



KSR College of
Engineering

AN AUTONOMOUS INSTITUTION



NAAC
ACCREDITED **A++**

NBA
ACCREDITED
PROGRAMMES



B.E. - CIVIL ENGINEERING

REGULATIONS 2024

(Academic Year 2024-25 Onwards)

**Curriculum & Syllabus
Semester I to IV**





K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215

(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

B.E. – Civil Engineering

(REGULATIONS 2024)

Vision of the Institution

IV	To become a globally renowned institution in Engineering and Management, committed to providing holistic education that fosters research, innovation and sustainable development.
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Mission of the Institution

IM1	Deliver value-based quality education through modern pedagogy and experiential learning.
IM2	Enrich Engineering and Managerial Skills through cutting-edge laboratories to meet evolving global demands.
IM3	Empower research and innovation by integrating collaboration, social responsibility and commitment to sustainable development.

Vision of the Department / Programme: (Civil Engineering)

DV	To develop premier Civil Engineers through education, fostering innovation and research to create a sustainable environment.
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Mission of the Department / Programme: (Civil Engineering)

DM1	Provide value-based education using advanced teaching methods and experiential learning.
DM2	Prepare engineers for global challenges through state-of-the-art labs and advanced skills.
DM3	Promote research, foster innovation, and strengthen industry collaboration, addressing infrastructure challenges through sustainable solutions.

Programme Educational Objectives (PEOs): (Civil Engineering)

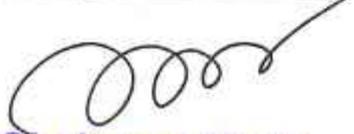
The graduates of the programme will be able to	
PEO 1	Core Competency: Apply comprehensive civil engineering knowledge to analyze, design, and solve real-world problems.
PEO 2	Professionalism: Apply ethical principles, communicate effectively, and collaborate in multidisciplinary teams.
PEO 3	Career Development: Attain professional success, embrace lifelong learning, and develop leadership skills to make a positive impact in their fields.

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Programme Outcomes (POs) of B.E. - Civil Engineering

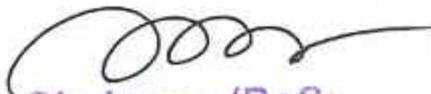
Program Outcomes (POs)	
PO1	Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO3	Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO4	Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
PO5	Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).
PO6	The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO7	Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8	Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9	Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
PO10	Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11	Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)
Program Specific Outcomes (PSOs)	
PSO1	Structural Analysis and Design: Plan and design structural systems that ensure safety, sustainability, and compliance with relevant codes and standards.
PSO2	Construction Planning and Management: Develop sustainable construction materials from waste, ensuring environmentally responsible waste management and complying with relevant regulations and standards.



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		K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode - 637 215							CURRICULUM UG R - 2024			
Department		Department of Civil Engineering										
Programme		B.E. Civil Engineering										
SEMESTER I												
S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
Induction Programme			MC	-	-	-	-	-	-	-	-	-
THEORY COURSES												
1	24ENT19	Professional Communication	HSMC	45	0	0	45	90	3	40	60	100
2	24CET11	Civil Engineers and society	PCC	45	0	0	45	90	3	40	60	100
3	24GET19	தமிழர்மரபு / Heritage of Tamils	HSMC	15	0	0	15	30	1	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
4	24MAI19	Matrices and Calculus	BSC	30	15	30	45	120	4	50	50	100
5	24PHI06	Applied Physics	BSC	45	0	30	45	120	4	50	50	100
6	24CEI12	Engineering Graphics	ESC	30	0	30	60	120	4	50	50	100
LABORATORY COURSES												
7	24GEP17	Manufacturing Practices Laboratory	ESC	0	0	30	0	30	1	60	40	100
8	24CEP11	Computer aided Building Drawing	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9	24SSP19	Aptitude and Coding Skill - I	EEC	0	0	30	0	30	1	60	40	100
TOTAL				195	15	180	270	660	22	900		


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SEMESTER II

S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24CST29	Python Programming	ESC	45	0	0	45	90	3	40	60	100
2	24CET21	Design Thinking	PCC	30	0	0	30	60	2	40	60	100
3	24CET22	Construction Materials, Techniques and Practices	PCC	45	0	0	45	90	3	40	60	100
4	24GET29	தமிழரும் தொழில்நுட்பமும் /Tamil and Technology	HSMC	15	0	0	15	30	1	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
5	24MAI29	Probability and Statistics	BSC	30	15	30	45	120	4	50	50	100
6	24CHI07	Applied Chemistry	BSC	45	0	30	45	120	4	50	50	100
LABORATORY COURSES												
7	24ENP29	Professional Communication Laboratory	HSMC	0	0	30	0	30	1	60	40	100
8	24CSP29	Python Programming Laboratory	ESC	0	0	30	0	30	1	60	40	100
9	24CEP21	Construction Materials Laboratory	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
10	24SSP29	Aptitude and Coding Skill - II	EEC	0	0	30	0	30	1	60	40	100
MANDATORY COURSES												
11		Mandatory Course - I	MC	0	0	30	0	30	0	-	-	-
TOTAL				210	15	210	225	660	21	1000		

SEMESTER III

S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24MAT36	Optimization Techniques	BSC	45	15	0	60	120	4	40	60	100
2	24CET31	Highway and Railway Engineering	PCC	45	0	0	45	90	3	40	60	100
3	24CET32	Mechanics of Solids	ESC	45	15	0	60	120	4	40	60	100
4	24CET33	Fluid Mechanics and Applied Hydraulics Engineering	PCC	45	15	0	60	120	4	40	60	100
5	24CET34	Surveying	PCC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
6	24CEP31	Strength of Materials Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7	24CEP32	Survey Engineering Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8	24CEP33	Highway Engineering Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9	24CEP34	Design Studio -I	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
10	24SDP39	Soft Skills Development - III	EEC	0	0	30	0	30	1	60	40	100
TOTAL				225	45	195	270	735	24.5	1000		

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iv Applicable for the students admitted from 2024-2025 onwards

SEMESTER IV

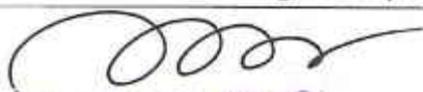
S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24MAT46	Numerical and Computational Techniques	BSC	45	15	0	60	120	4	40	60	100
2	24CET41	Concrete Technology	PCC	45	0	0	45	90	3	40	60	100
3	24CET42	Soil Mechanics	PCC	45	0	0	45	90	3	40	60	100
4	24CET43	Strength of Materials	PCC	45	15	0	60	120	4	40	60	100
5	24CET44	Water Supply Engineering	PCC	45	0	0	45	90	3	40	60	100
6	24GET09	Universal Human values and Ethics	HSMC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
7	24CEP41	Fluid Mechanics and Machinery Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8	24CEP42	Soil Mechanics Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9	24CEP43	Design Studio -II	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
10	24CEP44	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
11	24SDP49	Soft Skills Development - IV	EEC	0	0	30	0	30	1	60	40	100
TOTAL				270	30	180	300	780	26	1000		

*The Students should undergo internship during the IV semester summer vacation

SEMESTER V

S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24CET51	Structural Analysis - I	PCC	45	15	0	60	120	4	40	60	100
2	24CET52	Design of Reinforced concrete	PCC	45	15	0	60	120	4	40	60	100
3	24CET53	Foundation Engineering	PCC	45	0	0	45	90	3	40	60	100
4	24CET54	Waste Water Engineering	PCC	45	0	0	45	90	3	40	60	100
5		Professional Elective - I	PEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
6	24CEP51	Environmental Engineering Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7	24CEP52	Concrete Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
8	24CEP53	Internship - I*	EEC	0	0	0	0	0	1	100	-	100
9		Industry oriented course-I	EEC	0	0	15	0	15	1	50	50	100
MANDATORY COURSE												
10		Mandatory Course - II	MC	30	0	0	30	60	0	100	-	100
TOTAL				255	30	105	285	690	22	1000		

* The Students should undergo Survey camp for 2 weeks during the V semester summer vacation

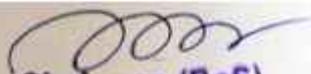

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SEMESTER VI

S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24GET69	Entrepreneurship Development	HSMC	45	0	0	45	90	3	40	60	100
2	24CET61	Irrigation Engineering	PCC	45	15	0	60	120	4	40	60	100
3	24CET62	Structural Analysis - II	PCC	45	15	0	60	120	4	40	60	100
4	24CET63	Design of Steel Structures	PCC	45	0	0	45	90	3	40	60	100
5		Professional Elective – II	PEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
6	24CEP61	Irrigation and Environmental Engineering Drawing	ESC	0	0	45	0	45	1.5	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
7	24CEP62	Survey Camp *	EEC	0	0	0	0	0	1	60	40	100
8	24SDP59	Soft Skills Development - V	EEC	0	0	30	0	30	1	60	40	100
9		Industry oriented course-II	EEC	0	0	15	0	15	1	40	60	100
MANDATORY COURSE												
10		Mandatory Course - III	MC	15	0	0	0	15	0	100	-	100
TOTAL				240	30	90	255	615	21.5	1000		

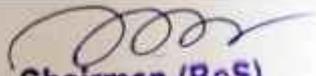
SEMESTER VII

S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24CET71	Construction Engineering and Management	PCC	45	0	0	45	90	3	40	60	100
2	24CET72	Quantity Surveying and Estimation	PCC	45	0	0	45	90	3	40	60	100
3	24CET73	Standards in Civil Engineering	PCC	15	0	0	15	30	1	100	-	100
4		Professional Elective – III	PEC	45	0	0	45	90	3	40	60	100
5		Professional Elective – IV	PEC	45	0	0	45	90	3	40	60	100
6		Professional Elective – V	PEC	45	0	0	45	90	3	40	60	100
7		Open Elective – I	OEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
8	24CEP71	Structural Design and Drawing Laboratory	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES												
9	24CEP72	Design Project	EEC	0	0	60	0	60	2	60	40	100
TOTAL				285	0	90	285	690	22	900		


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SEMESTER VIII												
S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
EMPLOYABILITY ENHANCEMENT COURSE												
1	24CEP81	Project Work	EEC	0	0	240	0	240	8	60	40	100
TOTAL				0	0	240	0	240	8	100		
Total Number of Credits to be Earned for the Award of the Degree = 167												
Note: HSMC – Humanities and Social Sciences including Management Courses, BSC – Basic Science Courses, ESC – Engineering Sciences Courses, PCC – Professional Core Courses, PEC – Professional Elective Courses, OEC – Open Elective Courses, EEC – Employability Enhancement Courses & MC – Mandatory Courses, SL – Self Learning.												



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 (Approved by AICTE & Affiliated to Anna University)
 K.S.R. Kalvi Nagar, Tiruchengode - 637 215

CURRICULUM
UG
R - 2024

Department	Department of Civil Engineering
Programme	B.E. Civil Engineering

HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSES (HSMC)

S.No.	Course Code	Course Title	Semester	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot.		CA	ES	Tot.
1	24ENT19	Professional Communication	I	45	0	0	45	90	3	40	60	100
2	24GET19	தமிழர்மரபு/ Heritage of Tamils	I	15	0	0	15	30	1	40	60	100
3	24GET29	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	II	15	0	0	15	30	1	40	60	100
4	24ENP29	Professional Communication Laboratory	II	0	0	30	0	30	1	60	40	100
5	24GET49	Universal Human Values	IV	45	0	0	45	90	3	40	60	100
6	24GET79	Professional Ethics	VII	45	0	0	45	90	3	40	60	100
Total				165	0	30	165	360	12	-	-	-

BASIC SCIENCE COURSES (BSC)

S.No.	Course Code	Course Title	Semester	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot.		CA	ES	Tot.
1	24MAI19	Matrices and Calculus	I	30	15	30	45	120	4	50	50	100
2	24PHI06	Applied Physics	I	30	0	30	60	120	4	50	50	100
3	24CHI07	Applied Chemistry	II	45	0	30	45	120	4	50	50	100
4	24MAI29	Probability and Statistics	II	30	15	30	45	120	4	50	50	100
5	24MAT36	Optimization Techniques	III	45	15	0	60	120	4	40	60	100
6	24MAT46	Numerical and Computational Techniques	IV	45	15	0	60	120	4	40	60	100
Total				225	60	120	315	720	24	-	-	-

ENGINEERING SCIENCES COURSES (ESC)

S.No.	Course Code	Course Title	Semester	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot.		CA	ES	Tot.
1	24CEI12	Engineering Graphics	I	30	0	30	60	120	4	50	50	100
2	24GEP17	Manufacturing Practices Laboratory	I	0	0	30	0	30	1	60	40	100

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3	24CST29	Python Programming	II	45	0	0	45	90	3	40	60	100
4	24CSP29	Python Programming Laboratory	II	0	0	30	0	30	1	60	40	100
5	24CET32	Mechanics of Solids	III	45	15	0	60	120	4	40	60	100
6	24CEP61	Irrigation and Environmental Engineering Drawing	VI	0	0	45	0	45	1.5	60	40	100
TOTAL				120	15	135	165	435	14.5	-	-	-

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S.No.	Course Code	Course Title	Semester	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot.
1	24SDP19	Aptitude and Coding Skill - I	I	0	0	30	0	30	1	60	40	100
2	24SDP29	Aptitude and Coding Skill - II	II	0	0	30	0	30	1	60	40	100
3	24SSP39	Soft Skills Development - III	III	0	0	30	0	30	1	60	40	100
4	24SSP49	Soft Skills Development - IV	IV	0	0	30	0	30	1	60	40	100
		Industry oriented course-I	IV	0	0	15	0	15	1	40	60	100
		Industry oriented course-II	V	0	0	15	0	15	1	40	60	100
5	24CEP53	Internship - I	V	0	0	0	0	0	1	100	-	100
6	24CEP62	Survey Camp	VI	0	0	0	0	0	1	60	40	100
7	24CEP72	Design Project	VII	0	0	60	0	60	2	60	40	100
8	24CEP73	Internship - II	VII	0	0	0	30	30	1	100	-	100
9	24CEP81	Project Work	VIII	0	0	240	0	240	8	60	40	100
Total				0	0	420	30	460	19	-	-	-

PROFESSIONAL CORE COURSES (PCC)

S.No.	Course Code	Course Title	Semester	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	S	Tot		CA	ES	Tot
1	24CET11	Civil Engineers and society	I	45	0	0	45	90	3	40	60	100
2	24CEP11	Computer Aided Building Drawing	I	0	0	30	0	30	1	60	40	100
3	24CET21	Design Thinking	II	30	0	0	30	60	2	40	60	100
4	24CET22	Construction Materials, Techniques and Practices	II	45	0	0	45	90	3	40	60	100
5	24CEP21	Construction Materials Laboratory	II	0	0	30	0	30	1	60	40	100
6	24CET31	Highway and Railway Engineering	III	45	0	0	45	90	3	40	60	100
7	24CET33	Fluid Mechanics and Applied Hydraulics Engineering	III	45	15	0	60	120	4	40	60	100
8	24CET34	Surveying	III	45	0	0	45	90	3	40	60	100
9	24CEP31	Strength of Materials Laboratory	III	0	0	45	0	45	1.5	60	40	100
10	24CEP32	Survey Engineering Laboratory	III	0	0	45	0	45	1.5	60	40	100
11	24CEP33	Highway Engineering Laboratory	III	0	0	45	0	45	1.5	60	40	100

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ix Applicable for the students admitted from 2024-2025 onwards

12	24CEP34	Design Studio -I	II	0	0	30	0	30	1	60	40	100
13	24CET41	Concrete Technology	IV	45	0	0	45	90	3	40	60	100
14	24CET42	Soil Mechanics	IV	45	0	0	45	90	3	40	60	100
15	24CET43	Strength of Materials	IV	45	15	0	60	120	4	40	60	100
16	24CET44	Water Supply Engineering	IV	45	0	0	45	90	3	40	60	100
17	24CEP41	Fluid Mechanics and Machinery Laboratory	IV	0	0	45	0	45	1.5	60	40	100
18	24CEP42	Soil Mechanics Laboratory	IV	0	0	45	0	45	1.5	60	40	100
19	24CEP43	Design Studio -II	IV	0	0	30	0	30	1	60	40	100
20	24CET51	Structural Analysis - I	V	45	0	0	45	90	3	40	60	100
21	24CET52	Design of Reinforced concrete	V	45	0	0	45	90	3	40	60	100
22	24CET53	Foundation Engineering	V	45	0	0	45	90	3	40	60	100
23	24CET54	Waste Water Engineering	V	45	0	0	45	90	3	40	60	100
24	24CEP51	Environmental Engineering Laboratory	V	0	0	45	0	45	1.5	60	40	100
25	24CEP52	Concrete Laboratory	V	0	0	45	0	45	1.5	60	40	100
26	24CET61	Irrigation Engineering	VI	45	0	0	45	90	3	40	60	100
27	24CET62	Structural Analysis - II	VI	45	0	0	45	90	3	40	60	100
28	24CET63	Design of Steel Structures	VI	45	0	0	45	90	3	40	60	100
29	24CET71	Construction Engineering and Management	VII	45	0	0	45	90	3	40	60	100
30	24CEI72	Quantity Surveying and Estimation	VII	30	15	30	45	120	4	50	50	100
31	24CET54	Standards in Civil Engineering	V	15	0	0	15	30	1	100	-	100
32	24CEP71	Structural Design and Drawing Laboratory	VII	0	0	30	0	30	1	60	40	100
Total				840	45	465	885	2235	74.5	-	-	-


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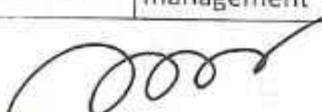


PROFESSIONAL ELECTIVE COURSES (PEC): VERTICALS					
Vertical- I	Vertical - II	Vertical - III	Vertical- IV	Vertical - V	Vertical – VI
Structural Engineering	Construction Engineering	Environmental and Water resources Engineering	Geotechnical Engineering	Transportation and Urban Planning	Diversified Electives
Pre-stressed Concrete	Maintenance and Rehabilitation of Structures	Air Pollution Management	Ground Improvement Techniques	Architecture and Town Planning	IOT in Civil Engineering
Bridge Engineering	Construction Safety Practices	Environmental Impact Assessment	Site Investigation and Soil Exploration	Pavement Engineering	Sustainable Engineering
Basics of Dynamics and Aseismic Design	Introduction to Smart Cities	Industrial Waste Management	Engineering Behaviour Soil	Traffic Engineering and management	Waste To Energy
Earthquake Engineering	Housing, Planning and Management	Municipal Solid Waste Management	Earth and Earth Retaining Structures	Housing Planning and Management	AI/ML in Civil Engineering
Smart Materials and Smart Structures	Construction Planning and Scheduling	Green Building	Engineering Geology	Introduction to Intelligent Transport System	Building Information and Modelling
Prefabricated Structures	Advanced Construction Techniques	Hydrology	Geo-Environmental Engineering	Urban Planning and Development	Form work Engineering
Advanced Concrete Structures	Building Services	Ground Water Engineering	Shallow Foundation	Public Transport System	Remote Sensing & GIS
Industrial Structures	Sustainable Construction	Integrated Water Resources Management	Deep Foundation	Airport and Harbour Engineering	Total Station and GPS Surveying


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S.No.	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot.
VERTICAL 1: STRUCTURAL ENGINEERING												
1	24CFF01	Pre-stressed Concrete	PEC	45	0	0	45	90	3	40	60	100
2	24CEE02	Bridge Engineering	PEC	45	0	0	45	90	3	40	60	100
3	24CEE03	Basics of Dynamics and Aseismic design	PEC	45	0	0	45	90	3	40	60	100
4	24CEE04	Earthquake Engineering	PEC	45	0	0	45	90	3	40	60	100
5	24CEE05	Smart Materials and Smart Structures	PEC	45	0	0	45	90	3	40	60	100
6	24CEE06	Prefabricated Structures	PEC	45	0	0	45	90	3	40	60	100
7	24CEE07	Advanced Concrete structures	PEC	45	0	0	45	90	3	40	60	100
8	24CEE08	Industrial Structures	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 2 : CONSTRUCTION ENGINEERING												
1	24CEE09	Maintenance and Rehabilitation of Structures	PEC	45	0	0	45	90	3	40	60	100
2	24CEE10	Construction Safety Practices	PEC	45	0	0	45	90	3	40	60	100
3	24CEE11	Introduction to smart cities	PEC	45	0	0	45	90	3	40	60	100
4	24CEE12	Housing, Planning and Management	PEC	45	0	0	45	90	3	40	60	100
5	24CEE13	Construction planning and Scheduling	PEC	45	0	0	45	90	3	40	60	100
6	24CEE14	Advanced construction Techniques	PEC	45	0	0	45	90	3	40	60	100
7	24CEE15	Building Services	PEC	45	0	0	45	90	3	40	60	100
8	24CEE16	Sustainable Construction	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 3: ENVIRONMENTAL AND WATER RESOURCES ENGINEERING												
1	24CEE17	Air Pollution Management	PEC	45	0	0	45	90	3	40	60	100
2	24CEE18	Environmental Impact Assessment	PEC	45	0	0	45	90	3	40	60	100
3	24CEE19	Industrial Waste Management	PEC	45	0	0	45	90	3	40	60	100
4	24CEE20	Municipal Solid Waste Management	PEC	45	0	0	45	90	3	40	60	100
5	24CEE21	Green Building	PEC	45	0	0	45	90	3	40	60	100
6	24CEE22	Hydrology	PEC	45	0	0	45	90	3	40	60	100
7	24CEE23	Ground Water Engineering	PEC	45	0	0	45	90	3	40	60	100
8	24CEE24	Integrated water resources management	PEC	45	0	0	45	90	3	40	60	100



