



THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

Mecheri, Salem - 636 453.



Approved by AICTE, New Delhi
Affiliated to Anna University

DEPARTMENT OF CIVIL ENGINEERING



**AUTONOMOUS
CURRICULUM AND**

**UG
REGULATIONS
2024**

Academic Year 2024-25 onwards

**SYLLABUS
I-VIII
SEMESTERS**



The Kavery Engineering College

Mecheri, Mettur Tk. Salem Dt – 636 453.



(An Autonomous Institution Approved by AICTE, New Delhi & Affiliated to Anna University)

An ISO 9001:2015 certified Institution and accredited by NAAC with A+ grade.

B.E. CIVIL ENGINEERING CHOICE BASED CREDIT SYSTEM CURRICULUM FOR SEMESTER I TO VIII

(Applicable to the students admitted from the Academic year 2024-2025 onwards)

VISION

- ❖ To attain global recognition as a commendable centre for quality Civil Engineering Education and Research

MISSION

- ❖ To impart technical knowledge to the students for innovative design and construction solution providing.
- ❖ To develop the students in team work, leadership and to impart infrastructure project work skills.
- ❖ To imbibe ethical, sustainable and integrity value among students to give solutions to the global challenges.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

- ❖ Gain knowledge and skills in Civil engineering which will enable them to have a career and professional accomplishment in the public or private sector organizations
- ❖ Become consultants on complex real life Civil Engineering problems related to Infrastructure development especially housing, construction, water supply, sewerage, transport, spatial planning.
- ❖ Become entrepreneurs and develop processes and technologies to meet desired infrastructure needs of society and formulate solutions that are technically sound, Economically feasible, and socially acceptable.
- ❖ Perform investigation for solving Civil Engineering problems by conducting research using modern equipment and software tools.
- ❖ Function in multi-disciplinary teams and advocate policies, systems, processes and equipment to support Civil Engineering.

**CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.**

PROGRAMME OUTCOMES (POS)

After going through the four years of study, our graduates will exhibit ability to:

PO	Graduate Attribute	Programme Outcome
1.	Engineering knowledge	Apply math, science, and engineering fundamentals to complex problems
2.	Problem analysis	Identify and analyze complex problems using research and sustainability principles
3.	Design/development of solutions	Design systems and processes considering health, safety, Cost, culture, and environment.
4.	Conduct Investigations of Complex Problems	Use experiments, modelling, and data analysis to reach valid Conclusions.
5.	Modern Tool Usage	Apply modern tools for modelling and problem-solving, recognizing their limits
6.	Society & Environment	Assess societal, legal, and environmental impacts of Engineering solutions.
7.	Ethics	Commit to ethics, human values, diversity, and legal Compliance.
8.	Individual and team work	Work effectively as an individual and in multidisciplinary teams
9.	Communication	Communicate clearly in reports, presentations, and Documentation across diverse groups.
10.	Project management and finance	Apply management and economic principles in Projects and teamwork.
11.	Life-long learning	Engage in continuous learning, adapt to new technologies, and think critically

PROGRAM SPECIFIC OUTCOMES (PSOs)

On completion of Electronics & Communication Engineering program, the student will have the following Program Specific outcomes.

- ❖ Design, develop and analyze electronic systems through application of relevant electronics, mathematics and engineering principles.
- ❖ Design, develop and analyze communication systems through application of fundamentals from communication principles, signal processing, and RF System Design & Electromagnetics.
- ❖ Adapt to emerging electronics and communication technologies and develop innovative solutions for existing and newer problems.



CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.

THE KAVERY ENGINEERING COLLEGE, MECHERI
REGULATIONS - 2024
CHOICE BASED CREDIT SYSTEM
B.E. CIVIL ENGINEERING
CURRICULUM & SYLLABI FOR I TO VIII SEMESTERS

SEMESTER – I									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory/Theory with Practical									
UENT24101	Professional English -I	3	0	0	3	40	60	100	HSMC
UMAT24102	Matrices and Calculus	3	1	0	4	40	60	100	BSC
UPHT24103	Engineering Physics	3	0	0	3	40	60	100	BSC
UCHT24104	Engineering Chemistry	3	0	0	3	40	60	100	BSC
UPST24105	Problem Solving and Python Programming	3	0	0	3	40	60	100	ESC
UTAT24106	Heritage of Tamils/ தமிழர் மரபு	1	0	0	1	40	60	100	HSMC
Practical / Employability Enhancement									
UIPE24101	Induction Programme								MC
UPSL2413	Problem Solving and Python Programming Laboratory	0	0	4	2	60	40	100	ESC
UPCL2412	Physics and Chemistry Laboratory	0	0	4	2	60	40	100	BSC
UENL2411	English Laboratory \$	0	0	2	1	60	40	100	EEC
Total Credits to be earned					22				

SEMESTER – II									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory/Theory with Practical									
UENT24201	Professional English-II	2	0	0	2	40	60	100	HSMC
UMAT24201	Statistics and Numerical Methods	3	1	0	4	40	60	100	BSC
UPHT24201	Physics for Civil Engineering	3	0	0	3	40	60	100	BSC
UBET24201	Basic Electrical, Electronics and Instrumentation Engineering	3	0	0	3	40	60	100	ESC
UGET24201	Engineering Graphics	2	0	4	4	50	50	100	ESC
UTAT24201	Tamils and Technology / தமிழரும் தொழில்நுட்பமும்	1	0	0	1	40	60	100	HSMC
UNCC24001	NSS/YRC/Sports/Clubs	0	0	2	0	0	0	0	-
Practical / Employability Enhancement									
UGEL24201	Engineering Practices Laboratory	0	0	4	2	60	40	100	ESC
UBEL24201	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	0	0	4	2	60	40	100	ESC
UGEL24202	Communication Laboratory / Foreign Language \$	0	0	4	2	60	40	100	EEC
Total Credits to be earned					23				

\$ Skill Based Course

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.

SEMESTER – III										
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category	
		L	T	P		CA	ESE	Total		
Theory										
UMAT24301	Transforms and Partial Differential Equations	3	1	0	4	40	60	100	HSMC	
UMET24301	Engineering Mechanics	3	0	0	3	40	60	100	ESC	
UCET24301	Water supply and Waste water Engineering	3	0	0	3	40	60	100	PCC	
UCET24302	Mechanics of Fluids	3	0	0	3	40	60	100	PCC	
Theory with Practical										
UCETL24301	Advanced Surveying	3	0	2	4	50	50	100	PCC	
UCETL24302	Construction Materials and Technology	3	0	2	4	50	50	100	PCC	
Practical / Employability Enhancement										
UCEL24301	Water and Waste water Analysis Laboratory	0	0	4	2	60	40	100	PCC	
USD24301	Soft Skill 1	2	0	0	0	100	-	100	MC	
Total Credits to be earned					23					

SEMESTER – IV									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory									
UCET24401	Applied Hydraulic Engineering	3	1	0	4	40	60	100	PCC
UCET24402	Strength of Materials	3	0	0	3	40	60	100	PCC
UCET24403	Highway and Railway Engineering	3	0	0	3	40	60	100	PCC
UCET24404	Advanced Construction Techniques and Practices	3	0	0	3	40	60	100	PCC
UESST24401	Environmental Sciences and Sustainability	2	0	0	2	40	60	100	BSC
Theory with Practical									
UCETL24401	Soil Mechanics Engineering	3	0	2	4	50	50	100	PCC
Practical / Employability Enhancement									
UCEL24401	Building Drawing and Detailing Laboratory	0	0	4	2	60	40	100	PCC
UCEL24402	Hydraulic Engineering Laboratory	0	0	4	2	60	40	100	PCC
USD24401	Soft Skills 2	2	0	0	0	100	-	100	MC
Total Credits to be earned					23				


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.

SEMESTER – V									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory									
UCET24501	Design of Reinforced Concrete Structural Elements	3	0	0	3	40	60	100	PCC
UCET24502	Structural Analysis - I	3	0	0	3	40	60	100	PCC
UCET24503	Foundation Engineering	3	0	0	3	40	60	100	PCC
	Professional Elective I	3	0	0	3	40	60	100	PEC
	Professional Elective II	3	0	0	3	40	60	100	PEC
	Professional Elective III	3	0	0	3	40	60	100	PEC
	Mandatory Course-I	2	0	0	0	100	-	100	MC
Practical / Employability Enhancement									
UCEL24501	Highway Engineering Laboratory	0	0	4	2	60	40	100	PCC
UCEL24502	Survey Camp (2 Weeks) [#]	0	0	0	1	60	40	100	EEC
USD24501	Soft Skill 3	2	0	0	0	100	-	100	MC
UIDL24001	Idea Lab	0	0	2	1	100	-	100	EEC
Total Credits to be earned					22				

Two weeks Survey Camp carries one credit and it will be done during IV semester vacation and same will be evaluated in V semester.

SEMESTER – VI									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory									
UCET24601	Design of Steel Structures	3	1	0	4	40	60	100	PCC
UCET24602	Structural Analysis – II	3	0	0	3	40	60	100	PCC
UCET24603	Environmental Impact Assessment	3	0	0	3	40	60	100	PCC
	Professional Elective IV	3	0	0	3	40	60	100	PEC
	Open Elective -I	3	0	0	3	40	60	100	OEC
Theory with Practical									
UCETL24601	Irrigation Engineering and Drawing	3	0	2	4	50	50	100	PCC
	Mandatory Course - II	2	0	0	0	100	-	100	MC
Practical / Employability Enhancement									
UCEL24601	Computer Analysis in Structural Engineering Laboratory	0	0	4	2	60	40	100	PCC
USD24601	Soft Skill 4	2	0	0	0	100	-	100	EEC
Total Credits to be earned					22				


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.

SEMESTER – VII									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory/Theory with Practical									
UCET24701	Hydrology	3	0	0	3	40	60	100	PCC
UCET24702	Estimation and Costing	3	0	0	3	40	60	100	PCC
UGET24707	Human Values and Ethics	3	0	0	2	40	60	100	HSMC
UGET24702	Total Quality and Management	3	0	0	3	40	60	100	HSMC
	Professional Elective V	3	0	0	3	40	60	100	PEC
	Open Elective -II	3	0	0	3	40	60	100	OEC
Practical / Employability Enhancement									
UCEL24701	Creative and Innovative Project	0	0	4	2	60	40	100	EEC
USI24701	Summer Internship - II #	0	0	2	1	100	-	100	EEC
Total Credits to be earned					20				

Two weeks internship carries one credit and it will be done during VI semester vacation and same will be evaluated in VII semester.

SEMESTER – VIII									
Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Theory/Theory with Practical									
	Professional Elective VI	3	0	0	3	40	60	100	PEC
	Open Elective -III	3	0	0	3	40	60	100	OEC
Practical / Employability Enhancement									
UCEL24801	Project Work / Internship	0	0	20	10	60	40	100	EEC
Total Credits to be earned					16				

MANDATORY COURSES

S.No	Course Code	Course Title	Category	Periods per Week			Total Contact periods	Credits
				L	T	P		
1	UMCT24001	Disaster Risk Reduction and Management	MC	2	0	0	2	0
2	UMCT24002	Elements of Literature	MC	2	0	0	2	0
3	UMCT24003	Film Appreciation	MC	2	0	0	2	0
4	UMCT24004	Introduction to Gender Studies	MC	2	0	0	2	0
5	UMCT24005	Industrial Safety	MC	2	0	0	2	0
6	UMCT24006	Interpersonal Skills	MC	2	0	0	2	0
7	UMCT24007	Personality and Character Development	MC	2	0	0	2	0
8	UMCT24008	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	MC	2	0	0	2	0


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.

PROFESSIONAL ELECTIVES (PEC)

Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
STREAM –I (Structures)									
UCEPE2401	Advanced Concrete Structures	3	0	0	3	40	60	100	PEC
UCEPE2402	Prefabricated Structures	3	0	0	3	40	60	100	PEC
UCEPE2403	Prestressed Concrete Structures	3	0	0	3	40	60	100	PEC
UCEPE2404	Rehabilitation/Heritage Restoration	3	0	0	3	40	60	100	PEC
UCEPE2405	Introduction to Finite Element Method	3	0	0	3	40	60	100	PEC
UCEPE2406	Dynamics and Earthquake Resistant Structures	3	0	0	3	40	60	100	PEC
STREAM –II (Construction Techniques)									
UCEPE2407	Formwork Engineering	3	0	0	3	40	60	100	PEC
UCEPE2408	Construction Equipment and Machinery	3	0	0	3	40	60	100	PEC
UCEPE2409	Sustainable and Lean Construction	3	0	0	3	40	60	100	PEC
UCEPE2410	Digitalized Construction Lab	0	0	6	3	50	50	100	PEC
UCEPE2411	Construction Management and Safety	2	0	2	3	50	50	100	PEC
UCEPE2412	Construction Planning and Scheduling	3	0	0	3	40	60	100	PEC
STREAM –III (Geotechnical)									
UCEPE2413	Geo Environmental Engineering	3	0	0	3	40	60	100	PEC
UCEPE2414	Soil Dynamics and Machine Foundations	3	0	0	3	40	60	100	PEC
UCEPE2415	Earth Retaining Structures	3	0	0	3	40	60	100	PEC
UCEPE2416	Remote Sensing Techniques and GIS	3	0	0	3	40	60	100	PEC
UCEPE2417	Satellite Image Processing	3	0	0	3	40	60	100	PEC
UCEPE2418	Hydrographic Surveying	3	0	0	3	40	60	100	PEC
STREAM –IV (Environmental)									
UCEPE2419	Natural Disaster Mitigation and Management	3	0	0	3	40	60	100	PEC
UCEPE2420	Air and Noise Pollution Control Engineering	3	0	0	3	40	60	100	PEC
UCEPE2421	Industrial Wastewater Management	3	0	0	3	40	60	100	PEC
UCEPE2422	Solid and Hazardous Waste Management	3	0	0	3	40	60	100	PEC
UCEPE2423	Environmental Policy and Legislations	3	0	0	3	40	60	100	PEC
UCEPE2424	Environmental Health and Safety	3	0	0	3	40	60	100	PEC


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.

OPEN ELECTIVES (OEC)
Open Elective courses offered by Civil Engineering to other branches

Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
UCEOE2401	Architectural Heritage of India	3	0	0	3	40	60	100	OEC
UCEOE2402	Building Planning and Construction	3	0	0	3	40	60	100	OEC
UCEOE2403	Elementary Civil Engineering	3	0	0	3	40	60	100	OEC
UCEOE2404	Energy and Environment	3	0	0	3	40	60	100	OEC
UCEOE2405	Global Warming and Climate Change	3	0	0	3	40	60	100	OEC
UCEOE2406	Introduction to Disaster Management and Mitigation	3	0	0	3	40	60	100	OEC

List of Open Elective courses offered by Other Engineering Courses for Civil Branches
(OPEN ELECTIVES – I, II & III)

Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Category
		L	T	P		CA	ESE	Total	
Agricultural Engineering									
UAIOE2401	Introduction to Food processing	3	0	0	3	40	60	100	OEC
UAIOE2402	Traditional Indian Foods	3	0	0	3	40	60	100	OEC
UAIOE2403	Fundamentals of Food Engineering	3	0	0	3	40	60	100	OEC
UAIOE2404	Remote Sensing Concepts	3	0	0	3	40	60	100	OEC
UAIOE2405	Basics of Integrated Water Resources Management	3	0	0	3	40	60	100	OEC
Biomedical Engineering									
UBMOE2401	Basics of Microbial Technology	3	0	0	3	40	60	100	OEC
UBMOE2402	Radiological Equipment	3	0	0	3	40	60	100	OEC
UBMOE2403	Fundamentals of Cell and Molecular Biology	3	0	0	3	40	60	100	OEC
UBMOE2404	Human Physiology	3	0	0	3	40	60	100	OEC
UBMOE2405	Lifestyle Diseases	3	0	0	3	40	60	100	OEC
UBMOE2406	Pathology and Microbiology	3	0	0	3	40	60	100	OEC
UBMOE2407	Medical Electronics	3	0	0	3	40	60	100	OEC
UBMOE2408	Assist Devices	3	0	0	3	40	60	100	OEC
Chemical Engineering									
UCHOE2401	Nanomaterials and applications.	3	0	0	3	40	60	100	OEC
UCHOE2402	Polymer Technology	3	0	0	3	40	60	100	OEC
UCHOE2403	Enzyme engineering	3	0	0	3	40	60	100	OEC
UCHOE2404	Bio Energy Resources	3	0	0	3	40	60	100	OEC
UCHOE2405	Chemical Process Safety	3	0	0	3	40	60	100	OEC


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.

Computer Science and Engineering									
UCSOE2401	Introduction to C Programming	2	0	2	3	50	50	100	OEC
UCSOE2402	Introduction to Data Structures	2	0	2	3	50	50	100	OEC
UCSOE2403	Data Science Fundamentals	2	0	2	3	50	50	100	OEC
UCSOE2404	Introduction of Data Analytics	2	0	2	3	50	50	100	OEC
UCSOE2405	Artificial Intelligence and Machine Learning Fundamentals	2	0	2	3	50	50	100	OEC
UCSOE2406	IoT Concepts and Applications	2	0	2	3	50	50	100	OEC
Electronics and Communication Engineering									
UECOE2401	Industrial Electronics	3	0	0	3	40	60	100	OEC
UECOE2402	Image Processing and Computer Vision	3	0	0	3	40	60	100	OEC
UECOE2403	4G/5G Communication Networks	3	0	0	3	40	60	100	OEC
UECOE2404	Wireless Communication	3	0	0	3	40	60	100	OEC
UECOE2405	Embedded and Real Time Systems	3	0	0	3	40	60	100	OEC
UECOE2406	Robotics and its Industrial Application	3	0	0	3	40	60	100	OEC
UECOE2407	Industrial IoT	3	0	0	3	40	60	100	OEC
UECOE2408	Sensors and Transducers	3	0	0	3	40	60	100	OEC
UECOE2409	Space Science	3	0	0	3	40	60	100	OEC
Electrical and Electronic Engineering									
UEEOE2401	Electrical safety	3	0	0	3	40	60	100	OEC
UEEOE2402	Introduction to Electrical Machines	3	0	0	3	40	60	100	OEC
UEEOE2403	Electric Energy Generation, Utilization and Conservation.	3	0	0	3	40	60	100	OEC
UEEOE2404	Power Electronics and Drives	3	0	0	3	40	60	100	OEC
UEEOE2405	Electrical Estimation and Costing	3	0	0	3	40	60	100	OEC
UEEOE2406	Basics of Electrical Measurements and Instrumentation	3	0	0	3	40	60	100	OEC
UEEOE2407	Introduction to Control Engineering	3	0	0	3	40	60	100	OEC
UEEOE2408	Fundamentals of Electrical Drives and Control	3	0	0	3	40	60	100	OEC
UEEOE2409	Energy Conservation and Management	3	0	0	3	40	60	100	OEC
UEEOE2410	Automotive Electrical and Electronics Engineering	3	0	0	3	40	60	100	OEC
UEEOE2411	Introduction to Embedded Systems	3	0	0	3	40	60	100	OEC
Mechanical Engineering									
UMEOE2401	Reverse Engineering	2	0	2	3	50	50	100	OEC
UMEOE2402	Non - Destructive Testing	2	0	2	3	50	50	100	OEC
UMEOE2403	Additive Manufacturing Technology	2	0	2	3	50	50	100	OEC
UMEOE2404	Energy Technology	3	0	0	3	40	60	100	OEC
UMEOE2405	Renewable Energy Technologies	3	0	0	3	40	60	100	OEC
UMEOE2406	Introduction to Industrial Engineering	3	0	0	3	40	60	100	OEC
UMEOE2407	Fiber Reinforced Plastics	3	0	0	3	40	60	100	OEC
UMEOE2408	NANO Technology and its Applications	3	0	0	3	40	60	100	OEC

CREDITS SUMMARY

S.NO	CATEGORY	TOTAL CREDITS								PERCENTAGE	
		I	II	III	IV	V	VI	VII	VIII		
1.	HSMC	4	3	4	2			5		18	10.53%
2.	BSC	12	7	3						22	12.87%
3.	ESC	5	11							16	9.36%
4.	PCC			16	21	11	16	6		70	40.94%
5.	PEC					9	3	3	3	18	10.53%
6.	OEC						3	3	3	9	5.26%
7.	EEC	1	2			2		3	10	18	10.53%
8.	MC (Non Credit)			√	√	√	√				
TOTAL		22	23	23	23	22	22	20	16	171	100%

HSMC – Humanities, Social Sciences and Management Courses
 BSC – Basic Sciences Courses
 ESC – Engineering Sciences Course
 PCC – Professional Core Courses
 PEC – Professional Elective Courses
 OEC – Open Elective Courses
 EEC – Employment Enhancement Course
 MC – Mandatory course


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UENT24101	PROFESSIONAL ENGLISH - I	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To improve the communicative competence of learners • To learn to use basic grammatic structures in suitable contexts • To acquire lexical competence and use them appropriately in a sentence and understand their meaning in a text • To help learners use language effectively in professional contexts • To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.					

