ıre – temp	perature	effect and	d CO2
secondary									
UNIT - III	Slab	and T – Beam Bridges					Per	iods: 09	····•
_		idges – skew slab culverts – box cul	lverts. T -	-Pigeau	d curves -	-Courbon'	s theory	Hendry	CO3
Jaegar me		esign of T – beam bridges.							
UNIT - IV		Span Bridges						iods: 09	····•
_	-	of box girder bridges, balanced cant		-		•		-	
-	-	ension bridges- Design of Prestresse		_	-				CO4
	-	f Steel Concrete composite bridges	by Cour	bons's 1	ineory (G	iraer secti	on only)	- Seismic	
UNIT - V	,	ping devices ngs and Substructure					Por	iods:09	
	<u>i</u>	bearings – Design of bearings – De	acian of n	naconny	and con	crete niere	<u>I</u>		
Types of b	oridge fo	oundations – Design of Open and de	ep founda	itions (w	ell founda	•	······		CO5
Lecture P	eriods:	45 Tutorial Periods: -	Practio	cal Peri	iods: -		Tot	al Period	s: 45
		of Bridge Engineering – D.J. Victor of bridges.	or <i>Funda</i>	mental	concepts,	design p	rinciples,	and con	structior
2. Brid ç techr	ge Engi niques.	ineering – Ponnuswamy <i>Explains d</i>		-					
		idge Practice: Analysis, Design an sed concrete bridges.	d Econo	mics – \	V.K. Raina	a Focuses	on the d	esign of re	inforced
Reference B									
1. Bridg	je Engir	neering Handbook – Wai-Fah Chen &	Lian Dua	an.					
2. Steel	Bridge	s: Conceptual and Structural Design	– Manfred	4 Hirt &	Jean-Pau	ıl Lebet.			
3. Struc	tural Ar	nalysis and Design of Tall Buildings a	nd Bridge	s – Bun	igale S. T	aranath.			
	/ations i	n Bridge Engineering Technology- K	(haled Ma	hmoud.					
4. Innov	auono i								
Web Refere	nces	.fhwa.dot.gov/bridge/nbi.cfm							
Web Refere 1. http:	nces s://www	.fhwa.dot.gov/bridge/nbi.cfm .fhwa.dot.gov/bridge/							

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)					ram Spe	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
2	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
3	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
4	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2
5	1	2	-	3	-	1	-	-	-	-	-	1	2	-	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Professer & Head

Department of Civil Engg

Sri Manakula Vinayagar Engg. College
Madagadipet, Puducherry, India

Department	Civil E	ngineering	Progr	amı	me: E	3.Tech	•		
Semester	VIII		Cours		_		End Se TE	mester Exa	m Type:
Course Code	U23CE	F830	Perio Week		/	Credit	M	aximum Ma	rks
Occide Code	OZUOL		L	Т	Р	С	CAM	ESE	TM
Course Name	Smart	City	3	0	0	3	25	75	100
Prerequisite			-		_				
		mpletion of the course, the stude	ents wi	l be	abl	e to		(Highe	apping st Level)
Course	CO1	Describe the concept of smart cit	y and a	sso	ciate	d challe	enges.		₹2
Outcome	CO2	Identify the planning and develop	ment o	fsm	nart c	ities.		I	K2
	CO3	Analyze the process of project m	anagen	nent	in sı	mart cit	ies.		₹2
	CO4	Understand the importance of development for smart cities.				•	ning a		₹2
	CO5	Learn about transportation syste	m for sr	nart	citie	S		l	₹2
UNIT-I	Introdu						Period		
Performance B developments	enchma	ties- Definition, dimensions, scope rks, Practice Code, Principal stake	holders				smart ci	ities	CO1
UNIT-II	<u>.</u>	Cities Planning and Developmer					Period		
developments,	Sustain	nfrastructure, Introduction to city able features for smart cities. Ro ervices, Case Study.							CO2
		management in Smart Cities					Period	s: 09	
Scheduling an technique. Pro	d CPM. ect mon	ect and work break down Structure Project cost analysis, resource itoring and control, Project risk ma	allocation nageme	on a ent.	& leν	eling,	Line of	f balancing	CO3
_	<u> </u>	ucture Planning and Developme				<u>i</u>	Period		
nfrastructure Pi Dimension of si	rogram a mart citie	nfrastructure projects, planning f and policies by MOUD, PPP (DBO es, Financing smart cities develop art Techniques, Case Study.	OT, BÓ	OT.	etc.) in infr	astruct	ure projects	
UNIT-V	·	oortation system for Smart Cities	}				Period	s: 09	4
public transpo	nd urbar rtation,	n mobility, urban land use and train pedestrians and bicyclists and p (ITS), Case Study.	nsport.						CO5
Lecture Perio			actical	Per	iods	: - T	otal Pe	eriods: 45	
Text Books						L			

- Jo Beall (1997); "A city for all: valuing differences and working with diversity"; Zed books limited, London (ISBN: 1-85649-477-2).
- 2. UN-Habitat; "Inclusive and sustainable urban planning: a guide for municipalities"; Volume 3: Urban Development Planning (2007); United Nations Human Settlements Programme (ISBN: 978- 92-1-132024-4).
- 3. Arup Mitra; "Insights into inclusive growth, employment and wellbeing in India"; Springer (2013), New Delhi (ISBN: 978-81-322-0655-2
- 4. Mission statement &guidelines on Smart City Scheme". Government of India Ministry of Urban Development http://smartcities.gov.in/upload/uploadfiles/files/Smart City Guidelines(1).pdf.

- 1. John S. Pipkin, Mark E. La Gory, Judith R. Balu (Editors); "Remaking the city: Social science perspective on urban design"; State University of New York Press, Albany (ISBN: 0-87395-678-8)
- 2. Giffinger, Rudolf; Christian Fertner; Hans Kramar; Robert Kalasek; Nataša Pichler-Milanovic; Evert Meijers (2007). "Smart cities Ranking of European medium-sized cities". Smart Cities. Vienna: Centre of Regional Science
- 3. "Draft Concept Note on Smart City Scheme". Government of India Ministry of Urban Development

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- 1. IEEE Xplore (www.ieeexplore.ieee.org) Research papers on smart infrastructure.
- 2. Springer & Elsevier Journals (www.springer.com, www.elsevier.com) Civil engineering advancements in Smart Cities.
- 3. Smart Cities Mission (India) (https://smartcities.gov.in) Updates on urban smart city projects.

COs/POs/PSOs Mapping

Cos					Prog	ram O	utcom	es (PO	s)					ram Spe	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
2	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
3	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
4	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3
5	3	3	2	-	-	3	-	-	-	-	-	-	1	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous As:	sessment Mark	s (CAM)	End	Tatal
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5 5 5			75	100

^{*} Application-oriented / Problem-solving / Design / Analytical in content beyond the syllabus

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Open Elective Courses Offered by Civil Department