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VERTICAL 4: GEOTECHNICAL ENGINEERING												
1	24CEE25	Ground Improvement Techniques	PEC	45	0	0	45	90	3	40	60	100
2	24CEE26	Site Investigation and Soil Exploration	PEC	45	0	0	45	90	3	40	60	100
3	24CEE27	Engineering Behaviour Soil	PEC	45	0	0	45	90	3	40	60	100
4	24CEE28	Earth and Earth Retaining Structures	PEC	45	0	0	45	90	3	40	60	100
5	24CEE29	Engineering Geology	PEC	45	0	0	45	90	3	40	60	100
6	24CEE30	Geo-Environmental Engineering	PEC	45	0	0	45	90	3	40	60	100
7	24CEE31	Shallow Foundation	PEC	45	0	0	45	90	3	40	60	100
8	24CEE32	Deep Foundation	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 5: TRANSPORTATION AND URBAN PLANNING												
1	24CEE33	Architecture and Town Planning	PEC	45	0	0	45	90	3	40	60	100
2	24CEE34	Pavement Engineering	PEC	45	0	0	45	90	3	40	60	100
3	24CEE35	Traffic Engineering and Management	PEC	45	0	0	45	90	3	40	60	100
4	24CEE36	Housing Planning and Management	PEC	45	0	0	45	90	3	40	60	100
5	24CEE37	Introduction to Intelligent Transport System	PEC	45	0	0	45	90	3	40	60	100
6	24CEE38	Urban Planning and Development	PEC	45	0	0	45	90	3	40	60	100
7	24CEE39	Public Transport System	PEC	45	0	0	45	90	3	40	60	100
8	24CEE40	Airport and Harbour Engineering	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 6 : DIVERSIFIED ELECTIVES												
S.No	Course Code	Course Title	Category	Periods / Week					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1	24CEE41	AI in Civil Engineering	PEC	45	0	0	45	90	3	40	60	100
2	24CEE42	Introduction to Civil Software Courses	PEC	45	0	0	45	90	3	40	60	100
3	24CEE43	Building Information Modeling	PEC	45	0	0	45	90	3	40	60	100
4	24CEE44	Drone Applications in Civil Engineering	PEC	45	0	0	45	90	3	40	60	100
5	24CEE45	Disaster Preparedness and Mitigation	PEC	45	0	0	45	90	3	40	60	100
6	24CEE46	Global Climate Change	PEC	45	0	0	45	90	3	40	60	100
7	24CEE47	Remote Sensing & GIS	PEC	45	0	0	45	90	3	40	60	100
8	24CEE48	Total Station and GPS Surveying	PEC	45	0	0	45	90	3	40	60	100

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MANDATORY COURSE – I,II,III

MANDATORY COURSE – I,II,III												
1	24MCP09	Yoga for Stress Management	MC	30	0	0	0	30	0	-	-	-
2	24MCT01	Constitution of India	MC	30	0	0	0	30	0	100	-	100
3	24MCT02	Environmental Science and Sustainability	MC	30	0	0	0	30	0	100	-	100
4	24MCT03	Introduction to Gender Studies	MC	30	0	0	0	30	0	100	-	100
5	24MCT04	Life Science for Engineers	MC	30	0	0	0	30	0	100	-	100
6	24MCT05	Industrial Safety	MC	30	0	0	0	30	0	100	-	100
7	24MCT06	Essence of Indian Knowledge System	MC	30	0	0	0	30	0	100	-	100
8	24MCT07	Elements of Literature	MC	30	0	0	0	30	0	100	-	100
9	24MCT08	Disaster Management	MC	30	0	0	0	30	0	100	-	100


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OPEN ELECTIVE OFFERED BY OTHER DEPARTMENT												
1	24AUO01	Basics of Automobile Engineering	OEC	45	0	0	45	90	3	40	60	100
2	24AUO02	Hybrid Vehicles	OEC	45	0	0	45	90	3	40	60	100
3	24BMO01	Basics of Biomedical Instrumentation	OEC	45	0	0	45	90	3	40	60	100
4	24BMO02	Biometric systems	OEC	45	0	0	45	90	3	40	60	100
5	24CSO01	Data structures and Algorithm using C	OEC	45	0	30	45	120	4	50	50	100
6	24CSO02	Fundamentals of Java Programming	OEC	15	0	90	15	120	4	50	50	100
7	24CSO03	Full Stack Framework	OEC	45	0	0	45	90	3	40	60	100
8	24CSO04	Digital Marketing	OEC	45	0	0	45	90	3	40	60	100
9	24CBO01	Ethical Hacking	OEC	45	0	0	45	90	3	40	60	100
10	24CBO02	Digital and Mobile Forensics	OEC	45	0	0	45	90	3	40	60	100
11	24CBO03	Applied Java Programming	OEC	15	0	90	15	120	4	50	50	100
12	24CSO06	Data Science Fundamentals	OEC	45	0	0	45	90	3	40	60	100
13	24CSO07	Artificial Intelligence and Machine learning	OEC	45	0	0	45	90	3	40	60	100
14	24CSO08	Data Exploration and Visualization	OEC	45	0	0	45	90	3	40	60	100
15	24IOO01	Industrial Internet of things	OEC	45	0	0	45	90	3	40	60	100
16	24IOO02	Introduction to Sensors and IoT	OEC	45	0	0	45	90	3	40	60	100
17	24ECO01	Drone Technology	OEC	45	0	0	45	90	3	40	60	100
18	24ECO02	Wearable Devices	OEC	45	0	0	45	90	3	40	60	100
19	24ECO03	5G /6G Communication	OEC	45	0	0	45	90	3	40	60	100
20	24ECO04	Embedded IoT	OEC	45	0	0	45	90	3	40	60	100
21	24EEO01	Solar and Wind Energy System	OEC	45	0	0	45	90	3	40	60	100
22	24EEO02	Hydrogen and Hybrid Energy System	OEC	45	0	0	45	90	3	40	60	100
23	24EEO03	Electric Vehicle Technology	OEC	45	0	0	45	90	3	40	60	100
24	24EEO04	Energy Conservation and Management	OEC	45	0	0	45	90	3	40	60	100
25	24ITO01	Introduction to Mobile Application Development	OEC	45	0	0	45	90	3	40	60	100
26	24ITO02	Introduction to Big Data and Analytics	OEC	45	0	0	45	90	3	40	60	100

28	24MEO01	3D Printing	OEC	45	0	0	45	90	3	40	60	100
29	24MEO02	Robotics and Automation	OEC	45	0	0	45	90	3	40	60	100
30	24MEO03	Lean Manufacturing	OEC	45	0	0	45	90	3	40	60	100
31	24SFO01	Occupational health and safety	OEC	45	0	0	45	90	3	40	60	100
32	24SFO02	Electrical safety	OEC	45	0	0	45	90	3	40	60	100
33	24SFO03	Building Fire Safety	OEC	45	0	0	45	90	3	40	60	100
34	24SFO04	Construction Safety	OEC	45	0	0	45	90	3	40	60	100
OPEN ELECTIVES OFFERED TO OTHER DEPARTMENTS												
1.	24CEO01	Smart Buildings	OEC	45	0	0	45	90	3	40	60	100
2.	24CEO02	Climate Change	OEC	45	0	0	45	90	3	40	60	100


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CREDIT SUMMARY										
Name of the Programme: B.E Civil Engineering										
CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL CREDITS	%
HSMC	4	2	-	3	-	3	0	-	12	7.18
BSC	8	8	4	4	-	-	-	-	24	14.37
ESC	5	4	4	-	-	1.5	-	-	14.5	8.68
PCC	4	6	15.5	17	17	11	8	-	78.5	47.00
PEC	-	-	-	-	3	3	9	-	15	8.98
OEC	-	-	-	-	0	0	3	-	3	1.79
EEC	1	1	1	2	2	3	2	8	20	12.00
MC	-	√	-	-	√	√	-	-	0	-
Total	22	21	24.5	26	22	21.5	22	8	167	100.00

Total No. of Credits = 167

Total No. of Credits for Lateral Entry Students = 131


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24ENT19	PROFESSIONAL COMMUNICATION	Category	L	T	P	SL	C
		HSMC	45	0	0	45	3
(Common to All Branches)							
PRE-REQUISITE: A comprehensive understanding of basic English grammar, vocabulary, and sentence structure with familiarity in Communication and Technical Writing are considered as pre-requisite for the course.							
OBJECTIVE: To equip learners with essential verbal and written communication skills, including technical writing, necessary for academic, professional, and workplace success.							
UNIT - I	UNDERSTANDING COMPARISONS AND CONTRASTS	(9)					
Reading: Technical brochures, telephone messages, social media messages. Writing: Emails/letters introducing oneself, Compare and Contrast Essay. Grammar: Present Tenses, Framing WH and Yes-No questions. Vocabulary: Portmanteau words, One-word substitutions.							
UNIT - II	WRITING REPORTS AND PARAGRAPHS	(9)					
Reading: Technical texts, biographies, travelogues, travel & technical blogs. Writing: Paragraph writing, Short Report on an event/industrial visit. Grammar: Past Tenses, Active & Passive Voice transformations, Prepositions. Vocabulary: Word formations using Prefixes & Suffixes.							
UNIT - III	DESCRIBING THE PROCESS/PRODUCT	(9)					
Reading: Advertisements, gadget reviews, user manuals, news reports. Writing: Definitions, Instructions, Product/Process description, Checklists. Grammar: Future Tenses, If clauses, Concord. Vocabulary: Nominal Compounds, Discourse Markers (connectives & sequence words).							
UNIT - IV	TRANSCODING AND RECOMMENDATIONS	(9)					
Reading: Newspaper articles, Journal reports. Writing: Recommendations, Transcoding.(Conversion of non-verbal to verbal information) Grammar: Articles, Relative pronouns, Modals. Vocabulary: Collocations, Homonyms.							
UNIT - V	SUMMATION AND DESCRIPTION	(9)					
Reading: Editorials and Opinion blogs, Company profiles. Writing: Descriptive/Narrative Essays, Job/Internship Application with Resume. Grammar: Numerical adjectives, Relative Clauses. Vocabulary: Cause & Effect Expressions, Homophones.							
TOTAL (T:45 , SL:45) = 90 PERIODS							

Pravin Kumar
Chairman (BOS)



COURSE OUTCOMES:

At the end of the course, the learners will be able to:

COs	Course Outcome	Cognitive Level
CO1	Recognize the structure of comparison texts using correct tenses and appropriate vocabulary.	Understand
CO2	Construct short paragraphs and reports using past tense and clear expressions.	Understand
CO3	Comprehend processes and products using future forms and appropriate vocabulary.	Understand
CO4	Interpret visuals like charts or graphs to produce well-structured written content.	Understand
CO5	Draft essays and job applications clearly, using proper grammar and structure.	Understand

TEXT BOOKS:

1. English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2023.
2. Nitin Bhatnagar, Communicative English for Engineers and Professionals, Pearson, 2024.

REFERENCES:

1. Dr. K.N. Shoba, and Dr. Lourdes Joevani, English for Science & Technology-II Cambridge University Press. Francis, Department of English, Anna University, 2023.
2. Lakshminarayanan, A Course Book on Technical English, Scitech Publications (India) Pvt. Ltd.2022.
3. Kulbhusan Kumar, RS Salaria, Effective Communication Skill, Khanna Publishing House, 2023.

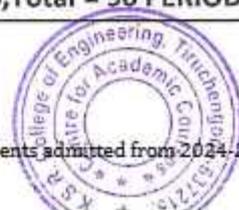
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	2	3	-	3	-	-
CO2	-	-	-	-	-	-	-	2	3	-	3	-	-
CO3	-	-	-	-	-	-	-	2	3	-	3	-	-
CO4	-	-	-	-	-	-	-	2	3	-	3	-	-
CO5	-	-	-	-	-	-	-	2	3	-	3	-	-

1-Low, 2-Medium, 3-High


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24CET11	CIVIL ENGINEERS AND SOCIETY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: A basic understanding of engineering principles, as well as familiarity with core Civil engineering ideas. Students should also be aware of environmental challenges and sustainability, as well as the ethical aspects involved in engineering methods.							
OBJECTIVES: This course explores the impact of engineering on society and technology, covering key concepts in building construction and infrastructure. It emphasizes the societal role of infrastructure and the ethical responsibilities of engineers. The course also highlights the importance of reliability and safety in engineering practices.							
UNIT – I	INTRODUCTION OF CIVIL ENGINEERING	(9)					
Engineering – Definition – Engineering Education – Graduate Attributes – Engineering functions – Role and Responsibilities of Engineers – Early construction and development over time.							
UNIT – II	FUNDAMENTALS OF CIVIL ENGINEERING	(9)					
Introduction to Civil Engineering –Branches in Civil Engineering – Elements of Building Construction - General Requirement of Building, Elementary principles and basic requirements of a building Planning, Importance of Planning – Possible scopes for a career.							
UNIT – III	NATIONAL PLANNING FOR CONSTRUCTION AND INFRASTRUCTURE DEVELOPMENT	(9)					
Types of Infrastructures - Impact of infrastructural development on economy and environment of country – Position of Construction Industry - Five year plan outlays for construction – Current budget for infrastructure works - Role of Civil Engineer in Society.							
UNIT – IV	ENGINEERING AS SOCIAL EXPERIMENTATION	(9)					
The concept of profession – Importance of ethics in engineering – Role of codes of ethics – Professional responsibilities of engineers – Overview of ethical theories and applications - Engineering as Experimentation – Engineers as responsible Experimenters.							
UNIT – V	SUSTAINABILITY	(9)					
Reliability, risk and safety – Risk management – Engineering and the environment – Ethics and the environment – Sustainable Engineering – Sustainable Development Goal and Civil Engineering.							
L=45,SL= 45,Total = 90 PERIODS							



COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Describe the role and responsibilities of engineers and the evolution of civil engineering.											Understand	
CO2	Explain basic building construction elements and the importance of planning.											Understand	
CO3	Describe infrastructure types and their impact on economy and environment.											Understand	
CO4	Interpret engineering ethics and the concept of engineers as responsible experimenters.											Understand	
CO5	Summarize key aspects of sustainable engineering, including reliability, safety, and sustainability goals											Understand	
TEXT BOOKS:													
1. Dr. Shakuntala Acharya, "Civil Engineering Societal and Global Impact" All India Council for Technical Education (AICTE), New Delhi. November, 2023.													
2. S S Bhavikati, "Basic Civil Engineering", New Age International (P) Limited Publishers, New Delhi, 2018.													
REFERENCES:													
1. Rebecca Mirsky and John Schaufelberger, "Professional Ethics for the Construction Industry" RICS, USA, 2014.													
2. Kim Strom Gottfried, "Straight Talk about Professional Ethics", Lyceum Books, 2nd Edition, 2014.													
3. Kenneth K. Humphreys, "What Every Engineer Should Know about Ethics", CRC Press, 1999.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	-	-	2	2
CO2	3	2	-	-	-	-	-	-	1	-	-	2	2
CO3	3	2	-	-	-	-	-	-	1	-	-	2	2
CO4	3	2	-	-	-	-	-	-	1	-	-	2	2
CO5	3	2	-	-	-	-	-	-	1	-	-	2	2
1-low, 2-medium, 3-high													


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24GET19	தமிழர்மரபு	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(அனைத்து துறைகளுக்கும் பொதுவானது)							
முன்கூட்டிய துறைசார் அறிவு : தேவை இல்லை							
அலகு - I	மொழி மற்றும் இலக்கியம்						[03]
இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலயக்கிகியங்கள் - சங்க இலக்கியத்தின் சமயச்சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் காப்பியங்கள், தமிழகத்தில் சமணபௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலகியங்கள் தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கியவளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.							
அலகு - II	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை						[03]
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனியில் திருவள்ளுவர் சிலை - இசை கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூகபொருளாதார வாழ்வில் கோவில்களின் பங்கு.							
அலகு - III	நாட்டுப் புறக் கலைகள் மற்றும் வீர விளையாட்டுக்கள்						[03]
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.							
அலகு - IV	தமிழர்களின் திணைக் கோட்பாடுகள்						[03]
தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்கக்காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.							
அலகு - V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு						[03]
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற்பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்தமருத்துவத்தின் பங்கு கல்வெட்டுகள் கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்கள்களின் அச்ச வரலாறு.							
Total (L= 15, SL=15)=30 Periods							

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பாடம் கற்றத்தின் விளைவுகள்: பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்		அறிவாற்றல் நிலை
CO1:	தமிழ்மொழியின் செந்தன்மை மற்றும் இலக்கியம் குறித்த தெரிதல்	புரிதல்
CO2:	தமிழர்களின் சிற்பக்கலை, ஓவியக்கலை மற்றும் இசைக் கருவிகள் குறித்த தெளிவு.	புரிதல்
CO3:	தமிழர்களின் நாட்டுப் புரைக் கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்த தெளிவு	புரிதல்
CO4:	தமிழர்களின் திணைக் கோட்பாடுகள், சங்ககாலவணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தகவல்கள்.	புரிதல்
CO5:	இந்திய தேசிய இயக்கம், சுயமரியாதை இயக்கம் மற்றும் சித்த மருத்தவம் பற்றிய புரிதல்.	புரிதல்

Text Books:

1	தமிழகவரலாறு-மக்களும்பண்பாடும்-கேகேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்) உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, 2002
2	கணினித்தமிழ்முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016

Reference Books :

1	கீழடி-வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல்துறைவெளியீடு)
2	பொருறை - ஆற்றங்கரை நாகரிகம்.(தொல்லியல் துறை வெளியீடு)
3	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL. - (in print)
4	Social Life of the Tamils - The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-

1. சிறிது (குறைந்த) 2. மிதமான (நடுத்தர) 3. கணிசமான (உயர்)

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24GET19	HERITAGE OF TAMILS	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(Common to all branches)							
<i>Prerequisite(s): No prerequisites are needed for enrolling into the course</i>							
UNIT - I	LANGUAGE AND LITERATURE	[03]					
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.							
UNIT - II	HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	[03]					
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.							
UNIT - III	FOLK AND MARTIAL ARTS	[03]					
Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.							
UNIT - IV	THINAI CONCEPT OF TAMILS	[03]					
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.							
UNIT - V	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	[03]					
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.							
Total (L= 15, SL=15) =30 Periods							
Course Outcomes:							Cognitive Level
At the end of the course, the student will be able to							
CO1:	Recognize the extensive literature of Tamil and its classical nature.						Understand
CO2:	Apprehend the heritage of sculpture, painting and musical instruments of ancient people.						Understand
CO3:	Review on folk and martial arts of Tamil people.						Understand
CO4:	Insight thinai concepts, trade and victory of Chozha dynasty.						Understand
CO5:	Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.						Understand

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Text Books:	
1	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
2	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)
Reference Books:	
1	Social Life of the Tamils – The. Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).
2	The Contribution of the Tamil to Indian Culture (Dr.M.Valarmathi) (Puplished by International Institute of Tamil Studies).
3	Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly Published by: Department of Archaeology & Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
4	Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by: The Author)

Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)													

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24MAI19	MATRICES AND CALCULUS	Category	L	T	P	SL	C
		BSC	30	15	30	45	4
SEMESTER I - B.E / B.TECH (Common to All Branches)							
PREREQUISITE							
The Students should have a basic understanding of calculus, matrices, and differential equations to effectively follow the concepts in this course.							
OBJECTIVES:							
Build a strong foundation in eigen values, eigen vectors, quadratic forms, and higher-order linear differential equations. Develop skills in differential and vector calculus to analyze curves, optimize multivariable functions, and interpret vector fields.							
UNIT - I	LINEAR ALGEBRA	(9)					
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (Excluding proof) – Cayley Hamilton theorem (excluding proof) – Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation.							
UNIT - II	ORDINARY DIFFERENTIAL EQUATIONS	(9)					
Linear differential equations of second and higher order with constant coefficients – Differential equations with variable coefficients – Cauchy’s and Legendre’s linear equations – Method of variation of parameters.							
UNIT - III	DIFFERENTIAL CALCULUS	(9)					
Curvature - Radius of curvature (Cartesian co-ordinates only) – Centre of curvature and Circle of curvature – Involute and Evolute (Parabola, Ellipse, Hyperbola and Rectangular hyperbola).							
UNIT - IV	FUNCTIONS OF SEVERAL VARIABLES	(9)					
Partial derivatives – Euler’s theorem for homogenous functions – Taylor’s series expansion - Maxima and Minima for functions of two variables – Method of Lagrangian multipliers.							
UNIT - V	VECTOR CALCULUS	(9)					
Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Green’s theorem in plane, Gauss divergence theorem and Stoke’s theorem (Cube, Cuboid and Rectangular Paralleopiped only).							
List of Exercise/Experiments(MAT LAB):							
<ol style="list-style-type: none"> 1. Calculate the characteristic equation and eigenvalues 2. Find the eigenvector and diagonalization of a given matrix. 3. Solving ODE with constant coefficients 4. Detect the solution of ODE with variable coefficients 5. Identify the radius of curvature 6. Establish the Evolute of curve. 7. Reckon the Taylor’s series for functions of two variables. 8. Compute the maxima and minima. 9. Estimate the directional derivative, divergence and curl. 10. Determine line integral, surface integral and volume integral. 							
L = 30 , T = 15 & P = 30 & SL = 45, TOTAL: 120 PERIODS							