Unit-I	INTRODUCTION TO EFFECTIVE COMMUNICATION	(1)
What is effective communication? (Explain using activities) Why is communication critical for excellence during study, research and work? What are the seven C's of effective communication? What are key language skills? What is effective listening? What does it involve? What is effective speaking? What does it mean to be an excellent reader? What should you be able to do? What is effective writing? How does one develop language and communication skills? What does the course focus on? How are communication and language skills going to be enhanced during this course? What do you as a learner need to do to enhance your English language and communication skills to get the best out of this course?		
Unit-I	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION	(8)
Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself. Grammar - Present Tense (simple and progressive); Question types: Why/ Yes or No/ and Tags. Vocabulary - Synonyms; One word substitution; Abbreviations & Acronyms (as used in technical contexts).		
Unit-II	NARRATION AND SUMMATION	(9)
Reading - Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. Writing - Guided writing-- Paragraph writing Short Report on an event (field trip etc.) Grammar -Past tense (simple); Subject-Verb Agreement; and Prepositions. Vocabulary - Word forms (prefixes& suffixes); Synonyms and Antonyms. Phrasal verbs.		
Unit-III	DESCRIPTION OF A PROCESS / PRODUCT	(9)
Reading - Reading advertisements, gadget reviews; user manuals. Writing - Writing definitions; instructions; and Product /Process description. Grammar - Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses. Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words).		



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Unit-IV	CLASSIFICATION AND RECOMMENDATIONS	(9)
Reading – Newspaper articles; Journal reports –and Non Verbal Communication (tables, pie charts etc.). Writing – Note-making / Note-taking (*Study skills to be taught, not tested); Writing recommendations; Transferring information from non verbal (chart , graph etc, to verbal mode) Grammar – Articles; Pronouns - Possessive & Relative pronouns. Vocabulary - Collocations; Fixed / Semi fixed expressions		
Unit-V	EXPRESSION	(9)
Reading – Reading editorials; and Opinion Blogs; Writing – Essay Writing (Descriptive or narrative). Grammar – Future Tenses, Punctuation; Negation (Statements & Questions); and Simple, Compound & Complex Sentences. Vocabulary - Cause & Effect Expressions – Content vs Function words.		
Total No of Periods to be Taught		45 Periods

TEXT BOOK:

1	English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 edition)
2	English for Science & Technology Cambridge University Press, 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Jeevani, Department of English, Anna University.

REFERENCES:

1	Technical Communication – Principles And Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2	A Course Book On Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.
3	English For Technical Communication (With CD) By Aysha Viswamohan, Mcgraw Hill Education, ISBN : 0070264244.
4	Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
5	Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.

COURSE OUTCOMES:

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

CO1:	To use appropriate words in a professional context
CO2:	To gain understanding of basic grammatical structures and use them in right context.
CO3:	To read and infer the denotative and connotative meanings of technical texts
CO4:	To read and interpret information presented in tables, charts and other graphic forms
CO5:	To write definitions, descriptions, narrations and essays on various topics

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	3	3	3	1	3	-	-	-	-
CO2	1	1	1	1	1	3	3	3	1	3	-	-	-	-
CO3	2	3	2	3	2	3	3	3	2	3	3	-	-	-
CO4	2	3	2	3	2	3	3	3	2	3	3	-	-	-
CO5	2	3	3	3	-	3	3	3	2	3	-	-	-	-
Avg.	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMAT24102	MATRICES AND CALCULUS	L	T	P	C	100
		3	1	0	4	
Course Objectives	- To develop the use of matrix algebra techniques that is needed by engineers for practical applications. - To familiarize the students with differential calculus. - To familiarize the student with functions of several variables. This is needed in many branches of engineering. - To make the students understand various techniques of integration. - To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.					

Unit-I	MATRICES	(9+3)
Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications : Stretching of an elastic membrane.		
Unit-II	DIFFERENTIAL CALCULUS	(9+3)
Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications : Maxima and Minima of functions of one variable.		
Unit-III	FUNCTIONS OF SEVERAL VARIABLES	(9+3)
Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications : Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.		
Unit-IV	INTEGRAL CALCULUS	(9+3)
Definite and Indefinite integrals - Substitution rule - Techniques of Integration : Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications : Hydrostatic force and pressure, moments and centres of mass.		
Unit-V	MULTIPLE INTEGRALS	(9+3)
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals – Applications : Moments and centres of mass, moment of inertia.		
Total No of Periods to be Taught		60

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2	Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.
3	James Stewart, "Calculus : Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

REFERENCES:

1	Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016
2	Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
3	Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.
4	Narayanan. S. and Manicavachagom Pillai. T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
5	Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
6	Srimantha Pal and Bhunia. S.C, " Engineering Mathematics " Oxford University Press, 2015.
7	Thomas. G. B., Hass. J, and Weir. M.D, " Thomas Calculus ", 14th Edition, Pearson India, 2018.

COURSE OUTCOMES:

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

CO1:	Use the matrix algebra methods for solving practical problems.
CO2:	Apply differential calculus tools in solving various application problems
CO3:	Able to use differential calculus ideas on several variable functions.
CO4:	Apply different methods of integration in solving practical problems.
CO5:	Apply multiple integral ideas in solving areas, volumes and other practical problems.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	1	1	0	0	0	0	2	0	2	-	-	-
CO2	3	3	1	1	0	0	0	0	2	0	2	-	-	-
CO3	3	3	1	1	0	0	0	0	2	0	2	-	-	-
CO4	3	3	1	1	0	0	0	0	2	0	2	-	-	-
CO5	3	3	1	1	0	0	0	0	2	0	2	-	-	-
Avg.	3	3	1	1	0	0	0	0	2	0	2	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UPHT24103	ENGINEERING PHYSICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To make the students effectively to achieve an understanding of mechanics. • To enable the students to gain knowledge of electromagnetic waves and its applications. • To introduce the basics of oscillations, optics and lasers. • Equipping the students to be successfully understand the importance of quantum physics. • To motivate the students towards the applications of quantum mechanics.					

Unit-I	MECHANICS	(9)
Multiparticle dynamics: Center of mass (CM) – CM of continuous bodies – motion of the CM – kinetic energy of system of particles. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M .I –moment of inertia of continuous bodies – M.I of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope - torsional pendulum – double pendulum – Introduction to nonlinear oscillations.		
Unit-II	ELECTROMAGNETIC WAVES	(9)
The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, Conditions on the wave field - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - polarization - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, waves from localized sources, momentum and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium-vacuum interface for normal incidence.		
Unit-III	OSCILLATIONS, OPTICS AND LASERS	(9)
Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect. Reflection and refraction of light waves - total internal reflection - interference –Michelson interferometer –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, CO ₂ laser, semiconductor laser –Basic applications of lasers in industry.		
Unit-IV	BASIC QUANTUM MECHANICS	(9)
Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle.		
Unit-V	APPLIED QUANTUM MECHANICS	(9)
The harmonic oscillator(qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope - Resonant diode - Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Basics of Kronig-Penney model and origin of energy bands.		
Total No of Periods to be Taught		45 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	D.Kleppner and R.Kolenkow. An Introduction to Mechanics. McGraw Hill Education (Indian Edition), 2017.
2	E.M.Purcell and D.J.Morin, Electricity and Magnetism, Cambridge Univ.Press, 2013.
3	Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw- Hill (Indian Edition), 2017.

REFERENCES:

1	R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition), 2009.
2	Paul A. Tipler, Physic – Volume 1 & 2, CBS, (Indian Edition), 2004.
3	K.Thyagarajan and A.Ghatak. Lasers: Fundamentals and Applications, Laxmi Publications, (Indian Edition), 2019.

COURSE OUTCOMES:

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

CO1:	Understand the importance of mechanics.
CO2:	Express their knowledge in electromagnetic waves.
CO3:	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO4:	Understand the importance of quantum physics.
CO5:	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	1	-	-	-	-	-	-	-	-
CO2	3	3	2	1	2	1	-	-	-	-	-	-	-	-
CO3	3	3	2	2	2	1	-	-	-	-	-	-	-	-
CO4	3	3	1	1	2	1	-	-	-	-	-	-	-	-
CO5	3	3	1	1	2	1	-	-	-	-	-	-	-	-
Avg.	3	3	1.6	1.2	1.8	1	-	-	-	-	-	-	-	-


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCHT24104	ENGINEERING CHEMISTRY	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To inculcate sound understanding of water quality parameters and water treatment techniques. • To impart knowledge on the basic principles and preparatory methods of nanomaterials. • To introduce the basic concepts and applications of phase rule and composites. • To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics. • To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.					

Unit-I	WATER AND ITS TREATMENT	(9)
Water: Sources and impurities, Water quality parameters: Definition and significance of-colour, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, fluoride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralisation and zeolite process.		
Unit-II	NANOCHEMISTRY	(9)
Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials: Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.		
Unit-III	PHASE RULE AND COMPOSITES	(9)
Phase rule: Introduction, definition of terms with examples. One component system - water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Thermal analysis; Two component system: lead-silver system - Pattinson process. Composites: Introduction: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites - definition and examples.		


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Unit-IV	FUELS AND COMBUSTION	(9)
Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil - cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. CO₂ emission and carbon foot print.		
Unit-V	ENERGY SOURCES AND STORAGE DEVICES	(9)
Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy; Batteries: Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion-battery; Electric vehicles-working principles; Fuel cells: H ₂ -O ₂ fuel cell, microbial fuel cell; Supercapacitors: Storage principle, types and examples.		
Total No of Periods to be Taught		Total: 45 periods

TEXT BOOK:	
1	P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, DhanpatRai Publishing Company (P) Ltd, New Delhi, 2018.
2	Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3	S.S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCES:	
1	B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2	O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3	Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
4	Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5	O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO2:	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO3:	To apply the knowledge of phase rule and composites for material selection requirements.
CO4:	To recommend suitable fuels for engineering processes and applications.
CO5:	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	2	2	1	-	1	1	-	-	-	-	1	-	-
CO2	2	-	-	1	-	2	2	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	1	1	-	-	1	2	-	-	-	-	-	-	-
CO5	3	1	2	1	-	2	2	-	-	-	-	2	-	-
Avg.	2.8	1.3	1.6	1	-	1.5	1.8	-	-	-	-	1.5	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CSE	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester-I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UPST24105	PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To understand the basics of algorithmic problem solving. - To learn to solve problems using Python conditionals and loops. - To define Python functions and use function calls to solve problems. - To use Python data structures - lists, tuples, dictionaries to represent complex data. - To do input/output with files in Python.					

Unit-I	COMPUTATIONAL THINKING AND PROBLEM SOLVING	(9)
Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.		
Unit-II	DATA TYPES, EXPRESSIONS, STATEMENTS	(9)
Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.		
Unit-III	CONTROL FLOW, FUNCTIONS, STRINGS	(9)
Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-Elif else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.		
Unit-IV	LISTS, TUPLES, DICTIONARIES	(9)
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation		
Unit-V	FILES, MODULES, PACKAGES	(9)
Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).		
Total No of Periods to be Taught		TOTAL: 45 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:	
1	Allen B. Downey, "Think Python : How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2	Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and programming", 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCES:	
1	Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2	G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3	John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data,,Third Edition, MIT Press 2021

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	Develop algorithmic solutions to simple computational problems.
CO2:	Develop and execute simple Python programs.
CO3:	Write simple Python programs using conditionals and looping for solving problems.
CO4:	Decompose a Python program into functions.
CO5:	Represent compound data using Python lists, tuples, dictionaries etc.
CO6:	Read and write data from/to files in Python programs

Mapping of COs with POs and PSOs														
Cos / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO 2	PSO 3
CO1	3	3	3	3	2	-	-	-	-	2	2	3	3	-
CO2	3	3	3	3	2	-	-	-	-	2	2	3	-	-
CO3	3	3	3	3	2	-	-	-	-	2	-	3	-	-
CO4	2	2	-	2	2	-	-	-	-	1	-	3	-	-
CO5	1	2	-	-	1	-	-	-	-	1	-	2	-	-
CO6	2	2	-	-	2	-	-	-	-	1	-	2	-	-
Avg.	2	3	3	3	2	-	-	-	-	2	2	3	3	-
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UTAT24106	HERITAGE OF TAMIL	L	T	P	C	100
		1	0	0	1	
COURSE OBJECTIVES	• Understanding Sangam literature • Learning about the heritage of Tamil culture and the importance of rock art • Being able to recognize and identify the folk and martial art forms of Tamils • Understanding the principles of the Tamils • Understanding the contribution of Tamils to the Indian national movement and Indian culture					

UNIT 1	LANGUAGE AND LITERATURE	(3)
Language Families in India - Dravidian Languages –Tamil Classical Language - Classical Literature inTamil–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 2	HERITAGE – ROCK ART PAINTINGS TO MODERN ART–SCULPTURE	(3)
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 3	FOLK AND MARTIAL ARTS	(3)
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.		
UNIT 4	THINAI CONCEPT OF TAMILS	(3)
FloraandFaunaofTamils&AhamandPuramConceptfromTholkappiyamandSangamLiterature-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 5	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	(3)
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 No of Periods to be Taught		Total: 15 periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	1. தமிழக வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும் கல்வியியல் பணிகள்கழகம்).
2	கணினித்தமிழ் - முனைவர் இல, சுந்தரம். (விகடன் பிரசுரம்).
3	கீழடி - வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம் (தொல்லியல்துறை வெளியீடு)
4	பொருநை - ஆற்றங்கரை நாகரிகம், (தொல்லியல்துறை வெளியீடு)
5	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

REFERENCES:

1	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB& ESCandRMRL-(in print)
2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
3	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
5	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

COURSE OUTCOMES:

பாடநெறியின் முடிவில் மாணவர்கள்

CO1:	Gain The Knowledge About Various Literatures Of Tamil
CO2:	Learn The Uniqueness Of Tamil Cultural Heritage
CO3:	Find Various Art Forms Of Tamil Nadu
CO4:	Understand The Thina Cocept In Tamil
CO5:	Distinguish The Contribution Of Tamils To Indian National Movement And Indian Culture



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO2	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO3	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO4	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO5	-	-	-	-	-	1	1	-	-	1	-	1	-	-
Avg.	-	-	-	-	-	1	1	-	-	1	-	1	-	-
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy														


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name				Common to All
Semester I						
Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UTAT24106	தமிழர் மரபு	L	T	P	C	100
		1	0	0	1	
பாடநெறி நோக்கங்கள்	- சங்க இலக்கியத்தை புரிந்து கொள்ளுதல் - தமிழ் கலாச்சாரத்தின் பாரம்பரியத்தையும் மற்றும் பாறை ஓவியத்தின் சிறப்பினையும் கற்றுத் தெளிதல் - தமிழர்களின் நாட்டுப்புற மற்றும் தற்காப்பு கலை வடிவங்களை அங்கீகரிக்கவும் அடையாளம் காண முடியும் - தமிழர்களின் திணைக் கோட்பாடுகள் உணர்தல் - இந்திய தேசிய இயக்கம் மற்றும் இந்திய கலாச்சாரத்திற்கு தமிழர்களின் பங்களிப்பை புரிதல்					

அலகு 1	மொழி மற்றும் இலக்கியம்	(3)
இந்திய மொழிக்குடும்பங்கள் - திராவிடமொழிகள் - தமிழ் ஒரு செம்மொழி தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம். ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிறுநிலக்கியங்கள் -தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.		
அலகு 2	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை சிற்பக்கலை	(3)
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் நாட்டுப்புறத் தெய்வங்கள் - குமரி முனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு		
அலகு 3	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	(3)
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஓயிலாட்டம். தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.		

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



அலகு 4	தமிழர்களின் திணைக் கோட்பாடுகள்	(3)
தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள் – சங்ககால நகரங்களும் துறை முகங்களும், சங்க கால தமிழர்களின் எழுத்தறிவும் கல்வி அறிவும் மற்றும் சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி		
அலகு 5	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	(3)
இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் சுயமரியாதை இயக்கம் இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு- கல்வெட்டு மற்றும் எழுத்துப் படிகள் தமிழ்ப்புத்தகங்களின் அச்ச வரலாறு.		
Total No of Periods to be Taught		Total: 15 periods

TEXT BOOK:

1	தமிழக வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும் கல்வியியல்பணிகள் கழகம்).
2	கணினித்தமிழ் – முனைவர் இல, சுந்தரம். (விகடன் பிரசுரம்).
3	கீழடி – வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம் (தொல்லியல்துறை வெளியீடு)
4	பொருநை - ஆற்றங்கரை நாகரிகம், (தொல்லியல்துறை வெளியீடு)
5	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

REFERENCES:

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.Singaravelu) (Published by: International Institute of Tamil Studies).
3	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
5	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

பாடநெறியின் முடிவில் மாணவர்கள்

CO1:	தமிழ் இலக்கியங்களைப் பற்றிய அறிவைப் பெற முடியும்
CO2:	தமிழ் கலாச்சார பாரம்பரியத்தின் தனித்துவத்தைக் கற்றுக்கொள்ள முடியும்
CO3:	தமிழ்நாட்டின் பல்வேறு கலை வடிவங்களைக் கண்டறிதல்
CO4:	தமிழில் தினை கொள்கையைப் புரிந்துகொள்ளவும் முடியும்
CO5:	இந்திய தேசிய இயக்கத்திற்கும் இந்திய கலாச்சாரத்திற்கும் தமிழின் பங்களிப்பை அறிதல்

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO2	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO3	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO4	-	-	-	-	-	1	1	-	-	1	-	1	-	-
CO5	-	-	-	-	-	1	1	-	-	1	-	1	-	-
Avg.	-	-	-	-	-	1	1	-	-	1	-	1	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CSE	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UPSL2413	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• To understand the problem solving approaches. • To learn the basic programming constructs in Python. • To practice various computing strategies for Python-based solutions to real world problems. • To use Python data structures - lists, tuples, dictionaries. • To do input/output with files in Python.					