Department	Civil	Engineering	Program	me: B	.Tecl	n.			
Semester	V/VI		Course C		ory	:	d Seme	ster Ex	am Type:
			Code: O			TE	N 4		N 4l
Course Code	11230	EOC01	Periods / \			Credit		aximum	
			L	Τ	Р	С	CAM	ESE 	ГМ
Course Name	Energ	y and Environment	3	0	0	3	25	75	100
	1	(Common to ECE, ECE, M	ECH, BME	, IT, N	/lecha	atronics)		l n =	
Course	On co	mpletion of the course, th	e student	s will	be al	ole to		(H	Mapping lighest ₋evel)
Outcome	CO1	Apply the knowledge of sci contemporary issues of En environment		_	_				K3
	CO2	Identify, review & analyze to in environment	the comple	x prob	olems	of Ener	gy crise	es	K4
	CO3	Designing solutions for the energy systems to meet th limitations	• • •					ole	K4
	CO4	Understanding the impact providing solutions for sust					d		K5
	CO5	Apply biomass energy und	er relevant	techr	nologi	ies			K3
UNIT-I	ENEF	RGY			l	Periods	: 09		
		gy sources, Conventional & es of energy advantages, lir				gy, Ren	ition. T ewable	source	
Nonrenewable	source				rison	gy, Ren	ewable	source	
Nonrenewable UNIT-II	e source ENVI	es of energy advantages, lir	mitations, c	ompa	rison	gy, Renos s Periods	ewable : 09		s &
Nonrenewable UNIT-II Impact of enerwarming, Green	ENVI rgy on enhous	es of energy advantages, lir RONMENT economy &environment. Re e effect, Acid rain, Ozone la - Water Act-1974 (Prever	mitations, c egional impayer deplet	ompa oacts o	rison I of ten	gy, Rends S Periods nperature environi	ewable : 09 e chanç ment de	ge - Glo egradati	s & bal on,
Nonrenewable UNIT-II Impact of ener warming, Gree Environmental	ENVI rgy on enhous I laws 1986, A	es of energy advantages, lir RONMENT economy &environment. Re e effect, Acid rain, Ozone la - Water Act-1974 (Prever	mitations, c egional imp ayer deplet ntion & co	oacts o	rison lacket	gy, Rends S Periods nperature environi	ewable : 09 e chang ment de The ei	ge - Glo egradati	s & bal on,
Nonrenewable UNIT-II Impact of eneron warming, Gree Environmental protection act UNIT-III Hydropower I working, class	ENVI rgy on enhous I laws 1986, A	es of energy advantages, lir RONMENT economy &environment. Re e effect, Acid rain, Ozone la - Water Act-1974 (Preven	egional impayer depletation & co AL ENER on, layout co	ompa pacts of ion. Ir ntrol of GY of hydi	rison lof ten ndian of po	gy, Rends Periods: nperature environi Ilution), Periods: wer plan mal Ener	ewable : 09 e changment de The ei : 09 t, comp	ge - Glo egradati nvironm oonents roductio	bal on, ent CO2
Nonrenewable UNIT-II Impact of eneron warming, Gree Environmental protection act UNIT-III Hydropower I working, class Site selection	ENVI rgy on enhous I laws 1986, A HYDI Energy sification, layou	RONMENT economy & environment. Re e effect, Acid rain, Ozone la - Water Act-1974 (Preventair act. ROPOWER & GEOTHERM - Introduction, Site selections, power station, structure	egional impayer depletation & co AL ENER on, layout co	ompa pacts of ion. Ir ntrol of GY of hydi	rison lipof ten ndian of po lipof ro por vanta	gy, Rends Periods: hperature environi Illution), Periods: wer plan mal Ener	ewable : 09 e changment de The ei : 09 t, comp gy - Intr	ge - Glo egradati nvironm oonents roductio	bal on, ent CO2
Nonrenewable UNIT-II Impact of enerone warming, Gree Environmental protection act UNIT-III Hydropower I working, class Site selection UNIT-IV Sun as source working, class working, class	ENVI rgy on enhous I laws 1986, A HYDI Energy sification n, layou SOLA ce of energiation	RONMENT economy & environment. Re e effect, Acid rain, Ozone la - Water Act-1974 (Preventair act. ROPOWER & GEOTHERM - Introduction, Site selections, power station, structure to f power plant, componentar & WIND ENERGY energy - Introduction, Site selections, Types of collectors, con, advantages/limitations, Site	egional impayer depletation & co AL ENER on, layout of and control ts & working election, lapollection sy	ompa pacts of ion. Ir ntrol of GY of hydroll. Geo	rison I pof ten ndian pof por otherr vanta I pof por s effices	gy, Rends Periods: hperature environi Illution), Periods: wer plan hal Ener ages and Periods: wer plan ciency, S	ewable 1 09 1 e changment de The ei 1 09 1 t, comp gy - Introduce de Comp de	ge - Glo egradati nvironm conents roductio vantage:	s & bal on, ent CO2
UNIT-II Impact of eneron warming, Gree Environmental protection act UNIT-III Hydropower I working, class Site selection UNIT-IV Sun as source working, class Energy - Intro	ENVI rgy on enhous I laws 1986, A HYDI Energy sification, layou SOLA ce of ensification duction	RONMENT economy & environment. Re e effect, Acid rain, Ozone la - Water Act-1974 (Preventair act. ROPOWER & GEOTHERM - Introduction, Site selections, power station, structure to f power plant, componentar & WIND ENERGY energy - Introduction, Site selections, Types of collectors, con, advantages/limitations, Site	egional impayer depletation & co AL ENER on, layout co and contro ts & working election, la ollection sy te selection	ompa pacts of ion. Ir ntrol of GY of hydroll. Geo	rison I pof ten pof poor pof poor	gy, Rends Periods: hperature environi Illution), Periods: wer plan hal Ener ages and Periods: wer plan ciency, S	ewable : 09 e changment de The ei : 09 t, comp gy - Intr I disadv : 09 at comp Solar ce ant, cor	ge - Glo egradati nvironm conents roductio vantage:	s & bal on, ent CO2
Nonrenewable UNIT-II Impact of ener warming, Gree Environmental protection act UNIT-III Hydropower I working, class Site selection UNIT-IV Sun as source working, class Energy - Intro &working, class UNIT-V Introduction,	ENUTE	RONMENT economy & environment. Rese effect, Acid rain, Ozone late effect, Acid rain, Site selections, power station, Site selections, power station, Site selections, Types of collectors, con, advantages/limitations, Sition. RGY AUDIT AND MANAGE tages/limitations, Photosyriomass, factors affecting bio	egional impayer depletation & co AL ENER on, layout of and control ts & working election, labollection systems selection the selection	ompa pacts of ion. Ir ntrol of GY of hydroll. Geo ong, Ad yout of rstems n, layo	rison I I I I I I I I I	gy, Rends Periods: hperature environi Illution), Periods: wer plan hal Ener ages and Periods: wer plan biency, S power pl	ewable 1 09 1 e changment de The ei 2 09 1 t, comp gy - Intrology - Introlog	ge - Glo egradati nvironm conents roductio vantage: conents ells. Wir mponen	s & bal on, ent CO2 & CO3 s. CO4

Text Books

- 1. Trivedi R.R. and Jalka K.R, "Energy Management", Commonwealth Publication, 20177.
- 2. Diamant R.M.E., "Total Energy", Pergamon, OxfordPublishers, 2017.
- 3. N.G. AJJANNA " Energy auditing & demand side management" first edition, Gouthami Publications, Shimoga
- 4. Chakrabarti, M.L.Soni, P.V. Gupta, U.S. Bhatnagar "Power system Engineering" 2001, DhanpatRai&Co, New Delhi.
- 5. D.P.Kothari, K.C Singal, Rajesh Ranjan, "Renewable Energy sources and Emerging Technologies" second edition, PHI, India

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- Boyle G, Everett B and Ramett J, "Energy systems and sustainability", Oxford University Press, 2018
- "Pollution Control Acts, Rules and Notifications", CPCB, Pollution Control series, PC/2/2014, Vol.I,2014
- 3. Peavy.H, Rowe.D, and Tchobanoglous, G., Environmental Engineering, Tata McGraw-Hill, 2013
- 4. S.Rao, Dr. BB Parulekar "Energy Technologies" Khanna Publications, New Delhi
- 5. David M Buchla, Thomas E Kissel, Thomas L Floyd "Renewable Energy systems" Pearson, India
- Godfrey Boyle "Renewable Energy power for sustainable future" oxford Publications , New Delhi

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- 2. https://swayam.gov.in/nd1 noc20 ce23/preview
- 3. www.iucn.org
- 4. www.cites.org
- 5. www.thesummitbali.com/
- 6. http://engineering.geology.gov.in/

COs/POs/PSOs Mapping.

					Prog	ram O	utcom	es (PC	s)					ram Spe omes (P	
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO1												PSO2	PSO3
CO1	1	1	2	1	2	2	1	-	-	-	-	3	3	3	3
CO2	1	1	1	-	-	2	1	-	-	-	-	3	1	1	1
CO3	2	2	2	2	2	3	3	-	1	1	2	3	3	3	3
CO4	2	2	2	2	3	3	3	-	1	1	2	3	3	3	3
CO5	2	2	2	2	3	3	3	-	1	1	2	3	3	3	3

Evaluation Method

A		Continue	ous Assessi	ment Marks (CAN	M)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	1	0	5	5	5	75	100

^{*}Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Department	Civil	Engineering	Programr	ne: B	.Tec	h.				
Semester	V/VI		Course C Code: OE	:	ory	Туј	d Seme pe: TE			
C C	11000	250000	Periods / V	Veek	Ī	Credit	. ,	aximun	า Ma	arks
Course Code		CEOC02	L	Τ	Р	С	CAM	ESE		ГМ
Course Name		gy Efficient Buildings	3	0	0	3	25	75		100
	(Corr	nmon to ECE, ECE, MECH)				<u> </u>				
Course	On co	mpletion of the course, the	e students	will	be al	ole to		(H	Map High Leve	
Outcome	CO1	Understand the concept and	d effects of	globa	al wa	rming			K2	
	CO2	Understand Climate syscomponents.	tem, earth	า'ร ส	atmos	sphere	and it	:s	K2	2
	CO3	Analyze the Impacts of Clim	ate Chang	e on	vario	us secto	rs		K4	Ļ
		Assess the concept about of mechanism					•		K3	3
		Understand climate change	s, its impac	t and	mitic	gation ac	tivities.		K2	2
UNIT-I		ODUCTION			<u>i</u>	Periods				
design (proced	lure), E	n of building, Energy efficience Energy efficient building tech uilding, cooling comfort in hot	nologies, e		_	_	-		_	
UNIT-II	ENE	RGY EFFICIENCY IMPLEM	ENTION	••••••		Periods	: 09			
Energy efficier	ісу ро	licies, Target setting and sta	akeholder e	ngag	jeme	nt, Vario	us build	ling co	des	
and standards of building	, Ener	gy efficient building operation	ı, Passive s	olar,	Natu	ral ventil	ation, D	ay ligh	ting	CO2
UNIT-III	ENE	RGY EFFICIENCY MEASUR	REMENT			Periods	: 09			
Data and ene	rgy eff	iciency indicators, Evaluation	n of energy	effic	iency	, The m	ultiple b	enefits	of	
	-	Electrical Energy Measu System Measurements, Me							ts,	CO3
UNIT-IV	ENE	RGY EFFICIENCY INVEST	MENT			Periods	: 09			
Energy effici	ency i	investment – through polic	y, through	pro	ject	standard	lization,	throu	gh	
procurement,	throug	gh funding, finance and fisca	al instrumei	nts, tl	hroug	ıh energ	y marke	ets. Ca	se	CO4
studies with c	utting	edge of sustainable construc	ction.							
UNIT-V		RGY AUDIT AND MANAGE			<u>i</u>	Periods				,
understanding requirement,	g ener maxim	udit, need, types of energy a gy costs, bench marking, e nizing system efficiencies, o tion, energy audit instrumen	nergy perf ptimizing th	orma ne in _l	nce, out e	matchin nergy re	g energ	ly use ents, fu	to ıel	CO5
Lecture Perio	ds: 45	Tutorial Periods: -	Practica	l Per	iods:	- T	otal Pe	riods:4	1 5	
2. Dean I 3. Amrita Press, 201 4. Ursula & Sons, 20 5. Jacob	Hawke nshu 8. Eicke)14. J. Lan	abija, "Energy Efficient Build is and Wayne Forster, "Energ Shukla, Atul Sharma, "Sust ir, "Energy Efficient Buildings inb and Bruno Georges Polle f Buildings for Improved Fr	gy Efficient cainability T s with Solar t, "Energy-	Build hrou and Smar	ings" gh E Geof t Buil	, W.W. N nergy-E thermal dings: D	lorton & fficient Resourd esign, (Buildin ces", Jo Constru	gs", ohn ictio	CRC Wiley
Monito Reference Bo	oring o	_								