COURSE OUTCOMES: At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Apply eigen values, eigen vectors, and the Cayley-Hamilton theorem to solve matrix problems and diagonalize quadratic forms into canonical form.											Apply	
CO2	Apply methods to solve second and higher-order linear differential equations with constant and variable coefficients.											Apply	
CO3	Apply concepts of differential calculus to find curvature, center of curvature, and evolutes of standard Cartesian conic sections.											Apply	
CO4	Apply partial derivatives, Jacobians, and lagrangian multipliers to determine local extremum of multivariable functions.											Apply	
CO5	Apply vector differential operators to the vector fields and verify Green's, Gauss divergence, and Stokes' theorems for geometries.											Apply	
TEXT BOOKS: 1.Ravish R Singh and Mukul Bhatt, "Engineering Mathematics – I", Mc-Graw Hill Publications, New Delhi, 2 nd Edition, 2020. 2.B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40 th Edition, 2020.													
REFERENCES: 1. Bali N. P and Manish Goyal, "Engineering Mathematics", Laxmi Publications Pvt Ltd., 7 th Edition, 2020. 2.Dass H.K, "Advance Engineering Mathematics", S. Chand and company, 11 th Edition, 2014. 3. Jain R.K. and Iyengar S.R.K," Advanced Engineering Mathematics", Narosa Publications, 8 th Edition, 2012. 4.Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, New Delhi, 10 th Edition 2016. 5. https://archive.nptel.ac.in/courses/111/108/111108157/ 6. https://archive.nptel.ac.in/courses/111/105/111105122/													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	2	-	-	1	-	-	2	-	-
CO2	3	3	3	3	2	-	-	1	-	-	2	-	-
CO3	3	3	3	3	2	-	-	1	-	-	2	-	-
CO4	3	3	3	3	2	-	-	1	-	-	2	-	-
CO5	3	3	3	3	2	-	-	1	-	-	2	-	-
Avg.	3	3	3	3	2	0	0	1	0	0	2	0	0
1-low, 2-medium, 3-high													

24PHI06	APPLIED PHYSICS	Category	L	T	P	SL	C
		BSc	45	-	30	45	4
(Common to CE, ME & SFE)							
PREREQUISITE: The students must have knowledge about basic concepts of sound, light, arrangement of atoms in crystalline solids, modern engineering materials, magnetic and super conducting materials and their applications.							
OBJECTIVES: To provide a comprehensive understanding of the principles, properties and applications of acoustics, ultrasonics, lasers, crystalline structures, new engineering materials, magnetic materials and superconductors in modern Science and technology.							
UNIT – I	ACOUSTICS AND ULTRASONICS	(9)					
Acoustics–Introduction – classification of sound – characteristics of musical sound – loudness – Weber – Fechner law – decibel – absorption co-efficient – reverberation – reverberation time – Sabine’s formula: growth and decay (derivation) – factors affecting acoustics of buildings and their remedies. Ultrasonics – production – Piezoelectric method – properties – velocity measurement: acoustical grating – applications – SONAR, NDT – ultrasonic flaw detection technique.							
UNIT – II	LASER TECHNOLOGY	(9)					
Introduction – principle of spontaneous emission and stimulated emission – Einstein’s co-efficient A & B(derivation) – population inversion, pumping – types of laser – CO ₂ laser and semiconductor diode laser– homo – junction and hetero – junction (qualitative analysis only) – industrial applications: lasers in welding, heat treatment and cutting – holography (construction and reconstruction of images).							
UNIT – III	CRYSTAL PHYSICS	(9)					
Introduction to crystalline and amorphous solids – lattice and unit cell – seven crystal systems and Bravais lattices – atomic radius – co-ordination number – packing factor of SC, BCC, FCC and HCP structures–Miller indices(hkl) – d-spacing in cubic lattice – crystal imperfections – point, line and surface defects.							
UNIT – IV	MODERN ENGINEERING MATERIALS	(9)					
New engineering materials: Metallic glasses – preparation, properties and applications – shape memory alloys (SMA) – characteristics, properties of Ni-Ti alloy – applications. Smart materials – smart fluids –Electrorheological fluids (ERF)–Magnetorheological fluids (MRF) – effect of temperature in fluids and its applications.							
UNIT - V	MAGNETIC AND SUPERCONDUCTING MATERIALS	(9)					
Magnetic Materials: Introduction – origin of magnetic moment – dia, para and ferromagnetic materials – domain theory of ferro-magnetism – Hysteresis – soft and hard magnetic materials. Superconducting Materials: Introduction to superconductivity – properties and types of superconductor – application of superconductors: magnetic levitation–SQUIDS – cryotron.							
List of exercises/experiments:							
1. Calculate the velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.							
2. Determine the thickness of the given thin paper using Air wedge method.							
3. Compute the width of the CD groove with a help of semiconductor laser.							
4. Find the band gap of a Germanium/ Silicon crystal.							
5. Evaluate the wavelength of an InP / GaAs crystal laser.							
6. Measure the Young’s modulus of a given beam using non – uniform bending method.							
7. Enumerate the viscosity of a given liquid by Poiseuille’s method.							
8. Assess the Hysteresis loss of magnetic materials using B-H curve.							
Lecture: 45, Laboratory: 30, SL:45 TOTAL: 120 PERIODS							



Course outcomes:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive level	
CO1	Apply acoustics and ultrasonics principles to determine sound quality in building and implement ultrasonic methods in practical applications.											Apply	
CO2	Interpret the laser principles, types and explain specific application based on their desirable requisite.											Understand	
CO3	Compute seven crystal systems, interplanar spacing in simple cubic lattice, atomic packing factor for SC, BCC, FCC & HCP and crystal imperfections.											Apply	
CO4	Discuss the properties and applications of metallic glasses, SMAs, smart fluids and recognize the behavior of ERF and MRF under temperature effects.											Understand	
CO5	Illustrate the principles governing magnetic materials, superconductors, including their classification, properties and applications.											Understand	
Text Books :													
1. M.N. Avadhanulu and P.G. Kshirsagar, "A text book of Engineering Physics", S. Chand and Company, New Delhi, 11 th Edition, 2018.													
2. R.K. Gaur & S.L. Gupta, "Engineering Physics", Dhanpat Rai Publication, New Delhi, 7 th Edition, 2014.													
Reference Books :													
1. R. Murugesan and Kiruthiga Sivaprasath, "Modern Physics", S. Chand & Company, New Delhi, 17 th Edition, 2014.													
2. V. Rajendran, "Engineering Physics", Tata McGraw-Hill, New Delhi, 1 st Edition, 2011.													
3. S.O. Pillai, "Solid State Physics", New Age Publication, Chennai, 10 th Edition, 2023.													
4. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill, New Delhi, 7 th Edition, 2015.													
Mapping of COs with POs and PSOs													
COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2
CO1	3	3	2	-	-	-	1	2	2	-	2	-	-
CO2	3	2	-	-	-	-	1	2	2	-	2	-	-
CO3	3	3	2	-	-	-	1	2	2	-	2	-	-
CO4	3	2	-	-	-	-	1	2	2	-	2	-	-
CO5	3	2	-	-	-	-	1	2	2	-	2	-	-
Avg.	3	2	-	-	-	-	1	2	2	-	2	-	-
1-low, 2-medium, 3-high													


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24PHI06 - APPLIED PHYSICS
I Year B.E (CE, ME & SFE)
Requirements for a batch of 30 students
Regulation (2024)

S.No.	Description of Equipment	Quantity required
1.	Ultrasonic interferometer. (with accessories)	5 Nos
2.	Air wedge apparatus. (with traveling microscope and accessories)	5 Nos
3.	Width of the groove of CD using laser. (with accessories)	5 Nos
4.	Band gap apparatus. (with accessories)	5 Nos
5.	Wavelength of semiconductor laser beam. (with accessories)	5 Nos
6.	Non- uniform Bending apparatus. (with accessories)	5 Nos
7.	Poiseuille's method apparatus. (with accessories)	5 Nos
8.	B-H curve apparatus. (with accessories)	5 Nos


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24CE112	ENGINEERING GRAPHICS	Category	L	T	P	SL	C
		ESC	30	0	30	60	4
PREREQUISITE: Student must have the basic knowledge of geometry, trigonometry and algebra, along with an introduction to fundamental engineering concepts. Students should also possess basic computer literacy and knowledge on traditional drafting tools such as scales, compasses, and protractors. The ability to visualize and interpret three-dimensional objects from two-dimensional drawings.							
OBJECTIVES: Apply BIS conventions to ensure standardized and accurate technical drawings. Master true lengths and inclinations to create precise projections of lines and solids. Develop skills in projecting and unfolding 3D solids, including their isometric and perspective views.							
UNIT – I	PLANE CURVES AND ORTHOGRAPHIC PROJECTION						(9)
Introduction on drafting instruments, BIS conventions and specifications, Lettering and Dimensions Conics - Construction of ellipse, Parabola and hyperbola by eccentricity method - Construction of cycloid construction of involutes- Drawing of tangents and normal to the above curves. Representation of Three Dimensional objects - General principles of orthographic projection - First angle projection.							
UNIT - II	PROJECTION OF POINTS, LINES AND PLANE SURFACES						(9)
Projection of points and straight lines located in the first quadrant - Determination of true lengths and true inclinations Projection of polygonal surface and circular lamina inclined to any one reference plane.							
UNIT - III	PROJECTION OF SOLIDS						(9)
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.							
UNIT - IV	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES						(9)
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids - Prisms, pyramids, cylinders and cones.							
UNIT - V	ISOMETRIC AND PERSPECTIVE PROJECTIONS						(9)
Principles of isometric projection - isometric scale - Isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projection of prisms, pyramids and cylinders by visual ray method.							
L=30, P= 30,SL=60, TOTAL= 120 PERIODS							


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Classify types of plane curves and understand their geometric properties and equations.											Understand	
CO2	Explain the orientation of points with respect to the frontal, horizontal, and profile planes.											Understand	
CO3	Construct projections of various solid shapes.											Apply	
CO4	Identify the true shape and size of surfaces using accurate projection methods.											Apply	
CO5	Interpret isometric views of simple 3D objects to understand their projection on a 2D surface.											Understand	
List of Exercise/Experiments:													
1. Study of basic tools, commands and coordinate system (absolute, relative, polar, etc.) used in 2D Software.													
2. Draw the conic curves and special curves by using AutoCAD.													
3. Draw the front view, top view, side view of objects from the given pictorial view.													
4. Draw the projections of straight lines.													
5. Draw the projections of polygonal surface.													
6. Draw the projections of simple solid objects.													
7. Draw the sectional view and the true shape of the given section.													
8. Draw the development of surfaces like prism, pyramids, cylinders and cone													
9. Draw the isometric projections of simple solids, truncated prism and pyramids.													
10. Draw the isometric projections of cylinder and cone.													
TEXT BOOKS:													
1.M.S. Kumar, Engineering Graphics, D.D. Publications, Assam 2018.													
2.K. V. Natarajan, A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai (2017).													
REFERENCES:													
1. Venugopal & V. Prabhu Raja, Engineering Graphics, New Age International (P) Limited, New Delhi, 15 th Edition, 2018.													
2. K. R. Gopalakrishna, Engineering Drawing (Vol.I&II), Subhas Publications, Bengaluru, 1 st Edition 2017.													
3. B. Shah and B.C. Rana, Engineering Drawing, Pearson Education London, 2 nd Edition, 2009.													
4. N.D. Bhatt, Engineering Drawing, Charotar Publishing House, Gujarat, 46 th Edition, 2003.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	1	-	-	2	1	-	2	3	-
CO2	3	2	-	-	1	-	-	2	1	-	2	3	-
CO3	3	3	2	-	1	-	-	2	1	-	2	3	-
CO4	3	2	2	-	1	-	-	2	1	-	2	3	-
CO5	3	2	-	-	1	-	-	2	1	-	2	3	-
1-low, 2-medium, 3-high													

Laboratory Equipment Details
(Requirement for batch of 30 students)

S. No.	Description of Equipment	Quantity required
1.	Pentium IV Computer with AutoCAD	30 Nos.
2.	Licensed Software for Drafting and Modeling	30 licenses
3.	Laser Printer or Plotter to print / plot drawings	2 Nos.



24GEP17	MANUFACTURING PRACTICES LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

(Common to AE, CE, MECH & SFE)

PREREQUISITE:

Students must have a basic knowledge on the topics from Civil works and Mechanical Engineering such as Plumbing, Carpentry, Welding, and Machining and Electrical & Electronics basic components.

OBJECTIVES:

Develop basic practical skills in plumbing, carpentry, welding, machining, sheet metal, and electrical work. Students gain hands-on experience with tools, materials, and techniques used in civil, mechanical, and electrical fields.

List of Exercise/Experiments:**GROUP A (CIVIL)****(12)****PLUMBING WORK**

1. Preparing plumbing line sketches
2. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, Elbows and other components which are commonly used in household.

CARPENTRY WORK

3. Sawing and planing work
4. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

GROUP B (MECHANICAL)**(14)****WELDING WORK**

5. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.

BASIC MACHINING WORK

6. Simple Facing and Turning operation using centre lathe.
7. Drilling and Tapping using drilling machine

SHEET METAL WORK

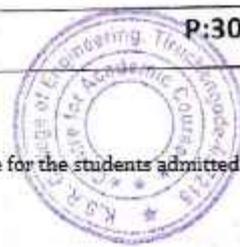
8. Making of a square tray.

GROUP C (ELECTRICAL & ELECTRONICS)**(04)**

9. Study of Ceiling Fan and Iron Box
10. Study of logic gates AND, OR, EX-OR and NOT.

LIST OF EQUIPMENT (for a batch of 30 Students)

S.No.	Name of the Equipment	Quantity
1	Carpentry tools and its accessories	15 sets
2	Plumbing tools and its accessories	15sets
3	Arc Welding equipment and its accessories	5 sets
4	Centre Lathe with its accessories	2 No's
5	Pillar type drilling machine	1 No
6.	Foundry tools and its accessories	5 set

P:30 TOTAL: 30 PERIODS

COURSE OUTCOMES:			
At the end of the course, the students will be able to:			
COs	Course Outcome	Exp. No.	Cognitive Level
CO1	Develop pipe line plan, lay and connect various pipe fittings used in common house hold plumbing work.	1 & 2	Apply
CO2	Develop joints in wood materials used in common household wood work	3 & 4	Apply
CO3	Construct various joints in steel plates using arc welding work	5	Apply
CO4	Apply lathe and drilling machine for turning, drilling, tapping and sheet metal work.	6, 7 & 8	Apply
CO5	Illustrate the key components and basic functions of a ceiling fan, iron box and logic gates.	9 & 10	Understand

REFERENCES:

1. Dr. V. Ramesh Babu. Engineering Practices Laboratory Manual, VRB Publishers, Revised Edition 2019-2020.
2. S Gowri & T Jeyapoovan Engineering Practices Lab Manual, Vikas Publishing, 5th Edition.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

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24CEP11	COMPUTER AIDED BUILDING DRAWING	Category	L	T	P	SL	C
		PCC	0	0	30	0	1
<p>PREREQUISITE: Students should have a basic understanding of building design principles and technical drawings. Furthermore, a basic understanding of geometry and mathematics is essential to effectively develop and interpret architectural plans. Students should also have basic computer literacy.</p>							
<p>OBJECTIVES: To equip learners with the skills to prepare 2D and 3D drawings using AutoCAD and interpret building layouts, elevations, and sections. Through hands-on experiments, students will gain practical knowledge of RCC, masonry structures, and factory building design.</p>							
<p>List of Exercise/Experiments:</p> <ol style="list-style-type: none"> 1. Study of Conventions & Symbols 2. Commands for AutoCAD 3. Cross section of RCC Isolated footing 4. Drawing of Building Components like Doors, Windows and Lintel 5. Reading room with R.C.C flat roof 6. Residential building with flat roof 7. Fully tiled gabled house 8. RCC framed building with partly flat and partly sloped roof 9. Elevation of steel roof truss 10. Workshop building 11. Perspective view of the building 12. C/S & plan of a RCC Dog legged stair case. 							
P= 30, TOTAL= 30 PERIODS							

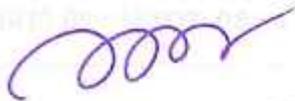

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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome									Ex.No	Cognitive Level		
CO1	Discuss the principles of planning and bye-laws used in building planning.									1,2	Understand		
CO2	Draw layout, plan, elevation & sectional elevation of different types of building.									3,4,5	Apply		
CO3	Draw plan, elevation and section of RCC framed structures.									6,7,8	Apply		
CO4	Draw plan, elevation and section of factory buildings.									9,10	Apply		
CO5	Prepare 2D and 3D model of building									11,12	Apply		
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	1	1	-	1	3	3
CO2	3	3	2	-	-	-	-	1	1	-	1	3	3
CO3	3	3	2	-	-	-	-	1	1	-	1	3	3
CO4	3	3	2	-	-	-	-	1	1	-	1	3	3
CO5	3	3	2	-	-	-	-	1	1	-	1	3	3
1-low, 2-medium, 3-high													

**List of Software
(Requirement for batch of 30 students)**

S.No.	Description of Software	Quantity required
1.	Auto CAD	30 Nos.
2.	Licensed Software for Drafting and Modelling	30 licenses
3.	Laser Printer or Plotter to print / plot drawings	2 No.


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24SSP19	APTITUDE AND CODING SKILLS – I	Category	L	T	P	SL	C	
		EEC	0	0	30	0	1	
(Common to All Branches)								
OBJECTIVES:								
The course aims to introduce students to the fundamentals of aptitude, highlighting its importance and real-world applications. It is designed to build proficiency in verbal reasoning, thereby enhancing analytical and problem-solving skills. The curriculum also focuses on developing a strong foundation in English grammar, essential for effective communication.								
UNIT - I	BASIC OF NUMBER SYSTEMS & FOUNDATION							(6)
Introduction to Number System and its Classification - Divisibility Rules and Problems –Place Value & Face Value - HCF & LCM and its properties.								
UNIT - II	BASICS OF SHARE BASED CONCEPTS							(6)
Introduction to Average – Basics of Ratio and proportion – Basics of Partnership–Introduction to Percentage								
UNIT - III	LOGICAL REASONING							(4)
Analogies - Alpha and numeric series - Number Series - Coding and Decoding - Direction and distance								
UNIT - IV	VERBAL ABILITY							(7)
Introduction to Grammar – Tenses – Parts of Speech – Preposition – Articles – Modal Verbs								
UNIT - V	C PROGRAMMING							(7)
C Basics-Control Statements Decision making – Functions – Arrays & Strings – Pointers - User Defined Data Types - Storage Classes - Memory Management - Preprocessor.								
TOTAL: 30 PERIODS								
COURSE OUTCOMES:								
At the end of the course, the students will be able to:								
COs	Course Outcome							Cognitive Level
CO1	Explain the classification of number systems, apply divisibility rules to identify number properties							Understand
CO2	Apply the concepts of averages, ratios, and proportions to solve real-life problems and interpret data effectively.							Apply
CO3	Solve number series problems by identifying and applying suitable numerical patterns or rules.							Apply
CO4	Apply the rules of grammar to enhance written and spoken communication.							Apply
CO5	Apply the fundamental concepts of C programming to develop efficient and structured programs.							Apply

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TEXT BOOKS:													
1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations.													
2. R.S. Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning													
3. Wren & Martin, High School English Grammar & Composition													
4. Brian W. Kernighan and Dennis Ritchie, The C Programming Language 2e, Pearson Education, 2015.													
5. Yashavant Kanetkar, The C Programming Language 2e, BPB publications, 15 th Edition, 2016													
REFERENCES:													
1. https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm													
2. Stephen G. Kochana, Programming in C, 3 rd Edition.													
3. K. N. King, C Programming: A Modern Approach, 2e, 2008.													
4. Aaron M. Tenenbaum, Yedidiah Langsam, and Moshe J. Augenstein, Data Structures Using C, Pearson Education-India, 1990.													
5. Robert L. Kruse and Bruce P. Leung, Data Structures and Program Design in C, Pearson Education 2007.													
6. https://www.geeksforgeeks.org/c-programming-language/													
7. https://www.geeksforgeeks.org/data-structures/													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	3	2	-	2	-	-	2	-	-	3	-	-
Avg.	3	3	3	-	2	-	-	2	-	-	3	-	-

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24CST29	PYTHON PROGRAMMING	Category	L	T	P	SL	C
		ESC	45	0	0	45	3
(Common to All Branches)							
PREREQUISITE: A basic understanding of programming principles such as variables and loops, paired with good problem-solving abilities is required. Logical thinking and analytical skills are critical for effective programming.							
OBJECTIVES: To provide a comprehensive foundation in Python programming, covering core concepts, data structures, OOP principles, file and database handling as well as web and GUI development using frameworks like Django and Tkinter.							
UNIT – I	FUNDAMENTALS OF PYTHON						(9)
Introduction to Python – Advantages of Python programming – Variables and Data types – Comments – Indentation – I/O function – Operators – Selection control structures – Looping control structures – Functions: Declaration – Types of arguments – Anonymous functions: Lambda.							
UNIT – II	HANDLING STRINGS AND EXCEPTIONS						(9)
Strings – List – Tuples – Dictionaries – Sets – Exception Handling: Built-in Exceptions – User-defined exception – Modules and Packages.							
UNIT – III	OBJECT ORIENTED PROGRAMMING CONCEPTS						(9)
Object Oriented Programming basics – Inheritance and Polymorphism – Operator Overloading and Overriding – Get and Set Attribute Values – Name Mangling – Duck Typing – Relationships.							
UNIT – IV	FILES AND DATABASES						(9)
File I/O operations – Directory Operations – Reading and Writing in Structured Files: CSV and JSON – Data manipulation using MySQL.							
UNIT – V	WEB PROGRAMING AND GUI USING PYTHON						(9)
Frameworks: Introduction to Django – Django CRUD – Socket Programming – Sending email – UI design: Tkinter – Events – CGI: Introduction to CGI Programming, GET and POST Methods.							
L=45, SL=45, TOTAL: 90 PERIODS							

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COURSE OUTCOMES:

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Describe Python syntax to write code using data types, operators, loops and conditionals.	Understand
CO2	Interpret string manipulation, data structures and exception handling to build robust applications.	Understand
CO3	Implement object-oriented programming principles including inheritance and polymorphism to design effective solutions.	Apply
CO4	Apply file I/O operations and database management techniques to efficiently manage and manipulate data.	Apply
CO5	Develop web applications and graphical user interfaces using Python frameworks and libraries.	Apply

TEXT BOOKS:

1. Yashwant Kanetkar, Aditya Kanetkar, "Let Us Python", BPB Publications, 5th Edition, 2023.
2. Wesley J.Chun, "Core Python Programming", Pearson Education, 2nd Edition, 2017.