List of Exercises/Experiments	
1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)	
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).	
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)	
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building –operations of list & tuples)	
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)	
6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)	
7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)	
8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)	
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)	
10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)	
11. Exploring Pygame tool.	
12. Developing a game activity using Pygame like bouncing ball, car race etc.	
Total No of Periods to be Taught	60 Periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Develop algorithmic solutions to simple computational problems
CO2:	Develop and execute simple Python programs
CO3:	Implement programs in Python using conditionals and loops for solving problems.
CO4:	Deploy functions to decompose a Python program
CO5:	Process compound data using Python data structures.
CO6:	Utilize Python packages in developing software applications.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	ANACONDA JUPITER SOFTWARE	30
2	WINDOWS 10 OS, 6GB RAM	

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	-	2	2	3	3	-
CO2	3	3	3	3	2	-	-	-	-	2	2	3	-	-
CO3	3	3	3	3	2	-	-	-	-	2	-	3	-	-
CO4	2	2	-	2	2	-	-	-	-	1	-	3	-	-
CO5	1	2	-	-	1	-	-	-	-	1	-	2	-	-
CO6	2	2	-	-	2	-	-	-	-	1	-	2	-	-
Avg.	2	3	3	3	2	-	-	-	-	2	2	3	3	-
1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UPCL2412	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C	100
		0	0	4	2	

PHYSICS LABORATORY : (Any Seven Experiments)

Course Objectives	- To learn the proper use of various kinds of physics laboratory equipment. - To learn how data can be collected, presented and interpreted in a clear and concise manner. - To learn problem solving skills related to physics principles and interpretation of experimental data. - To determine error in experimental measurements and techniques used to minimize such error. - To make the student as an active participant in each part of all lab exercises.
-------------------	---

List of Exercises / Experiments

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.	
2. Simple harmonic oscillations of cantilever.	
3. Non-uniform bending - Determination of Young's modulus	
4. Uniform bending – Determination of Young's modulus	
5. Laser- Determination of the wave length of the laser using grating	
6. Air wedge - Determination of thickness of a thin sheet/wire	
7. a) Optical fibre -Determination of Numerical Aperture and acceptance angle b) Compact disc- Determination of width of the groove using laser.	
8 .Acoustic grating- Determination of velocity of ultrasonic waves in liquids.	
9. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids	
10. Post office box -Determination of Band gap of a semiconductor.	
11. Photoelectric effect.	
12. Michelson Interferometer.	
13. Melde's string experiment	
14. Experiment with lattice dynamics kit.	
Total No of Periods to be Taught	30 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Understand the functioning of various physics laboratory equipment.
CO2:	Use graphical models to analyze laboratory data.
CO3:	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO4:	Access, process and analyze scientific information.
CO5:	Solve problems individually and collaboratively.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Torsional pendulum with accessories	5
2.	Simple harmonic oscillations of cantilever with accessories	5
3.	Non-uniform bending - Young's modulus with accessories	5
4.	Laser- Determination of the wave length of the laser using grating with accessories	5
5.	Air wedge with accessories	5
6.	Optical fibre with accessories Compact disc with accessories	5
7.	Ultrasonic interferometer	5

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	3	1	1	-	-	-	-	-	-	-	-
CO2	3	3	2	1	1	-	-	-	-	-	-	-	-
CO3	3	2	3	1	1	-	-	-	-	-	-	-	-
CO4	3	3	2	1	1	-	-	-	-	-	-	-	-
CO5	3	2	3	1	1	-	-	-	-	-	-	-	-
Avg.	3	2.4	2.6	1	1								
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy													


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UPCL2412	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C	100
		0	0	4	2	

CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

Course Objectives	- To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper. - To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions. - To demonstrate the analysis of metals and alloys. - To demonstrate the synthesis of nanoparticles
-------------------	---

List of Exercises/Experiments			
1	Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard		
2.	Determination of types and amount of alkalinity in water sample. Split the first experiment into two		
3.	Determination of total, temporary & permanent hardness of water by EDTA method.		
4.	Determination of DO content of water sample by Winkler's method.		
5.	Determination of chloride content of water sample by Argentometric method.		
6.	Estimation of copper content of the given solution by Iodometry.		
7.	Estimation of TDS of a water sample by gravimetry.		
8.	Determination of strength of given hydrochloric acid using pH meter.		
9.	Determination of strength of acids in a mixture of acids using conductivity meter.		
10.	Conductometric titration of barium chloride against sodium sulphate (precipitation titration) .		
11.	Estimation of iron content of the given solution using potentiometer		
12.	Estimation of sodium /potassium present in water using flame photometer.		
13.	Preparation of nanoparticles ($\text{TiO}_2/\text{ZnO}/\text{CuO}$) by Sol-Gel method		
14.	Estimation of Nickel in steel.		
15.	Proximate analysis of Coal		
<table> <tr> <td>Total No of Periods to be Taught</td><td>Total: 30 periods</td></tr> </table>		Total No of Periods to be Taught	Total: 30 periods
Total No of Periods to be Taught	Total: 30 periods		



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
CO2:	To determine the amount of metal ions through volumetric and spectroscopic techniques
CO3:	To analyse and determine the composition of alloys.
CO4:	To learn simple method of synthesis of nanoparticles.
CO5:	To quantitatively analyse the impurities in solution by electroanalytical techniques”

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	PH meter	15 nos
2.	Conductivity meter	15 nos
3.	Potentiometer	15 nos
4.	Flame photometer	4 nos
5.	Electronic Balance (Four digit)	1 no
6.	Hotplate with temperature controller	5 nos
7.	Hot Air Oven	1 no
8.	Muffle furnace	1 no
9.	Magnetic stirrer	2 nos

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	1	-	-	2	2	-	-	-	-	2	-	-
CO2	3	1	2	-	-	1	2	-	-	-	-	1	-	-
CO3	3	2	1	1	-	-	1	-	-	-	-	-	-	-
CO4	2	1	2	-	-	2	2	-	-	-	-	-	-	-
CO5	2	1	2	-	1	2	2	-	-	-	-	1	-	-
Avg.	2.6	1.3	1.6	1	1	1.4	1.8	-	-	-	-	1.3	-	-
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	S&H	Programme Code & Name	Common to All
------------	-----	-----------------------	---------------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UENL2411	ENGLISH LABORATORY	L	T	P	C	100
		0	0	2	1	
Course Objectives	• To improve the communicative competence of learners • To help learners use language effectively in academic /work contexts • To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc. • To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts. • To use language efficiently in expressing their opinions via various media.					

Unit-I	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION	6
Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form. Speaking - making telephone calls-Self Introduction; Introducing a friend; politeness strategies-making polite requests, making polite offers, replying to polite requests and offers- understanding basic instructions (filling out a bank application for example).		
Unit-II	NARRATION AND SUMMATION	6
Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking - Narrating personal experiences / events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings- engaging in small talk- describing requirements and abilities		
Unit-III	DESCRIPTION OF A PROCESS / PRODUCT	6
Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products. Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product- explaining uses and purposes- Presenting a product- describing shapes and sizes and weights- talking about quantities(large & small)-talking about precautions.		
Unit-IV	CLASSIFICATION AND RECOMMENDATIONS	6
Listening – Listening to TED Talks; Listening to lectures - and educational videos. Speaking – Small Talk; discussing and making plans-talking about tasks-talking about progress- talking about positions and directions of movement-talking about travel preparations- talking about transportation.		
Unit-V	EXPRESSION	6
Listening – Listening to debates/ discussions; different viewpoints on an issue; and panel discussions. Speaking –making predictions- talking about a given topic-giving opinions-understanding a website-describing processes.		
Total No of Periods to be Taught		30 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



ASSESSMENT PATTERN:

1.	One online / app based assessment to test listening /speaking
2.	End Semester ONLY listening and speaking will be conducted online.
3.	Proficiency certification is given on successful completion of listening and speaking internal test and end semester exam .

COURSE OUTCOMES:

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

CO1:	To listen to and comprehend general as well as complex academic information
CO2:	To listen to and understand different points of view in a discussion
CO3:	To speak fluently and accurately in formal and informal communicative contexts
CO4:	To describe products and processes and explain their uses and purposes clearly and accurately
CO5:	To express their opinions effectively in both formal and informal discussions

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	English	Programme Code & Name	Common to All
-------------------	---------	----------------------------------	---------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UENT24201	PROFESSIONAL ENGLISH - II	L	T	P	C	100
		2	0	0	2	
Course Objectives	- To engage learners in meaningful language activities to improve their reading and writing skills - To learn various reading strategies and apply in comprehending documents in professional context - To help learners understand the purpose, audience, contexts of different types of writing - To develop analytical thinking skills for problem solving in communicative contexts - To demonstrate an understanding of job applications and interviews for internship and placements					

Unit-I	MAKING COMPARISONS	(6)
Reading - Reading advertisements, user manuals, brochures; Writing – Professional emails, Email etiquette - Compare and Contrast Essay; Grammar – Mixed Tenses, Prepositional phrases		
Unit-II	EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING	(6)
Reading - Reading longer technical texts– Cause and Effect Essays, and Letters / emails of complaint, Writing - Writing responses to complaints. Grammar - Active Passive Voice transformations, Infinitive and Gerunds		
Unit-III	PROBLEM SOLVING	(6)
Reading - Case Studies, excerpts from literary texts, news reports etc. Writing – Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay. Grammar – Error correction; If conditional sentences.		
Unit-IV	REPORTING OF EVENTS AND RESEARCH	(6)
Reading –Newspaper articles; Writing – Recommendations, Transcoding, Accident Report, Survey Report Grammar – Reported Speech, Modals Vocabulary – Conjunctions- use of prepositions		
Unit-V	THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY	(6)
Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; Writing – Job / Internship application – Cover letter & Resume; Grammar – Numerical adjectives, Relative Clauses		
Total No of Periods to be Taught		30


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	English for Engineers & Technologists (2020 edition) Orient Blackswan Private Ltd. Department of English, Anna University.
2	English for Science & Technology Cambridge University Press 2021.
3	Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

REFERENCES:

1	Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2	Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, NewDelhi.
3	Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003
4	Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5	Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

COURSE OUTCOMES:

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

CO1:	To compare and contrast products and ideas in technical texts.
CO2:	To identify and report cause and effects in events, industrial processes through technical texts
CO3:	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
CO4:	To present their ideas and opinions in a planned and logical manner
CO5:	To draft effective resumes in the context of job search.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO 2	PSO 3
CO1	3	3	3	3	3	3	3	3	2	3	3	-	-	-
CO2	3	3	3	3	3	3	3	3	2	3	3	-	-	-
CO3	3	3	3	3	3	3	3	3	2	3	3	-	-	-
CO4	3	3	3	3	2	3	3	3	2	3	3	-	-	-
CO5	-	-	-	-	-	-	-	-	3	3	3	-	-	-
Avg.	3	3	3	3	2.75	3	3	3	2.2	3	3	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Chemical Engineering	Programme Code & Name	203 - CHEM
-------------------	----------------------	----------------------------------	------------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMAT24201	STATISTICS AND NUMERICAL METHODS	L	T	P	C	100
		3	1	0	4	
Course Objectives	● This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology. ● To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems. ● To introduce the basic concepts of solving algebraic and transcendental equations. ●To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines. ● To acquaint the knowledge of various techniques and methods of solving ordinary differential equations					

Unit-I	TESTING OF HYPOTHESIS	(9+3)
Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.		
Unit-II	DESIGN OF EXPERIMENTS	(9+3)
One way and two way classifications - Completely randomized design – Randomized block design – Latin square design – 2^2 factorial design.		
Unit-III	SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	(9+3)
Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method and Jacobi's method for symmetric matrices.		
Unit-IV	INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION	(9+3)
Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.		
Unit-V	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	(9+3)
Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.		
Total No of Periods to be Taught		60 Periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2	Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

REFERENCES:

1.	Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2.	Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3.	Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4.	Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.
5.	Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics", Tata McGraw Hill Edition, 4th Edition, 2012.
6.	Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010

COURSE OUTCOMES:

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

CO1:	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO2:	Apply the basic concepts of classifications of design of experiments in the field of agriculture
CO3:	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO4:	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO5:	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

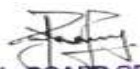
Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	1	1	1	0	0	0	2	0	2	-	-	-
CO2	3	3	1	1	1	0	0	0	2	0	2	-	-	-
CO3	3	3	1	1	1	0	0	0	2	0	2	-	-	-
CO4	3	3	1	1	1	0	0	0	2	0	2	-	-	-
CO5	3	3	1	1	1	0	0	0	2	0	2	-	-	-
Avg.	3	3	1	1	1	0	0	0	2	0	2	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Physics	Programme Code & Name	103-Civil
-------------------	---------	----------------------------------	-----------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UPHT24201	PHYSICS FOR CIVIL ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To introduce the basics of heat transfer through different materials, thermal performance of building and various thermal applications - To impart knowledge on the ventilation and air conditioning of buildings - To introduce the concepts of sound insulation and lighting designs - To give an introduction to the processing and applications of new engineering materials - To create an awareness on natural disasters and safety measures					

Unit-I	THERMAL APPLICATIONS	(9)
Principles of heat transfer, steady state of heat flow, conduction through compound media-series and parallel-conductivity of rubber tube and powder materials - heat transfer through fenestrations, thermal insulation and its benefits - heat gain and heat loss estimation - factors affecting the thermal performance of buildings, thermal measurements, thermal comfort, indices of thermal comfort, climate and design of solar radiation, shading devices - central heating.		
Unit-II	VENTILATION AND REFRIGERATION	(9)
Requirements, principles of natural ventilation - ventilation measurements, design for natural ventilation - Window types and packaged air conditioners - chilled water plant - fan coil systems - water piping - cooling load - Air conditioning systems for different types of buildings - Protection against fire to be caused by A.C.Systems.		
Unit-III	ACOUSTICS AND LIGHTING DESIGNS	(9)
Methods of sound absorptions - absorbing materials - noise and its measurements, sound insulation and its measurements, impact of noise in multistored buildings. Visual field glare, colour - day light calculations - day light design of windows, measurement of day-light and use of models and artificial skies, principles of artificial lighting, supplementary artificial lighting.		
Unit-IV	NEW ENGINEERING MATERIALS	(9)
Composites - Definition and Classification - Fibre reinforced plastics (FRP) and fiber reinforced metals (FRM) - Metallic glasses - Shape memory alloys - Ceramics - Classification - Crystalline - Non Crystalline - Bonded ceramics, Manufacturing methods - Slip casting - Isostatic pressing - Gas pressure bonding - Properties - thermal, mechanical, electrical and chemical ceramic fibres - ferroelectric and ferromagnetic ceramics - High Aluminium ceramics.		
Unit-V	NATURAL DISASTERS	(9)
Seismology and Seismic waves - Earth quake ground motion - Basic concepts and estimation techniques - site effects - Probabilistic and deterministic Seismic hazard analysis - Cyclone and flood hazards - Fire hazards and fire protection, fire-proofing of materials, fire safety regulations and firefighting equipment - Prevention and safety measures.		
Total No of Periods to be Taught		45

TEXT BOOK:

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



1	Marko Pinteric, Building Physics, Springer 2017.
2	D.S.Mathur. Elements of Properties of Matter. S Chand & Company, 2010.
3	Hugo Hens, Building Physics: Heat, Air and Moisture, Wiley, 2017

REFERENCES:

1	W.R.Stevens. Building Physics: Lighting. Pergamon Press, 2013..
2	Hugo Hens, Applied Building Physics, Wiley, 2016
3	K.G.Budinski and M.K.Budinski. Engineering Materials: Properties and Selection. Pearson Education, 2016.
4	Peter A. Claisse, Civil Engineering Materials, Elsevier, 2016.
5	Patrick L. Abbott, Natural Disasters, McGraw-Hill, 2017.

COURSE OUTCOMES:

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

CO1:	acquire knowledge about heat transfer through different materials, thermal performance of building and thermal insulation
CO2:	gain knowledge on the ventilation and air conditioning of buildings
CO3:	understand the concepts of sound absorption, noise insulation and lighting designs
CO4:	now about the processing and applications of composites, metallic glasses, shape memory alloys and ceramics.
CO5:	get an awareness on natural disasters such as earth quake, cyclone, fire and safety measures.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	1	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	1	2	1	1	-	-	-	-	-	-	-
CO4	3	-	2	1	3	-	1	-	-	-	-	-	-	-
CO5	3	2	2	2	2	1	2	-	-	-	-	-	-	-
Avg.	3	1.3	2	1.3	2.3	1	1.3	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	EEE	Programme Code & Name	105-B.E EEE
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBET24201	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To introduce the basics of electric circuits and analysis - To impart knowledge in domestic wiring - To impart knowledge in the basics of working principles and application of electrical machines - To introduce analog devices and their characteristics - To introduce the functional elements and working of sensors and transducers.					

Unit-I	ELECTRICAL CIRCUITS	(9)
DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws – Simple problems- Nodal Analysis, Mesh analysis with Independent sources only (Steady state) Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Steady state analysis of RLC circuits (Simple problems only), Three phase supply – star and delta connection – power in three-phase systems		
Unit-II	MAGNETIC CIRCUITS AND ELECTRICAL INSTALLATIONS	(9)
Magnetic circuits-definitions-MMF, flux, reluctance, magnetic field intensity, flux density, fringing, self and mutual inductances-simple problems. Domestic wiring , types of wires and cables, earthing ,protective devices- switch fuse unit- Miniature circuit breaker-moulded case circuit breaker- earth leakage circuit breaker, safety precautions and First Aid		
Unit-III	ELECTRICAL MACHINES	(9)
Construction and Working principle- DC Separately and Self excited Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, Working principle and Applications of Transformer, Three phase Alternator, Synchronous motor and Three Phase Induction Motor.		
Unit-IV	ANALOG ELECTRONICS	(9)
Resistor, Inductor and Capacitor in Electronic Circuits- Semiconductor Materials: Silicon & Germanium – PN Junction Diodes, Zener Diode –Characteristics Applications – Bipolar Junction Transistor-Biasing, JFET, SCR, MOSFET, IGBT – Types, I-V Characteristics and Applications, Rectifier and Inverters, harmonics.		
Unit-V	SENSORS AND TRANSDUCERS	(9)
Sensors, solenoids, pneumatic controls with electrical actuator, mechatronics, types of valves and its applications, electro-pneumatic systems, proximity sensors, limit switches, piezoelectric, hall effect, photo sensors, Strain gauge, LVDT, differential pressure transducer, optical and digital transducers, Smart sensors, Thermal Imagers.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Second Edition, 2020
2	A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.
3	S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019
4	James A Svoboda, Richard C. Dorf, Dorf's Introduction to Electric Circuits, Wiley, 2018

REFERENCES:

1	John Bird, "Electrical Circuit theory and technology", Routledge; 2017.
2	Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
3	Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017
4	Muhammad H.Rashid, "Spice for Circuits and electronics", 4th Edition., Cengage India, 2019.
5	H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

COURSE OUTCOMES:

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

CO1:	Compute the electric circuit parameters for simple problems
CO2:	Explain the concepts of domestics wiring and protective devices
CO3:	Explain the working principle and applications of electrical machines
CO4:	Analyze the characteristics of analog electronic devices
CO5:	Explain the types and operating principles of sensors and transducers

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1	-	-	-	1	-	-	-	-	-	-	-
CO2	2	1	1	-	-	-	1	-	-	-	-	-	-	-
CO3	2	1	1	-	-	-	1	-	-	-	-	-	-	-
CO4	2	1	1	-	-	-	1	-	-	-	-	-	-	-
CO5	2	1	1	-	-	-	1	-	-	-	-	-	-	-
Avg.	2	1	1	-	-	-	1	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	MECHANICAL	Programme Code & Name				114 - Mechanical
Semester						
Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UGET24201	ENGINEERING GRAPHICS	L	T	P	C	100
		2	0	4	4	
Course Objectives	1. Drawing engineering curves. 2. Drawing freehand sketch of simple objects. 3. Drawing orthographic projection of solids and section of solids. 4. Drawing development of solids 5. Drawing isometric and perspective projections of simple solids.					
CONCEPTS AND CONVENTIONS (Not for Examination) Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets — Lettering and dimensioning.						
Unit-I	PLANE CURVES					(6+12)
Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves.						
Unit-II	PROJECTION OF POINTS, LINES AND PLANE SURFACE					(6+12)
Orthographic projection- principles-Principal Planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.						
Unit-III	PROJECTION OF SOLIDS AND FREEHAND SKETCHING					(6+12)
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three Dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects. Practicing three-dimensional modeling of simple objects by CAD Software (Not for examination)						
Unit-IV	PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES					(6+12)
Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other — obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones. Practicing three-dimensional modeling of simple objects by CAD Software (Not for examination)						
Unit-V	ISOMETRIC AND PERSPECTIVE PROJECTIONS					(6+12)
Principles of isometric projection — isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method. Practicing three-dimensional modelling of isometric projection of simple objects by CAD Software (Not for Examination).						
Total No of Periods to be Taught				TOTAL: (L=30; P=60) 90 PERIODS		