- Umberto Desideri, Francesco Asdrubali, "Handbook of Energy Efficiency in Buildings: A Life Cycle Approach", Butterworth-Heinemann, 2019.
- 2. Susan Roaf and Mary Hancock, "Energy Efficient Building: A Design Guide", Wiley, 1992
- 3. Xiaoqiang Zhai and Ruzhu Wang, "Handbook of Energy Systems in Green Buildings", Springer Berlin Heidelberg, 2018
- 4. Roberto Gonzalo, "Energy-efficient architecture", Walter de Gruyter, 2012
- 5. José Manuel Andújar and Sergio Gómez Melgar, "Energy Efficiency in Buildings: Both New and Rehabilitated", MDPI, 2020

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- 2. https://nptel.ac.in/courses/105/102/105102195/
- 3. https://alison.com/course/sustainable-architecture-energy-efficiency-and-quality

COs/POs/PSOs Mapping

Cos					Prog	ram O	utcom	es (PC)s)					ram Spo omes (P	
	PO1												PSO1	PSO2	PSO3
CO1	2	1	1	1	1	3	3	3	3	3	3	3	3	3	3
CO2	2											3	3	3	3
CO3	2	1	1	1	1	3	3	3	3	3	3	3	3	3	3
CO4	2	1	1	1	1	3	3	3	3	3	3	3	3	3	3
CO5	2	1	1	1	1	3	3	3	3	3	3	3	3	3	3

Correlation Level: 1- Low, 2 - Medium, 3 - High

Evaluation Method

A		Continue	ous Assessi	ment Marks (CAI	M)	End Semester	Total
Assessment	CAT 1 CAT 2		Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	1	0	5	5	5	75	100

^{*}Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Department of Civil Engg Sri Manakula Vinayagar Engg. Cellege Madagadipet, Puducherry, India

Department	Civil Engineering	Programn	ne: B	.Tech	١.			
Semester	VII	Course C Code: OE		ory	TE		ter Exan	
Course Code	1122CEOC02	Periods / W			Credit		aximum l	
Course Code	U23CEOC03	L	Т	Р	С	CAM	ESE	ГМ
Course Name	Disaster Management	3	0	0	3	25	75	100
	(Common to EEE, ECE, CSE, I	T, ICE, ME	CH, E	BME,	CCE,AI	&DS)		
Course	On completion of the course, th	e students	will	be ab	ole to		(Hi	fapping ghest evel)
Outcome	CO1 Infer Disasters, man-made	Hazards aı	nd Vı	ılnera	bilities			K2
	CO2 Summarize the flood mana	gement stu	dies					K2
	CO3 Identify disaster mitigation	and manag	geme	nt me	chanisi	m		K1
	CO4 Estimate the disaster safet		-					K2
	CO5 Determine the disaster plai	n and act						K3
UNIT-I	DEFINITION AND TYPES			F	Periods	: 09		
i	Disasters, Risk and Vulnerability i							
•	floods drought, landside, land			-				
avalanches, g	lobal climate extremes. Man-made	disasters:	Terro	rism,	gas an	d radiat	ions leak	s,
toxic waste dis	sposal, oil spills, forest fires							
UNIT-II	STUDY OF IMPORTANT DISAS	TEDE			Periods	. 00		
_	ind its types, magnitude and intens			<u>i</u>			.144	
	flood types and its management, dents case studies of disasters in	• • • • • • • • • • • • • • • • • • • •			•			1
_	d Environmental impact of disaster	•	9., -	artiq	uunco,	Laridok	<i>10)</i> . 000	IGI 002
UNIT-III	MITIGATION AND MANAGEME	NT		F	Periods	: 09		
•	risk management and crisis ma	•				•	•	
•	d Recovery - Development, Preve	ention, Mitig	ation	and	Prepare	edness-	Planning	CO3
for relief. UNIT-IV	SAFETY PROCESS				Periods	· 00		
	isaster: Coping Strategies; alternat	ive adjustm	ent n	<u>l</u>			Concen	ite
	inagement - Industrial Safety Plan	-						
and disaster n		, ,						30,
IJNIT-V	PI ANNING AND ACT			F	Periods	: 09		
Planning for o	lisaster management: Strategies	for disaster	mar	nagen	nent pla	anning -	Steps f	or COE
formulating a					Λ	L D-1:	in India	- 003
Organizationa	disaster risk reduction plan - Dis	saster man	agen	nent i	Act and	Policy	III IIIuia	
_	disaster risk reduction plan - Dis I structure for disaster manageme	saster man	agen	nent i		•		ict
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disaster mana	disaster risk reduction plan - Dis I structure for disaster manageme gement plans	saster man ent in India	agen ı - Pı	repara	ation of	state a	and distri	
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disaster mana Lecture Perio Text Books 1. Dr. Mi 2. Tusha Ltd.	I structure for disaster management plans ds: 45 Tutorial Periods: - rinalini Pandey, Disaster Management Bhattacharya, Disaster Science a	saster man ent in India Practica Practica ent, Wiley I and Manag	agen I - Pi I Per i ndia emer	repara iods: Pvt. L	ation of - T td Graw H	state a	riods:45	dia) Pvt
disaster mana Lecture Perio Text Books 1. Dr. Mi 2. Tusha Ltd.	I structure for disaster management gement plans ds: 45	saster man ent in India Practica Practica ent, Wiley I and Manag	agen I - Pi I Per i ndia emer	repara iods: Pvt. L	ation of - T td Graw H	state a	riods:45	dia) Pvt
disaster mana Lecture Perio Text Books 1. Dr. Mi 2. Tusha Ltd. 3. Jagbii Pvt. L 4. J. P. S	I structure for disaster management gement plans ds: 45	ent in India Practica Practica Practica Pent, Wiley I And Manag Puture Challe Cmi Publica	agen Peri ndia emer enge	repara iods: Pvt. L nt, Mc	- T td Graw H	state a	riods:45 ation (Ind	dia) Pvt

Manmade, B S Publication

- 1. Disaster Management by Mrinalini Pandey Wiley 2014.
- Disaster Science and Management by T. Bhattacharya, McGraw Hill Education (India) Pvt Ltd Wiley 2015
- 3. Earth and Atmospheric Disasters Management, N. Pandharinath, CK Rajan, BS Publications 2009.
- 4. National Disaster Management Plan, Ministry of Home affairs, Government of India
- 5. Manual on Disaster Management, National Disaster Management, Agency Govt of India.

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- 2. http://nidm.gov.in/pdf/guidelines/new/sdmp.pdf
- 3. http://sdmassam.nic.in/pdf/publication/undp/disaster_management_in_india.pdf

COs/POs/PSOs Mapping

			<u> </u>												
					Prog	ram O	utcom	es (PC	s)					ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	3	2	-	2	2	2	3	1	3	3
CO2	3	2	3	2	3	3	2	-	2	2	2	3	1	3	3
CO3	3	2	3	2	3	3	2	-	2	2	2	3	1	3	3
CO4	3	2	3	2	3	3	2	-	2	2	2	3	1	3	3
CO5	3	2	3	2	3	3	2	-	2	2	2	3	1	3	3

Correlation Level: 1-Low, 2-Medium, 3- High

Evaluation Method

		Continuo	ous Assessi	ment Marks (CA	M)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	1	0	5	5	5	75	100

^{*}Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.S. SUNDARARAMAN, M.Tech., Ph. Professor & Head

Department of Civil Engg Sri Manakula Vinayagar Engg. Cellege Madagadipet, Puducherry, India