REFERENCES:

1. Robert Oliver, "Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications", Clyde Bank Media LLC, 1st Edition, 2023
2. Allen B. Downey, "Think Python", O'Reilly Media, 2nd Edition, 2016.
3. David Beazley, Brian K. Jones, "Python Cookbook", O'Reilly Media, 3rd Edition, 2013
4. Mark Lutz, "Python Pocket Reference", O'Reilly Media, 5th Edition, 2014
5. www.python.org
6. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO 1	PSO2
CO1	3	2	-	-	-	-	-	1	1	-	2	-	-
CO2	3	2	-	-	-	-	-	1	1	-	2	-	-
CO3	3	3	2	-	-	-	-	1	1	-	2	-	-
CO4	3	3	2	-	-	-	-	1	1	-	2	-	-
CO5	3	3	2	-	-	-	-	1	1	-	2	-	-

1-low, 2-medium, 3-high

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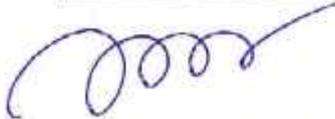


24CET21	DESIGN THINKING	Category	L	T	P	SL	C
		PCC	30	0	0	30	2
PREREQUISITE: Students are expected to have an empathetic mindset to help them understand users, a curious mindset to explore and questions assumptions, a collaborative mindset for interdisciplinary teamwork, an iterative approach for refining ideas and creativity to generate innovative solutions							
OBJECTIVES: To provide foundational and advanced knowledge in surveying, including plane and theodolite surveying, trigonometric levelling, curve setting, error adjustments, and modern techniques like total station and remote sensing.							
UNIT - I	FUNDAMENTALS OF DESIGN THINKING	(6)					
What is Design Thinking? - When to use Design Thinking? - How to do it? - Who are involved in this? – Design The Thinking™ – Personal Visualization, The Wheel of Life & Balancing Priorities – Appreciating ‘Design’ – The 3 Laws of Design Thinking.							
UNIT - II	STEP 1: THE ‘FEEL’ STAGE	(6)					
What is this stage about? – What role does a Design Thinker play in this stage? Tools – What is the purpose in this stage? – Persona – Journey Mapping – Stakeholder Mapping & CATWOE Analysis - Cartographic Perspective (LO) – Empathy Map – Case Study: Understanding the Stakeholders.							
UNIT - III	2 STEP: THE ‘DEFINE’ STAGE	(6)					
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Five-Whys – Anti-Pattern – Paraphrasing the Problem – Challenge Mapping – LORD: Definitive skill set for a Design Thinker – Case Study: Relooking at the Problem.							
UNIT - IV	STEP 3: THE ‘DIVERGENCE’ & ‘CONVERGENCE’ STAGE	(6)					
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Brainstorming – Metaphor – Random Association Technique – End-State Visualization - 10gm-100gm-1000gm – Prototyping – Wire framing for digital products – Case Study: Prototyping and Communicating for Effective Outcome.							
UNIT - V	STEP 5: THE ‘COMMUNICATION’ STAGE	(6)					
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – The 4Cs Framework – Naming – Packaging – Story boarding – Presentation – Distribution.							
L=30,SL= 30,Total = 30 PERIODS							


Chairman (BoS)



COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Demonstrate an understanding of Design Thinking concepts and principles by explaining their relevance in real-world contexts.											Understand	
CO2	Articulate the significance of a Design Mind set and its impact on creative problem-solving.											Understand	
CO3	Apply Design Thinking methods effectively at each stage of the problem-solving process.											Apply	
CO4	Implement the phases of Design Thinking to address complex challenges systematically.											Apply	
CO5	Use a variety of Design Thinking tools to develop innovative solutions and refine ideas through iteration.											Apply	
TEXT BOOKS:													
<ol style="list-style-type: none"> 1. UnMukt – The Science & Art of Design Thinking, Arun Jain 2. Don Norman, The Design of Everyday Things, MIT Press, 2013 3. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, Harper Collins Publishers Ltd, New York, First Edition, 2009. 													
REFERENCES:													
<ol style="list-style-type: none"> 1. Chrisitan Mueller-Roterberg, Handbook of Design Thinking – Tips & Tools for how to design thinking, kindle Direct Publishing, First Edition, 2018. 2. Johnny Schneider, Understanding Design Thinking, Lean and Agile, O'Reilly Media, California, First Edition, 2017 3. Roger Martin, The Design of Business, Why Design Thinking is the next competitive advantage, Harvard Business Press, United States, First Edition, 2009. 4. Idris Mootee, Design Thinking for Strategic Innovation, John Wiley & Sons Inc, New Jersey, First Edition, 2013. 													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	2	1	-	1	-	-
CO2	3	2	-	-	-	-	-	2	1	-	1	-	-
CO3	3	3	2	-	-	-	-	2	1	-	1	-	-
CO4	3	3	2	-	-	-	-	2	1	-	1	-	-
CO5	3	3	2	-	-	-	-	2	1	-	1	-	-
1-low, 2-medium, 3-high													


Chairman (BoS)



24CET22	CONSTRUCTION MATERIALS, TECHNIQUES AND PRACTICES	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: The students must have a basic knowledge of physics and mathematics, particularly in mechanics and material properties, along with an understanding of fundamental engineering concepts like statics and structures.							
OBJECTIVES: To choose construction materials and execute techniques for substructure and superstructure works. It also trains them to plan construction stages and determine suitable supporting structures based on site conditions.							
UNIT - I	STONES – BRICKS – CONCRETE BLOCKS	(9)					
Stone as Building Material – Criteria for Selection – Tests on Stones – Deterioration and Preservation of Stone Work – Bricks – Classification – Manufacturing of Clay and Fly Ash Bricks – Tests on Bricks – Compressive Strength – Water Absorption – Efflorescence – Bricks for Special Use – Refractory Bricks – Cement, Concrete Blocks – Lightweight Concrete Blocks.							
UNIT - II	PLANNING FOR CONSTRUCTION & SUPPORTING STRUCTURES	(9)					
Various Stages in the Construction of the Project – Construction Coordination - Job Planning – Technical Planning – Scheduling - Site Clearance - Marking – Setting out foundations, Earthwork job Layout – Temporary Sheds – Setting Out Works – Centering & Shuttering - Slip Forms - Scaffolding – Shoring – De-shuttering Forms.							
UNIT - III	CONSTRUCTION PRACTICES	(9)					
Masonry – Stone Masonry – Bond in Masonry - Concrete Hollow Block Masonry – Flooring – Damp Proof Courses – Construction Joints – Movement and Expansion Joints– Pre Cast Pavements – Building Foundations – Basements – Fabrication and Erection of Steel Trusses – Frames – Braced Domes – Laying Brick - Arrangement of bonds in brick masonry— Weather and Water Proof – Roof Finishes –Acoustic and Fire Protection.							
UNIT - IV	SUB STRUCTURE CONSTRUCTION	(9)					
Techniques of Box Jacking – Pipe Jacking -Under Water Construction of Diaphragm Walls and Basement – Tunneling Techniques – Piling Techniques - Well and Caisson - Sinking Cofferdam – Cable Anchoring and Grouting-Driving Diaphragm Walls, Sheet Piles - Shoring for Deep Cutting – Well Points -Dewatering and Stand by Plant Equipment for Underground Open Excavation.							
UNIT - V	SUPER STRUCTURE CONSTRUCTION	(9)					
Launching Girders, Bridge Decks, Off Shore Platforms – Special Forms for Shells - Techniques for Heavy Decks – In-Situ Pre-Stressing in High Rise Structures, Material Handling - Erecting Light Weight Components On Tall Structures - Support Structure for Heavy Equipment and Conveyors – Erection of Articulated Structures, Braced Domes and Space Decks.							
L=45,SL= 45,Total= 90 PERIODS							


Chairman (BoS)



COURSE OUTCOMES:

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Interpret basic information about construction materials.	Understand
CO2	Summarize the purpose and functionality of different construction stages and supporting structures.	Understand
CO3	Implement appropriate construction techniques based on specific project requirements.	Apply
CO4	Apply appropriate techniques used for sub structure construction.	Apply
CO5	Apply suitable techniques for superstructure construction based on functional and structural requirements.	Apply

TEXT BOOKS:

- Varghese, P.C., Building Materials, Prentice Hall India Learning Private Limited, Delhi, 2nd Edition, 2015
- Purushothama Raj, P., Construction Techniques, Equipment's and Practices, Sri Krishna Hitech Publishing Company Pvt. Ltd, Chennai, 5th Edition, 2015.

REFERENCES:

- Jagadish.K.S., Venktarama Reddy., B.V. and Nanjunda Rao, K.S., "Alternative Building Materials Technology", New Age International Private Limited, Bengaluru, 2nd Edition, 2017
- Sharma, S.C., "Construction Equipment and Management", Khanna Publishers, New Delhi, 1st Edition, 2016.
- Arora, S.P. and Bindra, S.P., "Building Construction, Planning Techniques and Method of Construction", Dhanpat Rai and Sons, New Delhi, Reprint, 2010.
- Deodhar, S.V., "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 4th edition, 2012.

Mapping of COs with POs and PSOs

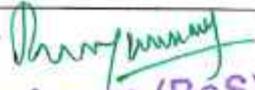
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO2
CO1	3	2	-	-	-	-	-	2	1	-	1	3	3
CO2	3	2	-	-	-	-	-	2	1	-	1	3	3
CO3	3	3	2	-	-	-	-	2	1	-	1	3	3
CO4	3	3	2	-	-	-	-	2	1	-	1	3	3
CO5	3	3	2	-	-	-	-	2	1	-	1	3	3

1-low, 2-medium, 3-high

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24GET29	தமிழகும் தொழில் நுட்பமும்	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(அனைத்து துறைகளுக்கும் பொதுவானது)							
முன் கூட்டிய துறைசார் அறிவு : தேவை இல்லை							
அலகு - I	நெசவு மற்றும் பாணைத் தொழில்நுட்பம்						[03]
சங்ககாலத்தில் நெசவுத் தொழில் - பாணைத் தொழில்நுட்பம் கருப்பு சிவப்பு பாண்டங்கள்-பாண்டுகளில் கீறல் குறியீடுகள்							
அலகு - II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்						[03]
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும்-சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்-மாமல்லபுரச் சிற்பங்களும், கோவில்களும்-சோழர்காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள்-நாயக்கர் காலக்கோயில்கள்-மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன்ஆலயம் மற்றும் திருமலைநாயக்கர்மஹால் - செட்டிநாட்டுவீடுகள்-பிரிட்டிஷ்காலத்தில் சென்னை இந்தோ-சாரோசெனிக் கட்டிடக்கலை.							
அலகு - III	உற்பத்தித் தொழில்நுட்பம்						[03]
கப்பல் கட்டும் கலை-உலோகவியல்-இரும்புத்தொழிற்சாலை-இரும்பை உருக்குதல், எஃகு-வரலாற்றுச்சான்றுகளாக செம்பு மற்றும் தங்கநாணயங்கள்-நாணயங்கள் அச்சடித்தல்-மணி உருவாக்கும் தொழிற்சாலைகள்-கல் மணிகள்-கண்ணாடி மணிகள்-சுடு மண்மணிகள்-சங்குமணிகள்-எலும்புத்துண்டுகள்-தொல்லியல் சான்றுகள்-சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.							
அலகு - IV	வேளாண்மை மற்றும் நீர்ப் பாசனத் தொழில்நுட்பம்						[03]
அணை, ஏரி, குளங்கள், மதகு-சோழர்காலகுமிழித்தாம்பின் முக்கியத்துவம்-கால்நடை பராமரிப்பு-கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள்-வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள்-கடல்சார் அறிவு - மீன் வளம்-முத்து மற்றும் முத்துக் குளித்தல்-பெருங்கடல் குறித்த பண்டைய அறிவு-அறிவுசார் சமூகம்.							
அலகு - V	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்						[03]
அறிவியல் தமிழின் வளர்ச்சி- கணினித்தமிழ் வளர்ச்சி-தமிழ் நூல்களை மின்பதிப்பு செய்தல்-தமிழ் மென் பொருட்கள் உருவாக்கம்-தமிழ் இணையக்கல்விக் கழகம்-தமிழ் மின்நூலகம்-இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத் திட்டம்.							
Total (L= 15, SL=15) =30 Periods							

பாடம் கற்றத்தின் விளைவுகள் : பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்	அறிவாற்றல் நிலை
CO1 சங்ககாலத் தமிழிர்களின் நெசவு மற்றும் பாணைவனைதல் தொழில் நுட்பம் குறித்து கற்றுணர்ந்தல்.	புரிதல்
CO2 சங்ககாலத் தமிழிர்களின் கட்டிட தொழில் நுட்பம் கட்டுமான பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்து அறிவு.	புரிதல்
CO3 சங்ககாலத் தமிழிர்களின் உலோகத் தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு.	புரிதல்
CO4 சங்ககாலத் தமிழிர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் குறித்த தெளிவு.	புரிதல்
CO5 நவீன அறிவியல் தமிழ் மற்றும் கணினி தமிழ் குறித்த புரிந்துகொள்ளும் மற்றும் பயன்படுத்தலும்.	பகுப்பாய்வு


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Text Books :	
1	தமிழகவரலாறு- மக்களும் பண்பாடும்- கேகேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2	கணினித்தமிழ்- முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
Reference Books :	
1	கீழடி- வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல் துறை வெளியீடு)
2	பொருறை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
3	Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by : The Author)
4	Porunai Civilization (Jointly Published by: Department of Archaeology &Tamilnadu Textbook and Educational Services Corporation, Tamilnadu)

Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1. சிறிது (குறைந்த) 2. மிதமான (நடுத்தர) 3. கணிசமான (உயர்)													

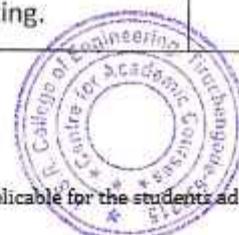
Aravindan

Chairman (BoS)



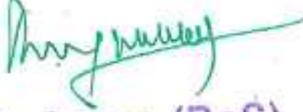
24GET29	TAMILS AND TECHNOLOGY	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(Common to All Branches)							
<i>Prerequisite(s): No prerequisites are needed for enrolling into the course</i>							
UNIT - I	WEAVING AND CERAMIC TECHNOLOGY						[03]
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.							
UNIT - II	DESIGN AND CONSTRUCTION TECHNOLOGY						[03]
Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram– Sculptures and Temples of Mamallapuram– Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple) – ThirumalaiNayakar Mahal –Chetti Nadu Houses, Indo –Saracenic architecture at Madras during British Period.							
UNIT - III	MANUFACTURING TECHNOLOGY						[03]
Art of Ship Building – Metallurgical studies – Iron industry – Iron smelting, steel – Copper and gold – Coins as source of history – Minting of Coins – Beads making – industries Stone beads – Glass beads –Terracotta beads –Shell beads/ bone beats – Archeological evidences – Gem stone types described in Silappathikaram.							
UNIT - IV	AGRICULTURE AND IRRIGATION TECHNOLOGY						[03]
Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea – Fisheries – Pearl – Conche diving – Ancient Knowledge of Ocean – Knowledge Specific Society.							
UNIT - V	SCIENTIFIC TAMIL & TAMIL COMPUTING						[03]
Development of Scientific Tamil – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.							
Total (L= 15, SL=15) =30 Periods							
Course Outcomes:							
At the end of the course, the student will be able to							Cognitive Level
CO1	Understand the weaving and ceramic technology of ancient Tamil People nature.						Understand
CO2	Comprehend the construction technology, building materials in sangam Period and case studies.						Understand
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence						Understand
CO4	Realize the agriculture methods, irrigation technology and pearl diving.						Understand
CO5	Apply the knowledge of scientific Tamil and Tamil computing.						Apply

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Text Books:	
1	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
2	Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).
Reference Books:	
1	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)
2	The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi)(Puplished by International Institute of Tamil Studies).
3	Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly Published by: Department of Archaeology &Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
4	Studies in the History of India with Special Reference to Tamilnadu (dr.K.K.Pillay) (Published by.: The Author)

Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)													


Chairman (BoS)



24MAI29	PROBABILITY AND STATISTICS	Category	L	T	P	SL	C
		BSC	30	15	30	45	4
SEMESTER II - B.E / B.TECH (Common to All Branches)							
PREREQUISITE: A basic understanding of algebra, calculus, and introductory statistics is required to grasp the concepts of probability, hypothesis testing, and statistical methods used in engineering and quality control.							
OBJECTIVES: To build a foundational understanding of probability and random variables, enable the application of two-dimensional random variables in engineering contexts, develop the ability to perform hypothesis testing for both small and large samples, introduce the principles of experimental design in agricultural studies, and provide knowledge of statistical quality control techniques.							
UNIT - I	ONE DIMENSIONAL RANDOM VARIABLES						(9)
One dimensional Random Variable - Discrete and continuous random Variables -Expectations - Moment generating functions and their properties - Binomial, Poisson, Uniform and Normal distributions.							
UNIT - II	TWO - DIMENSIONAL RANDOM VARIABLES						(9)
Joint distributions – Marginal and conditional distributions – Covariance – Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation - Regression Analysis.							
UNIT - III	TESTING OF HYPOTHESIS						(9)
One sample and two sample test for means of large samples (Z- test), One sample and two sample test for means of small samples (t-test), Chi-square - Independent of Attributes - F test for equality of variances.							
UNIT - IV	DESIGN OF EXPERIMENTS						(9)
Analysis of variance - One way and two way classifications - Completely Randomized Design - Randomized Block Design - Latin Square Design.							
UNIT - V	STATISTICAL QUALITY CONTROL						(9)
Control charts for measurements (\bar{X} and R charts) – Control charts for C and P charts – Acceptance sampling for construction of an OC curve.							
List of Exercise/Experiments (R Software):							
<ol style="list-style-type: none"> Determine the probability by using binomial distribution. Find the probability with the help of normal distribution. Determine the correlation co-efficient between X and Y. Calculate and plot the regression lines. Test the significance of difference between experimental and theoretical values of the data by using chi-square test. Examine the small samples using F distribution. Analyze the data using Randomized Block Design (RBD). Inspect the data using Latin Square Design (LSD). Find the \bar{X} and R charts. Compute c and p charts. 							
L = 30 , T = 15 & P = 30 & SL = 45, TOTAL: 120 PERIODS							



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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Apply the concepts of one dimensional random variables to compute expectations and analyze the standard distributions.											Apply	
CO2	Apply statistical methods to compute marginal and conditional distributions, and perform correlation and regression analysis.											Apply	
CO3	Apply Z-test, t-test, Chi-square test, and F-test to analyze sample data and draw inferences on independence of attributes.											Apply	
CO4	Apply analysis of variance techniques for one-way and two-way classifications, and implement experimental designs using CRD, RBD and LSD.											Apply	
CO5	Construct control charts for measurements Mean and Range charts and attributes charts to assess process control and product quality.											Apply	
TEXT BOOKS:													
1. S.P. Gupta, "Statistical Methods", Sulthan Chand & Sons, 46 th Edition ,2021.													
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4 th edition, 2007.													
REFERENCES:													
1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8 th Edition, 2014.													
2. Spiegel. M.R., Schiller. J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.													
3. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 9 th Edition, 2010.													
4. R.C.Gupta, "Statistical Quality Controls", Khanna Publishers, Delhi, 8 th Edition , 2008.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	2	-	-	1	-	-	2	-	-
CO2	3	3	3	3	2	-	-	1	-	-	2	-	-
CO3	3	3	3	3	2	-	-	1	-	-	2	-	-
CO4	3	3	3	3	2	-	-	1	-	-	2	-	-
CO5	3	3	3	3	2	-	-	1	-	-	2	-	-
Avg.	3	3	3	3	2	-	-	1	-	-	2	-	-
1-low, 2-medium, 3-high													

Dr. Anurag
Chairman (BoS)