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 53rd Edition, 2019
2	Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
3	Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015

REFERENCES:

1	Basant Agarwal and Agarwal C.M., “Engineering Drawing”, McGraw Hill, 2nd Edition, 2019.
2	Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3	Luzzader, Warren.J. and Duff, John M., “Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4	Parthasarathy N. S. and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
5	Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson Education India, 2nd Edition, 2009.
6	Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited,

COURSE OUTCOMES:

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

CO1:	Use BIS conventions and specifications for engineering drawing.
CO2:	Construct the conic curves, involutes and cycloid.
CO3:	Solve practical problems involving projection of lines.
CO4:	Draw the orthographic, isometric and perspective projections of simple solids.
CO5:	Draw the development of simple solids.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial, BT – Bloom’s Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		Programme Code & Name				
Semester						
Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UTAT24201	தமிழரும் தொழில் நுட்பமும்	L	T	P	C	100
		1	0	0	1	
பாடநெறி நோக்கங்கள்	- நெசவு மற்றும் பாணை தொழில்நுட்பத்தைப் புரிந்துகொள்ளல் - சேரர்கள், சோழர்கள், பல்லவர்கள் மற்றும் நாயக்கர்களின் கட்டுமான வடிவமைப்பு தொழில்நுட்பத்தை ஒப்பிடுதல் - தமிழர்களின் பல்வேறு உற்பத்தி தொழில்நுட்ப அறிவைப் பெறுதல். - தமிழர்களின் வேளாண்மை மற்றும் கடல்சார் அறிவை பகுப்பாய்வு செய்தல். - அறிவியல் தமிழையும் மற்றும் இணைய பயன்பாட்டையும் கற்றல்					

அலகு 1	நெசவுமற்றும்பாணைத்தொழில்நுட்பம்	(3)
சங்ககாலத்தில் நெசவுத்தொழில், பாணைத்தொழில்நுட்பம், கருப்பு சிவப்புபாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.		
அலகு 2	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	(3)
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமான பொருட்களும், வீட்டுப் பொருட்களில் வடிவமைப்பும். சங்க காலத்தில் நடுகல்லும் சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் மாமல்லபுரச் சிற்பங்களும், கோவில்களும் சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழி பாட்டுத் தலங்கள், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் செட்டிநாட்டு வீடுகள் பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக்கலை.		
அலகு 3	உற்பத்தித்தொழில்நுட்பம்	(3)
கப்பல் கட்டும் கலை உலோகவியல் - இரும்புத் தொழிற்சாலை இரும்பை உருக்குதல், எஃகு வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் மணி உருவாக்கும் தொழிற்சாலைகள் கல்மணிகள். கண்ணாடி மணிகள் - சங்கு மணிகள் சுடுமண் மணிகள் எலும்புத் துண்டுகள் தொல்வியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.		
அலகு 4	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	(3)
அணை, ஏரி, குளங்கள், மதகு சோழர் காலக் குழுழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு கால் நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் கடல்சார் அறிவு - மீன்வளம் - அறிவுசார் சமூகம் முத்து மற்றும் முத்துக் குளித்தல்.		
அலகு 5	அறிவியல் தமிழ் மற்றும் கணித்தமிழ்	(3)
அறிவியல் தமிழின் வளர்ச்சி கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென் பொருட்கள் உருவாக்கம் தமிழ் இணையக் கல்விக்கழகம் தமிழ் மின் நூலகம் இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத்திட்டம்.		

Space for BOS seal & Sign



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Total No of Periods to be Taught	Total: 15 periods
---	--------------------------

TEXT BOOK:

1	தமிழக வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும் கல்வியியல்பணிகள்கழகம்).
2	கணினித்தமிழ் - முனைவர் இல, சுந்தரம். (விகடன்பிரசுரம்).
3	கீழடி -வைகை நதிக்கரையில் சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
4	பொருநை -ஆற்றங்கரைநாகரிகம், (தொல்லியல்துறைவெளியீடு)
5	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

REFERENCES:

1	Social Life of Tamils(Dr.K.K.Pillay)A joint publication of TNTB& ESCandRMRL-(in print)
2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
3	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
5	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

COURSE OUTCOMES:

பாடநெறியின் முடிவில் மாணவர்கள்

CO1:	நெசவு மற்றும் பாணை தொழில்நுட்பத்தைப் புரிந்துகொள்ள
CO2:	வடிவமைப்பு மற்றும் கட்டிட தொழில்நுட்பத்தில் தமிழர்களின் அறிவை பெறுவார்கள்
CO3:	தமிழர்களின் பல்வேறு உற்பத்தி தொழில்நுட்ப அறிவை கண்டறிவார்கள்
CO4:	தமிழர்களின் வேளாண்மை மற்றும் கடல்சார் அறிவை விவாதிப்பார்கள்.
CO5:	இணைய பயன்பாடுகளின் அறிவியல் தமிழை பயன்படுத்திப் பார்ப்பார்கள்

Space for BOS seal & Sign



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	1	1	1	1	1	-	1	-	-
CO2	-	-	-	-	-	2	2	2	2	2	-	2	-	-
CO3	-	-	-	-	-	2	2	2	2	2	-	2	-	-
CO4	-	-	-	-	-	1	1	1	1	1	-	1	-	-
CO5	-	-	-	-	-	2	2	2	2	2	-	2	-	-
Avg.	-	-	-	-	-	2	2	2	2	2	-	2	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

Space for BOS seal & Sign



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	EEE	Programme Code & Name	105-B.E EEE
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UGEL24201	ENGINEERING PRACTICES LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common house hold wood work. • Wiring various electrical joints in common household electrical wire work. • Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work. • Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.					

GROUP – A (CIVIL & ELECTRICAL)

PART I: CIVIL ENGINEERING PRACTICES

15

PLUMBING WORK:

- Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
- Preparing plumbing line sketches.
- Laying pipe connection to the suction side of a pump
- Laying pipe connection to the delivery side of a pump.
- Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:

- Sawing,
- Planning and
- Making joints like T-Joint Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:

- Studying joints in door panels and wooden furniture
- Studying common industrial trusses using models.

PART II: ELECTRICAL ENGINEERING PRACTICES

15

- Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
- Staircase wiring
- Fluorescent Lamp wiring with introduction to CFL and LED types.
- Energy meter wiring and related calculations/ calibration
- Study of Iron Box wiring and assembly
- Study of Fan Regulator (Resistor type and Electronic type using Diac /Triac /quadrac)
- Study of emergency lamp wiring/Water heater

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III MECHANICAL ENGINEERING PRACTICES

15

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



WELDING WORK: a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding. b) Practicing gas welding. BASIC MACHINING WORK: a) (simple) Turning. b) (simple) Drilling. c) (simple) Tapping. ASSEMBLY WORK: a) Assembling a centrifugal pump. b) Assembling a household mixer. c) Assembling an air conditioner. SHEET METAL WORK: a) Making of a square tray FOUNDRY WORK: a) Demonstrating basic foundry operations.	
PART IV: ELECTRONIC ENGINEERING PRACTICES	15
SOLDERING WORK: a) Soldering simple electronic circuits and checking continuity. ELECTRONIC ASSEMBLY AND TESTING WORK: a) Assembling and testing electronic components on a small PCB ELECTRONIC EQUIPMENT STUDY: a) Study an elements of smart phone. b) Assembly and dismantle of LED TV. c) Assembly and dismantle of computer/ laptop	
Total No of Periods to be Taught	60

COURSE OUTCOMES: On completion of the course, the students will be able to	
CO1:	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
CO2:	Wire various electrical joints in common household electrical wire work.
CO3:	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
CO4:	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB

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	-	-	-	-	2	2	1
CO2	3	2	-	-	1	1	-	-	-	-	2	2	1
CO3	3	2	-	-	1	1	-	-	-	-	2	2	1
CO4	3	2	-	-	1	1	-	-	-	-	2	2	1
Avg.	3	2	-	-	1	1	-	-	-	-	2	2	1
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy													

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	EEE	Programme Code & Name	105-B.E EEE
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBEL24201	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	- To train the students in conducting load tests electrical machines - To gain practical experience in experimentally obtaining the characteristics of electronic devices and rectifiers - To train the students to measure three phase power and displacement					

List of Exercises / Experiments :	
1. Verification of ohms and Kirchhoff's Laws.	
2. Three Phase Power Measurement.	
3. Load test on DC Shunt Motor.	
4. Load test on Self Excited DC Generator	
5. Load test on Single phase Transformer .	
6. Load Test on Induction Motor .	
7. Characteristics of PN and Zener Diodes	
8. Characteristics of BJT, SCR and MOSFET	
9. Design and analysis of Half wave and Full Wave rectifiers	
10. Measurement of displacement of LVDT	
Total No of Periods to be Taught	60

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power
CO2:	Analyze experimentally the load characteristics of electrical machines
CO3:	Analyze the characteristics of basic electronic devices
CO4:	Use LVDT to measure displacement

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



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	1	2	-	-	1.5	2	-	-	-	-	-
CO2	2	3	1	2	-	-	1.5	2	-	-	-	-	-
CO3	2	3	1	2	-	-	1.5	2	-	-	-	-	-
CO4	2	3	1	2	-	-	1.5	2	-	-	-	-	-
Avg.	2	3	1	2	-	-	1.5	2	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	English	Programme Code & Name	
-------------------	---------	----------------------------------	--

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UGEL24202	COMMUNICATION LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	- To identify varied group discussion skills and apply them to take part in effective discussions in a professional context. - To analyse concepts and problems and make effective presentations explaining them clearly and precisely. - To be able to communicate effectively through formal and informal writing. - To be able to use appropriate language structures to write emails, reports and essays - To give instructions and recommendations that are clear and relevant to the context					

Unit-I		12
Speaking-Role Play Exercises Based on Workplace Contexts, - talking about competition-discussing progress toward goals-talking about experiences- talking about events in life- discussing past events-Writing: writing emails (formal & semi-formal).		
Unit-II		12
Speaking: discussing news stories-talking about frequency-talking about travel problems- discussing travel procedures- talking about travel problems- making arrangements-describing arrangements-discussing plans and decisions- discussing purposes and reasons- understanding common technology terms-Writing: - writing different types of emails.		
Unit-III		12
Speaking: discussing predictions-describing the climate-discussing forecasts and scenarios- talking about purchasing-discussing advantages and disadvantages- making comparisons- discussing likes and dislikes-discussing feelings about experiences-discussing imaginary scenarios Writing: short essays and reports-formal/semi-formal letters.		
Unit-IV		12
Speaking: discussing the natural environment-describing systems-describing position and movement-explaining rules-(example- discussing rental arrangements)- understanding technical instructions-Writing: writing instructions-writing a short article		
Unit-V		12
Speaking: describing things relatively-describing clothing-discussing safety issues (making recommendations) talking about electrical devices-describing controlling actions- Writing: job application(Cover letter + Curriculum vitae)-writing recommendations.		
Total No of Periods to be Taught		60 periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Speak effectively in group discussions held in a formal/semi formal contexts.
CO2:	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
CO3:	Write emails, letters and effective job applications.
CO4:	Write critical reports to convey data and information with clarity and precision
CO5:	Give appropriate instructions and recommendations for safe execution of tasks

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	3	3	1	3	3	3	3	3	3	3	-	-
CO2	2	3	3	3	1	3	3	3	3	3	3	3	-	-
CO3	2	2	3	3	1	3	3	3	3	3	3	3	-	-
CO4	3	3	3	3	3	3	3	3	3	3	3	3	-	-
CO5	3	3	3	3	3	3	3	3	3	3	3	3	-	-
Avg.	2.4	2.8	3	3	1.8	3	3	3	3	3	3	3	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B



Mecheri, Salem Dt-636453, Tamilnadu

Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

3rd Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMAT24301	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	L	T	P	C	100
		3	1	0	4	
Course Objectives	➤ To introduce the basic concepts of PDE for solving standard partial differential equations. ➤ To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems. ➤ To acquaint the student with Fourier series techniques in solving heat flow problems used in various situations. ➤ To acquaint the student with Fourier, transform techniques used in wide variety of situations. ➤ To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.					

Unit-I	PARTIAL DIFFERENTIAL EQUATIONS	(9+3)
Formation of partial differential equations – Solutions of standard types of first order partial differential equations - First order partial differential equations reducible to standard types- Lagrange's linear equation - Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.		
Unit-II	FOURIER SERIES	(9+3)
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series and cosine series – Root mean square value – Parseval's identity – Harmonic analysis.		
Unit-III	APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS	(9+3)
Classification of PDE – Method of separation of variables - Fourier series solutions of one-dimensional wave equation– One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction (Cartesian coordinates only).		
Unit-IV	FOURIER TRANSFORMS	(9+3)
Vector spaces – Subspaces – Linear combinations and linear system of equations – Linear independence and linear dependence – Bases and dimensions		
Unit-V	Z - TRANSFORMS AND DIFFERENCE EQUATIONS	(9+3)
Z-transforms - Elementary properties – Convergence of Z-transforms - – Initial and final value theorems - Inverse Z- transform using partial fraction and convolution theorem - Formation of difference equations – Solution of difference equations using Z - transforms.		
Total No of Periods to be Taught		60 periods

TEXT BOOK:

1	Grewal B.S., "Higher Engineering Mathematics", 44 th Edition, Khanna Publishers, New Delhi, 2018.
---	--



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Kreyszig E, "Advanced Engineering Mathematics ", 10 th Edition, John Wiley, New Delhi, India, 2018.
---	--

REFERENCES:

1	Andrews. L.C and Shivamoggi. B, "Integral Transforms for Engineers" SPIE Press, 1999.
2	Koshy. T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.
3	James. G., "Advanced Modern Engineering Mathematics", 4 th Edition, Pearson Education, New Delhi,

COURSE OUTCOMES:

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

CO1:	Understand how to solve the given standard partial differential equations.
CO2:	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO3:	Appreciate the physical significance of Fourier series techniques in solving one-and two-dimensional heat flow problems and one-dimensional wave equations.
CO4:	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO5:	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	1	1	0	0	0	2	0	0	3	-	-	3
CO2	3	3	1	1	0	0	0	2	0	0	3	-	-	3
CO3	3	3	1	1	0	0	0	2	0	0	3	-	-	3
CO4	3	3	1	1	0	0	0	2	0	0	3	-	-	3
CO5	3	3	1	1	0	0	0	2	0	0	3	-	-	3
Avg.	3	3	1	1	0	0	0	2	0	0	3	-	-	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMET24301	ENGINEERING MECHANICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To learn the use scalar and vector analytical techniques for analyzing forces in statically determinate structures. ➤ To analyze the behavior of the rigid body under the action of forces ➤ To study and understand the distributed forces, surface, loading on beam and intensity. ➤ To learn the principles of friction, forces and to determine the apply the concepts of frictional forces at the contact surfaces of various engineering systems. ➤ To develop basic dynamics concepts – force, momentum, work and energy.					

Unit-I	STATICS OF PARTICLES	(9)
Fundamental Concepts and Principles, Systems of Units, Method of Problem Solutions, Statics of Particles -Forces in a Plane, Resultant of Forces, Resolution of a Force into Components, Rectangular Components of a Force, Unit Vectors. Equilibrium of a Particle- Newton's First Law of Motion, Space and Free-Body Diagrams, Forces in Space, Equilibrium of a Particle in Space.		
Unit-II	EQUILIBRIUM OF RIGID BODIES	(9)
Statics of rigid body in two dimensions - rigid body - moment of a force about a point - varignon's theorem - resultant force for coplanar parallel and non-concurrent forces - moments and couples - equilibrium of rigid bodies in twodimensions - requirements of stable equilibrium - types of supports and their reactions.		
Unit-III	DISTRIBUTED FORCES	(9)
Centroid – centre of gravity- Theorems of Pappus and Guldinus – moment of inertia of plane areas - transfer theorems- parallel axis and perpendicular axis theorem- radius of gyration- product of inertia polar moment of inertia – principal axes and principal moment of inertia of plane areas.		
Unit-IV	FRICTION	(9)
The Laws of Dry Friction, Coefficients of Friction, Angles of Friction, Wedge friction, Wheel Friction, Rolling Resistance, Ladder friction.		
Unit-V	DYNAMICS OF PARTICLES	(9)
Kinematics - Displacements, velocity and acceleration, their relationship -rectilinear motion – curvilinear motion - projectile motion. Kinetics - Newton's law – D'Alembert's principle - impact of elastic bodies.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, SanjeevSanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education., 11 th Edition, 2017.
2	Vela Murali, "Engineering Mechanics-Statics and Dynamics", Oxford University Press, 2018.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Boresi P and Schmidt J, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.
2	Hibbeler, R.C., Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics, 13 th edition, Prentice Hall, 2013.
3	Irving H. Shames, Krishna Mohana Rao G, Engineering Mechanics – Statics and Dynamics, 4 th Edition, Pearson Education Asia Pvt. Ltd., 2005.
4	Meriam J L and Kraige L G, Engineering Mechanics: Statics and Engineering Mechanics: Dynamics, 7 th edition, Wiley student edition, 2013.
5	Timoshenko S, Young D H, Rao J V and Sukumar Pati, Engineering Mechanics, 5 th Edition, McGraw Hill Higher Education, 2013.

COURSE OUTCOMES:

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

CO1:	Illustrate the vector and scalar representation of forces and moments
CO2:	Analyse the rigid body in equilibrium
CO3:	Analyse the properties of distributed forces
CO4:	Determine the friction and the effects by the laws of friction
CO5:	Calculate dynamic forces exerted in rigid body

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24301	WATER SUPPLY AND WASTE WATER ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To introduce students to various components and design of water supply scheme, water treatment methods, water storage distribution system, sewage treatment and disposal and design of intake structures and sewerage system.					

Unit-I	WATER SUPPLY	(9)
Estimation of surface and subsurface water resources - Predicting demand for water- Impurities of water and their significance - Physical, chemical and bacteriological analysis - Waterborne diseases - Standards for potable water. Intake of water: Pumping and gravity schemes.		
Unit-II	WATER TREATMENT	(9)
Objectives - Unit operations and processes - Principles, functions, and design of water treatment plant units, aerators of flash mixers, Coagulation and flocculation – Clarifloccuator - Plate and tube settlers - Pulsator clarifier - sand filters - Disinfection - softening, removal of iron and manganese -Defluoridation - Softening - Desalination process – Residue Management - Construction, Operation and Maintenance aspects		
Unit-III	WATER STORAGE AND DISTRIBUTION	(9)
Storage and balancing reservoirs - types, location and capacity. Distribution system: layout, hydraulics of pipe lines, pipe fittings, valves including check and pressure reducing valves, meters, analysis of distribution systems, leak detection, maintenance of distribution systems, pumping stations and their operations - House service connections.		
Unit-IV	PLANNING AND DESIGN OF SEWERAGE SYSTEM	(9)
Characteristics and composition of sewage - Population equivalent - Sanitary sewage flow estimation - Sewer materials - Hydraulics of flow in sanitary sewers - Sewer design - Storm drainage-Storm runoff estimation - Sewer appurtenances - Corrosion in sewers - Prevention and control – Sewage Spumping- drainage in buildings – Plumbing systems for drainage		
Unit-V	SEWAGE TREATMENT AND DISPOSAL	(9)
Objectives - Selection of Treatment Methods - Principles, Functions, - Activated Sludge Process and Extended aeration systems - Trickling filters - Sequencing Batch Reactor(SBR) - UASB – Waste Stabilization Ponds - Other treatment methods - Reclamation and Reuse of sewage – Recent Advances in Sewage Treatment - Construction, Operation and Maintenance aspects. – Discharge standards-sludge treatment -Disposal of sludge		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Garg, S.K. Environmental Engineering, Vol.I Khanna Publishers, New Delhi, 2010.
2	Modi, P.N., Water Supply Engineering, Vol.I Standard Book House, New Delhi, 2016.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



3	Garg, S.K., Environmental Engineering Vol.II, Khanna Publishers, New Delhi, 2015.
4	Duggal K.N., "Elements of Environmental Engineering" S. Chand and Co. Ltd., New Delhi, 2014.
5	Punmia, B.C., Jain, A.K., and Jain.A.K., Environmental Engineering, Vol.II, Laxmi Publications, 2010.