Department	Civil	Engin	eering	Program						
Semester	VII			Course (ory Co	TE			
0	11000	NEO 0 0	.4	Periods /	Week		Credit	ļ	ximum	············
Course Code		CEOC		L	Т	Р	С	CAM	ESE	ГМ
Course Name	Air Po Manaç		n and Solid Waste It	3	0	0	3	25	75	100
	(Cor	mmon	to EEE, ECE, CSE, I	T, ICE, ME	CH, B	ME,	CCE, AI	&DS)		
Course		-	ion of the course, th						(Hi	lapping ghest evel)
Outcome	CO1	Unde	rstand the type, sour	ces & effec	t of air	pollu	utants			K2
	CO2	1	the parameters affe asurement and estim				various	methods	;	K3
	CO3	Gain	knowledge of basics	of noise po	llution					K2
	CO4	1	rstand various air pol ed due to automobile		rol equ	iipme	ent's & p	ollution		K4
	CO5	Unde	rstand the concepts o	of solid was	ste ma	nage	ment			K2
UNIT-I	DEFI	NITIO	N AND TYPES				Periods	: 09	<u>i</u>	
			Air pollution episode fects of air pollutants						ation a	nd CO1
UNIT-II	STU	OY OF	IMPORTANT DISAS	STERS			Periods	: 09		
Meteorologica sampling, colle	l Asped	cts: At of parti	mospheric stability, p culates and gaseous	lume beha pollutants	vior, <i>A</i> meth	Ambie ods c	ent air sa of estima	ampling a tion.	and sta	ck CO2
UNIT-III	MITIC	GATIO	N AND MANAGEME	ENT			Periods	: 09		
gaseous pollut automobile ex	tants, g xhaust:	ravity: Pollu	ds and equipment: P settlers, electrostatic ution due to diesel Sources, ill effects, o	precipitato and petro	rs, bag ol eng	filter jines	s cyclon	es, wet s	crubbei	rs, CO3
UNIT-IV	SAFE	ETY PI	ROCESS				Periods	: 09		
			ste management, s nts, sampling and an		•			charact	erisatio	co4
UNIT-V	PLAN	NNING	AND ACT				Periods	: 09		
management.	Treatr	nent a	ion and transportatio and disposal method applications, leachate	s: compos	ting, s					
Lecture Perio	ds: 45		Tutorial Periods: -	Practica	al Peri	ods:	- T	otal Peri	ods:45	5
Text Books		<u></u>					<u>I</u>			

- 1. M.N. Rao & H.V.N. Rao, 1988, Air Pollution, Tata McGraw Hill Publishing Co. Ltd.
- 2. C.S. RAO, 2007, Environmental Pollution Control Engineering, New Age International, Wiley Estern Ltd. New Delhi.
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- P. Aarne Vesilind, William Worrell & Debra Reinhart, 2002, Solid Waste Engineering, Cengage Learning India pvt. Ltd.
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- 2. http://cpheeo.gov.in/upload/uploadfiles/files/Part1
- 3. https://nptel.ac.in/content/storage2/courses/104103022

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PC	Os)					ram Spo omes (P	
	PO1												PSO1	PSO2	PSO3
CO1	2	2 3 2 3 2 3 3 3 3 2										3	3	2	3
CO2	3	2 2 2 2 2 2 2 2 2 2 2										3	3	3	3
CO3	3	3	3	2	2	2	3	3	3	3	2	3	3	3	2
CO4	2 3 2 3 2 3 2 3 2 2										3	3	3	3	
CO5	3	3 3 3 2 3 3 3 3 2 3										3	3	3	3

Correlation Level: 1- Low, 2 - Medium, 3 - High

Evaluation Method

		Continue	ous Assessi	ment Marks (CAN	/ I)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	1	0	5	5	5	75	100

^{*}Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Department of Civil Engg Sri Manakula Vinayagar Engg. College Madagadipet, Puducherry, India

ANNEXURE IV

Honours / Minors Degree Programme

Green Technologies and Sustainable Engineering

		(Green Technolo	gies and Su	stainable	Enç	gine	erir	ıg			
SI.	Sem	Course Code	Course Title	Category	Course Type*	Pe	rio	ds	Credits	Ma	ax. Mar	ks
		Oode			Type	L	T	Р		CAM	ESM	Total
1	IV	U23GXT401	Energy, Environment and Renewable Energy Technologies	PC/IC	Т	3	0	0	3	25	75	100
2	V	U23GXT502	Sustainable Energy Systems	PC/IC	Т	3	0	0	3	25	75	100
3	VI	U23GXB603	Green Technologies & Renewable Energy Systems	PC/IC	В	3	0	2	4	50	50	100
4	VII	U23GXB704	Sustainability in the Built Environment	PC/IC	В	3	0	2	4	50	50	100
5	VIII	U23GXT805	Green Management	PC/IC	Т	3	0	0	3	25	75	100
6	VIII	U23CXW806	Project work	PC/IC	PA	0	0	4	2	50	50	100
			Total Credits						19	225	375	600
			Equ	ivalent NPT	EL Course	es**						
1	IV		vironment and	Environ	mental Ch	emis	stry		3			
2	IV		ble Energy nologies	Environmental Modeling and Simulation				d 	3	12 Weeks Course		
3	V	Sustainable E	Energy Systems	Concep	stainable Engineering ncepts and Life Cycle Analysis							

^{**}The students shall be given to earn 3 credits through one 12-week NPTEL course (Equivalent) Instead of any one theory course listed for Honour/Minor degree programme and shall be completed before the commencement of eight semester. The equivalent course are subject to change based on its availability a per NPTEL Course List.

The students shall be given to earn 3 credits through one 12 week NPTEL course (Equivalent) Instead of any one theory course listed for Honour/Minor degree programme and shall be completed before the commencement of eight semester. The equivalent course are subject to change based o its availability a per NPTEL Course List.

^{*} T - Theory, B - Theory cum Practical, PA - Project Work

UNIT-II ECOLOGY AND ENVIRONMENT Concept and theories of ecosystems, - energy flow in major man-made ecosystems- agricultural, industrial and urban ecosystems - sources of pollution from energy technologies and its impact on atmosphere - air, water, soil, and the environment - environmental laws on pollution control, The environmental protection act: Effluent standards and ambient air quality, innovation and sustainability, eco-restoration: phyto-remediation. UNIT-III RENEWABLE SOURCES OF ENERGY Periods: 09 Solar Energy: Solar radiation: measurements and prediction. Indian's solar energy potential and challenges, solar energy conversion principles and technologies: Photosynthesis, Photovoltaic conversion and Photo thermal energy conversion. Wind Energy: Atmospheric circulations, atmospheric boundary layers, classification, factors influencing wind, wind shear, turbulence, wind energy basics and power Content, wind speed monitoring, Betz limit, wind energy conversion system: classification, characteristics and applications. Ocean Energy: Ocean energy esources-ocean energy conversion principles and technologies: ocean thermal, ocean wave & ocean tide. Sioenergy: resources and types. UNIT-IV OTHER ENERGY SOURCES AND SYSTEMS Periods: 09 Hydropower, Nuclear fission and fusion-Geothermal energy: Origin, types of geothermal energy sites, site selection, geothermal power plants; hydrogen energy, Magneto-hydro-dynamic (MHD) energy conversion – Radioisotope Thermoelectric Generator (RTG), Bio-solar cells, battery & super capacitor, energy transmission and conversions UNIT-V ENERGY AND ECONOMY Periods: 09 Energy and Economics: gross domestic product (GDP) and energy – energy market and society – energy of the product (GDP) and energy – energy market and society – energy of the product (GDP) and energy – energy market and society – energy of the product (GDP) and energy – energy market and society – energy of the product (GDP) and energy – energy market and society – energy of the product (GDP) and energy – energy	Department	Civil E	Engineering	Progr	amme:	Honours	/Minors			
Course Energy Environment and Renewable 3 0 0 3 3 25 75 100 Prerequisite Environmental Science On completion of the course, the students will be able to (Highest Level CO2 Appreciate energy ecosystems and its impact on environment in K4 (CO2 Appreciate energy ecosystems and its impact on environment in K4 (CO3 Learn basics of various types of renewable and clean energy technologies. K4 (CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics of various types of renewable energy (Prior CO3 Learn basics) (Prior CO3 Learn basi	Semester	IV		Cours	e Categ	jory Cod	le: PC E	nd Semest	er Exam ⁻	Гуре: ТЕ
Course Energy Environment and Renewable 3 0 0 3 25 75 100 Prerequisite Environmental Science On completion of the course, the students will be able to CO1 Understand the nexus between energy, environment and sustainable development K4 CO2 Appreciate energy ecosystems and its impact on environment CO3 Learn basics of various types of renewable and clean energy technologies. K4 CO3 Learn basics of various types of renewable and clean energy technologies. K4 CO4 Serve as bridge to advanced courses in renewable energy CO4 Serve as bridge to advanced courses in renewable energy Introduction to the nexus between energy, environment and sustainable development, Energy sources over view and classification, sun as the source of energy, fossil fuel reserves and resources - overview of global/ India's energy scenario. Energy consumption models - Specific Energy Consumption. UNIT-II ECOLOGY AND ENVIRONMENT Concept and theories of ecosystems, - energy flow in major man-made ecosystems- agricultural, industrial and urban ecosystems - sources of pollution from energy technologies and its impact on atmosphere - air, water, soil, and the environmental are uniformental laws on pollution control. The environmental protection act: Effluent standards and ambient air quality, innovation and sustainability, eco-restoration: phyto-remediation. UNIT-III RENEWABLE SOURCES OF ENERGY Periods: 09 Folar Energy: Solar radiation: measurements and prediction. Indian's solar energy potential and challenges, solar energy conversion principles and technologies: photosynthesis, Photovoltaic conversion and Photo thermal energy conversion wind Energy: Atmospheric circulations, atmospheric boundary layers, classification, factors influencing energy conversion principles and technologies: ocean thermal, ocean wave & ocean tide. Bionenergy: resources and types. UNIT-IV OTHER ENERGY SOURCES AND SYSTEMS Periods: 09 Hydropower, Nuclear fission and fusion-Geothermal energy, Magneto-hydro-dynamic (MHD) energy conversion - mergy energy and eco		U23C	EX401	Pei	riods/We	eek	Credit	Max	kimum Ma	ırks
Prerequisite Environmental Science On completion of the course, the students will be able to On Junderstand the nexus between energy, environment and sustainable development KA COURTIES COURT				L	Т	Р	С	CAM	ESE	TM
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Course Outcomes Outco	. roroquioro			nts will b	e able t				1	
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	Georges (Eds	.), 200	5.							