24CHI07	APPLIED CHEMISTRY	Category	L	T	P	SL	C
		BSC	45	0	30	45	4
(Common to AE, CE, MECH and SFE)							
PREREQUISITE The students must have knowledge about the basic concepts of water parameters, electro chemistry, organic reactions and their applications.							
OBJECTIVES: To equip the learners to apply the chemical principles and their applications in the engineering fields.							
UNIT - I	WATER TREATMENT						(9)
Hardness – types, units – estimation of hardness by EDTA method; Boiler feed water – requirements, disadvantages of using hard water in boilers – scale and sludge – priming and foaming – caustic embrittlement – boiler corrosion. Softening methods – internal conditioning – calgon, phosphate – external conditioning – zeolite process and ion exchange process; Desalination – reverse osmosis. Domestic water treatment (Sterilisation process Only).							
UNIT - II	ELECTROCHEMISTRY AND CORROSION						(9)
Introduction – electrode potential – Nernst equation – EMF series and its significance; E – Vehicles - Need - Types – Advantages and Disadvantages; Corrosion – causes, consequences – classification – chemical corrosion – electro chemical corrosion – mechanism; Galvanic & differential aeration corrosion – factors influencing corrosion – corrosion control (Sacrificial anode and Impressed Current Cathodic protection method).							
UNIT - III	ENERGY STORAGE DEVICES						(9)
Batteries – primary battery – Dry cell, secondary batteries – lead-acid and lithium-ion batteries. Fuel cells – H ₂ -O ₂ fuel cell, solar cells – principle, applications and advantages; Nuclear energy: Light water Nuclear power plant - breeder reactor.							
UNIT - IV	PHASE RULE & LUBRICANTS						(9)
Phase rule: Introduction, definition of terms with examples. One component system – water system; Reduced phase rule; Two component system: lead-silver system. Lubricants – definition – function – characteristics – properties – viscosity index, flash and fire points, cloud and pour points, oiliness; Solid lubricants – graphite and MoS ₂ .							
UNIT - V	ADVANCED ENGINEERING MATERIALS						(9)
Abrasives – Moh's scale of hardness – types – natural [Diamond] – synthetic [SiC]; Refractories – characteristics – classifications [Acidic, basic and neutral refractories] – properties – refractoriness – RUL – porosity – thermal spalling; Nano materials – CNT– synthesis [CVD, laser evaporation, pyrolysis] – applications of nano materials.							
List of Exercise/Experiments:							
1. Estimation of total, permanent and temporary hardness of water sample By EDTA method							
2. Estimation of chloride content in water by Argentometric method [Mohr's Method]							
3. Conductometric titration of strong acid with strong base (HCl Vs NaOH)							
4. Estimation of dissolved oxygen in water (Winkler's Method)							
5. Conductometric titration of mixture of acids (HCl & CH ₃ COOH) with strong base							
6. Estimation of Fe ²⁺ ion by potentiometric titration							
7. Estimation of HCl by p ^H - Metry							
8. Conductometric precipitation titration using BaCl ₂ -Na ₂ SO ₄							
L = 45, P = 30, SL = 45, TOTAL = 120 PERIODS							

COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Interpret the treatment solutions for drinking water, boiler feed water, and wastewater reuse.											Understand	
CO2	Describe different types of electrochemical cells, including galvanic and electrolytic cells.											Understand	
CO3	Categorize different energy storage methods, such batteries, fuel cell and solar cell for the production of electricity.											Understand	
CO4	Choose the Engineering materials through the concept of phase rule and lubricants.											Understand	
CO5	Classify the manufacturing processes of advanced engineering materials and its uses.											Understand	
TEXT BOOKS:													
1. S S. Dara and S. S. Umare, "A Text book of Engineering Chemistry", S.Chand & Co.Ltd., 12 th Edition, 2015.													
2. P.C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub. Co., 16 th Edition, 2013.													
3. Wiley, "Engineering Chemistry", Wiley India Pvt. Ltd., 2 nd Edition, 2013.													
REFERENCES:													
1. Dr. A. Ravikrishnan, "Engineering Chemistry", Srikrishna Hi-tech Publishing Company Pvt. Ltd., 21 st Edition, 2022.													
2. J. Mendham, R. C. Denney, J. D. Barnes, M. J. K. Thomas and B. Sivasankar, "Vogel's Text book of Quantitative Chemical Analysis", Pearson Education Pvt., Ltd., 6 th Edition, 2019.													
3. Shashi Chala, "A Text book of Engineering Chemistry", Dhanpat Rai Pub. Co., 2015.													
4. S. K. Bhasin and Sudha Rani, "Laboratory Manual of Engineering Chemistry", Dhanpat Rai Publishing Company Private Limited, 3 rd Edition, 2012.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2
CO1	3	2	-	-	-	1	-	2	1	-	1	-	-
CO2	3	2	-	-	-	1	-	2	1	-	1	-	-
CO3	3	2	-	-	-	1	-	2	1	-	1	-	-
CO4	3	2	-	-	-	1	-	2	1	-	1	-	-
CO5	3	2	-	-	-	1	-	2	1	-	1	-	-
1-low, 2-medium, 3-high													

Laboratory Equipment Details
(Requirements for a batch of 30 students)

S.No.	Description of Equipment	Quantity required
1.	Electronic balance	1 No.
2.	pH meter	6 Nos.
3.	Conductivity meter	6 Nos.
4.	Potentiometer	6 Nos.

Aravind Kumar
Chairman (BoS)



24ENP29	PROFESSIONAL COMMUNICATION LABORATORY	Category	L	T	P	SL	C	
		HSMC	0	0	30	0	1	
(Common to All Branches)								
OBJECTIVE: To enhance learners' proficiency in listening, speaking, reading, and writing through structured activities and professional communication practices relevant to academic and workplace settings.								
UNIT - I	VERBAL AND CRITICAL REASONING							(6)
Syllogism – Drawing conclusions from given logical statements, Assertion and Reason – Judging the link between a claim and its reason, Verbal Analogies – Completing word pairs based on relationships, Statement and Assumption – Identifying hidden assumptions in statements, Statement and Conclusion – Choosing valid conclusions from given data, Critical Reasoning – Evaluating arguments for logic and consistency.								
UNIT - II	LISTENING							(6)
Listening to Announcement – Understanding key details and context from public messages, Short Conversation – Extracting specific information from brief dialogues, Motivational Speech – Grasping main ideas, tone, and speaker's intent, Telephone Conversation – Comprehending spoken exchanges over the phone.								
UNIT - III	SPEAKING							(6)
Talking about Oneself – Sharing personal details clearly and confidently, Oral-presentation on a General Topic – Presenting ideas briefly with clarity and structure, Group Discussion on Current Affairs – Expressing and support opinions in group settings, Role Play – Performing situational conversations using appropriate language, Mock & HR Interview – Answering common interview questions with clarity and confidence.								
UNIT - IV	READING							(6)
Reading Short Texts – Understanding the main message and key ideas, Reading for General and Specific Information – Locating relevant details in various texts, Case Studies on Problem Solving – Analyzing real-life scenarios to identify issues and solutions.								
UNIT - V	WRITING							(6)
Written communication: Letters (Apology & Complaint) – Writing formal letters using appropriate tone and structure, E-mails (Appreciation & Permission) – Composing clear and courteous emails, Technical Report – Using standard format for preparing structured technical report, Agenda / Minutes – Preparing format for meeting agendas and recording minutes.								
TOTAL (P:30) = 30 PERIODS								

Shreejany
Chairman (BoS)



List of Experiments:

1. Syllogism, Assertion & Reason and Verbal Analogies
2. Statement & Assumption, Statement & Conclusion and Critical Reasoning
3. Listening: Announcement and Short Conversation
4. Listening: Motivational Speech and Telephone Conversation
5. Speaking: Taking about oneself, Mock & HR Interview and Mini-presentation
6. Speaking: Group Discussion and Role Play
7. Reading: Multiple Choice & Fill in the Blanks
8. Reading: Analyzing Case Studies on Problem Solving
9. Writing: Complaint/Apology Letter and Appreciation/Permission Email
10. Writing: Format of Technical Report and Format of Agenda/Minutes

COURSE OUTCOMES:

Upon completion of the course, the students will be able to:

COs	Description	Ex. No.	Cognitive Level
CO1	Comprehend assumptions and draw conclusions from verbal reasoning tasks.	1 & 2	Understand
CO2	Understand spoken texts to identify key points and the speaker's intent.	3 & 4	Understand
CO3	Use appropriate language and tone in personal, group, and interview conversations.	5 & 6	Understand
CO4	Recognize main ideas and supporting points in short texts and case studies.	7 & 8	Understand
CO5	Draft formal letters, emails, reports, and meeting notes in the correct format.	9 & 10	Understand

TEXT BOOKS:

1. Bhatnagar Nitin, Communicative English for Engineers and Professionals, Pearson India, 2010.
2. Kulbhusan Kumar, RS Salaria, Effective Communication Skill, Khanna Publishing House, 2018.

REFERENCES:

1. Jack C Richards, Interchange, Cambridge University Press, 2022.
2. RS Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S Chand, 2024.

Mapping of COs with POs and PSOs

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

1-Low, 2-Medium, 3-High

Anurag
Chairman (BoS)



2

Lab Requirement for a batch of 30 Students

Sl. No.	Description of Equipment / Software	Quantity required
1.	Server	1
	Intel core i3 - 2120	
	4 GB RAM / 240 GB SSD	
	OS: Windows 2011	
	Headphones with mike	
2.	Client Systems	30
	Intel core i3 - 2120	
	4 GB RAM / 240 GB SSD	
	OS: Windows 2011	
	Headphones with mike	
3.	Software	1
	a) Interactive Teacher control software	
	b) English Language Lab Software	
	c) Career Lab Software	

Murugan
Chairman (BoS)



24CSP29	PYTHON PROGRAMMING LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1
(Common to All Branches)							
PREREQUISITE:							
Students must have basic knowledge on programming principles, such as variables, simple data types, control structures, problem solving and logical thinking skills.							
OBJECTIVES:							
To develop programming skills in Python by performing string operations using functions for mathematical problem-solving, applying conditionals and loops, exploring sets and dictionaries for data handling and gaining foundational knowledge in polymorphism, exception handling, GUI design and web development.							
List of Exercise/Experiments:							
<ol style="list-style-type: none"> 1. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters) 2. Implementing programs using Functions (GCD of two numbers, Factorial) 3. Scientific problems using conditional statements and loops. (Largest among three numbers, Number series, Number Patterns) 4. Implementing real-time applications using Sets, Dictionaries (Sorting, Searching, Remove Duplicates) 5. Implementing real-time/technical applications using Lists, Tuples. (Swapping two elements, Reversing a List / Sorting Tuples) 6. Create a Python program to demonstrate polymorphism with inheritance. (Single, Multilevel Inheritance, Hierarchical) 7. Implement a simple calendar in python program without using the calendar module using string array or list. 8. Write a program to demonstrate the user-defined exception handling mechanism in Python. 9. Design and implement a graphical user interface to perform any arithmetic operation. 10. Implementing a web application with MySQL database integration for CRUD operations (Flask / Django Framework) 							
L=0, T=0, P=30, TOTAL: 30 PERIODS							


Chairman (BoS)



COURSE OUTCOMES:			
At the end of the course, the students will be able to:			
COs	Course Outcome	Experi ments	Cognitive Level
CO1	Apply string operations and functions to solve problems like reversing text, palindrome check, GCD, and factorial.	1,2	Apply
CO2	Solve problems and manage data efficiently using conditionals, loops, sets, and dictionaries.	3,4	Apply
CO3	Develop applications using lists, tuples, and demonstrate polymorphism through inheritance in Python.	5,6	Apply
CO4	Build programs in Python that effectively use arrays or lists along with custom exception handling.	7,8	Apply
CO5	Implement GUI applications and web-based systems with MySQL integration to perform CRUD operations.	9,10	Apply

REFERENCES:

1. Yashwant Kanetkar, Aditya Kanetkar, "Let Us Python", BPB Publications, 5th Edition, 2023.
2. Wesley J.Chun, "Core Python Programming", Pearson Education, 2nd Edition, 2017.

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	1	-	1	-	2	-	-
CO2	3	3	2	-	-	-	1	-	1	-	2	-	-
CO3	3	3	2	-	-	-	1	-	1	-	2	-	-
CO4	3	3	2	-	-	-	1	-	1	-	2	-	-
CO5	3	3	2	-	-	-	1	-	1	-	2	-	-

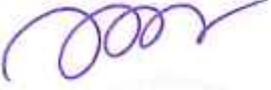
1-low, 2-medium, 3-high

LIST OF EQUIPMENTS (For a Batch of 30 Students)

Sl.No	Name of the Equipment's	Qty.
1.	A computer with a modern processor, RAM and Windows or Linux.	30 Nos.
2.	Programming Tools: Python 2.7.11 / 3.x with IDLE	30 Nos.
3.	IDEs: Eclipse (PyDev), VS Code, Jupyter Notebook	30 Nos.


Chairman (BoS)

24CEP21	CONSTRUCTION MATERIALS LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	30	0	1
<p>PREREQUISITE: Basic understanding of geometry, trigonometry, and physics, along with familiarity in handling measurement instruments and interpreting technical drawings.</p>							
<p>OBJECTIVES: A basic understanding of material science and engineering principles, knowledge of construction materials and their properties and familiarity with laboratory equipment and testing procedures are all required.</p>							
<p>List of Exercise/Experiments:</p> <ol style="list-style-type: none"> 1. Compressive Strength Test on Clay and Fly ash Bricks 2. Water Absorption Test on clay and Fly ash Bricks 3. Efflorescence Test on Clay and Fly ash Bricks 4. Specific Gravity of Cement 5. Consistency of Cement 6. Initial and Final Setting time of Cement 7. Soundness of Cement 8. Compressive Strength of Cement 9. Specific Gravity test on Fine and Coarse Aggregate 10. Water Absorption Test on Fine and Coarse Aggregate 11. Bulking of Sand 12. Compressive Strength Tests on Paver Blocks 							
P= 30, TOTAL= 30 PERIODS							


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome									Ex.No	Cognitive Level		
CO1	Determine the compressive strength of clay bricks, fly ash bricks, and paver blocks through standard testing procedures.									1,12	Apply		
CO2	Perform water absorption and efflorescence tests on bricks to evaluate their durability and quality.									2,3	Apply		
CO3	Determine consistency, setting time, and soundness of cement to assess its suitability for construction.									5,6,7	Apply		
CO4	Conduct the specific gravity and compressive strength tests on cement and analyze strength development as per standards.									4,8	Apply		
CO5	Determine the specific gravity, water absorption, and bulking of aggregates to apply in mix proportioning and construction practices.									9,10,11	Apply		
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	1	1	-	2	3	3
CO2	3	3	2	-	-	-	-	1	1	-	2	3	3
CO3	3	3	2	-	-	-	-	1	1	-	2	3	3
CO4	3	3	2	-	-	-	-	1	1	-	2	3	3
CO5	3	3	2	-	-	-	-	1	1	-	2	3	3
1-low, 2-medium, 3-high													

Laboratory Equipment Details
(Requirement for batch of 30 students)

S.No.	Description of Equipment	Quantity required
1.	CTM – 3000 KN capacity	1
2.	Vicat apparatus	1
3.	Le Chatlier Flask	1
4.	Le Chatelier Mould	1
5.	Pyconometer	1


Chairman (BoS)



24SSP29	APTITUDE AND CODING SKILLS –II	Category	L	T	P	SL	C
		EEC	0	0	30	0	1
(Common to All Branches)							
OBJECTIVES:							
This course aims to expose students to various concepts of aptitude problem solving, enabling them to tackle problems effectively and enhance their analytical skills in alignment with company-specific requirements. It also focuses on developing proficiency in verbal reasoning to strengthen critical thinking abilities.							
UNIT - I	NUMBERS AND SHARE BASED CONCEPTS						(6)
Problems on Numbers – Unit Digits – Squares and Cubes – Remainder Theorem – Averages - Ratio Proportions and Partnership – Percentage – Profit and Loss.							
UNIT - II	BASICS OF WORK BASED CONCEPTS						(6)
Introduction to time and work –Introduction to Time, Speed and Distance, Problems on Trains.							
UNIT - III	LOGICAL REASONING						(4)
Blood Relations – Ranking and Ordering – Inequalities – Cause and Effect.							
UNIT - IV	VERBAL ABILITY						(7)
Yes or No and “WH” Questions – Conjunctions – Count / Uncounted Nouns – Direct and Indirect Speech – Active and Passive Voice.							
UNIT - V	PYTHON PROGRAMMING FUNDAMENTALS						(7)
Introduction-Features-Environment setup; Basic syntax: variable-data types-operators-control statements-if-if-else- loop-break-continue, etc. List- operations on list; String operations- access; Tuple: operations on tuple; Dictionaries: Accessing dictionaries, working with dictionaries; Functions- Exception Handling-Input & Output-Modules-OOPs concepts-Numerical Programming.							
TOTAL: 30 PERIODS							
COURSE OUTCOMES:							
At the end of the course, the students will be able to:							
COs	Course Outcome						Cognitive Level
CO1	Interpret fundamental concepts to analyse and approach basic quantitative problems effectively.						Understand
CO2	Apply the concepts of time and work, time, speed and distance, to solve real-time quantitative aptitude problems effectively.						Apply
CO3	Apply logical reasoning techniques to solve problems related to ranking and ordering, decision-making and analytical skills.						Apply
CO4	Apply grammatical concepts to construct grammatically correct and contextually appropriate sentences.						Apply
CO5	Apply fundamental Python programming concepts to develop and implement basic computational solutions.						Apply

Chairman (BoS)



TEXT BOOKS:													
1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations.													
2. R.S. Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning.													
3. Wren & Martin, High School English Grammar & Composition													
4. Allen B. Downey, Think Python: How to Think like a Computer Scientist, 2 nd Edition, O'Reilly Publishers, 2016													
5. Karl Beecher, Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1 st Edition, BCS Learning & Development Limited, 2017.													
REFERENCES:													
1. Paul Deitel and Harvey Deitel, Python for Programmers, Pearson Education, 1 st Edition, 2021.													
2. Martin C. Brown, Python: The Complete Reference, 4 th Edition, Mc-Graw Hill, 2018.													
3. https://www.python.org/													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	3	2	-	2	-	-	2	-	-	3	-	-
Avg.	3	3	3	-	2	-	-	2	-	-	3	-	-

Shreyas
Chairman (BoS)



24MAT36	OPTIMIZATION TECHNIQUES	Category	L	T	P	SL	C
		BSC	45	15	0	60	4
SEMESTER III - (Common to AE,CE,ME and SFE)							
PREREQUISITE: A fundamental knowledge of linear algebra, calculus, and basic problem-solving techniques in engineering mathematics is required to understand and apply optimization methods effectively.							
OBJECTIVES: To equip students with a comprehensive understanding of optimization methods and their practical implementation in engineering decision-making. The course emphasizes applications in transportation and assignment problems, project scheduling, inventory management, sequencing, and replacement models across diverse engineering fields.							
UNIT - I	LINEAR PROGRAMMING PROBLEM						[12]
Introduction - scope and role of Operations Research - limitations of Operations Research - Linear Programming Problem (LPP) - Formulation of linear programming problem - Optimum solution by Graphical Method - Simplex Method by using slack variable only.							
UNIT - II	TRANSPORTATION AND ASSIGNMENT PROBLEM						[12]
Transportation Models - Balanced and unbalanced cases - Initial Basic feasible solution by North West Corner Rule, Least Cost Method and Vogel's approximation method. Check for optimality by Modified method. Assignment Models (Minimizing and Maximizing Cases) - Balanced and Unbalanced Cases - Solution by Hungarian method.							
UNIT - III	NETWORK ANALYSIS						[12]
Network - Fulkerson's rule - construction of a Network - Critical Path Method (CPM) - optimistic, pessimistic and most likely time estimates - Project Evaluation and Review Technique (PERT) analysis excluding cost considerations.							
UNIT - IV	INVENTORY MODELS						[12]
Types of Inventory - Deterministic inventory models - EOQ models with and without shortages - Quantity discount model - Price breaks - Probabilistic inventory model.							
UNIT - V	REPLACEMENT MODELS AND SEQUENCING						[12]
Replacement Policy for Equipment which deteriorates gradually - Items that deteriorate with time and the value of money - Replacement of items that fails suddenly - Individual replacement problems only Sequencing problem - assumptions - processing of 'n' jobs with 2 machines, 'n' jobs with 'm' machines.							
L = 45, T = 15, SL = 60, TOTAL = 120 PERIODS							

Chairman (BoS)



COURSE OUTCOMES: At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Apply linear programming techniques for effective decision-making in uncertain situation.	Apply
CO2	Apply transportation and assignment models to achieve cost efficiency and profit enhancement.	Apply
CO3	Apply Fulkerson's rule to design project networks and solve them using Critical Path Method CPM and PERT.	Apply
CO4	Develop solutions using deterministic and probabilistic inventory models, including EOQ with and without shortages and price break models.	Apply
CO5	Solve replacement problems involving equipment and determine sequencing problems in scheduling of jobs to the machines.	Apply

TEXT BOOKS:

1. P.K. Gupta and Man Mohan "Problems in Operations Research", S. Chand and Co, 14th edition, 2016.
2. Hiller F.S, Liberman G.J, Introduction to Operations Research, 10th Edition McGraw Hill, 2017.