REFERENCES:

1	Punmia B.C, Ashok Jain and Arun Jain, Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi 2010.
2	Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1999.
3	Syed R. Qasimand Edward M. Motley Guang Zhu, Water Works Engineering Planning, Design and Operation, Prentice Hall of India Learning Private Limited, New Delhi, 2009.
4	Syed R.Qasim "Waste water Treatment Plants", CRCPress,WashingtonD.C.,2010
5	Metcalf and Eddy – Waste water Engineering – Treatment and Reuse, Tata Mc. Graw – Hill Company, New Delhi, 2010.

COURSE OUTCOMES:

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

CO1:	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission.
CO2:	Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
CO3:	Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process
CO4:	Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods.
CO5:	Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1	1	1	1	2	3	2	1
CO2	3	2	1	1	1	2	1	1	1	1	2	3	2	1
CO3	3	2	3	2	1	2	1	1	1	1	3	3	3	2
CO4	3	3	2	2	1	3	1	1	1	1	3	3	3	3
CO5	3	3	2	2	1	3	1	1	1	1	3	3	3	3
Avg.	3	2	2	2	1	2	1	1	1	1	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24302	MECHANICS OF FLUIDS	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To introduce the students about properties and behavior of the fluids under static conditions and to impart basic knowledge of the dynamics of fluids through the control volume approach and to expose to the applications of the conservation laws to a) flow measurements b) flow through pipes (both laminar and turbulent) and c) forces on pipe bends with an exposure to the significance of boundary layer theory and its applications.					

Unit-I	FLUIDS PROPERTIES AND FLUID STATICS	(9)
Scope of fluid mechanics – Definitions of a fluid – Methods of analysis – Continuum hypothesis – System and Control volume approach – Reynold's transportation theorem – Fluid properties – Fluid statics – Manometry – Forces on plane and curved surfaces – Buoyancy and floatation – Stability of floating bodies.		
Unit-II	BASIC CONCEPTS OF FLUID FLOW	(9)
Kinematics: Classification of flows – Streamline, streak-line and path-lines – Stream function and velocity potentials – Flow nets; Dynamics : Application of control volume to continuity, energy and momentum – Euler's equation of motion along a stream line – Bernoulli's equation – Applications to velocity and discharge measurements – Linearmomentum equation – Application to Pipe bends – Moment of momentum equation.		
Unit-III	DIMENSIONAL ANALYSIS AND MODEL STUDIES	(9)
Fundamental dimensions – Dimensional homogeneity – Rayleigh's method and Buckingham Pi theorem –Dimensionless parameters – Similitude and model studies – Distorted and undistorted models.		
Unit-IV	INCOMPRESSIBLE VISCOUS FLOW	(9)
Reynolds experiment – Laminar flow in pipes and between parallel plates – Development of laminar and turbulent flows in pipes – Darcy-Weisbach equation – Moody diagram – Major and minor losses of flow in pipes – Total energy line – Hydraulic grade line – Siphon – Pipes in series and parallel – Equivalent pipes.		
Unit-V	BOUNDARY LAYERS	(9)
Definition of boundary layers – Laminar and turbulent boundary layers – Displacement, momentum and energythickness – Momentum integral equation – Applications – Separation of boundary layer – Drag and Lift forces.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Modi P.N and Seth Hydraulics and Fluid Mechanics including Hydraulic Machines Standard Book House New Delhi. 2015.
2	Streeter, V.L. Wylie, E. B. and Bedford K.W, Fluid Mechanics. (9 th Ed.) Tata McGraw Hill, New Delhi, 1998.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	S K Som; Gautam Biswas and S Chakraborty, Introduction to Fluid Mechanics and Fluid Machines, Tata McGraw Hill Education Pvt. Ltd., 2012.
2	Pani B S, Fluid Mechanics: A Concise Introduction, Prentice Hall of India Private Ltd, 2016.
3	Jain A. K. Fluid Mechanics including Hydraulic Machines, Khanna Publishers, New Delhi, 2014.
4	Narayana Pillai N. Principles of Fluid Mechanics and Fluid Machines, (3 rd Ed.) University Press (India) Pvt. Ltd. 2009.

COURSE OUTCOMES:

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

CO1:	Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.
CO2:	Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.
CO3:	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.
CO4:	Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.
CO5:	Explain the concept of boundary layer and its application to find the drag force exerted by the fluid on the flat solid surface.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1	1	1	1	2	3	2	1
CO2	3	2	1	1	1	2	1	1	1	1	2	3	2	1
CO3	3	2	3	2	1	2	1	1	1	1	2	3	3	2
CO4	3	3	3	2	1	3	1	1	1	1	3	3	3	3
CO5	3	3	2	2	1	3	1	1	1	1	3	3	3	3
Avg.	3	2	3	2	1	2	1	1	1	1	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

3rd Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCETL24301	ADVANCED SURVEYING	L	T	P	C	100
		3	0	2	4	
Course Objectives	At the end of the course the student will possess knowledge about survey field techniques ➤ Gain knowledge on control surveying ➤ Impart knowledge on survey adjustment ➤ Understand the principles of total station survey ➤ Give an exposure to basic concepts of GPS surveying ➤ Familiarize on setting out curves and astronomical surveying					

Unit-I	FUNDAMENTALS OF CONVENTIONAL SURVEYING	(9)
Definition – Classifications – Basic principles – Equipment and accessories for ranging and chaining – Methods of ranging – Well conditioned triangles – Chain traversing – Compass – Basic principles – Types – Bearing – System and conversions – Sources of errors and Local attraction – Magnetic declination – Dip – compass traversing – Plane table and its accessories – Merits and demerits – Radiation – Intersection – Resection – Plane table traversing.		
Unit-II	LEVELLING	(9)
Level line – Horizontal line – Datum – Benchmarks – Levels and staves – Temporary and permanent adjustments –Methods of leveling – Fly leveling – Check leveling – Procedure in leveling – Booking – Reduction – Curvature and refraction – Reciprocal leveling – Precise leveling - Contouring.		
Unit-III	THEODOLITE SURVEYING	(9)
Horizontal and vertical angle measurements – Temporary and permanent adjustments – Heights and distances – Tacheometric surveying – Stadia Tacheometry – Tangential Tacheometry – Trigonometric leveling – Single Plane method – Double Plane method.		
Unit-IV	CONTROL SURVEYING AND ADJUSTMENT	(9)
Horizontal and vertical control – Methods – Triangulation – Traversing – Gale's table – Trilateration – Concepts of measurements and errors – Error propagation and Linearization – Adjustment methods - Least square methods –Angles, lengths and levelling network.		
Unit-V	MODERN SURVEYING	(9)
Total Station: EDM– Advantages – Parts and accessories – Working principle – Errors – Field procedure and applications. GPS: Advantages – System components – Signal structure – Selective availability and antispoofing receiver components and antenna – Errors in GPS – Field procedure and applications- Drone Surveying and its application.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Dr. B. C. Punmia, Ashok K. Jain and Arun K Jain, Surveying Vol. I & II, Lakshmi Publications Pvt Ltd, New Delhi, Sixteenth Edition, 2016.
2	T. P. Kanetkar and S. V. Kulkarni, Surveying and Levelling, Parts 1 & 2, Pune Vidyarthi Griha Prakashan, Pune, 2008.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	T. P. Kanetkar and S. V. Kulkarni, Surveying and Levelling, Parts 1 & 2, Pune Vidyarthi Griha Prakashan, Pune, 24 th Reprint, 2015.
2	Dr. B. C. Punmia, Ashok K. Jain and Arun K Jain, Surveying Vol. I & II, Lakshmi Publications Pvt Ltd, New Delhi, 17 th Edition, 2016.
3	James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, Seventh Edition, McGraw Hill 2001
4	Bannister and S. Raymond, Surveying, Seventh Edition, Longman 2004 a. David Clark, Plane and Geodetic Surveying for Engineers, Volume I, Constable and Company Ltd, London, CBS, 6 th Edition, 2004.
5	David Clark and James Clendinning, Plane and Geodetic Surveying for Engineers, Volume II, Constable and Company Ltd, London, CBS, 6 th Edition, 2004.
6	S. K. Roy, Fundamentals of Surveying, Second Edition, Prentice Hall of India 2004

List of Exercises/Experiments

1.Study of chains and its accessories, Aligning, Ranging, Chaining and Marking Perpendicular offset.	
2. Compass Traversing – Arriving included angles.	
3. Fly levelling using Dumpy level.	
4. Check levelling using Dumpy level.	
5. Measurements of horizontal angles by reiteration , repetition and vertical angles	
6. Determination of elevation of an object using single plane method when base is Accessible / inaccessible.	
7. Determination of Tacheometric Constants	
8. Heights and distances by stadia Tacheometry and Tangential Tacheometry	
9. Traverse using Total station and Area of Traverse	
10. Determination of distance and difference in elevation between two inaccessible points	
Total No of Periods to be Taught	30 Periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Introduce the rudiments of various surveying and its principles.
CO2:	Imparts knowledge in computation of levels of terrain and ground features
CO3:	Imparts concepts of Theodolite Surveying for complex surveying operations
CO4:	Understand the procedure for establishing horizontal and vertical control
CO5:	Imparts the knowledge on modern surveying instruments

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Chain	5
2	Cross Staff	10
3	Ranging Rod	30
4.	Steel Arrows	25
5	Prismatic Compass	10
6	Surveyor Compass	2
7	Dumpy Level	7
8	Levelling Staff	7
9	Theodolite	10
10	Total Station	2
11	Pocket stereoscope	1

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	3	2	2	3	2	2	1	2	1	3	3	3
CO2	3	3	2	2	2	3	2	2	1	2	1	3	3	3
CO3	3	3	3	2	3	3	2	2	1	2	1	3	3	3
CO4	3	3	3	3	3	3	2	3	1	2	2	3	3	3
CO5	3	3	3	3	3	3	3	2	1	2	2	3	3	3
Avg.	3	3	3	2	3	3	2	2	1	2	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

3rd Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCETL24302	CONSTRUCTION MATERIALS AND TECHNOLOGY	L	T	P	C	100
		3	0	2	4	
Course Objectives	➤ To study the properties of concrete making materials. ➤ To have better knowledge about the chemical and mineral admixtures in concrete. ➤ To familiarize with the IS method of mix design as per the latest code. ➤ To understand the fresh and hardened properties of concrete. ➤ To know the importance and applications of special concretes.					

Unit-I	CONSTRUCTION MATERIALS	(9)
Stone -Tests on stones –Types of stone masonry – Bricks – Classification – Manufacturing of clay bricks – Tests on bricks – Types of Brick masonry-Glass – Ceramics– Sealants for joints – UPVC - Fibre glass reinforced plastic– Ever wood WPC Clay products – Refractories – Composite materials –Types – Applications of laminar composites –Fibretextiles.		
Unit-II	CONSTITUENT MATERIALS	(9)
Cement–Ingredients – Manufacturing process –Types and Grades – Properties of cement and Cement mortar –Hydration – Tests on cement – Aggregates – Properties – Types & Tests on fine and coarse aggregates– Chemical and Mineral Admixtures – Steel – Properties.		
Unit-III	CONCRETE AND MIX PROPORTIONING	(9)
Concrete – Ingredients – W/C Ratio – Admixtures – PCC – RCC - Grades – Manufacturing Process –. Principles of MixProportioning- Design Mix and Nominal Mix-BIS Method of Mix Design - Mix Design Examples.		
Unit-IV	FRESH AND HARDENED PROPERTIES OF CONCRETE	(9)
Workability-Tests for workability of concrete-Slump Test and Compacting factor Test-Segregation and Bleeding-Determination of Compressive and Flexural strength as per BIS - Properties of Hardened concrete- Stress-strain curve for concrete-Determination of Modulus of elasticity.		
Unit-V	SPECIAL CONCRETES	(9)
Light weight concretes - High strength concrete - Fibre reinforced concrete – Ferrocement – Ready mix concrete -SIFCON - Shotcrete – Polymer concrete - High performance concrete- self compacting concrete - Geopolymer Concrete.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Varghese.P.C, Building Materials, Second Edition PHI Learning Ltd., 2015.
2	Shetty,M.S, "Concrete Technology", S.Chand and Company Ltd, New Delhi, 2003



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Punmia ,B.C Building construction , Laxmi publication (p)ltd.,2008.
2	Gambhir.M.L.Concrete Technology,Fifth Edition, McGraw Hill Education,2017.
3	IS10262-2019 Recommended Guidelines for Concrete Mix Design, Bureau of Indian Standards, New Delhii.
4	Job Thomas., Concrete Technology, Cengage learning India Private Ltd, New Delhi, 2015.
5	Gupta.B.L., Amit Gupta, "Concrete Technology", Jain Book Agency, 2010.

List of Exercises/Experiments

1. Determination of compressive strength of bricks and blocks.	
2. Determination water absorption of bricks and blocks.	
3. Determination of Efflorescence of bricks.	
4. Determination of fineness of cement.	
5. Determination of consistency cement.	
6. Determination of specific gravity of cement.	
7. Determination of initial and final setting time of cement.	
8. Sieve analysis of aggregate.	
9. Determination of specific gravity and bulk density.	
10. Determination of Bulking of sand.	
11. Tension test on mild steel rod.	
12. Double shear test on metal.	
13. Impact test on metal specimens.	
14. Deflection test on metal beam.	
15. Hardness Test on Metal specimens.	
16. Workability tests on self compacting concrete.	
Total No of Periods to be Taught	30 Periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Understand the requirements of cement, aggregates and water for concrete.
CO2:	Select suitable admixtures for enhancing the properties of concrete.
CO3:	Design concrete mixes as per IS method of mix design.
CO4:	Determine the properties of concrete at fresh and hardened state.
CO5:	Know the importance of special concretes for specific requirements.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Compression Testing Machine	1
2	Vicat's Needle apparatus	2
3	Pycnometer	3
4	Sieve Set	1
5	Universal Testing Machine minimum of 400 kN capacity	1
6	Impact testing machine Charpy & Izod.	1 Each
7	Hardness testing machine Rockwell & Brinell	1 Each
8	Beam deflection test apparatus	1
9	L Box Apparatus	1
10	V Funnel Apparatus	1
11	U Box Apparatus	1

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	1	2	1	3	2	1	1	1	2	3	2	3
CO2	3	1	1	1	1	3	1	1	1	1	2	3	2	3
CO3	3	2	3	3	1	3	1	1	1	1	2	3	2	3
CO4	3	1	1	1	1	3	2	1	1	1	2	3	2	3
CO5	3	1	1	1	1	3	2	1	1	1	2	3	2	3
Avg.	3	1	2	2	1	3	2	1	1	1	2	3	2	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24301	WATER AND WASTE WATER ANALYSIS LABORATORY	L	T	P	C	100
		0	0	3	2	
Course Objectives	➤ This subject includes the list of experiments to be conducted for characterization of water and municipal sewage. At the end of the course, the student is expected to be aware of the procedure for quantifying quality parameters for water and sewage.					

List of Exercises/Experiments

Analysis of water sample:

1. Sampling and preservation methods for water and wastewater (Demonstration only).
2. Measurement of Electrical conductivity and turbidity.
3. Determination of fluoride in water by spectro photometric method /ISE.
4. Determination of iron in water (Demo).
5. Determination of Sulphate in water.
6. Determination of Optimum Coagulant Dosage by Jar test apparatus.
7. Determination of available Chlorine in Bleaching powder and residual chlorine in water.

Analysis of wastewater sample:

8. Estimation of suspended, volatile and fixed solids
9. Determination of Sludge Volume Index in waste water
10. Determination of Dissolved Oxygen
11. Estimation of B.O.D.
12. Estimation of C.O.D.
13. Determination of TKN and Ammonia Nitrogen in wastewater
14. Determination of total and faecal coliform (Demonstration only)

Total No of Periods to be Taught	45 periods
---	-------------------



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Calibrate and standardize the equipment
CO2:	Collect proper sample for analysis
CO3:	To know the sample preservation methods
CO4:	To perform field oriented testing of water, wastewater
CO5:	To perform coliform analysis

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	PH Meter	1
2	Electrical conductivity Meter	1
3	Turbidity Meter	1
4	Spectrophotometer	1
5	Jar test Apparatus	1
6	DO Meter	1
7	BOD Incubator	1
8	COD	1
9	Hot air oven	1
10	Volumetric Flask	As Required
11	Beakers	As Required
12	Imhoffcone	1

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	2	2	1	1	1	3	1	2	2
CO2	2	1	1	1	1	2	2	1	1	2	3	2	2	2
CO3	1	1	1	1	1	2	2	2	2	2	2	2	2	2
CO4	3	3	3	3	3	2	3	3	2	3	2	3	3	3
CO5	2	3	3	3	3	2	3	2	2	2	3	2	2	2
Avg.	2	2	2	2	2	2	3	2	2	2	3	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24401	APPLIED HYDRAULIC ENGINEERING	L	T	P	C	100
		3	1	0	4	
Course Objectives	➤ To impart basic knowledge to the students about the open channel flows with analysis of uniform flow, gradually varied flow and rapidly varied flow and to expose them to basic principles of working of hydraulic machineries and to design Pelton wheel, Francis and Kaplan turbine, Centrifugal and Reciprocating pumps.					

Unit-I	UNIFORM FLOW	(9+3)
Definition and differences between pipe flow and open channel flow - Types of Flow - Properties of open channel - Fundamental equations - Sub-critical, Super-critical and Critical flow - Velocity distribution in open channel - Steady uniform flow: Chezy's equation, Manning equation - Best hydraulic sections for uniform flow - Computation in Uniform Flow - Specific energy and specific force.		
Unit-II	VARIED FLOWS	(9+3)
Dynamic equations of gradually varied - Water surface flow profile classifications: Hydraulic Slope, Hydraulic Curve -Profile determination by Numerical method: Direct step method and Standard step method – Change in Grades.		
Unit-III	RAPIDLY VARIED FLOWS	(9+3)
Application of the momentum equation for RVF - Hydraulic jumps - Types - Energy dissipation – Positive and Negative surges.		
Unit-IV	TURBINES	(9+3)
Turbines - Classification - Impulse turbine – Pelton wheel - Reaction turbines - Francis turbine - Kaplan turbine – Draft tube - Cavitation - Performance of turbine - Specific speed - Runaway speed – Minimum Speed to start the pump.		
Unit-V	PUMPS	(9+3)
Centrifugal pumps - Minimum speed to start the pump - NPSH - Cavitation's in pumps - Operating characteristics - Multistage pumps - Reciprocating pumps - Negative slip - Indicator diagrams and its variations - Air vessels - Savings in work done.		
Total No of Periods to be Taught		60 periods

TEXT BOOK:

1	Jain. A.K., Fluid Mechanics, Khanna Publishers, Delhi, 2010.
2	Chandramouli P N, Applied Hydraulic Engineering, Yes Dee Publisher, 2017



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	VenTe Chow, Open Channel Hydraulics, McGraw Hill, New York, 2009.
2	Modi P.N. and Seth S.M., Hydraulics and Fluid Mechanics, Standard Book House, New Delhi, 19 th edition, 2013.
3	Mays L. W., Water Resources Engineering, John Wiley and Sons (WSE), New York, 2019
4	Subramanya K., Flow in open channels, Tata McGraw Hill, New Delhi, 2019.

COURSE OUTCOMES:

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

CO1:	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application
CO2:	Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.
CO3:	Derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.
CO4:	Design turbines and explain the working principle
CO5:	Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	3	1	2	1	2	1	1	1	3	2	2
CO2	3	3	2	3	2	2	1	2	1	1	1	3	2	2
CO3	3	3	2	3	1	2	1	2	1	1	1	3	2	3
CO4	3	3	3	3	1	2	1	2	1	1	1	3	2	3
CO5	3	3	3	3	1	2	1	2	1	1	1	3	2	3
Avg.	3	3	2	3	1	2	1	2	1	1	1	3	2	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24402	STRENGTH OF MATERIALS	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To learn the fundamental concepts of Stress in simple and complex states and to know the mechanism of load transfer in beams and the induced stresses due to simple bending and unsymmetrical bending and to determine the deformation in determinate beams and to know the basic concepts of analysis of indeterminate beams.					