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- 3. D. Y. Goswami, F. Kreith and J. F. Kreider, Principles of Solar Engineering, Taylor and Francis, Philadelphia, 2000.
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- 6. Ocean Energy: Tide and Tidal Power by R. H. Charlier and Charles W. Finkl, Springer 2010

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)					ram Spe	
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3
2	2	3	-	1	2	3	3	1	-	1	2	-	-	-	3
3	2	3	-	1	2	3	3	1	-	1	2	-	-	-	3
4	2	3	-	1	2	3	3	1	-	1	-	2	-	-	3
5	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assessi	ment Marks (CAI	VI)	End	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Pr.S. SUNDARARAMAN, M.Tech., Ph.Z.,
Professor & Head
Department of Civil Engg
Sri Manakula Vinayagar Engg. College
Madagadipet, Puducherry, India

Department	Civil I	Engineer	ing		Progra	amme:	Honours	/Minors.			
Semester	VI				Cours	e Cate	gory Code	e: PC End 9	Semeste	er Exam T	ype: TE
Course	11000				······	iods/W		Credit		ximum Ma	
Code	0230	EX502			L	Т	Р	С	CAM	ESE	TM
Course Name	Sustai	nable En	nergy Syste	ems	3	0	0	3	25	75	100
Prerequisite	Enviro	nmental	Science								
	On c	ompletic	on of the co	urse. the st	udents will b	e able	to			BT Ma	
		·-		*				salutiona ta	onoral,	(Highes	t Level)
	CO1	problems consider	s using app	propriate too	and sustainat Is and techn environment	iques f	ollowing	relevant sta	ındards	K	4
	CO2	using ap society,	propriate to health,			ing rele	evant sta	ndards cons		K	4
Course Outcomes	CO3	complex relevant	energy pr standards	oblems usir considering	tidal and wang appropriate society, healing effectively	e tools th, env	and te	chniques fo sustainabil	llowing	K	4
	CO4	problems and late	s using app st developm	propriate too nents consid	ogy systems t ls and techn ering society, licating effect	iques f health	ollowing , environi	relevant sta ment, sustai	1	K	4
	CO5	problem: consider	s using app ing society,	propriate too	newable ener Is and techn ironment, sus phical form.	iques f	ollowing	relevant sta	ındards	K	4
UNIT- I	THE	ENERGY	LANDSCA	PE AND SU	STAINABILI	ΓΥ			Per	riods: 09	
Current globe emissions, Lit and convers Refrigerators,	fetime o ion, Fi	of fossil for rst and	uels, Sustai second la	nability and e ws of thern	energy use, E nodynamics	nergy	conversion	n technolog	jies, En	ergy forms	GO1
UNIT- II	SOLA	AR AND I	WIND ENER	RGY					Per	iods: 09	<u>i</u>
Principles of	solar ra	diation, F	Resource fo	undations, T	echnology ch	allenge	s, Sustai	nability, Sol	ar energ	gy industry	/
and economi technologies,			-			e wind,	Wind re	esource bas	sics, Wi	nd energy	CO2
UNIT - III	BION	IASS, GE	OTHERMA	L, TIDAL A	ND WAVE EN	IERGIE	S		Per	riods: 09	
Sources of for Diesel and Geothermal technology, C	ethanol energy	, Biogas - Princi	, Electricity ples, Geot	production hermal pote	, Transporta ntial and te	tion, C chnolog	hallenges gy, Electi	s, Sustainal ricity produc	bility, E	conomics	; CO3
UNIT - IV	ELEC	TRICITY	STORAGE	TECHNOL	OGIES				Per	riods: 09	
Introduction, I	Battery	energy s	torage tech	nologies - Li	thium-ion bat	teries, F	-ull cells,	Nickel-base	d batte	ries, Lead	-
acid batteries Site selection developments	for pur				•					• .	(.()4
UNIT - V	GRID	INTEGR	ATION OF	RENEWABL	E ENERGY				Per	iods: 09	
Variability, Int Growing a mo power distribu	ore effic	cient grid	, The smart	grid, Secure							
Lecture Pe	eriods:	45	Tutorial F	Periods: 15	Practio	al Peri	ods: -		Tot	al Period	s: 60
								Donartmont	- t C: ::I	-	

Text Books

- 1. Boyle, Godfrey, "Renewable Energy: Power for a Sustainable Future", Oxford University Press, 3rd Edition, 2012.
- 2. efferson W. Tester, Elisabeth M. Drake, Michael J. Driscoll, Michael W. Golay, William A. Peters, "Sustainable Energy (Choosing Among Options)", MIT Press, 2nd Edition, 2012.

Reference Books

- Gilbert M. Masters, "Renewable and Efficient Electric Power Systems", John Wiley &Sons, Inc., Hoboken, New Jersey, 2nd Edition, 2013
- 2. Vanek, F.M., Albright, L.D., "Energy Systems Engineering Evaluation and Implementation", McGraw-Hill, 2nd Edition, 2008.
- 3. David MacKay, "Sustainable Energy: Without the Hot Ai"r, UIT Cambridge Ltd., Cambridge, England, 2009.
- 4. Frank Kreith, "Principles of Sustainable Energy Systems,", CRC Press, Taylor and Francis group, 2nd Edition, 2014.

COs/POs/PSOs Mapping

COs						ram Spe									
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12												PSO2	PSO3
1	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3
2	2	3	-	1	2	3	3	1	-	1	2	-	-	-	3
3	2	3	-	1	2	3	3	1	-	1	2	-	-	-	3
4	2	3	-	1	2	3	3	1	-	1	-	2	-	-	3
5	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assess	ment Marks (CAI	VI)	End Semester	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department of Civil Engg Sri Manakula Vinayagar Engg. College Madagadipet, Puducherry, India

Professor & Head

NDARARAMAN, M. Tech., Ph.z..

Departmen	t Civil Engineering			Honours	-			
Semester	V	Course	e Cate	ory Code	e: PC End	Semeste	r Exam T	ype: TE
Course	U23CEX603	Per	iods/W	eek	Credit		kimum Ma	arks
Code		L	Т	Р	С	CAM	ESE	TM
Course Name	Green Technologies & Renewable Energy Systems	2	0	2	4	25	75	100
Prerequisi	te Environmental Science						DTM	
	On completion of the course, the student	s will b	e able	to			(Hi	apping ghest evel)
Course	CO1 Analyze cleaner development mechani	ism (CD	M).					K4
Outcomes	CO2 Understand various aspects of green b	uildings	1					K4
	CO3 Analyze renewable energy systems as	a part o	of gree	n technolo	ogy			K4
UNIT- I	CLEANER DEVELOPMENT MECHANISM					Per	iods: 10	
	elopment mechanisms, role of industry; reuse,			-				1
	carbon credits, carbon trading, carbon seques			•		chnology	for waste	e CO1
	ent- Cavitation, Fenton chemistry, photocatalysi GREEN BUILDINGS & SUSTAINABLE URE			rocesses	•	Dor		
UNIT - II	res, advantages & limitations, Energy efficient b			node for i	ncreasing e	<u>i</u>	iods: 10	æ
	ilding components, ventilation system, Energy r	_			-		-	1
•	system, Sustainable cities, Sustainable transpo			,,				
UNIT - III	RENEWABLE ENERGY					Per	iods: 10	<u>i</u>
	ewable energy sources, Solar Energy Systems:						_	1
	ions, Hydro Energy Systems: Resource asses o-fuels, fuel cells.	sment o	of micro	o and sm	nall hydro p	ower: Wi	ndEnergy	y CO3
List of Expe								
1. Cald	culate the carbon footprint of a small business							
	culate the carbon footprint of a household							
	ign a rainwater harvesting system for a small co	mmunit	V					
	software for sustainable building design		,					
	-benefit analysis for a solar farm							
	cycle assessment (LCA) tools							
		Practic	al Pori	ods: 30		Tota	al Period	e.
Text Books			ai i 611			100	ai i c iiou	J. UU
	ancaster, "Green Chemistry – An introductory te	ext", RS	C.					
	hmi Sanghi and M.M. Srivastava, "Green Chemi			ent Friend	dly Alternati	ves", Nar	osaPublis	shing
Hou	se, New Delhi 2009.	-			•			
Reference	Books							
1. Pau	L. Bishop, Pollution prevention –Fundamentals	and Pr	actices	, McGraw	/-Hill- intern	ational 2	000	
	Majumdar, "Energy Efficient Buildings in India"' ⁻			esearch I	nstitute.			
3. Volk	er Quaschning, "Understanding Renewable Ene	ergy Sys	stems".					
	asi & Abbasi, "Renewable Energy Sources and Khan, "Non conventional energy resources", Ta			······································		ntice Hall	of India.	