REFERENCES:

1. Taha H.A, "Operation Research", Pearson Education sixth edition, 2016.
2. Hira and Gupta "Problems in Operations Research", S. Chand and Co, 2015.
3. ND Vohra, Quantitative Techniques in Management, Tata McGraw Hill, 4th Edition, 2011.
4. J. K. Sharma, Operations Research Theory and Applications, Macmillan, 5th Edition, 2012
5. Wayne. L. Winston, "Operations Research applications and algorithms", Thomson learning, 10th edition 2016.
6. https://en.wikipedia.org/wiki/Resource_management

Mapping of COs with POs and PSOs

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

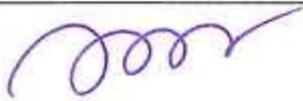
1-Low, 2-Medium, 3-High

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Chairman (BoS)



24CET31	HIGHWAY AND RAILWAY ENGINEERING	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: Students must have basic knowledge of construction materials (such as aggregates, bitumen, and concrete) and understanding of fundamental civil engineering concepts related to surveying and structural behavior.							
OBJECTIVES: The course aims to provide essential knowledge in planning, design, construction, and maintenance of highways and railways. It equips students to analyze geometric and structural elements, apply IRC standards, and use modern surveying methods. Emphasis is placed on sustainable transportation solutions for urban and rural development.							
UNIT - I	HIGHWAY ENGINEERING	(9)					
Classification of highways – Institutions for Highway planning, design and construction at different levels – factors influencing highway alignment –Typical cross sections of Urban and Rural roads – Engineering surveys for alignment- Conventional and Modern method.							
UNIT - II	DESIGN OF HIGHWAY ELEMENTS	(9)					
Cross sectional elements – Horizontal curves, super elevation, transition curves, widening of curves – Sight distances – Vertical curves, gradients– pavement components and their role - Design practice for flexible and rigid pavements (IRC methods only).							
UNIT - III	HIGHWAY CONSTRUCTION AND MAINTENANCE	(9)					
Highway construction materials, properties, testing methods – Construction practice of flexible and concrete pavement- Highway drainage – Evaluation and Maintenance of pavements.							
UNIT - IV	RAILWAY PLANNING AND CONSTRUCTION	(9)					
Elements of permanent way – Rails, Sleepers, Ballast, rail fixtures and fastenings, Selection of gauges - Track Stress, coning of-wheels, creep in rails, defects in rails – Route alignment surveys, Conventional and modern methods-Geometric design of railway, gradient, super elevation, widening of gauge -Railway drainage- Level Crossings-Signaling.							
UNIT - V	RAILWAY TRACK CONSTRUCTION MAINTENANCE AND OPERATION	(9)					
Points and Crossings - Design of Turnouts, Working Principle-Track Circuiting - Construction & Maintenance – Conventional, Modern methods and Materials, Lay outs of Railway Stations and Yards, Rolling Stock, Tractive Power, Track Resistance - Role of Indian Railways in National Development – Railways for Urban Transportation – LRT & MRTS Feasibility study, Planning and construction.							
L = 45,SL = 45,TOTAL = 90 PERIODS							



Chairman (BoS)

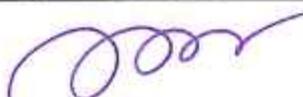


COURSE OUTCOMES:													
Upon completion of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Classify types of highways and carry out alignment surveys for designing urban and rural road sections.											Understand	
CO2	Apply geometric design principles and IRC methods for the design of flexible and rigid pavements.											Apply	
CO3	Discuss appropriate highway materials, construction techniques, and maintenance methods to ensure pavement quality.											Understand	
CO4	Interpret the technical concepts in track construction, geometric design, and signalling to support safe railway operations.											Understand	
CO5	Discuss the layout and functionality of stations, yards, rolling stock, and tractive power systems within Indian Railways.											Understand	
TEXT BOOKS:													
1. Khanna, S.K. and Justo, C.E.G., Highway Engineering, Nem Chand & Bros., Roorkee, 10 th Edition, 2019.													
2. Chandra, S. and Agarwal, M.M., Railway Engineering, Oxford University Press, New Delhi, 2 nd Edition, 2013.													
REFERENCES:													
1. Saxena, S.C. and Arora, S.P., A Textbook of Railway Engineering, Dhanpat Rai Publications, New Delhi, 9 th Edition, 2010.													
2. Yoder, E.J. and Witczak, M.W., Principles of Pavement Design, Wiley India Pvt. Ltd., New Delhi, 2 nd Edition, 2012.													
3. Chandola, S.P., Transportation Engineering – Volume II: Railways, Airports, Docks and Harbours, Khanna Publishers, New Delhi, 2014.													
4. http://nptel.ac.in/courses/105105107/ , http://nptel.ac.in/courses/105106119/													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	-	2	1	-
CO2	3	3	2	-	-	-	-	-	1	-	2	1	-
CO3	3	2	-	-	-	-	-	-	1	-	2	1	-
CO4	3	2	-	-	-	-	-	-	1	-	2	1	-
CO5	3	2	-	-	-	-	-	-	1	-	2	1	-
1-low, 2-medium, 3-high													


Chairman (BoS)



24CET32	MECHANICS OF SOLIDS	Category	L	T	P	SL	C
		ESC	45	15	0	60	4
PREREQUISITE: A background in basic physics and differential calculus is essential for understanding stress, strain, and deformation in solids.							
OBJECTIVES: The course enables students to analyze the concepts of stress, strain, deformation, and state of stress in solids. It covers determining centroids and shear force and bending moment diagrams. It also includes evaluating torsion, deflection, and calculate slope and deflection by various methods.							
UNIT – I	STRESSES AND STRAIN						(12)
Introduction – Types of loads – Stability - Stresses and strains – Stress and strain diagram for steel – Elastic limit -Hooke’s law – Poisson’s ratio – Elastic constants – Young’s modulus – Shear modulus – Bulk modulus – Thermal stresses – Compound stresses - Factor of Safety - Deformation of simple and compound bars.							
UNIT - II	PROPERTIES OF SURFACES AND SOLIDS						(12)
First moment of area and Centroid of sections – T section- I section- Angle section- Hollow section from primary simpler sections – Second moment of plane areas – Parallel axis theorem and Perpendicular axis theorem – T-section – I section- Angle section- Hollow section –Product of Inertia- Principal Moment of Inertia of plane area-Mass moment of inertia.							
UNIT - III	SHEAR FORCE AND BENDING MOMENTS IN BEAMS						(12)
Types of beams – Types of supports and loads – Plane bending – Oblique bending – Bending moment and Shear force – Sign conventions - Point of contra-flexure – Clockwise and anti-clockwise moments – Shear force and bending moment diagrams for concentrated load, uniformly distributed load, uniformly varying load and Couples.							
UNIT - IV	STRESSES IN BEAMS AND TORSION						(12)
Simple Bending - Bending stress – Assumptions – Theory of simple bending and bending equation – Complimentary shear – Load Carrying capacity – Applications of bending equation - Shear stress distribution in beam. Simple torsion – Torsional loads – Torsion equation for circular shafts and hollow circular shafts – Assumptions -Torsional rigidity - Power transmission –Modulus of rupture.							
UNIT - V	DEFLECTION OF BEAMS						(12)
Beam Deflection – Slope - Sign conventions - Double integration method –Macaulay’s Method - Moment area method – Mohr’s Theorems - Conjugate beam theorems - Conjugate beam method.							
L=45, T=15, SL= 60, TOTAL =120 PERIODS							


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Apply the fundamental concepts of force-deformation, and stress-strain relationships to the solid and structural mechanics problems.											Apply	
CO2	Compute the centroid of the different types of section.											Apply	
CO3	Develop shear force and bending moment diagrams of a beam and find the maximum shear/ moment and their locations.											Apply	
CO4	Compute bending and torsional stresses in structural members and apply them to determine strength, rigidity, and load-carrying capacity.											Apply	
CO5	Determine the slope and deflection of beams by using various methods.											Apply	
TEXT BOOKS:													
1.Bansal R.K. "A Textbook of Strength of Materials", Edition, 2018.													
2.Rajput R.K., "Strength of Materials", S. Chand Publications, 8 th Edition, 2022.													
REFERENCES:													
1.Punmia B.C., Ashok Kumar Jain, Arun Kumar Jain, "Mechanics of Material", Laxmi Publications, revised edition, 2017.													
2.Srinath L.S, "Advanced Mechanics of Solids", McGraw Hill Education, 2017.													
3.Egor P Popov, "Engineering Mechanics of Solids", Pearson Education India; 2 nd edition, 2015.													
4.Subramanian R., "Strength of Materials", Oxford University Press, 3 rd edition, 2016.													
5.Timoshenko S.P. Gere, J.M. "Mechanics of Materials, CBS; 2 nd edition, 2006.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	1	3	3
CO2	3	3	2	-	-	-	-	2	1	-	1	3	3
CO3	3	3	2	-	-	-	-	2	1	-	1	3	3
CO4	3	3	2	-	-	-	-	2	1	-	1	3	3
CO5	3	3	2	-	-	-	-	2	1	-	1	3	3
1-low, 2-medium, 3-high													


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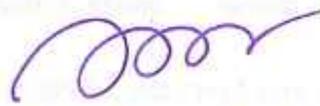


24CET33	FLUID MECHANICS AND APPLIED HYDRAULICS ENGINEERING	Category	L	T	P	SL	C
		PCC	45	15	0	60	4
PREREQUISITE: A strong foundation in Physics, particularly in the study of forces and properties of materials, along with proficiency in calculus and differential equations, is essential to effectively grasp the principles of fluid mechanics and hydraulic engineering.							
OBJECTIVES: The course enables students to analyze fluid properties, fluid statics, and fluid flow using Bernoulli's principle. It covers determining hydraulic parameters and losses in pipes and open channels, applying boundary layer concepts and dimensional analysis. It also includes evaluating the performance of pumps and turbines.							
UNIT – I	FLUID PROPERTIES AND FLUID STATICS						(12)
Properties of fluids – Types of fluids – Hydrostatic law – Pascal's law – Pressure Measurements using single column manometer – Hydrostatic pressure – Total Pressure – Centre of Pressure – Buoyancy – Meta centre – Equilibrium conditions.							
UNIT – II	FLUID DYNAMICS AND KINEMATICS						(12)
Classification and types of flow – Flow lines and path lines – Continuity equation – Velocity potential function and Stream function – Flownet – Euler's equation of motion – Bernoulli's equation and its applications – Venturimeter – Orifice meter – Velocity measurement.							
UNIT – III	FLOW THROUGH PIPES AND OPEN CHANNEL FLOW						(12)
Flow through Pipes: Laminar flow through circular pipes - Hagen-Poiseuille's equation – Hydraulic gradient line – Darcy-Weisbach equation – Major and minor losses. Open Channel Flow: Definition – Differences between pipe flow and open channel flow – Types of open channel flow – Velocity distribution – Steady uniform flow: Chezy and Manning equations – Best hydraulic sections.							
UNIT – IV	BOUNDARY LAYER AND DIMENSIONAL ANALYSIS						(12)
Boundary Layer: Definition – Laminar and turbulent boundary layers – Displacement, Momentum and Energy thickness – Boundary layer separation. Dimensional Analysis: Fundamental dimensions – Dimensional homogeneity – Rayleigh's method – Buckingham Pi theorem.							
UNIT – V	PUMPS AND TURBINES						(12)
Pumps: Classification of pumps – Centrifugal pumps: working principle, priming – Specific speed of pumps – Multistage pumps -Characteristics of Pumps— Reciprocating pumps – Single acting reciprocating pump. Turbines: Classification – Impulse and Reaction turbines – Components and functions of Pelton wheel turbine.							
L=45,T=15,SL= 60,TOTAL = 120 PERIODS							


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome									Cognitive Level			
CO1	Apply fluid statics principles to solve problems involving pressure forces and buoyancy.									Apply			
CO2	Demonstrate the application of Bernoulli's principle in analyzing real-world fluid flow scenarios.									Apply			
CO3	Compute flow parameters and apply appropriate methods to determine energy losses in pipe and open channels.									Apply			
CO4	Utilize boundary layer theory and dimensional analysis techniques to simplify fluid mechanics problems.									Apply			
CO5	Assess the operational characteristics of pumps and turbines.									Apply			
TEXT BOOKS:													
1. Bansal, R.K., A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications Pvt. Ltd., New Delhi, 11th Edition, 2023.													
2. Modi, P.N. and Seth, S.M., Hydraulics and Fluid Mechanics including Hydraulic Machines, Standard Book House, New Delhi, 22nd Edition, 2019.													
REFERENCES:													
1. White, F.M., Fluid Mechanics, McGraw Hill Education India Pvt. Ltd., Bengaluru, 9th Edition, 2022.													
2. Rajput, R.K., Fluid Mechanics and Hydraulic Machines, S Chand & Company, New Delhi, 7th Edition, 2020.													
3. Hibbeler, R.C., Fluid Mechanics in SI Units, Pearson Education, New Delhi, 2nd Edition, 2017													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	2	3	3
CO2	3	3	2	-	-	-	-	2	1	-	2	3	3
CO3	3	3	2	-	-	-	-	2	1	-	2	3	3
CO4	3	3	2	-	-	-	-	2	1	-	2	3	3
CO5	3	3	2	-	-	-	-	2	1	-	2	3	3
1-low, 2-medium, 3-high													


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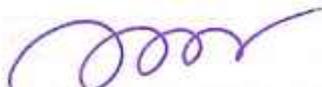


24CET34	SURVEYING	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: Fundamental knowledge of geometry, trigonometry, and physics, along with basic skills in engineering drawing and measurement techniques.							
OBJECTIVES: To provide foundational and advanced knowledge in surveying, including plane and theodolite surveying, trigonometric levelling, curve setting, error adjustments, and modern techniques like total station and remote sensing.							
UNIT - I	INTRODUCTION TO PLANE SURVEYING AND LEVELLING	(9)					
Surveying, Classification of Surveys, Linear Measurements with Chain and Tapes, Field Survey by Chains/Tapes, Compass Surveying, True and Magnetic Bearings, Local Attraction, Fore and Back Bearing, Various Types of Compasses and Applications, Detail Plotting, Traverse Using Graphical Approach, Plane Table Accessories, Methods of Plane Table Survey, Contouring, Methods of Levelling, Determination of Height, Booking of Levelling Operation, Types of Levels, Guidelines for Preparation of Contour Maps, Methods of Contouring.							
UNIT - II	THEODOLITE SURVEY AND CURVES	(9)					
Theodolites, Measurements of Horizontal and Vertical Angles, Differences in Vernier and Microscopic Theodolites, Methods of Recording Angles, Principle and basic system, Subtense bar, Various Types of Tachometers, plotting with Tacheometers, Curves, Classification, Elements of Simple Circular, Compound, Reverse, Transition, Vertical Curves, Setting of Curves.							
UNIT - III	TRIGNOMETRICAL LEVELLING	(9)					
Triangulation, Purpose of Triangulation and Trilateration, Classification, Strength of Figure, Well-Conditioned Triangle, Triangulation Figures, Reconnaissance and Station Selection, Inter Visibility of Stations, Signal and Towers, Base Lining, Computation and Adjustment in Triangulation, Satellite Station, Reduction to centre, Trigonometrical leveling – Single and reciprocal observations.							
UNIT - IV	SURVEY ERRORS AND ADJUSTMENTS	(9)					
Sources of Errors, Errors in Chain, Compass and Theodolite Survey, Laws of Accidental Errors, Principles of Least Squares, Laws of Weights, Determination of Probable Error, Distribution of Error of the Field Measurements, Normal Equations, Determination of the Most Probable values, Method of Correlates, Triangulation Adjustments, Figure Adjustment, Adjustment of Geodetic Triangle, Adjustment of Chain of Triangles, Method of Equal Shift.							
UNIT - V	ADVANCED SURVEYING	(9)					
Introduction, basic concepts, aerial photogrammetry, terrestrial photogrammetry, terrestrial scanning, stereoscopy, types of EDM instruments. Total station - Fundamental measurements - Horizontal and vertical angle - Slope distance - Advantages and applications, Drone Surveying, Principles of remote sensing and applications in surveying.							
L=45,SL= 45,Total = 90 PERIODS							


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Calculate point heights and distances to generate ground profiles and contour maps for civil engineering projects.											Apply	
CO2	Implement surveying procedures using a theodolite to establish road alignment and determine heights.											Apply	
CO3	Apply triangulation techniques and trigonometric levelling methods for surveying large areas.											Apply	
CO4	Calculate measurement errors and apply appropriate corrections to ensure accuracy in surveying.											Apply	
CO5	Assess numerical solutions for civil engineering surveying tasks using advanced techniques.											Apply	
TEXT BOOKS:													
1. B.C.Punmiya, Surveying and Leveling, vol. 1, Laxmi Publications New Delhi, Seventeenth Edition, 2016													
2. B.C.Punmiya, Surveying and Leveling, vol. 2, Laxmi Publication, New Delhi, Seventeenth Edition, 2016													
REFERENCES:													
1. Subramanian R., Surveying and Levelling, Oxford University Press, Noida, Second Edition 2012.													
2. Arora K. R, Surveying Vol. I and II, Standard Book House, New Delhi, Seventh Edition 2019.													
3. Duggal S.K, Surveying Vol. I and II, Tata McGraw Hill, New Delhi, Fifth Edition 2017.													
4. https://archive.nptel.ac.in/courses/105/104/105104101/													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	3	2	2
CO2	3	3	2	-	-	-	-	2	1	-	3	2	2
CO3	3	3	2	-	-	-	-	2	1	-	3	2	2
CO4	3	3	2	-	-	-	-	2	1	-	3	2	2
CO5	3	3	2	-	-	-	-	2	1	-	3	2	2
1-low, 2-medium, 3-high													


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24CEP31	STRENGTH OF MATERIALS LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5

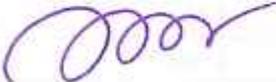
PREREQUISITE:
Students should have a basic knowledge of construction materials and this laboratory enables the determination of the material characteristics and strength which are essential for the Engineering designs.

OBJECTIVES:
To conduct tests and interpret results to evaluate mechanical properties of materials

List of Experiments:

1. Axial Compression test to obtain the Stress – Strain Curve.
2. Axial Tension test to obtain the Stress – Strain Curve and the Strength.
3. Torsion test to obtain the Torque vs. Angle of Twist and the Stiffness.
4. Flexural test to obtain the Load Deflection Curve and the Stiffness for Simply Support Beam.
5. Flexural test to obtain the Load Deflection Curve and the Stiffness for Cantilever Beam.
6. Compression spring test to obtain the Load Deflection Curve and the Stiffness
7. Tension spring test to obtain the Load Deflection Curve and the Stiffness.
8. Rockwell and Brinell hardness tests to obtain the hardness number.
9. Charpy impact test to obtain the impact resistance.
10. Izod impact test to obtain the impact resistance.
11. Shear test to obtain the maximum shear strength.
12. Compression test to obtain the strength of hollow bricks.

P= 45, TOTAL = 45 PERIODS


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Ex. No.	Cognitive Level
CO1	Apply the linear laws of elasticity as related to stress and strain.											1,2	Apply
CO2	Compute the angle of twist, deflection and the stiffness of specimen.											3,4	Apply
CO3	Calculate the deflection and stiffness of different sections.											5,6,7	Apply
CO4	Measure the hardness of the material and the energy absorption capacity of the material.											8,9,10	Apply
CO5	Predict the behaviour of the materials under shear and compression.											11,12	Apply
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	2	3	3
CO2	3	3	2	-	-	-	-	2	1	-	2	3	3
CO3	3	3	2	-	-	-	-	2	1	-	2	3	3
CO4	3	3	2	-	-	-	-	2	1	-	2	3	3
CO5	3	3	2	-	-	-	-	2	1	-	2	3	3
Avg.	3	3	2	-	-	-	-	2	1	-	2	3	3
1-low, 2-medium, 3-high													

Laboratory Equipment Details
(Requirement for batch of 30 students)

S.No.	Description of Equipment	Quantity required
1.	Compression Testing Machine	1 No.
2.	Universal Testing Machine	1 No.
3.	Torsion Testing Machine	1 No.
4.	Deflection Test Apparatus	1 No.
5.	Spring Testing Machine	1 No.
6.	Rockwell Cum Brinell Hardness Testing	1 No.
7.	Impact Testing Machine	1 No


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24CEP32	SURVEY ENGINEERING LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
PREREQUISITE: Basic understanding of geometry, trigonometry, and physics, along with familiarity in handling measurement instruments and interpreting technical drawings.							
OBJECTIVES: To provide practical experience in traditional and modern surveying using instruments like chain, compass, theodolite, and total station to measure angles, distances, elevations, and set out curves and building layouts.							
List of Exercise/Experiments: <ol style="list-style-type: none"> 1. Study of Chain, Compass, Plane Table Surveying and its Accessories. 2. Fly Levelling and Check Levelling using Dumpy Level. 3. Determination of Horizontal angle by Repetition method and Reiteration Method. 4. Measurement of Vertical Angle. 5. Theodolite Traversing. 6. Determination of Tacheometric constants. 7. Horizontal and vertical Distances using Stadia Tachometric Principles. 8. Horizontal and vertical Distances using Triangulation – Single plane Method. 9. Horizontal and vertical Distances using Triangulation – Double plane Method. 10. Setting out Simple Circular Curve by using ordinate long chord method. 11. Setting out works for Building. 12. Measurement of angle and distance by using Total Station. 							
P= 45, TOTAL= 45 PERIODS							


Chairman (BoS)



COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome									Ex.No	Cognitive Level		
CO1	Apply chain, compass, plane table, and dumpy level to measure linear distances, direction and elevation differences through leveling.									1,2	Apply		
CO2	Calculate horizontal and vertical angles using theodolite by applying repetition, reiteration, and vertical angle methods									3,4	Apply		
CO3	Apply theodolite for traversing and determine tacheometric constants for distance and elevation measurements.									5,6	Apply		
CO4	Apply stadia tachometry and single/double plane triangulation methods to compute horizontal and vertical distances.									7,8,9	Apply		
CO5	Demonstrate simple circular curves, building layouts, and measure angles and distances using a total station.									10,11,12	Apply		
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	2	3	3
CO2	3	3	2	-	-	-	-	2	1	-	2	3	3
CO3	3	3	2	-	-	-	-	2	1	-	2	3	3
CO4	3	3	2	-	-	-	-	2	1	-	2	3	3
CO5	3	3	2	-	-	-	-	2	1	-	2	3	3
1-low, 2-medium, 3-high													

**Laboratory Equipment Details
(Requirement for batch of 30 students)**

S.No.	Description of Equipment	Quantity required
1.	Total Station	3
2.	Theodolite	3
3.	Dumpy level	3
4.	Plane table	3
5.	Prismatic Compass	3
6.	Ranging Rods	6
7.	Levelling Staff	6
8.	Cross Staff	6
9.	Chains	6
10.	Tapes	6
11.	Arrows	6


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24CEP33	HIGHWAY ENGINEERING LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
<p>PREREQUISITE: Students should understand pavement layers, functions, and basic properties of aggregates, bitumen. Prior knowledge of material testing and its role in pavement design is recommended.</p>							
<p>OBJECTIVES: To provide practical knowledge and hands-on experience in testing highway construction materials such as aggregates, soil, and bitumen, using standard procedures. This enables accurate evaluation of material properties for the design and quality control of pavement layers in road construction.</p>							
<p>List of Exercise/Experiments:</p> <ol style="list-style-type: none"> 1. Sieve Analysis of Coarse Aggregates 2. Specific Gravity & Water Absorption Test on Coarse Aggregates 3. Crushing Strength and Impact Test of Aggregates. 4. Los Angeles Abrasion Test on Aggregates 5. Flakiness Index, Elongation Index of Coarse Aggregates 6. CBR Test on Soil 7. Penetration Test on Bitumen 8. Softening Point Test 9. Viscosity Test 10. Ductility Test 11. Determination of Binder Content on Bituminous Mixes 12. Determination of Marshall Stability Value on Bituminous Mixes 							
P=45, TOTAL: 45 PERIODS							