Unit-I	SIMPLE AND COMPOUND STRESSES	(9)
Stresses in simple and compound bars – Thermal stresses – Elastic constants - Thin cylindrical and spherical shells –Principal stresses and principal planes – Mohr's circle of stresses - Torsion on circular shafts.		
Unit-II	BENDING OF BEAMS	(9)
Types of beams and transverse loadings– Shear force and bending moment for simply supported, cantilever and over-hanging beams - Theory of simple bending – Bending stress distribution – Shear stress distribution.		
Unit-III	DEFLECTION OF BEAMS	(9)
Double Integration method – Macaulay's method – Area moment method – Conjugate beam method		
Unit-IV	INDETERMINATE BEAMS	(9)
Propped Cantilever and Fixed Beams – Fixed end moments reactions, slope and deflection for standard cases of loading — Continuous beams – support reactions and moments – Theorem of three moments – Shear Force and Bending Moment Diagrams.		
Unit-V	ADVANCED TOPICS	(9)
Unsymmetrical bending of beams - shear center applied - Thick cylinders - Theories of failure – Principal stress, principal strain, shear stress, strain energy and distortion energy theories – application problems.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi, 2018.
2	Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2017.
3	Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain, "Theory of Structures" (SMTS) Vol - II, Laxmi Publishing Pvt Ltd, New Delhi 2017.
4	Basavarajiah and Mahadevapa, Strength of Materials, University press, Hyderabad, 2016
5	Vazirani.V.N, Ratwani.M.M, Duggal .S.K Analysis of Structures: Analysis, Design and Detailing of Structures-Vol.1, Khanna Publishers, New Delhi 2014.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Kazimi S.M.A, "Solid Mechanics", Tata McGraw-Hill Publishing Co., New Delhi, 2017
2	William A .Nash, "Theory and Problems of Strength of Materials", Schaum's Outline Series, Tata McGraw Hill Publishing company, 2017.
3	Singh. D.K., " Strength of Materials", Ane Books Pvt. Ltd., New Delhi, 2021
4	Egor P Popov, "Engineering Mechanics of Solids", 2 nd edition, PHI Learning Pvt. Ltd., New Delhi, 2015
5	H.Shames, James M.Pitarresi, Introduction to Solid Mechanics, Prentice Hall of India, New Delhi, 2002
6	Beer. F.P. &Johnston.E.R."Mechanics of Materials", Tata McGraw Hill, Sixth Edition, New Delhi 2010.

COURSE OUTCOMES:

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

CO1:	Understand the concepts of stress and strain, principal stresses and principal planes.
CO2:	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
CO3:	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
CO4:	Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
CO5:	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	3	2	3	1	3	3	3	3
CO2	3	3	3	3	2	3	3	2	3	1	3	3	3	3
CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	3
CO4	3	3	3	3	2	3	3	2	3	1	3	3	3	3
CO5	3	3	3	3	2	3	3	2	3	1	3	3	3	3
Avg.	3	3	3	3	2	3	3	2	3	1	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24403	HIGHWAY AND RAILWAY ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To give an overview about the highway and railway engineering with respect to, planning, design, construction and maintenance as per IRC standards, specifications and methods.					

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 on curves (Problems)-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.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Khanna.S. K., Justo.C.E.G and Veeraragavan A. "Highway Engineering", Nemchand Publishers, 2014.
2	Subramanian K.P., "Highways, Railways, Airport and Harbour Engineering", Scitech Publications (India), Chennai, 2010
3	Kadiyali.L.R. "Principles and Practice of Highway Engineering", Khanna Technical Publications, 6 th edition Delhi, 2015.
4	C. Venkatramaiah., Transportation Engineering-Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels., Universities Press (India) Private Limited, Hyderabad, 2015.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Indian Road Congress (IRC), Guidelines for the Design of Flexible Pavements, (Third Revision), IRC:37-2012
2	Indian Road Congress (IRC), Guidelines for the Design of Plain Jointed Rigid Pavements for Highways, (Third Revision), IRC:58-2012
3	Yang H. Huang, "Pavement Analysis and Design", Pearson Education Inc, Ninth Impression, South Asia,2012
4	Ian D. Walsh, "ICE manual of highway design and management", ICE Publishers, 1st Edition, USA,2011
5	Fred L. Mannering, Scott S. Washburn and Walter P.Kilareski, "Principles of Highway Engineering and Traffic Analysis", Wiley India Pvt. Ltd., New Delhi,2011
6	Garber and Hoel, "Principles of Traffic and Highway Engineering", CENGAGE Learning, New Delhi,2010
7	O'Flaherty.C.A "Highways, Butterworth – Heinemann, Oxford,2006
8	IRC-37–2012, The Indian roads Congress, Guidelines for the Design of Flexible Pavements, NewDelhi

COURSE OUTCOMES:

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

CO1:	Plan a highway according to the principles and standards adopted in various Constitutions in India.
CO2:	Design the geometric features of road network and components of pavement.
CO3:	Test the highway materials and construction practice methods and know its Properties and able to perform pavement evaluation and management.
CO4:	Understand the methods of route alignment and design elements in railway Planning and constructions.
CO5:	Understand the construction techniques and maintenance of track laying and railway stations

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24404	ADVANCED CONSTRUCTION TECHNIQUES AND PRACTICES	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To study and understand the latest construction Equipment and techniques applied to engineering construction for sub structure, super structure, and special structures.					

Unit-I	CONSTRUCTION TECHNIQUES	(9)
Structural systems - Load Bearing Structure - Framed Structure - Load transfer mechanism – floor system - Development of construction techniques - High rise Building Technology - Seismic effect - Environmental impact of materials – responsible sourcing - Eco Building (Green Building) - Material used - Construction methods - Natural Buildings - Passive buildings - Intelligent(Smart) buildings - Meaning - Building automation - Energy efficient buildings for various zones-Case studies of residential, office buildings and other buildings in each zones.		
Unit-II	SUB STRUCTURE CONSTRUCTION	(9)
Construction Methodology - Box jacking - Pipe jacking - Under water construction of diaphragm walls and basement - Tunneling techniques - Piling techniques - Driving well and caisson - sinking cofferdam - cable anchoring and grouting - Driving diaphragm walls, Sheet piles - Laying operations for built up offshore system - Shoring for deep cutting – Large reservoir construction - well points - Dewatering for underground open excavation.		
Unit-III	SUPER STRUCTURE CONSTRUCTION FOR BUILDINGS	(9)
Vacuum dewatering of concrete flooring – Concrete paving technology – Techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections – Erection techniques of tall structures, Large span structures – launching techniques for heavy decks – in-situ prestressing in high rise structures, Post tensioning of slab- aerial transporting – Handling and erecting lightweight components on tall structures.		
Unit-IV	CONSTRUCTION OF SPECIAL STRUCTURES	(9)
Erection of lattice towers - Rigging of transmission line structures – Construction sequence in cooling towers, Silos, chimney, sky scrapers - Bow string bridges, Cable stayed bridges – Launching and pushing of box decks – Construction of jetties and break water structures – Construction sequence and methods in domes – Support structure for heavy equipment and machinery in heavy industries – Erection of articulated structures and space decks.		
Unit-V	CONSTRUCTION EQUIPMENT	(9)
Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, front end waders, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching and mixing and concreting - Equipment for material handling and erection of structures - Equipment for dredging, trenching, tunneling.		
Total No of Periods to be Taught		45 Periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Arora S.P. and Bindra S.P., "Building Construction, Planning Techniques and Method of Construction", Dhanpat Rai and Sons, 1997.
2	Varghese, P.C. "Building construction", Prentice Hall of India Pvt. Ltd, New Delhi, 2007.
3	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., "Construction Planning, Equipment and Methods", 5 th Edition, McGraw Hill, Singapore, 1995.

REFERENCES:

1	Jerry Irvine, Advanced Construction Techniques, CA Rocket, 1984
2	Patrick Powers. J., Construction Dewatering: New Methods and Applications, John Wiley & Sons, 1992.
3	Peter H.Emmons, "Concrete repair and maintenance illustrated", Galgotia Publications Pvt. Ltd., 2001.Press, 2008.
4	Robertwade Brown, Practical foundation engineering hand book, McGraw Hill Publications, 1995.

COURSE OUTCOMES:

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

CO1:	Understand the modern construction Practices used in the construction.
CO2:	Understand the construction techniques used in the sub structure Construction.
CO3:	Demonstrate knowledge and understanding of the principles and concepts relevant to super structure construction for buildings
CO4:	Understand the concepts used in the construction of special structures
CO5:	Identify the suitable Construction Equipment.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UESST24401	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	L	T	P	C	100
		2	0	0	2	
Course Objectives	➤ To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.					
	➤ To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.					
	➤ To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.					
	➤ To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.					
	➤ To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.					

Unit-I	ENVIRONMENT AND BIODIVERSITY	(6)
Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.		
Unit-II	ENVIRONMENTAL POLLUTION	(6)
Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Wastemanagement. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.		
Unit-III	RENEWABLE SOURCES OF ENERGY	(6)
Energy management and conservation, New Energy Sources: Need of new sources. Different types new energysources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.		
Unit-IV	SUSTAINABILITY AND MANAGEMENT	(6)
Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals- targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.		
Unit-V	SUSTAINABILITY PRACTICES	(6)



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio economical and technological change.

Total No of Periods to be Taught

30 periods

TEXT BOOK:

1	Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6 th Edition, New Age International Publishers, 2018.
2	Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3	Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education.
4	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5	Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6	Environment Impact Assessment Guidelines, Notification of Government of India, 2006.

REFERENCES:

1	R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 th edition 2010.
2	Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai,
3	Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4	Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5	Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd.

COURSE OUTCOMES:

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

CO1:	To recognize and understand the functions of environment, ecosystems and Bio diversity and their conservation.
------	--



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



CO2:	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
CO3:	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
CO4:	To recognize the different goals of sustainable development and apply them for Suitable technological advancement and societal development.
CO5:	To demonstrate the knowledge of sustainability practices and identify green Materials, energy cycles and the role of sustainable urbanization.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCETL24401	SOIL MECHANICS ENGINEERING	L	T	P	C	100
		3	0	2	4	
Course Objectives	➤ To impart knowledge to classify the soil based on index properties and to assess their engineering properties based on the classification. ➤ To familiarize the students about the fundamental concepts of compaction, flow through soil, stress transformation, stress distribution, consolidation and shear strength of soils. ➤ To impart knowledge of design of both finite and infinite slope.					

Unit-I	SOIL CLASSIFICATION AND COMPACTION	(9)
History – formation and types of soil – composition - Index properties –Classification – BIS – AASHTO – Unified classification system – phase relationship – Compaction theory – laboratory and field technology – field Compaction method – factors influencing compaction.		
Unit-II	EFFECTIVE STRESS AND PERMEABILITY	(9)
Soil - water – Static pressure in water - Effective stress concepts in soils – Capillary phenomena– Permeability –Darcy's law – Determination of Permeability — Factors influencing permeability of soils – Unconfined and Confined aquifer- Seepage - Two dimensional flow – Laplace's equation – Introduction to flow nets.		
Unit-III	STRESS DISTRIBUTION AND SETTLEMENT	(9)
Stress distribution in homogeneous and isotropic medium – Boussinesq theory – (Point load, Line load and udl) Use of Newmarks influence chart –Components of settlement – Immediate and consolidation settlement – Factors influencing settlement – Terzaghi's one dimensional consolidation theory – Computation of rate of settlement. – $\sqrt{t}$ and $\log t$ methods. e-log p relationship - determination of pre consolidation pressure consolidation settlement N-Cclays – O.C clays – Computation.		
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, UCC and Vane shear tests – Pore pressure parameters – Cyclic mobility –Liquefaction.		
Unit-V	SLOPE STABILITY	(9)
Infinite slopes and finite slopes — Friction circle method – Use of stability number –Guidelines for location of critical slope surface in cohesive and c - soil – Slope protection measures.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

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



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



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.

List of Exercises/Experiments

Determination of Index Properties:

1. Specific gravity of soil solids.
2. Grain size distribution – Sieve analysis.
3. Grain size distribution - Hydrometer analysis.
4. Liquid limit and Plastic limit tests.

Determination of Insitu Density and Compaction Characteristics:

5. Field density Test (Sand replacement method and core cutter method).
6. Determination of moisture – density relationship using standard Proctor compaction test.
7. Determination of relative density (Demonstration only).

Determination of Engineering Properties:

8. Permeability determination (constant head and falling head methods).
9. One dimensional consolidation test (Determination of Co-efficient of consolidation only).
10. Direct shear test in cohesionless soil.
11. Tri-axial compression test in cohesionless soil (Demonstration only).
12. California Bearing Ratio Test.

Total No of Periods to be Taught

30 Periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Summarize the classification of soil and soil properties.
CO2:	Describe the effective stress concepts and permeability of soil.
CO3:	Outline stress distribution of soil.
CO4:	Explain about shear strength of soil.
CO5:	Narrate the slope stability in soil and slope protection measures.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Sieves	2
2	Liquid and Plastic limit apparatus	2
3	Proctor Compaction apparatus	2
4	Direct Shear apparatus	1
5	Sand replacement method accessories	1
6	core cutter method accessories	2
7	Three Gang Consolidation test device	1
8	Sieve Shaker Machine	1
9	Permeability Apparatus	1
10	CBR Apparatus	1
11	Weighing machine – 1kg capacity	1

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	2	2	2	1	1	1	2	1	2	3	3	3
CO2	3	2	3	2	2	1	1	1	2	1	2	3	2	2
CO3	3	3	2	2	2	2	1	1	2	1	2	3	2	2
CO4	2	3	3	2	2	1	1	1	1	1	2	3	2	2
CO5	3	3	2	2	2	1	1	1	1	1	1	3	2	3
Avg.	3	3	2	2	2	1	1	1	2	1	2	3	2	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24401	BUILDING DRAWING AND DETAILING LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	➤ To impart knowledge and skill relevant to Building drawing and Detailing lab using computer software.					

List of Exercises/Experiments

List of Exercises/Experiments	
1. Introduction about Computer Aided Drafting.	
2. Buildings with load bearing walls.	
3. R.C.C. framed structures (Plan, section , elevation).	
4. Principles of planning, orientation and complete joinery details (Paneled and Glazed Doors and Windows).	
5. Buildings with sloping roof Structure.	
6. Industrial buildings – North light roof structures.	
7. Reinforcement details of RCC structural elements –Slab.	
8. Reinforcement details of RCC structural elements –Beam.	
9. Reinforcement details of RCC structural elements –Column.	
10. Reinforcement details of footings.	
Total No of Periods to be Taught	60 periods

COURSE OUTCOMES:

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

CO1:	Draft the plan, elevation and sectional view of the load bearing
CO2:	Draft the plan, elevation and sectional view of the framed buildings
CO3:	Draft the plan, elevation and sectional view of the Industrial buildings
CO4:	Draw the structural detailing of RCC elements
CO5:	Draw the structural detailing of Footing



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer	30 Nos
2	AutoCAD 2023	10 users

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	-	-	1	-	-	-	1	3	2
CO2	3	2	-	-	2	3	-	2	3	2	-	2	3	2
CO3	3	2	-	-	2	3	-	2	3	2	-	2	3	2
CO4	3	2	-	2	2	3	-	1	3	2	-	2	3	2
CO5	3	2	-	2	2	3	-	2	3	2	-	2	3	2
Avg.	3	2	-	2	2	3	-	2	3	2	-	2	3	2
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy														



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24402	HYDRAULIC ENGINEERING LABORATORY	L	T	P	C	100
		0	0	3	2	
Course Objectives	➤ To provide hands on experience in calibration of flow meters, performance characteristics of pumps and turbines.					

List of Exercises/Experiments	
A. Flow Measurement:	
1. Calibration of Rotameter.	
2. Flow through Orifice meter/mouthpiece, Venturimeter and Notches.	
3. Bernoulli's Experiment.	
B. Losses in Pipes:	
4. Determination of friction factor in pipes.	
5. Determination of minor losses.	
C. Pumps:	
6. Characteristics of Centrifugal pumps & Gear pump.	
7. Characteristics of Submersible pump & Reciprocating pump.	
D. Turbines:	
8. Characteristics of Pelton wheel turbine.	
9. Characteristics of Francis turbine.	
E. Determination of Metacentric Height:	
10. Determination of metacentric height of floating bodies.	
Total No of Periods to be Taught	45 periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Apply Bernoulli equation for calibration of flow measuring devices.
CO2:	Measure friction factor in pipes and compare with Moody diagram
CO3:	Determine the performance characteristics of rotodynamic pumps.
CO4:	Determine the performance characteristics of positive displacement pumps.
CO5:	Determine the performance characteristics of turbines.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Rotameter	1
2	Orifice meter/mouthpiece, Venturimeter and Notches	1
3	Bernoulli's Experiment	1
4	Friction factor in pipes.	1
5	Minor losses	1
6	Centrifugal pumps	1
7	Gear pump	1
8	Submersible pump	1
9	Reciprocating pump	1
10	Pelton wheel turbine	1
11	Francis turbine	1

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	3	1	2	1	2	1	1	2	2	1	1
CO2	3	2	1	3	1	2	1	2	1	1	2	3	1	1
CO3	3	3	2	3	1	2	1	3	1	1	2	3	2	1
CO4	3	3	2	3	1	2	1	3	1	1	2	3	2	1
CO5	3	3	2	3	1	2	1	3	1	1	2	3	2	1
Avg.	3	3	2	3	1	2	1	2	1	1	2	3	2	1

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103- Civil
-------------------	-------------------	----------------------------------	------------

Semester v

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24501	DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To introduce the different design philosophy for reinforced concrete and discuss the limit state method of design of RC rectangular beams and to learn the concept in the design of RC flanged beams and design for shear and torsion and design of RC slabs and staircase, short RC columns, RC footing for walls, pad, sloped and combined rectangular footings.					