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)					ram Spe omes (P	
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12												PSO2	PSO3
1	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3
2	2	2 3 - 1 2 3 3 1 - 1 2 -											-	-	3
3	2	3	-	1	2	3	3	1	-	1	2	-	-	-	3
4	2	2 3 - 1 2 3 3 1 - 1 -										2	-	-	3
5	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Methods

		Conti	nuous Assessi	ment Marks (CAI	VI)	End Somostor	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Department of Civil Engg Sri Manakula Vinayagar Engg. College Madagadipet, Puducherry, India

Semester	VII		Cours	e Cate	gory Code	e: PC End	Semeste	er Exam T	ype: TE
Course	U23C	EX704	<u> </u>	iods/W	···•	Credit		ximum M	
Code			L	Т	Р	С	CAM	ESE	TM
Course Name	Susta	inability in the Built Environment	2	0	2	4	25	75	100
Prerequisite	Enviro	onmental science							
	On o	completion of the course, the studer	nts will b	e able	to			(Hi	lapping ighest evel)
	CO1	graphical form	and ted ronment	hnique beside	s followings commu	ng relevant unicating eff	standard ectively	ds in	K4
Course Outcomes	CO2	effectively in graphical form.	te tools Ith and	and fenviror	technique nment be	es following esides comr	releva nunicatir	nt ig	K4
	соз	Analyze sustainable buildings to solven environment using appropriate tools considering society, health and environment form.	and tec	hnique	s followir	ng relevant	standard	ak	K4
UNIT - I	SUS	TAINABLE BUILDINGS					Per	iods: 10	
		inable buildings and standards, Green ergy Buildings (NZEB), Examples of di	_			ncy and sus			cO3
UNIT - II	. <u>.i</u>	DING ENVELOPE AND SERVICES					<u>i</u>	iods: 10	
services, Sus	tainabl	ffect and energy efficiency measures e construction and materials, Integra ility to natural disasters.			• • •	-			~;
UNIT - III	MAN	AGEMENT OF SUSTAINABLE BUIL	T ENVIR	ONMEI	NT		Per	iods: 10	
	_	Measuring sustainability; Facilities ma nfrastructure, social mix, Accessibility i	-			-	•	amenities	cO5
List of Exper	iments	: :							
1. Deve	lop a si	ustainable transportation plan for a sm	all comm	unity					
2. Cond	uct an	energy audit of a small building or faci	lity.						
3. Deve	lop an	energy-saving plan and present findinເ	gs						
4. Cond	uct an	energy efficiency audit for a building.							
5. Enerç	gy audi	t of a small building or home							
6. Enerç	gy mod	eling software - eQUEST							
Lecture Pe	eriods:	30 Tutorial Periods: -	Practic	al Per	iods: 30		Tot	al Period	s: 60
Text Books		INCLUDE STATE OF THE STATE OF T	u-					 	0040
	-	nd Mike Riley, " <i>Total Sustainability in t</i> Gary Hack, " <i>Site Planning</i> ", MIT Press				acmilian Ed	ucation,	1st Editio	n, 2012.
Reference B	ooks								
		and Pete Silver, "Environmental Designmental	gn Source	Book:	Innovativ	e Ideas for	a Sustai	nable Bui	It
		.5 donorming, not Edition, 2021.							

2. Tim Dixon, John Connaughton, Stuart Green, "Sustainable Futures in the Built Environment to 2050: A Foresight

3. Rob Fleming, Saglinda H Roberts, "Sustainable Design for the Built Environment", Routledge Press, London, 1st

Approach to Construction and Development", John

Edition, 2019

Department of Civil Engineering

4. Charles J. Kibert, "Sustainable Construction: Green Building Design and Delivery", Wiley,4th Edition, 2021.

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PO	s)					ram Spe omes (P	
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12												PSO2	PSO3
1	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3
2	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3
3	2	3	-	1	2	3	3	1	-	1	-	-	-	-	3
4	2	3	-	1	2	3	3	1	-	1	2	-	-	-	3
5	2	3	-	1	2	3	3	1	-	1	2	-	-	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Professor & Head

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Sri Manakula Vinayagar Engg. College

Madagadipet, Puducherry, India

Evaluation Methods

		Conti	nuous Assessi	ment Marks (CAI	M)	End	Total
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department of Civil Engineering

Annexure V

R2023	- Chosen Profes	ssional Elective – I (Offered in Semester IV)
SI. No.	Course Code	Course Title
1	U23CEE401	Composite Structures
2	U23CEE402	Environmental Law and Policy
3	U23CEE403	Building Services
4	U23CEE404	Remote Sensing and GIS
<mark>5</mark>	U23CEE405	Alternative Building Materials and Technologies

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Department	Civil Engineering	Progr	amme:	B.Te	ch.								
Semester	IV	Cours CC	se Cate	egory (Code: *End TE	d Semes	ter Exam	Туре:					
		Perio	ds / We	eek	Credit	Ма	ximum Ma	arks					
Course Code	U23CEE405	L	Т	Р	С	CAM	ESE	TM					
Course Name	Alternative Building Materials and Technologies	3	0	0	3	25	75	100					
Prerequisite	Building Material and Construction												
Course	On completion of the course, the student	ts will be	able t	to			(Hiç Le	apping ghest vel)					
Outcome	CO1 Understand the various energies invol	lved in th	e cons	tructio	n		ŀ	< 2					
CO2 Understand the different types alternative materials K2													
CO3 Identify various eco-friendly materials K2													
CO4 Recognize suitable alternative building technologies K2													
CO5 Apply the cost concept involved in the planning of construction K3													
UNIT-I	Introduction			Р	eriods: 09	9							
cycle energy, technologies, R	ng materials, Environmental issues concerne Global warming and construction industry, E equirements for buildings of different climatic	nvironme		riendly	and cost	-effectiv							
UNIT-II	Sustainable Materials			<u>i</u>	eriods: 09	_							
	of building blocks for walls - Stones and L s - Stabilized mud blocks - Fal-G Blocks - Ma					llow clay	/ blocks -	CO2					
UNIT-III	Alternative Building Materials			Р	eriods: 09	9							
	l concretes – Types: metal and synthetic - Pro												
	c and synthetic - Properties and applications. wastes - Types of industrial and mine wastes					d industr	ial wastes	CO3					
UNIT-IV	Alternative Building Technologies	- Flopei	ues ai		eriods: 09	9							
Alternatives for	wall constructions, composite masonry, co	nfined m	asonry	, cavi	ty walls, F	erro ce	ment and	CO4					
ferroconcrete	building components, Materials and spe	cification	s, Pro	pertie	s, Const	ruction	methods,						
	op down construction, Mivan Construction Tec epts, Filler slabs, Composite beam panel roof		D Prin	ting Te	echnology.	Alternat	te Roofing						
UNIT-V	Machines & Planning Control	3		Р	eriods: 09	9							
Machines for m	nanufacture of concrete, Equipment for produc			ed blo	cks, Mould	ls and m							
	recast elements, Cost concepts in buildings, ost analysis: Case studies using alternatives	Cost sa	virig te	ciniq	ues in piai	ining, a	esign and						
Lecture Period		actical P	eriods	;; -	To	otal Peri	ods: 45						
Text Books													

- 1. KS Jagadish, B V Venkatarama Reddy and K S Nanjunda Rao, "Alternative Building Materials and Technologies", New Age International Publishers, 2017.
- 2. BT Ashwini Manjunath, "Alternative Building Materials and Technology", Medtech Publisher, 2017.
- 3. Trevor M. Letcher and Janet L. Scott, "Materials for a Sustainable Future", Royal Society of Chemistry, 2012

- 1. S Christian Johnson, "Concrete Technology", Dipti Press, 2017.
- 2. G.C Sahu and Jayagopal Jena, "Building Materials and Construction", McGraw hill Publication, 2015.
- 3. B C Punmia and Ashok kumar jain, "Building Construction", Laxmi Publication, 2019.
- 4. M.S. Shetty, "Concrete Technology (Theory and Practice)", S. Chand & Company Ltd., 2019. 5. S.K. Duggal, "Building Materials", 5th edition, New age International Publication, 2020.

Web References

- 1. https://nptel.ac.in/courses/105/102/105102175/
- 2. https://nptel.ac.in/courses/105/102/105102195/
- 3. https://alison.com/course/sustainable-architecture-energy-efficiency-and-quality

COs/POs/PSOs Mapping

COs					Pro	gram O	utcome	es (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12												PSO2	PSO3
1	2	-	-	-	-	3	3	2	-	2	1	3	3	2	2
2	2												3	3	2
3	3	-	-	-	3	3	3	3	-	2	1	3	3	3	2
4	3	3 3 3 3 3 1											3	3	2
5	3													2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contir	nuous Assessi	ment Marks (CA	M)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Chosen	Chosen Professional Elective – III (Offered in Semester VI)							
SI. No.	Course Code	Course Title						
1	U20CEE611	Rock Engineering						
2	U20CEE612	Intellectual Property Rights						
3	U20CEE613	Shoring scaffolding and Form Work						
4	U20CEE614	Municipal Solid Waste Management						
5	U20CEE615	Design of Industrial Structures						

Chosen	Professional Elec	tive – V (Offered in Semester VIII)
SI. No.	Course Code	Course Title
1	U20CEE821	Structural Dynamics and Earthquake Engineering
2	U20CEE822	Housing - Planning and Management
3	U20CEE823	Tall Structures
4	U20CEE824	Industrial Waste Disposal and Treatment
<mark>5</mark>	U20CEE825	Prefabricated Structures
Chosen	Professional Elec	tive – VI (Offered in Semester VIII)
SI. No.	Course Code	Course Title
1	U20CEE826	Coastal and Offshore Structures
2	U20CEE827	Pavement Engineering
3	U20CEE828	Repair and Rehabilitation of Structures
4	U20CEE829	Environmental Impact Assessment
5	U20CEE830	Pre- Stressed Concrete Structures

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U20CEE614 MUNICIPAL SOLID WASTE MANAGEMENT

L T P C Hrs 3 0 0 3 45

Course Objectives

This course should enable the students to

- Impart knowledge on sources and generation of municipal solid waste.
- Gain adequate knowledge in reduction and recycle of waste.
- Understand the concept of collection methods and routes.
- Gain knowledge about the transport method of municipal solid waste
- Impart knowledge of disposal method of waste.