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome									Ex.No.	Cognitive Level		
CO1	Conduct sieve analysis, specific gravity and water absorption tests to assess the quality of coarse aggregates.									1,2	Apply		
CO2	Apply the mechanical properties of coarse aggregates using crushing strength, impact, abrasion, flakiness, and elongation index tests.									3,4,5	Apply		
CO3	Conduct CBR test on soil and perform penetration test on bitumen to evaluate their strength.									6,7	Apply		
CO4	Determine the softening point, viscosity and assess ductility of bitumen to evaluate thermal behavior.									8,9,10	Apply		
CO5	Apply the material properties in the selection and design of road layers.									11,12	Apply		
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PSO 1	PSO 2
CO1	3	3	2	-	-	-	-	2	1	-	2	3	3
CO2	3	3	2	-	-	-	-	2	1	-	2	3	3
CO3	3	3	2	-	-	-	-	2	1	-	2	3	3
CO4	3	3	2	-	-	-	-	2	1	-	2	3	3
CO5	3	3	2	-	-	-	-	2	1	-	2	3	3
1-low, 2-medium, 3-high													

LIST OF EQUIPMENTS
(For a Batch of 30 students)

S.No.	Name of the Equipments	Qty.
1	Sieve shaker	1
2	Pycnometer and Mesh Bucket	1
3	Aggregate crushing test apparatus and Aggregate impact test machine	1
4	Los Angeles abrasion machine	1
5	Thickness gauge, length gauge	1
6	CBR test apparatus	1
7	Bitumen penetrometer	1
8	Ring and ball apparatus	1
9	Bitumen viscometer	1
10	Ductility testing machine	1
11	Centrifugal extractor	1
12	Marshall stability apparatus	1


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24CEP34	DESIGN STUDIO I	Category	L	T	P	SL	C
		PCC	0	0	30	0	1
PREREQUISITE:							
Students should have a basic Understanding of architectural floor plans, levels, grids, and basic structural elements like walls, doors, and windows. Basic understanding of electrical circuits, components like resistors and LEDs, and familiarity with circuit simulation tools.							
OBJECTIVES:							
To apply design thinking and system design principles to develop, prototype, and present user-centered civil engineering solutions through hands-on projects.							
List of Exercise/Experiments:							
<ol style="list-style-type: none"> 1. Introduction & Interface Navigation 2. Creating Levels, Grids & Basic Floor Plan 3. Modelling Walls, Doors, and Windows 4. Adding Floors, Roofs, and Ceilings 5. Introduction to basic components: Connecting LED with fixed resistor and variable resistors 6. Electronic LED Lantern 7. Light Detector 8. LED Blinking 9. A) Blinking of LED using Wokwi simulator B) Interfacing Ultrasonic sensor using Wokwi simulator 							
P = 30, TOTAL: 30 PERIODS							
COURSE OUTCOMES:							
At the end of the course, the students will be able to:							
COs	Course Outcome					Cognitive Level	
C01	Demonstrate proficiency in navigating design software interfaces and creating basic architectural elements such as levels, grids, walls, doors, and windows.					Apply	
C02	Apply modeling techniques to design floors, roofs, and ceilings accurately within a digital environment.					Apply	
C03	Understand circuit basics: connecting LEDs, fixed, and variable resistors for practical electronic experiments.					Understand	
C04	Design and assemble an electronic LED lantern with light detection circuits to trigger actions based on light.					Apply	
C05	Learn LED blinking with microcontrollers, simulate in Wokwi, and interface ultrasonic sensors for distance measurement.					Apply	
REFERENCES:							
<ol style="list-style-type: none"> 1. https://www.youtube.com/watch?v=Nd6U2KgHI6k 2. https://www.youtube.com/watch?v=2K7QpLnmPvU 3. https://www.youtube.com/watch?v=s2na8CumNR0 							



Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	1	3	-
CO2	3	3	2	-	-	-	-	2	1	-	1	3	-
CO3	3	2	-	-	-	-	-	2	1	-	1	-	-
CO4	3	3	2	-	-	-	-	2	1	-	1	-	-
CO5	3	3	2	-	-	-	-	2	1	-	1	-	-
Avg.	3	3	2	-	-	-	-	2	1	-	1	3	-
1-low, 2-medium, 3-high													

Chairman (BoS)



24SDP39	SOFT SKILLS DEVELOPMENT – III	Category	L	T	P	SL	C
		EEC	0	0	30	0	1
(Common to All Branches)							
OBJECTIVES: To the concept of aptitude and its relevance in various fields. It highlights the need for aptitude skills and emphasizes their importance in academic and career development. It also focuses on building a strong foundation in English grammar to improve communication skills.							
UNIT - I	TIME SPEED AND DISTANCE						(6)
Relationship Between Time Speed and Distance Time Conversion – Relative Speed – Chasing – Problems on Late, Early and Usual Time							
UNIT - II	PROBLEMS ON TRAINS						(6)
Crossing a Static objects – Crossing a Moving Object: Same and Opposite Direction – Time Difference based Problems.							
UNIT - III	BOATS AND STREAM						(6)
Introduction to Boat in Still Water and Current – Down Stream Speed – Upstream Speed – Speed in Still Water – Rate of Stream.							
UNIT - IV	LOGICAL REASONING						(6)
Seating Arrangements: Circular and Linear Arrangements – Inequalities – Assertion & reasoning.							
UNIT - V	VERBAL ABILITY						(6)
Parts of Speech – Sentence Completion – Idioms and Phrases – Reading Comprehension.							
TOTAL: 30 PERIODS							
COURSE OUTCOMES: At the end of the course, the students will be able to:							
COs	Course Outcome	Cognitive Level					
CO1	Apply time, speed, and distance concepts to solve problems involving relative speed, time conversion, and punctuality scenarios.	Apply					
CO2	Solve problems on trains with object crossing and time differences using concepts of relative speed and direction.	Apply					
CO3	Solve problems involving boats and streams using concepts of upstream, downstream, and current speed.	Apply					
CO4	Apply logical reasoning to solve problems on seating arrangements, inequalities, and assertion-reasoning statements.	Apply					
CO5	Demonstrate understanding of grammar, vocabulary, and comprehension to complete sentences and interpret texts effectively.	Understand					


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TEXT BOOKS:

1. R S Aggarwal, "Quantitative Aptitude for Competitive Examinations".
2. Abhijit Guha, "Quantitative Aptitude for Competitive Examinations".
3. Nishit K. Sinha, "Logical Reasoning and Data Interpretation for CAT".
4. R.S. Agarwal, "A Modern Approach to Verbal & Non-Verbal Reasoning".
5. Wren & Martin, "High School English Grammar & Composition".

REFERENCES:

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. English for Competitive Examinations – by Edgar Thorpe & Showick Thorpe.
4. <https://prepinsta.com/>.
5. <https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm>.
6. <https://www.youtube.com/@FeelFreetoLearn/playlists>.

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	2	-	-	2	-	-	3	3	-	3	-	-
Avg.	3	3	2	-	2	-	-	2	3	-	3	-	-



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24MAT46	NUMERICAL AND COMPUTATIONAL TECHNIQUES	Category	L	T	P	SL	C
		BSC	45	15	0	60	4
SEMESTER - IV (COMMON TO II B.E. / B.Tech., - AE, BME, CE, CSE, CSD, CS, EEE, IOT, IT, MECH & SFE)							
PREREQUISITE: A fundamental knowledge of algebra, linear algebra, calculus, and differential equations is required for this course.							
OBJECTIVES: To develop the ability to apply numerical methods for solving algebraic and transcendental equations, systems of linear equations, interpolation, numerical differentiation and integration, and initial and boundary value problems.							
UNIT - I	SOLUTIONS OF EQUATIONS AND EIGEN VALUE PROBLEMS						(12)
Solutions to polynomial and transcendental equations - Newton Raphson Method - Solutions to simultaneous linear system of equations by Gauss Elimination Method - Gauss Seidel Method - Eigen value of a matrix by power method.							
UNIT - II	INTERPOLATION AND APPROXIMATION						(12)
Interpolation - Newton's Forward and Backward difference Interpolation Techniques (Equal intervals) - Newton's divided difference method - Lagrange's interpolation and Inverse Lagrange's interpolation methods (Unequal intervals).							
UNIT - III	NUMERICAL DIFFERENTIATION AND INTEGRATION						(12)
Numerical differentiation using Newton's Forward and Backward difference interpolation methods - Numerical integration by Trapezoidal rule - Simpson's 1/3 rd rule and Simpson's 3/8 th rule- Double integration using Trapezoidal and Simpson's rules.							
UNIT - IV	INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS						(12)
Ordinary Differential Equations (for solving first order equations) - Taylor's Series Method - Euler's Method - Modified Euler's Method - Fourth order Runge-Kutta method- Milne's Predictor and Corrector Method.							
UNIT - V	BOUNDARY VALUE PROBLEMS IN PARTIAL DIFFERENTIAL EQUATIONS						(12)
Classification of Partial Differential Equations - One dimension heat equation by Crank Nicolson's method - One dimensional wave equation - Two Dimensional Laplace and Poisson equations.							
Lecture = 45, Tutorial = 15, Self Learning = 60; Total = 120 Periods							
COURSE OUTCOMES: At the end of the course, the students will be able to							
COs	Course Outcome						Cognitive Level
CO1	Implement numerical techniques to solve equations, systems of linear equations and Eigen value problems						Apply
CO2	Assess Newton's interpolation methods to select the most suitable technique based on data spacing and the location of the interpolation point.						Analyze
CO3	Apply numerical methods to perform differentiation and integration						Apply
CO4	Apply numerical techniques to obtain approximate solutions of first order ordinary differential equations						Apply
CO5	Analyze and solve partial differential equations of heat and wave equations by using numerical approaches.						Analyze

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CHAIRMAN

TEXT BOOKS:

1. Dr. B. S.Grewal, "Numerical Methods in Engineering and Science" Khanna Publishers, New Delhi, 12th edition, 2016.
2. Dr. M.K. Venkataraman," Numerical Methods in Science and Engineering", National Publishing Company, 4th edition, 2012.

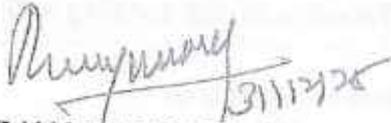
REFERENCES:

1. Sukhendu Dey and Shishir Gupta "Numerical Methods", Tata McGraw Hill Publishing Company, 1st edition 2013.
2. V. Gerald 'Applied Numerical Analysis' Pearson Education, 6th edition, 2013.
3. P. Kandasamy, K. Thilagavathy, K. Gunavathy "Numerical Methods", S. Chand Company ,5th Edition.
4. S.R.K. Iyengar, R.K.Jain,"Numerical Methods", New Age International Publishers, 1st edition , 2014.
5. Rajasekaran.S, "Numerical Methods in Science and Engineering A Practical Approach", A.H.Wheeler and Company Private Limited, 2016.

Mapping of COs with POs and PSOs

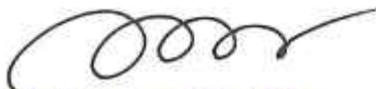
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	-	-	2	-	-
CO2	3	3	3	2	-	-	-	2	-	-	2	-	-
CO3	3	3	2	-	-	-	-	2	-	-	2	-	-
CO4	3	3	2	-	-	-	-	2	-	-	2	-	-
CO5	3	3	3	2	-	-	-	2	-	-	2	-	-

1 - Low, 2 - Medium, 3- High.


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24CET41	CONCRETE TECHNOLOGY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: Basic knowledge of Construction Materials and Fundamentals of Strength of Materials.							
OBJECTIVES: To impart knowledge on the properties and behavior of various concrete materials, mix design methods, and testing procedures and also enable students to understand the use of special concretes and chemical/mineral admixtures for enhanced performance.							
UNIT - I	CONSTITUENT MATERIALS	(9)					
Cement-Different types-Chemical composition and Properties-Tests on cement - hydration of cement – IS Specifications- Aggregates-Classification-Mechanical properties and tests as per BIS Grading requirements – M-Sand -Water- Quality of water for use in concrete							
UNIT - II	CHEMICAL AND MINERAL ADMIXTURES	(9)					
Role of Construction Chemicals - Accelerators – Retarders - Plasticizers- Super plasticizers - Water proofers - Mineral Admixtures - Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag, Rice husk ash and Metakaolin - Their effects on concrete properties							
UNIT - III	PROPORTIONING OF CONCRETE MIX	(9)					
Principles of Mix Proportioning - Properties of concrete related to Mix Design - Physical properties of materials required for Mix Design - Design Mix and Nominal Mix - BIS and ACI Methods of Mix Design with examples							
UNIT - IV	FRESH AND HARDENED PROPERTIES OF CONCRETE	(9)					
Preparation of concrete (mixing, placing)Workability - Tests for workability of concrete - Slump Test, Flow table test, Vee Bee Test and Compaction factor Test- Segregation and Bleeding - Determination of Compressive and Flexural strength as per BIS Properties of Hardened concrete - Determination of Stress-strain curve for concrete - Determination of Young's Modulus-Durability of concrete.							
UNIT - V	SPECIAL CONCRETES	(9)					
Light weight and Heavy weight concretes- High strength concrete - Fibre reinforced concrete – Ferrocement- Ready mix concrete – SIFCON - Shotcrete- Polymer concrete - High performance concrete – Self compacting concrete - no-fine concrete - properties and applications							
L=45,SL= 45,Total = 90 PERIODS							
COURSE OUTCOMES: At the end of the course, the students will be able to:							
COs	Course Outcome	Cognitive Level					
CO1	Classify the types, composition, and properties of constituent materials used in concrete.	Understand					
CO2	Illustrate the role and effects of various chemical and mineral admixtures on concrete performance.	Understand					
CO3	Interpret the principles of mix proportioning and differentiate between BIS and ACI mix design methods.	Understand					
CO4	Apply appropriate test procedures to determine the fresh and hardened properties of concrete.	Apply					
CO5	Employ suitable types of special concretes for different construction applications.	Apply					


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TEXT BOOKS:

1. Shetty, M.S, and Jain, A.K., Concrete Technology, Theory and Practice, S.Chand and Company Ltd, New Delhi, Eighth Edition, 2018.
2. Santhakumar, A.R., Concrete Technology, Oxford University Press, New Delhi, Second Edition, 2018.

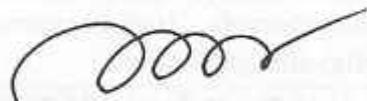
REFERENCES:

1. Nevill, A.M, Properties of Concrete, Pearson Education, New Delhi, Fifth Edition, 2012.
2. Gambir, M.L, Concrete Technology: Theory and Practice, Tata McGraw Hill Publishers, New Delhi, Fifth Edition, 2017.
3. IS: 10262-2009 Recommended Guidelines for Concrete Mix Design, Bureau of Indian Standards, New Delhi.
4. Bhavikatti .S. S., Concrete Technology, Dreamtech Press, New Delhi, First Edition, 2019.

Mapping of COs with POs and PSOs

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

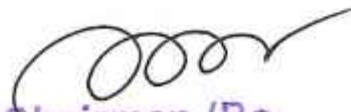
1-low, 2-medium, 3-high



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24CET42	SOIL MECHANICS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE Basic understanding of Geology and Fluid mechanics, enabling students to grasp soil properties and behavior under loads.							
OBJECTIVES: The course explains soil properties and behavior, including formation, classification, compaction, effective stress, permeability, and capillarity. It also covers settlement, shear strength, and slope stability analysis and improvement methods.							
UNIT - I	SOIL CLASSIFICATION AND COMPACTION	(9)					
Origin of soil - Soil description – Particle – Size shape and colour – Composition of gravel, sand, silt, clay particles – Particle behaviour – Soil structure – Phase relationship – Index properties – Significance – BIS classification system – Unified classification system – Compaction of soils – Theory, Laboratory and field tests – Field Compaction methods – Factors influencing compaction of soils.							
UNIT - II	EFFECTIVE STRESS AND PERMEABILITY	(9)					
Soil water – Static pressure in water - Effective stress concepts in soils – Capillary phenomena– Permeability interaction – Hydraulic conductivity – Darcy’s law – Determination of Hydraulic Conductivity – Laboratory Determination (Constant head and falling head methods) and field measurement pumping out in unconfined and confined aquifer – Factors influencing permeability of soils – Seepage - Two-dimensional flow – Laplace’s equation – Introduction to flow nets – Simple problems. (Sheet pile and weir).							
UNIT - III	STRESS DISTRIBUTION AND SETTLEMENT	(9)					
Stress distribution in homogeneous and isotropic medium – Boussinesq theory – (Point load, Live load and Udl) Use of New marks influence chart –Components of settlement — Immediate and consolidation settlement – Terzaghi’s one dimensional consolidation theory – Computation of rate of settlement. - v_t and $\log t$ methods– e - $\log p$ relationship.							
UNIT - IV	SHEAR STRENGTH	(9)					
Shear strength of cohesive and cohesion less soils – Mohr-Coulomb failure theory – Measurement of shear strength - Direct shear, Triaxial compression, Unconfined Compression (UCC) and Vane shear tests – Pore pressure parameters – Cyclic mobility – Liquefaction.							
UNIT - V	SLOPE STABILITY	(9)					
Stability Analysis - Infinite slopes and finite slopes – Total stress analysis for saturated clay – Friction circle method – Use of stability number – Method of slices – Fellenious and Bishop’s method - Slope protection measures.							
L=45,SL= 45,Total = 90 PERIODS							


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COURSE OUTCOMES:

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Interpret origin of soil, classification, and compaction characteristics.	Understand
CO2	Apply effective stress and permeability concepts to soil behavior.	Apply
CO3	Illustrate stress distribution and basic settlement concepts in soils.	Understand
CO4	Determine soil behavior by applying shear strength principles.	Apply
CO5	Implement basic slope stability concepts for choosing suitable slope protection methods.	Apply

TEXT BOOKS:

1. Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., New Delhi. 2015.
2. Gopal Ranjan and Rao, A.S.R., "Basic and Applied Soil Mechanics", New Age Ltd. International Publisher New Delhi (India) 2006.

REFERENCES:

1. McCarthy, D.F., "Essentials of Soil Mechanics and Foundations". Prentice-Hall, 2006.
2. Coduto, D.P., "Geotechnical Engineering – Principles and Practices", Prentice Hall of India Pvt.Ltd. New Delhi, 2010.
3. Das, B.M., "Principles of Geotechnical Engineering". Brooks / Coles / Thompson Learning Singapore, 8th Edition, 2013.
4. Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd. New Delhi, 2005

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


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24CET43	STRENGTH OF MATERIALS	Category	L	T	P	SL	C
		PCC	45	15	0	60	4
PREREQUISITE: - Basic knowledge of Mechanics of Solids and mathematical skills.							
OBJECTIVES: The course focuses on material behaviour under different loads, covering strain energy, complex stresses, and indeterminate structures. It also includes analysis of trusses, columns, cylinders, and stresses due to bending and shear.							
UNIT - I	STRAIN ENERGY PRINCIPLES AND COMPLEX STRESSES	(12)					
Strain energy -Resilience - Stresses due to suddenly applied loads and impact loads. Complex stresses - Components of stress on inclined planes - Expression for stressed element subjected to two normal stresses with shear - Principal stresses and Principal planes - Mohr's circle of stress.							
UNIT - II	STATICALLY INDETERMINATE BEAMS	(12)					
Analysis of propped cantilevers and fixed beams - Analysis of Continuous beams using Theorem of Three moments.							
UNIT - III	COLUMNS	(12)					
Short columns -Stresses due to combined bending and axial Force - core of section - unsymmetrical sections - Elastic buckling of long columns - Euler's theory for long Columns - Critical loads with different end conditions - limitations of Euler's theory - Rankine's formula.							
UNIT - IV	THIN AND THICK CYLINDER AND MEMBER FORCES IN TRUSS	(12)					
Stresses in thin-walled cylindrical shells - Wire wound cylindrical vessels - Thick cylinder - Lamé's equations. Plane roof trusses – Forces in the member - Method of Joints.							
UNIT - V	UNSYMMETRICAL BENDING AND SHEAR CENTRE	(12)					
Analysis of stresses and deflections due to unsymmetrical Bending - Significance of shear centre - Location of shear centre for Channel section & I section.							
Lecture: 45 Tutorial: 15 TOTAL: 60 PERIODS							
COURSE OUTCOMES: At the end of the course, the students will be able to:							
COs	Course Outcome	Cognitive Level					
CO1	Apply the concepts of complex stresses and strain energy in two dimensional solid systems.	Apply					
CO2	Determine the shear force and bending moment in statically indeterminate beams.	Apply					
CO3	Compute the stresses due to combined bending and axial load for short column and critical load calculation for long columns.	Apply					
CO4	Determine stresses in thin, thick cylinders subjected to fluid pressure and find the member forces for a given plane section.	Apply					
CO5	Calculate the stresses and deflections due to unsymmetrical bending and determine the location of the shear centre.	Analyze					


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TEXT BOOKS:

1. Rajput, R.K., A Textbook of Strength of Materials, Laxmi Publications, New Delhi, Sixth Edition, 2018.
2. "Strength of Materials" by Bansal R.K., Laxmi Publications, NewDelhi, 2018.