Unit-I	METHODS OF DESIGN OF CONCRETE STRUCTURES	(9)
Concept of Elastic method, ultimate load method and limit state method – Working stress method as detailed in IS code - Design of Singly Reinforced beam by working stress method - Limit State philosophy as detailed in IS code - Advantages of Limit State Method over other methods - Analysis and design of singly and doubly reinforced rectangular beams by limit State Method.		
Unit-II	LIMIT STATE METHOD - FLANGED BEAM, SHEAR & TORSION	(9)
Analysis and design of flanged beams – Use of design aids for Flexure - Behaviour of RC members in bond and Anchorage - Design requirements as per current code - Behaviour of RC beams in shear and torsion - Design of RC members for combined bending, shear and torsion - serviceability.		
Unit-III	LIMIT STATE DESIGN OF SLABS AND STAIRCASE	(9)
Analysis and design of cantilever, one way, two way and continuous slabs subjected to uniformly distributed load for various boundary conditions- Types of Staircases – Design of dog-legged Staircase – Introduction to Flat Slab.		
Unit-IV	LIMIT STATE DESIGN OF COLUMNS	(9)
Types of columns – Design of short Rectangular and circular columns for axial, uniaxial and biaxial bending.		
Unit-V	LIMIT STATE DESIGN OF FOOTING	(9)
Design of wall footing – Design of axially and eccentrically loaded rectangular pad and sloped footings – Design of combined rectangular footing for two columns only.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Gambhir.M.L., "Fundamentals of Reinforced Concrete Design", Prentice Hall of India Private Limited, New Delhi, 2006.
2	Krishnaraju.N "Design of Reinforced Concrete Structures", CBS Publishers & Distributors Pvt. Ltd., New Delhi.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Sinha, S.N., "Reinforced Concrete Design", Tata McGraw Hill Publishing Company Ltd., New Delhi.
2	Unnikrishna Pillai, S., Devdas Menon, "Reinforced Concrete Design", Tata McGraw Hill Publishing Company Ltd., 2021
3	Punmia.B.C., Ashok Kumar Jain, Arun Kumar Jain, "Limit State Design of Reinforced Concrete", Laxmi Publication Pvt. Ltd., New Delhi, 2016
4	Shah V L Karve S R., "Limit State Theory and Design of Reinforced Concrete", Structures Publications, Pune, 2013

COURSE OUTCOMES:

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

CO1:	Know the various design concepts and design RC rectangular beams by working stress and limit state methods
CO2:	Understand the design of flanged beams, design for shear and torsion, and anchorage and development length.
CO3:	Design RC slabs and staircase and draw the reinforcement detailing.
CO4:	Design short columns for axial, uni-axial and bi-axial eccentric loadings
CO5:	Design wall footings, isolated footings and combined rectangular footing.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	3	1	3	2	1	2	3	3	3
CO2	3	3	3	3	1	3	1	3	2	1	2	3	3	3
CO3	3	3	3	3	1	3	1	3	2	1	2	3	3	3
CO4	3	3	3	3	1	3	1	3	2	1	2	3	3	3
CO5	3	3	3	3	1	3	1	3	2	1	2	3	3	3
Avg.	3	3	3	3	1	3	1	3	2	1	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester V

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24502	STRUCTURAL ANALYSIS - I	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To introduce the students to the basic theory and concepts of classical methods of structuralanalysis					

Unit-I	ANALYSIS OF TRUSSES	(9)
Determinate and indeterminate trusses - analysis of determinate trusses - method of joints - method of sections - Deflections of pin-jointed plane frames - lack of fit - change in temperature method of tension coefficient – Application to space trusses.		
Unit-II	SLOPE DEFLECTION METHOD	(9)
Slope deflection equations – Equilibrium conditions - Analysis of continuous beams and rigid frames – Rigid frames with inclined members - Support settlements - symmetric frames with symmetric and skew-symmetric loadings.		
Unit-III	MOMENT DISTRIBUTION METHOD	(9)
Stiffness - distribution and carry over factors – Analysis of continuous Beams- Plane rigid frames with and without sway – Support settlement - symmetric frames with symmetric and skew-symmetric loadings.		
Unit-IV	FLEXIBILITY METHOD	(9)
Primary structures - Compatibility conditions – Formation flexibility matrices - Analysis of indeterminate pin-jointed plane frames, continuous beams and rigid jointed plane frames by direct flexibility approach.		
Unit-V	STIFFNESS METHOD	(9)
Restrained structure – Formation of stiffness matrices - equilibrium condition - Analysis of Continuous Beams, Pin-jointed plane frames and rigid frames by direct stiffness method.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Bhavikatti, S.S, Structural Analysis, Vol.1, & 2, Vikas Publishing House Pvt.Ltd. New Delhi-4, 2014.
2	Punmia.B.C, Ashok Kumar Jain & Arun Kumar Jain, Theory of structures, Laxmi Publications, New Delhi, 2004.

REFERENCES:

1	William Weaver, Jr and James M.Gere, Matrix analysis of framed structures, CBS Publishers & Distributors, Second Edition, Delhi, 2004
2	Reddy .C.S, “Basic Structural Analysis”, Tata McGraw Hill Publishing Company, 2005.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



3	Negi L.S. and Jangid R.S., Structural Analysis, Tata McGraw Hill Publishing. Co. Ltd. 2004
4	Bhavikatti, S.S, Matrix Method of Structural Analysis, I. K. International Publishing House Pvt.Ltd.,New Delhi-4,2014.

COURSE OUTCOMES:

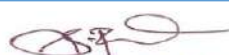
On completion of the course, the students will be able to

CO1:	Analyze the pin-jointed plane and space frames.
CO2:	Analyse the continuous beams and rigid frames by slope deflection method.
CO3:	Understand the concept of moment distribution and analysis of continuousbeams and rigid frames with and without sway.
CO4:	Analyse the indeterminate pin jointed plane frames continuous beams andrigid frames using matrix flexibility method.
CO5:	Understand the concept of matrix stiffness method and analysis of continuousbeams, pin jointed trusses and rigid plane frames.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	3	1	3	2	1	2	3	3	3
CO2	3	3	3	3	1	3	1	3	2	1	1	3	3	3
CO3	3	3	3	3	1	3	1	3	2	1	1	3	3	3
CO4	3	3	3	3	1	3	1	3	2	1	1	3	3	3
CO5	3	3	3	3	1	3	1	3	2	1	1	3	3	3
Avg.	3	3	3	3	1	3	1	3	2	1	1	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103-Civil
-------------------	-------------------	----------------------------------	-----------

Semester V

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24503	FOUNDATION ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To impart knowledge to plan and execute a detail site investigation programme, to select geotechnical design parameters and type of foundations. Also to familiarize the students for the geotechnical design of different type of foundations and retaining walls.					

Unit-I	SITE INVESTIGATION AND SELECTION OF FOUNDATION	(9)
Scope and objectives – Methods of exploration – Auguring and boring – Wash boring and rotary drilling – Depth and spacing of bore holes – Soil samples – Representative and undisturbed – Sampling methods – Split spoon sampler, Thin wall sampler, Stationary piston sampler – Penetration tests (SPT and SCPT) – Data interpretation – Strength parameters and Evaluation of Liquefaction potential - Selection of foundation based on soil condition- Bore log report.		
Unit-II	BEARING CAPACITY OF SHALLOW FOUNDATION	(9)
Introduction – Location and depth of foundation – Codal provisions – Bearing capacity of shallow foundation on homogeneous deposits – Terzaghi's formula and BIS formula – Factors affecting bearing capacity – Bearing capacity from in-situ tests (SPT, SCPT and plate load) – Allowable bearing pressure – Seismic considerations in bearing capacity evaluation. Determination of Settlement of foundations on granular and clay deposits – Total and differential settlement – Allowable settlements – Codal provision – Methods of minimizing total and differential settlements.		
Unit-III	FOOTINGS AND RAFTS	(9)
Types of Isolated footing, Combined footing, Mat foundation – Contact pressure and settlement distribution – Proportioning of foundations for conventional rigid behaviour – Minimum depth for rigid behaviour – Applications – Floating foundation – Special foundations – Seismic force consideration – Codal provision		
Unit-IV	PILE FOUNDATION	(9)
Types of piles and their functions – Factors influencing the selection of pile – Carrying capacity of single pile in granular and cohesive soil – Static formula – Dynamic formulae (Engineering news and Hileys) – Capacity from insitu tests (SPT, SCPT) – Negative skin friction – Uplift capacity- Group capacity by different methods (Field's rule, Converse– Labarra formula and block failure criterion) – Settlement of pile groups – Interpretation of pile load test (routine test only), Under reamed piles – Capacity under compression and uplift – Codal provision.		
Unit-V	RETAINING WALLS	(9)
Plastic equilibrium in soils – Active and passive states – Rankine's theory – Cohesionless and cohesive soil – Coulomb's wedge theory – Condition for critical failure plane – Earth pressure on retaining walls of simple configurations – Culmann Graphical method – Pressure on the wall due to line load – Stability analysis of retaining walls – Codal provision.		
Total No of Periods to be Taught		45 periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

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

REFERENCES:

1	Das, B.M. "Principles of Foundation Engineering" (Eighth edition), Thompson Asia Pvt. Ltd., Singapore, 2017.
2	Kaniraj, S.R. "Design aids in Soil Mechanics and Foundation Engineering", Tata McGraw Hill publishing company Ltd., New Delhi, 2017.
3	Varghese, P.C., "Foundation Engineering", Prentice Hall of India Private Limited, New Delhi, 2012.
4	Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd., New Delhi, 2017.

COURSE OUTCOMES:

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

CO1:	Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation
CO2:	Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications.
CO3:	Graduate will demonstrate an ability to design combined footings and raft foundations, its component or process as per the needs and specifications.
CO4:	Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications.
CO5:	Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	3	3	1	2	1	1	1	1	3	3	2	3
CO2	2	3	3	3	1	2	1	1	1	1	3	2	3	2
CO3	2	3	3	3	1	2	1	1	1	2	3	2	3	2
CO4	2	3	3	3	1	1	1	1	1	2	3	2	3	3
CO5	2	3	3	3	1	2	1	1	1	2	3	2	3	3
Avg.	2	3	3	3	1	2	1	1	1	2	3	2	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester V

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24501	HIGHWAY ENGINEERING LABORATORY	L	T	P	C	100
		0	0	3	2	
Course Objectives	➤ To understand the various tests procedure of fresh and hardened concrete. ➤ To study mix design as per Indian and ACI Standards ➤ To conduct test on aggregate and bitumen					

List of Exercises/Experiments

1. Determination of workability of concrete by slump test and casting of specimens	
2. Determination of workability of concrete by compaction factor test and casting of specimens	
3. Determination of workability of concrete by Vee Bee Consistometer test and casting of specimens	
4. Determination of flakiness, elongation index of aggregates	
5. Design of concrete mix by IS method and casting of specimens	
6. Determination of crushing, impact value of aggregates	
7. Determination of Abrasion value of aggregates	
8. Determination of Compressive strength of concrete specimens	
9. Determination of Tensile strength of concrete specimens	
10. Determination of flexural strength of concrete specimens	
11. Determination of penetration value of Bitumen	
12. Determination of Ductility index of Bitumen	
Total No of Periods to be Taught	45 periods

COURSE OUTCOMES:

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

CO1:	Understand the physical properties of constituent materials of concrete
CO2:	Determine the properties of fresh concrete including strength
CO3:	Determine the properties of hardened concrete including strength and durability
CO4:	Design concrete mixes and apply statistical quality control techniques
CO5:	Evaluate the Consistency and Properties of Bitumen.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Universal Testing Machine minimum of 400 kN capacity	1
2	Compression Testing Machine	1
3	Slump Test Apparatus with tamping rod	1
4	Compaction factor apparatus	1
5	Fine sieves	1
6	Coarse Sieves	1
7	Length gauge(Elongation gauge)	1
8	Thickness gauge (Flakiness)	1
9	Cube Mould	20
10	Cylindrical mould	3
11	Beam Mould	3
12	Weighing Balance 50 Kg	1
13	Vee Bee Consistometer	1
14	Los angel Abrasion Machine	1
15	Ductility Machine	1
16	Impact Machine	1
17	Concrete Mixer	1

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	3	2	1	1	1	3	3	1	3	3	3	2
CO2	3	1	3	2	1	1	1	3	3	1	3	3	3	2
CO3	3	1	3	2	1	1	1	3	3	1	3	3	3	2
CO4	3	1	3	2	1	1	1	3	3	1	3	3	3	2
CO5	3	1	3	2	1	1	1	3	3	1	3	3	3	2
Avg.	3	1	3	2	1	1	1	3	3	1	3	3	3	2

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
------------	-------------------	-----------------------	-------------

Semester V

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24502	SURVEY CAMP (2 WEEKS)	L	T	P	C	100
		0	0	0	1	
Course Objectives	➤ The objective of the survey camp is to enable the students to get practical training in the field work. Groups of not more than six members in a group will carry out each exercise in survey camp. At the end of the camp, each student shall have mapped and contoured the area. Thecamp record shall include all original field observations, calculations and plots.					

List of Exercises/Experiments

Two weeks Survey Camp will be conducted during summer vacation in the following activities:

1. Traverse – using Theodolite / Total station	
2. Contouring	
i. (Radial tachometric contouring - Radial Line at Every 45 Degree and Length not less than 60 Meter on each Radial Line	
ii. Block Level/ By squares of size at least 100 Meter x 100 Meter atleast 20 Meter interval	
iii. L.S & C.S - Road and canal alignment for a Length of not less than 1 Kilo Meter atleast L.S at Every 30M andC.S at every 90 M	
3. Offset of Buildings and Plotting the Location	
4. Sun observation to determine azimuth (guidelines to be given to the students)	
5. Use of GPS to determine latitude and longitude and locate the survey camp location	
6. Traversing using GPS	
7. Curve setting by deflection angle	
Apart from above students may be given survey exercises in other area also based on site condition to give good exposure on survey.	
Total No of Periods to be Taught	2 WEEKS

COURSE OUTCOMES:

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

CO1:	Carry out different setting out works in the field
CO2:	Apply modern surveying techniques in field to establish horizontal control.
CO3:	Understand the surveying techniques in field to establish vertical control
CO4:	Apply different survey adjustment techniques
CO5:	Handle the modern surveying instruments like Total station and GPS

Space for BOS seal & Sign



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Chain	5
2	Cross Staff	10
3	Ranging Rod	30
4.	Steel Arrows	25
5	Prismatic Compass	10
6	Surveyor Compass	2
7	Dumpy Level	7
8	Levelling Staff	7
9	Theodolite	10
10	Total Station	2
11	Pocket stereoscope	1

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	-	3	3	2	3	2	2	2	3	3	3	3
CO2	3	3	-	3	3	2	3	2	2	2	3	3	3	3
CO3	3	3	2	3	3	3	2	2	2	2	3	3	3	3
CO4	3	3	2	-	3	2	2	2	2	2	3	3	3	3
CO5	3	3	2	-	3	2	2	-	2	2	3	3	3	3
Avg.	3	3	2	3	3	2	2	2	2	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy														

Space for BOS seal & Sign



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name				114 - Mechanical
Semester						
Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UIDL24001	IDEA LAB	L	T	P	C	100
		0	0	2	1	
Course Objectives	- To learn all the skills associated with the tools and inventory associated with the IDEA Lab. - To familiarize with PCB design and prototyping - To explore design software and laser cutting for fabrication - To perform basic turning operation on a lathe machine - To introduce basic 3D modeling and additive manufacturing					

List of Exercises/Experiments	
1.	To study the working principles and operation of wood lathe machine.
2.	To Study the 3D 2D profile cutting of press fit box/casing in acrylic (3 or 6 mm thickness)/cardboard, MDF (2 mm) board using laser cutter & engraver.
3.	Schematic and PCB layout design of a suitable circuit, fabrication and testing of the circuit.
4.	Making of Models Using CNC Wood Router
5.	3D Printing of Scanned Geometry Using FDM, SLA Printer, 3D Printing of Scanned Geometry
Total No of Periods to be Taught	
30 periods	

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	Apply basic design thinking principles to conceptualize and develop simple prototypes using digital fabrication tools such as 3D printers, scanners, and PCB machines.
CO2:	Demonstrate the ability to operate modern prototyping equipment like laser cutters, CNC machines, and lathes to fabricate mechanical and electronic components.
CO3:	Integrate mechanical design, electronics, and fabrication techniques to develop interdisciplinary solutions for real-world problems through hands-on experimentation


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	PCB Prototyping Machines	01 No
2	CNC Wood Router	01 No
3	CO ₂ Laser Cutter	01 No
4	3D Printer	05 No
5	3D Scanner	02 No

Mapping of COs with POs and PSOs														
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	3	1	3	1	-	-	-	-	-	-	-	-
CO2	2	2	2	2	3	2	-	-	-	-	-	-	-	-
CO3	3	3	3	2	3	2	-	-	-	-	-	-	-	-
Avg.	2	2	2	2	3	2	-	-	-	-	-	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester VI

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24601	DESIGN OF STEEL STRUCTURES	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To introduce the students to limit state design of structural steel members subjected to compressive, tensile and bending loads, including connections and to provide the students the tools necessary for designing structural systems such as roof trusses and gantry girders as per provisions of current code (IS 800 - 2007) of practice.					

Unit-I	INTRODUCTION TO STRUCTURAL STEEL AND DESIGN OF CONNECTIONS	(9)
General -Types of Steel -Properties of structural steel - I.S. rolled sections - Concept of Limit State Design - Design of Simple and eccentric Bolted and welded connections - Types of failure and efficiency of joint – prying action -Introduction to HSFG bolts		
Unit-II	DESIGN OF TENSION MEMBERS	(9)
Behaviour and Design of simple and built-up members subjected to tension - Shear lag effect- Design of lug angles -tension splice		
Unit-III	DESIGN OF COMPRESSION MEMBERS	(9)
Behaviour of short and long columns - Euler's column theory- Design of simple and built-up compression members with lacing and battens - Design of column bases - slab base and gusseted base		
Unit-IV	DESIGN OF BEAMS	(9)
Design of laterally supported and unsupported beams - Design of built-up beams - Design of plate girders		
Unit-V	INDUSTRIAL STRUCTURES	(9)
Design of roof trusses – loads on trusses – purlin design using angle and channel sections – truss design, Design of joints and end bearings–Design of gantry girder - Introduction to pre-engineered buildings		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Duggal S.K., Design of Steel Structures, Tata McGraw Hill, Publishing Co. Ltd., New Delhi, 2010
2	Bhavikatti S.S, Design of Steel Structures, Iik International Publishing House, New Delhi, 2017.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Gambhir M L, Fundamentals of Structural Steel Design, McGraw Hill Education India Pvt Limited, 2013
2	Jack C. McCormac and Stephen F Csernak, Structural Steel Design, Pearson Education Limited, 2013.
3	SarwarAlamRaz, Structural Design in Steel, New Age International Publishers, 2014
4	Subramanian N, Design of Steel Structures, Oxford University Press, New Delhi, 2016

COURSE OUTCOMES:

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

CO1:	Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connections, and determine their design strengths
CO2:	Select the most suitable section shape and size for tension members according to specific design criteria
CO3:	Select the most suitable section shape and size for compression members according to specific design criteria
CO4:	Apply the principles, procedures and current code requirements to the analysis and design of beams
CO5:	Identify and compute the design loads on Industrial structures, and gantry girder

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester VI

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24602	STRUCTURAL ANALYSIS – II	L	T	P	C	100
		3	0	0	3	
Course Objectives	➤ To learn the method of drawing influence lines and its uses in various applications like beams,bridges and plane trusses and to analyse arches and suspension bridges					

Unit-I	INFLUENCE LINES FOR DETERMINATE STRUCTURES	(9)
Introduction to moving loads, Concept of Influence Lines, Influence lines for reactions in statically determinate structures –Influence lines for shear force and bending moment in beam section – Calculation of critical stress resultants due to concentrated and distributed moving loads - Influence lines for member forces in pin jointed plane frames.		
Unit-II	INFLUENCE LINES FOR INDETERMINATE BEAMS	(9)
Muller Breslau's principle - Influence line for support reactions, shearing force and bending moments for indeterminate beams - propped cantilevers, fixed beams and continuous beams.		
Unit-III	ARCHES	(9)
Arches - Eddy's theorem - Types of arches – Analysis of three-hinged, two-hinged and fixed arches - Parabolic and circular arches - influence lines, rib shortening– Settlement and temperature effects.		
Unit-IV	SUSPENSION BRIDGES AND SPACE TRUSSES	(9)
Analysis of suspension bridges – Unstiffened cables and cables with three hinged stiffening girders – Influence lines for three hinged stiffening girders - Introduction to analysis of space trusses using method of tension coefficients.		
Unit-V	APPROXIMATE ANALYSIS OF FRAMES	(9)
Approximate analysis for gravity loadings - substitute frame method for maximum moments in beams and columns -Approximate analysis for horizontal loads - portal method and cantilever method - assumptions - axial force, shearing force and bending moment diagrams.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Bhavikatti, S.S, Structural Analysis, Vol.1 & 2, Vikas Publishing House Pvt.Ltd., New Delhi-4, 2014.
2	Punmia, B.C, Ashok Kumar Jain and Arun Kumar Jain, Theory of structures, Laxmi, Publications, 2004.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Negi.L.S and JangidR.S ., Structural Analysis , Tata McGraw-Hill Publishers, 2004.
2	Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Co. Ltd., Third Edition, 2010.
3	Gambhir.M.L., Fundamentals of Structural Mechanics and Analysis, PHI Learning Pvt. Ltd., 2011.
4	Vazrani.V.N And Ratwani,M.M, Analysis of Structures, Vol.II, Khanna Publishers,2015.