Course Outcomes

After completion of the course, the students will be able to

- CO 1 Understand the nature and characteristics of municipal solid wastes. (K2)
- CO 2 Understand the concept of reduction, reuse and recycling of waste. (K4)
- **CO 3** Plan and design systems for storage, collection, transport, processing and disposal of municipal solid Waste.(**K3**)
- CO 4 Understand the issues on solid waste management from an integrated source.(K4)
- CO 5 Design and operate sanitary landfill.(K5)

KNOWLEDGE LEVEL: K1 - Remember, K2 - Understand, K3 - Apply, K4 - Analyze and K5 - Evaluate

UNIT I SOURCES AND CHARACTERISTICS

(9 Hrs)

Sources and types of municipal solid wastes- Public health and environmental impacts of improper disposal of solid wastes- sampling and characterization of wastes - factors affecting waste generation rate and characteristics –functional Elements of solid waste management – Requirements and salient features of Solid waste management rules (2016) -Role of public and NGO"s- Public Private participation – Elements of integrated Municipal Solid Waste Management Plan.

UNIT II SOURCE REDUCTION, WASTE STORAGE AND RECYCLING

(8 Hrs)

Waste Management Hierarchy –3R-Reduction, Reuse and Recycling - source reduction of waste – On-site storage methods – Effect of storage, materials used for containers - segregation of solid wastes – Public health and economic aspects of open storage – case studies under Indian conditions – Recycling of Plastics, and Construction/Demolition wastes.

UNIT III COLLECTION AND TRANSFER OF WASTES

(8 Hrs)

Methods of Residential and commercial waste collection – Collection vehicles – Manpower – Collection routes – Analysis of waste collection systems; Transfer stations –location, operation and maintenance- options under Indian conditions – Field problems- solving.

UNIT IV PROCESSING OF WASTES

(12 Hrs)

Objective(s) of waste processing – Physical Processing techniques and Equipment; Resource recovery from solid waste -composting and biomethanation; Thermal processing options – case studies under Indian conditions.

UNIT V WASTE DISPOSAL

(8 Hrs)

Land disposal of solid waste- Sanitary landfills – site selection- design and operation of sanitary landfills – Landfill liners– Management of leachate and landfill gas- Landfill bioreactor – Dumpsite Rehabilitation.

Text Books

- 1. William A. Worrell, P. AarneVesilind (2012) Solid Waste Engineering, Cengage Learning, 2012.
- 2. John Pitchel (2014), Waste Management Practices-Municipal, Hazardous and industrial CRC Press, Taylor and Francis, New York.
- 3. George Tchobanoglouset.al., "Integrated Solid Waste Management", McGraw-Hill Publishers, 1993.
- 4. B.Bilitewski, G.HardHe, K.Marek, A.Weissbach, and H.Boeddicker, "Waste Management", Springer, 1994.

- 1. CPHEEO (2014), "Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization. Government of India, New Delhi.
- 2. George Tchobanoglous and FrankKreith (2002).Handbook of Solid waste management, McGraw Hill, New York.
- 3. Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 2000
- 4. R.E.Landreth and P.A.Rebers, "Municipal Solid Wastes problems and Solutions", Lewis Publishers, 1997.

Web References

- 1. https://nptel.ac.in/courses/120108005/
- 2. http://cpheeo.gov.in/upload/uploadfiles/files/Part1
- 3. https://nptel.ac.in/content/storage2/courses/104103022

COs/POs/PSOs Mapping

	3/1 03	3/F 3U	3 Map	pilig												
COs		Program Outcomes (POs) PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12											Program Specific Outcomes (PSOs)			
	PO1											PO12	PSO1	PSO2	PSO3	
CO1	1	2	2	3	3	3	3	3	3	2	3	3	3	3	2	
CO2	3	3	2	3	3	3	3	2	3	2	2	3	3	3	3	
соз	3	3	3	2	2	2	3	3	3	3	2	3	3	3	2	
CO4	2	3	2	3	2	3	2	3	3	2	2	3	3	3	3	
CO5	3	3	3	2	3	3	3	3	3	2	3	3	3	3	2	

Correlation Level: 1- Low, 2 - Medium, 3 - High

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U20CEE825

PREFABRICATED STRUCTURES

L T P C Hrs 3 0 0 3 45

Course Objectives

This course should enable the students to

- Learn various distress and damages to concrete structures
- Assess the durability of concrete due to various non-destructive testing
- Suggest the suitable materials and techniques for repair
- Implement various rehabilitation and retrofitting techniques
- Select suitable demolition techniques for structures

Course Outcomes

After completion of the course, the students will be able to

- CO1 Gain knowledge of maintenance and various assessment techniques (K2)
- CO2 Understand the methods of non-destructive testing systems (K2)
- CO3 Understand the types and properties of repair material (K2)
- CO4 Understand the corrosion and damaged structures (K2)
- CO5 Gain knowledge of strengthening of structures (K3)

KNOWLEDGE LEVEL: **K1** – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyze and **K5** – Evaluate

UNIT I INTRODUCTION (9 Hrs)

Need for prefabrication – Principles – Materials – Modular coordination – Standarization – Systems – Production – Transportation – Erection.

UNIT II PREFABRICATED COMPONENTS

(9 Hrs)

Behaviour of structural components – Large panel constructions – Construction of roof and floor slabs – Wall panels – Columns – Shear walls

UNIT III DESIGN PRINCIPLES

(9 Hrs)

Disuniting of structures – Design of cross section based on efficiency of material used – Problems in design because of joint flexibility – Allowance for joint deformation.

UNIT IV JOINT IN STRUCTURAL MEMBERS

(9 Hrs)

Joints for different structural connections - Dimensions and detailing - Design of expansion joints

UNIT V DESIGN FOR ABNORMAL LOADS

(9 Hrs)

Progressive collapse – Code provisions – Equivalent design loads for considering abnormal effects such as earthquakes, cyclones, etc., – Importance of avoidance of progressive collapse

Text Books

- Poonam I. Modi and Chirag N. Patel, "Repair and Rehabilitation of concrete structures", PHI Learning Pvt. Ltd., 2015
- 2. P.C.Varghese, "Maintenance, Repair & Rehabilitation & Minor Works of Buildings", PHI Learning Pvt. Ltd., 2014
- 3. Riadh Al-Mahaidi, Robin Kalfat, "Rehabilitation of Concrete Structures with Fiber-Reinforced Polymer", Matthew Deans, 2018

Reference Books

- R.T.L. Allen, S.C. Edwards, and J.D.N. Shaw, "The Repair of Concrete Structures", Blackie Academic & Professional, 2005
- 2. Walter F. Silva-Araya. Oladis T. De Rincon and Luis Pumarada O'Neill, "Repair and Rehabiliation of Reinforced Concrete Structures", ASCE Publications, 1997.

- 3. Anibal Costa, Joao Miranda Guedes, Humberto Varum, "Structural Rehabilitation of Old buildings", Springer, 2014
- 4. V.M. Malhotra,"Repair, Rehabiliation and Maintenance of Concrete Structures, and innovations in design and construction", American Concrete Institute, 2000
- 5. Thomas Dyer, "Concrete Durability", CRC Press, 2014

Web References

- 1. https://nptel.ac.in/courses/105/106/105106202/
- 2. https://onlinelibrary.wiley.com/doi/abs/10.1002/pse.140
- 3. https://onlinelibrary.wiley.com/doi/abs/10.1002/9780470015902.a0021403.pub2

COs/POs/PSOs Mapping

COs					Prog	ram O	utcom	es (PC	s)				_	ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	2	-	-	-	-	-	-	2	3	3
CO2	3	2	3	3	1	2	-	-	-	-	-	-	2	3	3
CO3	3	3	3	3	1	2	-	-	-	-	-	-	2	3	3
CO4	3	3	3	3	1	2	-	-	-	-	-	-	2	3	3
CO5	3	3	3	3	1	2	-	-	-	-	-	-	2	3	3

Correlation Level: 1-Low, 2-Medium, 3- High

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Professor & Head

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U20CEE828 REPAIR AND REHABILITATION OF STRUCTURES

L T P C Hrs 3 0 0 3 45

Course Objectives

This course should enable the students to

- Learn various distress and damages to concrete structures
- Assess the durability of concrete due to various non-destructive testing
- · Suggest the suitable materials and techniques for repair
- Implement various rehabilitation and retrofitting techniques
- Select suitable demolition techniques for structures

Course Outcomes

After completion of the course, the students will be able to

- CO1 Gain knowledge of maintenance and various assessment techniques (K2)
- CO2 Understand the methods of non-destructive testing systems (K2)
- CO3 Understand the types and properties of repair material (K2)
- CO4 Understand the corrosion and damaged structures (K2)
- CO5 Gain knowledge of strengthening of structures (K3)

KNOWLEDGE LEVEL: K1 - Remember, K2 - Understand, K3 - Apply, K4 - Analyze and K5 - Evaluate

UNIT I MAINTENANCE AND REPAIR STRATEGIES

(9 Hrs)

Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration.