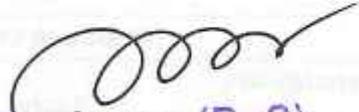
REFERENCES:

1. Nash, William.A., Theory and Problems of Strength of Materials, Schaum's Outline Series, Tata McGraw-Hill Publishing Co., New Delhi, First Edition, 2007.
2. Punmia, B.C. Ashok Kumar Jain. and Arun Kumar Jain., Mechanics of Material, Laxmi Publications, New Delhi, Tenth Edition, 2018.
3. Srinath, L.S., Advanced Mechanics of Solids, McGraw Hill Education, New York, Third Edition, 2017.
4. Popov, Egor. P., Engineering Mechanics of Solids, Pearson Education, New Delhi, Second Edition, 2015.
5. <https://nptel.ac.in/courses/105105108/>

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high



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24CET44	WATER SUPPLY ENGINEERING	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: A basic knowledge of Fluid mechanics, Hydrology and Engineering mathematics.							
OBJECTIVES: The course focuses on planning, designing, and managing public water supply systems using source analysis, treatment, distribution, and modern computer and IoT tools.							
UNIT – I	PLANNING OF WATER SUPPLY SYSTEM	(9)					
Public water supply system – Planning – Objectives – Design period – Standards and Planning factors for public water supply system – Population forecasts – Variation demand Pattern – Continuous Vs Intermittent Supplies – Water quality analysis and standards							
UNIT – II	SOURCES OF WATER	(9)					
Surface and Ground water sources – Elementary hydrology to compute impounded storage requirements – Mass curve analysis – Wells, Infiltration galleries – Deep tube wells – Construction, development and sanitary protection of wells, Hydraulics of ground water flow – estimating yields of wells – Steady state conditions – Intakes structure							
UNIT – III	CONVEYANCE OF WATER	(9)					
Pipes and Channels for transporting water – Hydraulics of pipe flow – Use of charts and Nomograms for flow computations – Materials for pipes and conduits – Selection of Materials and Class for pipes – Laying, Jointing and testing of G.I, C.I,R.C.C pipes – Pumps and pumping stations – Selection of pumps – Series and parallel operation-Water transmission for irrigation system							
UNIT – IV	TREATMENT OF WATER	(9)					
Objectives – Unit process of water treatment – Principles, functions and design of flash mixers, flocculators, sedimentation tank and sand filters – Principles of disinfection , Water softening, aeration, iron and manganese removal, fluoride removal – Residue management – Demineralization – Desalination – Membrane systems – Recent advances							
UNIT – V	STORAGE AND DISTRIBUTION OF WATER	(9)					
Types, functions and requirement of water distribution system – Service reservoirs – Functions and drawings – Network design – Economics – Computer applications – Analysis of distribution network using Hardy Cross method – Equivalent pipes – Elementary methods of pipe sizing – Operation and maintenance – Leak detection – Principles of design of water supply in buildings – House service connection – Fixtures and fittings – Systems of plumbing and drawings of types of plumbing – Introduction to IoT in water supply distribution system							
L=45,SL= 45,Total = 90 PERIODS							


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COURSE OUTCOMES:

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Interpret the various components of water supply scheme	Understand
CO2	Classify water supply sources based on water quality characteristics and other parameters.	Understand
CO3	Illustrate various process involved in water conveyance system.	Understand
CO4	Employ standard water treatment principles to select suitable processes and design the components of a water treatment plant.	Apply
CO5	Utilize the appropriate water distribution network for a city and plumbing systems for a building.	Apply

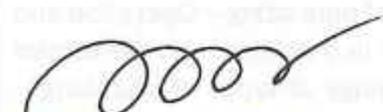
TEXT BOOKS:

- Garg, S.K., Water Supply Engineering, Vol.1, Khanna Publishers, New Delhi, Thirty third Edition, 2017
- Punmia, B.C. Ashok Kumar Jain. and Arun Kumar Jain., Environmental Engineering (Water Supply Engineering), Laxmi Publications, New Delhi, Second Edition, 2016.
- Modi, P.N., Water Supply Engineering, Vol.1, Standard Book House, New Delhi, Sixth Edition, 2018.
- Paul Guyer, J., An Introduction to Water Supply Systems, Create Space Independent Publishing Platform, California, Second Edition, 2017.
- Birdie, G.S. and Birdie, J.S, Water Supply and Sanitation Engineering, Dhanpat Rai & Sons, New Delhi, Ninth Edition, 2014.
- <http://nptel.ac.in/courses/105106119/>

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high



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24GET09	UNIVERSAL HUMAN VALUES AND ETHICS	Category	L	T	P	SL	C	
		HSMC	45	0	0	45	3	
(Common to All Branches)								
OBJECTIVES: To understand the concept of Universal Human Values and discuss theoretical and practical implications of UHV. To relate the use of harmony in the family and society and classify the harmony in the nature methods. To construct effective human values in personal and professional in life.								
UNIT - I	INTRODUCTION TO VALUE EDUCATION							(09)
Right Understanding, Relationship and Physical Facility, Holistic Development and the Role of Education - Understanding Value Education - Sharing about Oneself - Self-exploration as the Process for Value Education- Continuous Happiness and Prosperity – the Basic Human Aspirations - Exploring Human Consciousness - Happiness and Prosperity – Current Scenario - Method to Fulfil the Basic Human Aspirations - Exploring Natural Acceptance.								
UNIT - II	HARMONY IN THE HUMAN BEING							(09)
Understanding Human being as the Co-existence of the Self and the Body - Distinguishing between the Needs of the Self and the Body - Exploring the difference of Needs of Self and Body – The Body as an Instrument of the Self - Understanding Harmony in the Self - Exploring Sources of Imagination in the Self - Harmony of the Self with the Body - Programme to ensure self- regulation and Health - Exploring Harmony of Self with the Body.								
UNIT - III	HARMONY IN THE FAMILY AND SOCIETY							(09)
Harmony in the Family – the Basic Unit of Human Interaction - 'Trust' – the Foundational Value in Relationship-Exploring the Feeling of Trust - 'Respect' – as the Right Evaluation -Exploring the Feeling of Respect - Other Feelings, Justice in Human-to-Human Relationship- Understanding Harmony in the Society - Vision for the Universal Human Order – Exploring Systems to fulfil Human Goal.								
UNIT - IV	HARMONY IN THE NATURE/EXISTENCE							(09)
Understanding Harmony in the Nature – Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature - Exploring the Four Orders of Nature – Realizing Existence as Co-existence at All Levels - The Holistic Perception of Harmony in Existence -Exploring Co-existence in Existence.								
UNIT - V	IMPLICATIONS OF THE HOLISTIC UNDERSTANDING- A LOOK AT PROFESSIONAL ETHICS							(09)
Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct – Exploring Ethical Human Conduct - A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order- Competence in Professional Ethics - Exploring Humanistic Models in Education- Holistic Technologies, Production Systems and Management Models -Typical Case Studies- Strategies for Transition towards Value-based Life and Profession - Exploring Steps of Transition towards Universal Human Order.								
TOTAL (L:45, SL:45): 90PERIODS								

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COURSE OUTCOMES:

At the end of the course, the learners will be able to:

COs	Course Outcome	Cognitive Level
CO1	Interpret the concepts of Universal Human Values.	Understand
CO2	Summarize both theoretical and practical implications of Universal Human Values.	Understand
CO3	Understand how the feeling of trust develops through honesty, care, and consistent behavior.	Understand
CO4	Explains how viewing existence as a whole helps us understand harmony among humans, nature, and systems.	Understand
CO5	Relate human values in both personal and professional life.	Understand

TEXT BOOKS:

1. R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019.
2. A.N. Tripathi, Human Values, New Age Intl. Publishers, New Delhi, 2004.

REFERENCES:

1. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010.
2. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted 2008.
3. Frankl, Viktor E. Yes to Life In spite of Everything, Penguin Random House, London, 2019.
4. Van Zomeren, M., & Dovidio, J. F. The Oxford Handbook of the Human Essence (Eds.), New York Oxford University Press, 2018.
5. <https://fdp-si.aicte-india.org/UHVII.php>
6. <https://nptel.ac.in/courses/109104068>

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	2	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	-	-	-	-	-	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	3	-	-	-	2	-	-
CO5	-	-	-	-	-	3	-	2	-	-	-	-	-

Santh
V. SANTH
Chairman (BOS)



24CEP41	FLUID MECHANICS AND MACHINERY LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
PREREQUISITE: Basic knowledge of mathematics, physics, and engineering principles related to forces, pressure, and fluid behavior.							
OBJECTIVES: The lab focuses on determining discharge coefficients, studying jet impact forces, and analyzing pipe losses by comparing experimental results with theory. It also evaluates pump and turbine performance, building practical skills in hydraulic measurements and data interpretation.							
LIST OF EXERCISE/EXPERIMENTS: <ol style="list-style-type: none"> 1. Determination of Co-efficient of Discharge for Orifice 2. Determination of Co-efficient of Discharge for Notches 3. Determination of Co-efficient of Discharge for Venturimeter 4. Determination of Co-efficient of Discharge for Orifice Meter 5. Study of Impact of Jet on Flat Plate (Normal / Inclined) 6. Determination of Friction Losses in Pipes 7. Determination of of Minor Losses in Pipes 8. Performance Characteristics of Centrifugal Pumps (Constant Speed / Variable Speed) 9. Performance Characteristics of Reciprocating Pump 10. Characteristics of Pelton Turbine 11. Characteristics of Francis Turbine 12. Characteristics of Kaplan Turbine 							
							TOTAL: 45 PERIODS


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome										Ex.No.	Cognitive Level	
CO1	Measure discharge using various measuring devices.										1,2,3,4	Apply	
CO2	Estimate the friction and measure the frictional losses in fluid flow.										6,7	Apply	
CO3	Determine the force exerted by jet of water on vanes.										5	Apply	
CO4	Estimate performance parameters of a given centrifugal and reciprocating pump.										8,9	Apply	
CO5	Demonstrate the use of turbine fundamentals in grouping turbines and drawing their performance curves.										10,11,12	Apply	
REFERENCES:													
1. R.K. Bansal, A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 2019.													
2. Rajput, R.K., Fluid Mechanics and Hydraulic Machines, S. Chand Publishing, 2018.													
3. Subramanya, K., Flow in Open Channels and Fluid Mechanics and Hydraulic Machines, McGraw Hill Education, 2019.													
4. Jain, A.K., Fluid Mechanics Including Hydraulic Machines, Khanna Publishers, 2019.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	2	-	-
CO2	3	3	2	-	-	-	-	2	1	-	2	-	-
CO3	3	3	2	-	-	-	-	2	1	-	2	-	-
CO4	3	3	2	-	-	-	-	2	1	-	2	-	-
CO5	3	3	2	-	-	-	-	2	1	-	2	-	-
1-low, 2-medium, 3-high													

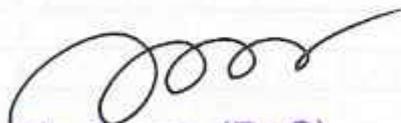
**LIST OF EQUIPMENTS
(For a Batch of 30 students)**

S.No.	Name of the Equipment	Qty.
1	Orifice and Mouth Piece Apparatus	1
2	Notch Apparatus	1
3	Venturimeter and Orifice Meter	1
4	Impact of Jet on Vane Apparatus	1
5	Major Losses Apparatus	1
6	Minor Losses Apparatus	1
7	Centrifugal Pump	1
8	Reciprocating Pump	1
9	Pelton Wheel Turbine	1
10	Francis Turbine	1
11	Kaplan Turbine	1


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24CEP42	SOIL MECHANICS LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
PREREQUISITE: A basic knowledge on Soil mechanics and Geology.							
OBJECTIVES: The objective is to determine soil properties through laboratory tests and interpret soil behavior under different conditions for geotechnical design.							
List of Exercise/Experiments: Determination of Index properties of soil. <ol style="list-style-type: none"> 1. Grain Size Distribution – Sieve Analysis 2. Grain Size distribution – Hydrometer Analysis 3. Specific Gravity of Soil 4. Relative density of Sands 5. Atterberg's Limits Test Determination of In-situ density of soil. <ol style="list-style-type: none"> 6. Field Density by Core Cutter Method and Sand Replacement Method Determination of Permeability Coefficient of soil. <ol style="list-style-type: none"> 7. Coefficient of Permeability - Variable Head Method 8. Coefficient of Permeability – Constant Head Method Determination of Compaction characteristics of soil. <ol style="list-style-type: none"> 9. Standard Proctor Compaction Test Determination of shear strength and consolidation characteristics of soil. <ol style="list-style-type: none"> 10. Unconfined Compression Test 11. Direct Shear Test Determination of consolidation characteristics of soil. <ol style="list-style-type: none"> 12. One Dimensional Consolidation Test 							
P=45, TOTAL: 45 PERIODS							


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COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome									Ex.No.	Cognitive Level		
CO1	Perform grain size distribution using sieve analysis and by hydrometer analysis.									1,2	Apply		
CO2	Measure specific gravity, relative density, and field density of soils using core cutter and sand replacement methods.									3,4,5	Apply		
CO3	Conduct Atterberg limits tests and interpret the consistency and plasticity characteristics of soils.									6,	Apply		
CO4	Demonstrate compaction and permeability tests to evaluate their impact on soil behavior.									7,8,9	Apply		
CO5	Conduct unconfined compression, direct shear, and consolidation tests to evaluate soil shear strength and settlement behavior.									10,11,12	Apply		
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	2	2	2
CO2	3	3	2	-	-	-	-	2	1	-	2	2	2
CO3	3	3	2	-	-	-	-	2	1	-	2	2	2
CO4	3	3	2	-	-	-	-	2	1	-	2	2	2
CO5	3	3	2	-	-	-	-	2	1	-	2	2	2
1-low, 2-medium, 3-high													

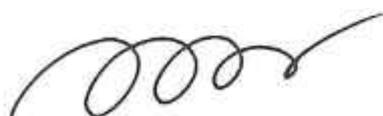
LIST OF EQUIPMENTS
(For a Batch of 30 students)

S.No.	Name of the Equipment's	Qty.
1	Sieve shaker	1
2	Hydrometer	1
3	Pycnometer	1
4	Core cutter	1
5	Sand pouring Measuring cylinder	1
6	Casagrande apparatus	1
7	Permeability apparatus	1
8	Proctor compaction apparatus	1
9	Unconfined compression Testing machine	1
10	Direct shear apparatus	1
11	One dimensional consolidation gang.	1


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24CEP43	DESIGN STUDIO 2	Category	L	T	P	SL	C
		PCC	0	0	30	0	1
PREREQUISITE A basic knowledge of architectural design software (e.g., Revit)							
OBJECTIVES: The objective is to develop skills in Revit-based building modeling, detailing and visualization, sensor calibration, basic programming, and integrated system design for data acquisition and visualization.							
List of Exercise/Experiments: <ol style="list-style-type: none"> 1. Creating Sections, Elevations, and 3D Views in Revit 2. Detailing and Annotations 3. Schedules and Sheets 4. Rendering and Walkthroughs 5. Sensor calibration techniques 6. Basic programming for sensor data reading and processing 7. System design approach: Hardware + Software integration 8. Mobile and web app basics for data display 9. Demonstration of working prototype 							
TOTAL: 45 PERIODS							
COURSE OUTCOMES: At the end of the course, the students will be able to:							
COs	Course Outcome	Cognitive Level					
CO1	Develop accurate sections, elevations, and 3D views in Revit with proper detailing and annotations.	Apply					
CO2	Generate schedules, sheets, rendered images, and walkthroughs for architectural presentation.	Apply					
CO3	Apply sensor calibration and programmatically read, process, analyze sensor data.	Apply					
CO4	Develop programs to read, process sensor data and integrate with hardware systems.	Apply					
CO5	Demonstrate prototype systems with mobile/web interfaces for real-time data display.	Apply					


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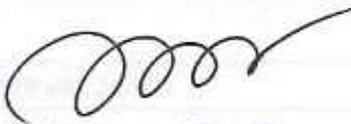
REFERENCES:

1. <https://www.youtube.com/watch?v=602zbf8RN4>
2. <https://www.youtube.com/watch?v=CRa9djnZRu0>
3. <https://www.youtube.com/watch?v=3KsRjnn83T0>

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


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24CEP44	SEMINAR PRESENTATION	Category	L	T	P	SL	C
		EEC	0	0	30	0	1

OBJECTIVES:

To explore the fundamental principles of verbal and non-verbal communication, and to develop active and empathetic listening, speaking, and writing skills, while exposing students to emerging technologies, research, products, algorithms, and services.

Guidelines:

- Each student shall select a seminar topic in the area of engineering/technology, preferably based on recent technological trends and developments beyond the prescribed syllabus.
- Each student shall prepare and deliver a seminar presentation using appropriate audio-visual aids for a duration of 10 minutes.
- Seminar presentations shall be conducted for two periods per week. Each student shall present a minimum of two seminars during the semester.
- Each seminar presentation carries 50 marks. The total marks allotted for the seminar component are 100 and the evaluation shall be carried out internally.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

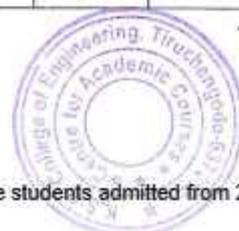
At the end of the course, the learners will be able to:

COs	Course Outcome	Cognitive Level
CO1	Explain a selected contemporary topic in the relevant engineering field based on a systematic literature survey.	Understand
CO2	Summarize and organize technical information from credible sources for seminar preparation.	Understand
CO3	Apply appropriate presentation tools and visual aids to prepare seminar materials.	Apply
CO4	Demonstrate effective oral communication skills while presenting technical content.	Apply
CO5	Apply subject knowledge to respond to questions during seminar discussions.	Apply

Mapping of COs with POs and PSOs

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


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Assessment Weightage

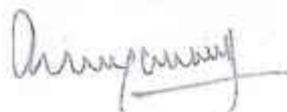
Presentation Skills	Technical Knowledge	Viva Voce	Total
30	20	10	50

Maximum marks - 50				
S. No	Assessment	Excellent (90-100%)	Good (75-89%)	Average (50-74%)
1.	Presentation Skills (20)	Delivers with open and closure remarks with appropriate body language and direct eye contact	Delivers with open and closure remarks with appropriate body language and consistent eye contact.	Delivers with open and closure remarks with poor body language and consistent eye contact
		Complete the presentation and well-presented within specified time	Completed the Presentation and well-presented beyond the time limit	Completed the Presentation and well-presented with in minimum span of time
2.	Technical Knowledge (20)	Demonstrated and answered all questions with detailed elaboration	Demonstrated and answered majority of questions with detailed elaboration	Demonstrated and answered most of questions with detailed elaboration
3.	Viva-Voce (10)	Responded to all the queries with valid explanations	Responded to majority of the queries with valid explanations	Responded to few queries with valid explanations


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24SDP49	SOFT SKILLS DEVELOPMENT – IV	Category	L	T	P	SL	C
		EEC	0	0	30	0	1
(Common to All Branches)							
OBJECTIVES:							
To the concept of aptitude and make them aware of its growing importance in academics, competitive exams, and professional life. In addition, it seeks to build a strong foundation in English grammar to improve language and communication skills.							
UNIT - I	TIME AND WORK						(6)
Relationship Between Time and Work – Efficiency Calculation – Wages – Alternate Days – Pipes and Cisterns – Chain Rule.							
UNIT - II	PERMUTATION COMBINATION AND PROBABILITY						(6)
Permutation Based on Words and Numbers – Combination Based on Committee, Balls and Cards – Probability Based on Persons, Balls, Cards, Dice and Coins.							
UNIT - III	SIMPLE INTEREST AND COMPOUND INTERST						(6)
Introduction to Principal, Interest and Time – Simple Interest Calculation – Compound Interest: Compounded Annually, Half-yearly and quarterly.							
UNIT - IV	LOGICAL REASONING						(6)
Syllogism – Clocks – Calendar.							
UNIT - V	VERBAL ABILITY						(6)
Tenses – Articles – Subject Verb Agreement – Error Spotting – Essay Writing.							
TOTAL: 30 PERIODS							
COURSE OUTCOMES:							
At the end of the course, the students will be able to:							
COs	Course Outcome					Cognitive Level	
CO1	Apply time and work concepts to solve problems on efficiency, wages, alternate days and pipes & cisterns, and chain rule.					Apply	
CO2	Develop problem solving on permutations, combinations, and probability involving words, objects, and standard.					Understand	
CO3	Apply concepts of principal, rate, and time to calculate simple and compound interest under various compounding periods.					Apply	
CO4	Demonstrate logical reasoning to solve problems related to syllogisms, clocks, and calendars effectively.					Understand	
CO5	Demonstrate grammatical accuracy and coherence in writing by applying rules of tenses, articles, subject-verb agreement.					Understand	


 Chairman (BoS)



TEXT BOOKS:

1. R S Aggarwal, "Quantitative Aptitude for Competitive Examinations".
2. Abhijit Guha, "Quantitative Aptitude for Competitive Examinations".
3. Nishit K. Sinha, "Logical Reasoning and Data Interpretation for CAT".
4. R.S. Agarwal, "A Modern Approach to Verbal & Non-Verbal Reasoning".
5. Wren & Martin, "High School English Grammar & Composition".

REFERENCES:

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. English for Competitive Examinations – by Edgar Thorpe & Showick Thorpe.
4. <https://prepinsta.com/>.
5. <https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm>.
6. <https://www.youtube.com/@FeelFreetoLearn/playlists>.

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	2	-	-	2	-	-	3	-	-
CO2	3	2	-	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	2	-	-	2	-	-	2	-	-	3	-	-
CO5	3	2	-	-	2	-	-	3	3	-	3	-	-
Avg.	3	2	2	-	2	-	-	2	3	-	3	-	-

Prasanna
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