UNIT II DAMAGE DIAGNOSIS AND ASSESSMENT

(9 Hrs)

Visual inspection, Non Destructive Testing using Rebound hammer, Ultra sonic pulse velocity, Semi destructive testing, Probe test, Pull out test, Chloride penetration test, Carbonation, Carbonation depth testing, Corrosion activity measurement.

UNIT III REPAIR TECHNIQUES

(9 Hrs)

Various methods of crack repair, Grouting, Routing and sealing, Stitching, Dry packing, Autogenous healing, Overlays, Repair to active cracks, Repair to dormant cracks.

UNIT IV CORROSION OF STEEL IN CONCRETE

(9 Hrs)

Corrosion of embedded steel in concrete, Mechanism, Stages of corrosion damage, Repair of various corrosion damaged of structural elements (slab, beam and columns)

UNIT V STRENGTHENING OF CONCRETE STRUCTURES

(9 Hrs)

Introduction – Plate bonding method - RC Jacketing of column and beams with reinforced concrete – FRP methods – Strengthening of RC members in flexure, shear, confinement using FRP

Text Books

- Poonam I. Modi and Chirag N. Patel, "Repair and Rehabilitation of concrete structures", PHI Learning Pvt. Ltd., 2015
- 2. P.C.Varghese, "Maintenance, Repair & Rehabilitation & Minor Works of Buildings", PHI Learning Pvt. Ltd., 2014.
- 3. Riadh Al-Mahaidi, Robin Kalfat, "Rehabilitation of Concrete Structures with Fiber-Reinforced Polymer", Matthew Deans, 2018

- 1. R.T.L. Allen, S.C. Edwards, and J.D.N. Shaw, "The Repair of Concrete Structures", Blackie Academic & Professional, 2005
- 2. Walter F. Silva-Araya. Oladis T. De Rincon and Luis Pumarada O'Neill, "Repair and Rehabiliation of Reinforced Concrete Structures", ASCE Publications, 1997.
- 3. Anibal Costa, Joao Miranda Guedes, Humberto Varum, "Structural Rehabilitation of Old buildings", Springer, 2014
- 4. V.M. Malhotra,"Repair, Rehabiliation and Maintenance of Concrete Structures, and innovations in design and construction", American Concrete Institute, 2000
- 5. Thomas Dyer, "Concrete Durability", CRC Press, 2014

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- 2. https://onlinelibrary.wiley.com/doi/abs/10.1002/pse.140
- 3. https://onlinelibrary.wiley.com/doi/abs/10.1002/9780470015902.a0021403.pub2

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)									Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	1	-	-	-	-	-	-	2	3	3
CO2	3	3	3	3	2	1	-	-	-	-	-	-	2	3	2
CO3	3	3	3	3	2	1	-	-	-	-	-	-	2	3	3
CO4	3	3	3	3	2	1	-	-	-	-	-	-	2	3	2
CO5	3	2	3	3	2	-	-	-	-	-	-	-	2	3	3

Correlation Level: 1-Low, 2-Medium, 3- High

Dr.S. SUNDARARAMAN, M.Tech., Ph. a.. Professor & Head

Department of Civil Engg Sri Manakula Vinayagar Engg. Cellege Madagadipet, Puducherry, India

ANNEXURE VI

Mandatory Course

Department	0.1	il Engineering Programme: B.Tech.									
Semester	II			Course	e Categ	ory: M	C En	d Semest	er Exam	Type: -	
Course Code	11230	EM202		Peri	ods / W	/eek	Credit	Ma	ximum Ma	arks	
Course Code	0230	LIVIZUZ		L	Т	Р	С	CAM	ESE	TM	
Course Name	-	ts Yoga and I	NSS	0	0	2	Non- Credit	100	-	100	
Prerequisite	-										
0	On c	ompletion of	the course, th	ne students	will be	able 1	to		(⊦	Mappin lighest ₋evel)	
Course Outcomes	CO1	Practice Physic and relaxation.	cal activities an	d Hatha Yoga	a focusii	ng on y	oga for stre	ngth, flexil	bility	K2	
		Understand basic skills associated with yoga and physical activities including streng and flexibility, balance and coordination. Develop understanding of psychological problems associated with age and lifestyle.								K2	
	CO3	Develop unders	standing of psyc	chological prol	blems a	ssociat	ed with age	and lifestyl	le.	K2	
	CO4	Recognize the	importance of n	ational service	e in com	nmunity	developme	nt.		K2	
	CO5	Convert existin	g skills into soci	ally relevant li	fe skills					K2	
UNIT-I	Introd	uction to Phy	sical Educati	on			Periods:	06	ii		
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•		Positive Lifestyle	•					_			
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- 3. http://nss.nic. in
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- 5. Young Journal on Youth published by SAGE: http://you.sagepub.com

Evaluation methods

Assessment		Total Marks		
	Attendance	MCQ Test	Presentation / Activity / Assignment	
Marks	10	30	60	100

Professor & Head
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Sri Manakula Vinayagar Engg. Cellege
Madagadipet, Puducherry, India

Department	Civil Engineering Programme: B.Tech. IV Course Category Code: SEC *End Semester Exam Typ										
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Course Code	U23CES402	L	Т	Р	С	CAM	ESE	TM			
Course Name	MS Office – Word, Excel, Power Point	2	0	0	-	100	-	100			
UNIT-I	Introduction to MS Office and Word Processing]		Pe	eriods: 06						
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Evaluation Method

Accomment	Interna	Total		
Assessment	Attendance	Report	Presentation/Demo/Skil Test	Marks
Marks	10	40	50	100

Professor & Head

Department of Civil Engg

Sri Manakula Vinayagar Engg. College
Madagadipet, Puducherry, India

Department	Civil Engineering Programme: B.Tech.								
Semester	IV	Course MC	e Cate	gory Co	ode: *End	d Semes	ter Exan	n Type:	
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Course Code	U23CEM404	L	Т	Р	С	CAM	ESE	TM	
Course Name	Right to Information and Good Governance	2	0	0	-	100	-	100	
UNIT-I	Introduction	<u> </u>		P	eriods: 06	<u> </u>			
Conceptual bac	kground — Right to know — Open Government –	– Transp	arency	/ in gov	ernance a	and acco	untabilit	y	
— Right to infor	mation under the Indian Constitution - Article 19 (· ′1Xa) and	Articl	e 21 of	the Cons	titution -	- Role o	ıf	
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Evaluation Method

A	Interna	Total		
Assessment	Attendance	Report	Presentation/Demo/Skil Test	Marks
Marks	10	40	50	100

Dr.S. SUNDARARAMAN, M.Tech., Pa.s..
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ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

L T P C Hrs 2 0 0 - 30

U20CEM606

Course Objectives

This course should enable the students to

- To get a knowledge in Indian Culture
- To Know Indian Languages and Literature and the fine arts in India
- To explore the Science and Scientists of Medieval and Modern India

Course Outcomes

After completion of the course, the students will be able to

- CO1 Understand philosophy of Indian culture.
- **CO2** Distinguish the Indian languages and literature.
- CO3 Learn the philosophy of ancient, medieval and modern India.
- CO4 Acquire the information about the fine arts in India.
- CO5 Know the contribution of scientists of different eras.

UNIT I INTRODUCTION TO CULTURE

Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India

UNIT II INDIAN LANGUAGES, CULTURE AND LITERATURE

Indian Languages and Literature-I: the role of Sanskrit, significance of scriptures to current society, Indian philosophies, other Sanskrit literature, literature of south India Indian Languages and Literature-II: Northern Indian languages & literature

UNIT III RELIGION AND PHILOSOPHY

Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

UNIT IV FINE ARTS IN INDIA (ART, TECHNOLOGY & ENGINEERING)

Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India

UNIT V EDUCATION SYSTEM IN INDIA

Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

Reference Books

- 1. Kapil Kapoor, "Text and Interpretation: The India Tradition", ISBN:81246033375,2005
- 2. "Science in Samskrit", Samskrita Bharti Publisher, ISBN 13:978-8187276333, 2007
- 3. NCERT, "Position paper on Arts, Music, Dance and Theatre", ISBN 81-7450494-X,200
- 4. S.Narain, "ExaminationsinancientIndia", AryaBookDepot, 1993
- 5. SatyaPrakash, "FoundersofSciencesinAncientIndia", VijayKumarPublisher, 1989
- M. Hiriyanna, "Essentials of Indian Philosophy", Motilal Banarsidass Publishers, ISBN 13: 978-8120810990.2014

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ANNEXURE VII

EXAMINERS SELECTION CRITERIA

1. Professors with Ph.D. and 5 Years Experience

List of colleges

- 1. Vellore Institute of Technology, Vellore
- 2. Puducherry Technological University
- 3. SRM Institute of Science and Technology
- 4. IIT
- 5. NIT
- 6. Annamalai University
- 7. Bharath Institute of Higher Education and Research
- 8. University College of Engineering, Panruti
- 9. Hindustan College of Engineering and Technology
- 10. Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Avadi, Chennai
- 11. Saveetha Engineering College
- 12. Dr.M.G.R Educational and Research Institute
- 13. VNR Vignana Jyothi Institute of Engineering and Technology
- 14. Meenakshi College of Engineering,
- 15. CK College of Engineering and Technology, Cuddalore
- 16. SNS College of Technology, Coimbatore

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