COURSE OUTCOMES:

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

CO1:	Draw influence lines for statically determinate structures and calculate critical stress resultants.
CO2:	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
CO3:	Analyse three hinged, two hinged and fixed arches.
CO4:	Analyse the suspension bridges with stiffening girders
CO5:	Analyse HYD rigid frames by approximate methods for gravity and horizontal loads.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	3	1	3	2	1	1	3	3	3
CO2	3	3	3	3	1	3	1	3	2	1	1	3	3	3
CO3	3	3	3	3	1	3	1	3	2	1	1	3	3	3
CO4	3	3	3	3	1	3	1	3	2	1	1	3	3	3
CO5	3	3	3	3	1	3	1	3	2	1	1	3	3	3
Avg.	3	3	3	3	1	3	1	3	2	1	1	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester VI

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24603	ENVIRONMENTAL IMPACT ASSESSMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To expose the students to the need, methodology, documentation and usefulness of environmental impact assessment and to develop the skill to prepare environmental management plan. - To participate in the performance of an environmental assessment process (EIA or SEA), given the disciplinary knowledge and skills in natural sciences and Engineering the student have achieved in other courses.					

Unit-I	INTRODUCTION	(9)
Historical development of Environmental Impact Assessment (EIA). Environmental Clearance- EIA in project cycle. legal and regulatory aspects in India – types and limitations of EIA –EIA process screening – scoping - terms of reference in EIA- setting – analysis – mitigation. Cross sectoral issues – public hearing in EIA- EIA consultant accreditation.		
Unit-II	IMPACT IDENTIFICATION AND PREDICTION	(9)
Matrices – networks – checklists – cost benefit analysis – analysis of alternatives – expert systems in EIA. prediction tools for EIA – mathematical modelling for impact prediction – assessment of impacts – air – water – soil – noise – biological — cumulative impact assessment		
Unit-III	SOCIO-ECONOMIC IMPACT ASSESSMENT	(9)
Socio-economic impact assessment - relationship between social impacts and change in community and institutional arrangements. factors and methodologies- individual and family level impacts. communities in transition-rehabilitation		
Unit-IV	EIA DOCUMENTATION AND ENVIRONMENTAL MANAGEMENT PLAN	(9)
Environmental management plan - preparation, implementation and review – mitigation and rehabilitation plans – policy and guidelines for planning and monitoring programmes – post project audit – documentation of EIA findings – ethical and quality aspects of environmental impact assessment		
Unit-V	CASE STUDIES	(9)
Mining, power plants, cement plants, highways, petroleum refining industry, storage & handling of hazardous chemicals, common hazardous waste facilities, CETPs, CMSWMF, building and construction projects		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	K. V. Raghavan and A A. Khan, "Methodologies in Hazard Identification and Risk Assessment", Manual by CLRI, 1990
---	--


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Canter, L.W., "Environmental Impact Assessment", McGraw Hill, New York. 1996
2	Lawrence, D.P., "Environmental Impact Assessment – Practical solutions to recurrent problems", Wiley- Interscience, New Jersey. 2003
3	World Bank –Source book on EIA
4	Cutter, S.L., "Environmental Risk and Hazards", Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.

COURSE OUTCOMES:

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

CO1:	Carry out scoping and screening of developmental projects for environmental and social assessments
CO2:	Explain different methodologies for environmental impact prediction and assessment
CO3:	Asses socio-economic investigation of the environment in a project
CO4:	Plan environmental impact assessments and environmental management plans
CO5:	Knowledge to prepare environmental impact assessment reports for various projects

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103 - Civil
-------------------	-------------------	----------------------------------	-------------

Semester VI

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCETL24601	IRRIGATION ENGINEERING AND DRAWING	L	T	P	C	100
		3	0	2	4	
Course Objectives	To expose the students to irrigation principles, concept of available water, storage and diversion structures, and canal irrigation with the design components, so that they could understand the necessity of irrigation which aims at providing water at the right quantity, at the right time and at the right place.					

Unit-I	IRRIGATION PRINCIPLES	(9)
Need for irrigation – Advantages and ill effects – National Water Policy – Tamil Nadu scenario – Physical properties of soil that influence soil moisture characteristics – Concept of soil water potential and its components – Concept of available water – Measurement of soil moisture content.		
Unit-II	CROP WATER REQUIREMENT	(9)
Necessity and importance – Crop and crop seasons in India – Duty, Delta, and Base Period – Factors affecting Duty –Irrigation efficiencies – Consumptive use of water – Irrigation scheduling: CROP WATER – Standards for irrigation water.		
Unit-III	DIVERSION AND IMPOUNDING STRUCTURES	(9)
Diversion Head works: Components, Location, Functions – Weirs and Barrages – Types of dams – Factors affecting,location of dams – Forces acting on a dam – Spillways – Energy dissipaters.		
Unit-IV	CANAL IRRIGATION	(9)
Classification – Design of irrigation canals: Regime theories – Canal regulators – Canal drops – Cross drainage works – Canal Outlets – Canal Escapes – Lining of canals – Methods of Irrigation: Surface, Subsurface and Micro Irrigation - canal alignments-Canal lining - Kennedy's and Lacey's Regime theory		
Unit-V	WATER MANAGEMENT IN IRRIGATION	(9)
Modernization techniques- Rehabilitation – Optimization of water use-Minimizing water losses- On farm development works-Participatory irrigation management- Water resources associations- Changing paradigms in water management-Performance evaluation-Economic aspects of irrigation.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Sharma, R.K., and Sharma, T.K., "Irrigation Engineering", S. Chand and Company, New Delhi, 2008.
2	Michael, A.M., "Irrigation Engineering", Vikas Publishers, New Delhi,2008.
3	Garg, S.K., "Irrigation Engineering and Hydraulic Structures," KH Publications, New Delhi,2006.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Punmia, B.C., "Irrigation and Water Power Engineering", Laxmi Publishers, New Delhi, 2021.
2	Arora, K.R., "Irrigation, Water Power and Water Resources Engineering", Standard Publishers Distributors, New Delhi, 2018.
3	Basak, N.N., "Irrigation Engineering", Tata McGraw-Hill Publishing Co, New Delhi, 2017.

List of Exercises/Experiments

1.Design and drawing of a Tank Surplus Weir	
2. Design and drawing of a Gravity Dam.	
3. Design and drawing of a Canal Drop Structure	
4. Design and drawing of a Canal Regulator Model	
5. Design and drawing of a Canal Aqueduct	
Total No of Periods to be Taught	30 Periods

COURSE OUTCOMES:

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

CO1:	Acquire an in-depth understanding about the National Water Policy, soil- water- plant characteristics and the measurement of soil water.
CO2:	Capture the basics of crop water requirement and hence to perform irrigation scheduling.
CO3:	Understand the diversion and storage structures along with its components.
CO4:	Design the irrigation canal and get a knowledge about the various irrigation methods
CO5:	Get knowledge on water management on optimization of water use.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2		1					2	3	2	1
CO2	2	1	2	1	2	3				2	2	3	3	2
CO3	3	3	3	3	2	3				3	1	3	3	2
CO4	3	3	3	2	2	3				3	1	3	3	2
CO5	2	1	1	2	2	3	1	3	2	3	3	3	2	2
Avg.	2	2	2	2	2	3	1	3	2	3	2	3	3	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Civil Engineering	Programme Code & Name	103-Civil
-------------------	-------------------	----------------------------------	-----------

Semester VI

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24601	COMPUTER ANALYSIS IN STRUCTURAL ENGINEERING LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• The objective of a Computer Applications in Structural Engineering Laboratory course is to equip students with the skills to analyze and design structures using computer-aided tools and software. This involves learning to utilize software like STAAD Pro to model, analyze, and design various structural elements and systems under different loading conditions. The course also aims to develop students' ability to interpret software results, verify them against theoretical knowledge.					

List of Exercises/Experiments

1.Introduction to STAAD Pro Software	
2.Design of beams for various supports (SSB,OHB,CT and FX) with PL and UDL	
3.Design of beams for various supports (SSB,OHB,CT and FX) with UVL	
4.Analysis and Design of multi-storied building (2D frame)	
5.Analysis and Design of multi-storied building (3D frame) with DL and LL	
6.Analysis and Design of multi-storied building (3D frame) with DL LL and WL	
7.Analysis and Design of RCC Rectangular Over Head Tank	
8.Analysis and Design of RCC Circular Over Head Tank	
9.Analysis and Design of Steel Over Head Tank	
10.Analysis and Design of Industrial buildings with various Trusses	
Total No of Periods to be Taught	60 Periods

COURSE OUTCOMES:

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

CO1:	Analyse and interpret the internal forces in 2D and 3D frames, using software
CO2:	Design of trusses using software
CO3:	Analyse and design simple bridge decks using software
CO4:	Calculate the fundamental frequency and mode shapes of a given structure.
CO5:	Analyse the internal forces in beams and truss elements using software.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer	30 Nos
2	StaddPro	10 users

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	1	1	1	1	2	3	3	3	3
CO2	3	3	3	3	2	1	1	1	1	2	3	3	3	3
CO3	3	3	3	3	3	1	1	1	1	2	3	3	3	3
CO4	3	3	3	3	3	1	1	1	1	2	3	3	3	3
CO5	3	3	3	3	3	1	1	1	1	2	3	3	3	3
Avg.	3	3	3	3	3	1	1	1	1	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy														


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	103-CIVIL
-------------------	-------	----------------------------------	-----------

Semester VII

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24701	HYDROLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	•To introduce to the students, the concepts of hydrological processes, hydrological extremes and groundwater. •To prepare the students to quantify, regulate and manage water resources.					

Unit-I	PRECIPITATION AND ABSTRACTIONS	(9)
Hydrological cycle - Meteorological measurements – Types and forms of precipitation - Rain gauges - Spatial analysis of rainfall data using Thiessen polygon and Iso-hyetal methods - Interception – Evaporation: Measurement, Evaporation suppression methods – Infiltration: Horton's equation - Double ring infiltrometer - Infiltration indices.		
Unit-II	RUNOFF	(9)
Catchment: Definition, Morphological characteristics - Factors affecting runoff - Run off estimation using Strange's table and empirical methods - SCS-CN method – Stage discharge relationship - Flow measurements - Hydrograph – Unit Hydrograph – IUH.		
Unit-III	HYDROLOGICAL EXTREMES	(9)
Natural Disasters - Frequency analysis - Flood estimation - Flood management - Definitions of drought: Meteorological, Hydrological, Agricultural and Integrated - IMD method - NDVI analysis - Drought Prone Area Programme (DPAP).		
Unit-IV	RESERVOIRS	(9)
Classification of reservoirs - Site selection - General principles of design - Spillways -Elevation-Area-Capacity curve -Storage estimation - Sedimentation - Life of reservoirs – Rule curve.		
Unit-V	GROUNDWATER AND MANAGEMENT	(9)
Origin - Classification and types - Properties of aquifers - Governing equations – Steady and unsteady flow – Artificial recharge - RWH in rural and urban areas.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Subramanya K, "Engineering Hydrology"- Tata McGraw Hill, 2010
2	Jayarami Reddy P, "Hydrology", Tata McGraw Hill, 2008.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	David Keith Todd. "Groundwater Hydrology", John Wiley & Sons, Inc. 2007
2	VenTe Chow, Maidment, D.R. and Mays, L.W. "Applied Hydrology", McGraw Hill International Book Company, 1998.
3	Raghunath. H.M., "Hydrology", Wiley Eastern Ltd., 1998.
4.	Bhagu R. Chahar, Groundwater Hydrology, McGraw Hill Education (India) Pvt Ltd, New Delhi, 2017.

COURSE OUTCOMES:

On completion of the course, the student is expected to

CO1:	Define the hydrological processes and their integrated behaviour in catchments
CO2:	Apply the knowledge of hydrological processes to address basin characteristics, runoff and hydrograph
CO3:	Explain the concept of hydrological extremes and its management strategies
CO4:	Describe the principles of storage reservoirs
CO5:	Understand and apply the concepts of groundwater management

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	103-CIVIL
-------------------	-------	----------------------------------	-----------

Semester VII

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24702	ESTIMATION AND COSTING	L	T	P	C	100
		3	0	0	3	
Course Objectives	• The students will acquire knowledge in estimation, tender practices, contract procedures, and valuation and will be able to prepare estimates, call for tenders and Execute works.					

Unit-I	QUANTITY ESTIMATION OF BUILDING	(9)
Philosophy – Purpose – Methods of estimation – Centre line method – Long and short wall method – Types of estimates – Approximate estimates – Detailed estimate – Estimation of quantities for buildings, bituminous and cement concrete roads, septic tank, soak pit, Retaining walls.		
Unit-II	QUANTITY ESTIMATION OF OTHER STRUCTURES	(9)
Estimating of septic tank, soak pit – sanitary and water supply installations – water supply pipe line – sewer line – tube well – open well – estimate of bituminous and cement concrete roads – estimate of retaining walls – culverts.		
Unit-III	RATE ANALYSIS AND SPECIFICATIONS	(9)
Standard Data – Observed Data – Schedule of rates – Market rates – Materials and Labour – Standard Data for Man Hours and Machineries for common civil works – Rate Analysis for all Building works (Analysis of rates for the item of work asked, the data regarding labour, rates of material and rates of labour to be given in the Examination Question Paper) , Specifications –Types of specifications.		
Unit-IV	TENDERS ,CONTRACTS AND REPORTS	(9)
Tender-Tender notices– tender procedures – Drafting model tenders , TTT Act 2000 – E-tendering- e NOI – e NOT - Digital signature certificates – Encrypting -Decrypting – Reverse auctions.Contract – Types of contracts –Formation of contract – Contract conditions – Contract for labour, material, design, construction – Drafting of contract documents based on IBRD / MORTH Standard bidding documents – Arbitration , litigation and legal requirements. Principles for report preparation – report on estimate of residential building – Culvert – Roads.		
Unit-V	VALUATION	(9)
Definitions – Various types of valuations – Valuation methods - Necessity –Year's purchase-sinking fund-Capitalised value – Depreciation – Escalation – Valuation of land – Buildings – Calculation of Standard rent – Mortgage – Lease -Types of lease.		
Total No of Periods to be Taught		45 periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	B.N Dutta 'Estimating and Costing in Civil Engineering', CBS Publishers & Distributors (P) Ltd, Twenty eighth revised edition, 2020.
2	B.S.Patil, 'Civil Engineering Contracts and Estimates', 7th edition, University Press, 2015
3.	D.N. Banerjee, 'Principles and Practices of Valuation', V Edition, Eastern Law House, 2015

REFERENCES:

1	Hand Book of Consolidated Data – 8/2000, Vol.1, TNPWD
2	Tamil Nadu Transparencies in Tenders Act, 1998 and rules 2000
3	Arbitration and Conciliation Act, 1996
4.	Standard Bid Evaluation Form, Procurement of Good or Works, The World Bank, April 1996
5.	Standard Data Book for Analysis and Rates, IRC, New Delhi, 2019

COURSE OUTCOMES:

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

CO1:	Estimate the quantities for buildings.
CO2:	Estimate the quantities for Other Structures.
CO3:	Rate Analysis for all Building works, canals, and Roads and Cost Estimate.
CO4:	Understand types of specifications,
CO5:	Gain knowledge on types of contracts, principles for report preparation,

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	2	3	2	3	3	3	3	3
CO2	3	2	3	3	3	3	2	3	2	3	3	3	3	3
CO3	3	1	2	3	1	3	2	3	2	2	3	3	3	3
CO4	3	1	1	3	1	3	2	3	2	2	3	3	3	3
CO5	3	2	2	3	3	3	2	3	2	2	3	3	3	3
Avg.	3	2	3	3	3	3	2	3	2	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

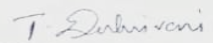


Department	CIVIL	Programme Code & Name	103-CIVIL
-------------------	-------	----------------------------------	-----------

Semester VII

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCET24707	HUMAN VALUES AND ETHICS	L	T	P	C	100
		3	0	0	2	
Course Objectives	• To create awareness about values and ethics enshrined in the Constitution of India • To sensitize students about the democratic values to be upheld in the modern society. • To inculcate respect for all people irrespective of their religion or other affiliations. • To instill the scientific temper in the students' minds and develop their critical thinking. • To promote sense of responsibility and understanding of the duties of citizen.					

Unit-I	DEMOCRATIC VALUES	(9)
Understanding Democratic values: Equality, Liberty, Fraternity, Freedom, Justice, Pluralism, Tolerance, Respect for All, Freedom of Expression, Citizen Participation in Governance – World Democracies: French Revolution, American Independence, Indian Freedom Movement. Reading Text: Excerpts from John Stuart Mills' On Liberty		
Unit-II	SECULAR VALUES	(9)
Understanding Secular values – Interpretation of secularism in Indian context - Disassociation of state from religion – Acceptance of all faiths – Encouraging non-discriminatory practices. Reading Text: Excerpt from Secularism in India: Concept and Practice by Ram Puniyani		
Unit-III	SCIENTIFIC VALUES	(9)
Scientific thinking and method: Inductive and Deductive thinking, Proposing and testing Hypothesis, Validating facts using evidence based approach – Skepticism and Empiricism – Rationalism and Scientific Temper. Reading Text: Excerpt from The Scientific Temper by Antony Michaelis R		
Unit-IV	SOCIAL ETHICS	(9)
Application of ethical reasoning to social problems – Gender bias and issues – Gender violence – Social discrimination– Constitutional protection and policies – Inclusive practices. Reading Text: Excerpt from 21 Lessons for the 21st Century by Yuval Noah Harari		
Unit-V	SCIENTIFIC ETHICS	(9)
Transparency and Fairness in scientific pursuits – Scientific inventions for the betterment of society - Unfair application of scientific inventions – Role and Responsibility of Scientist in the modern society. Reading Text: Excerpt from American Prometheus: The Triumph and Tragedy of J.Robert Oppenheimer by Kai Bird and Martin J. Sherwin.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	The Nonreligious: Understanding Secular People and Societies, Luke W. Galen Oxford University Press, 2016.
2	Secularism: A Dictionary of Atheism, Bullivant, Stephen; Lee, Lois, Oxford University Press, 2016.
3	The Oxford Handbook of Secularism, John R. Shook, Oxford University Press, 2017.
4.	The Civic Culture: Political Attitudes and Democracy in Five Nations by Gabriel A. Almond and Sidney Verba, Princeton University Press

COURSE OUTCOMES:

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

CO1:	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life
CO2:	Practice democratic and scientific values in both their personal and professional life.
CO3:	Find rational solutions to social problems.
CO4:	Behave in an ethical manner in society
CO5:	Practice critical thinking and the pursuit of truth.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1		3									3	2		3
CO2											3		2	
CO3					3			3					2	3
CO4		2			3	3	2				3	3	2	
CO5			3			3	2							
Avg.		2.5	3		3	3	2	3			3	2.5	2	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

T. Duraisoni
CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	103-CIVIL
-------------------	-------	----------------------------------	-----------

Semester VII

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UGET24702	TOTAL QUALITY MANAGEMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	•Teach the need for quality, its evolution, basic concepts, contribution of quality gurus, TQM framework, Barriers and Benefits ofTQM. •Explain the TQM Principles for application. •Define the basics of Six Sigma and apply Traditional tools, New tools, Benchmarking and FMEA. •Describe Taguchi's Quality Loss Function, Performance Measures and apply Techniques like QFD, TPM, COQ and BPR. •Illustrate and apply OMS and EMS in any Organization.					

Unit-I	INTRODUCTION	(9)
Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of product and service quality—DefinitionofTQM—BasicconceptsofTQM-GurusofTQM(Briefintroduction)—TQMFramework-BarrierstoTQM—Benefits of TQM.		
Unit-II	TQM PRINCIPLES	(9)
Leadership - Deming Philosophy, Quality Council, Quality statements and Strategic planning- Customer Satisfaction – Customer Perception of Quality, Feedback, Customer complaints, Service Quality, Kano Model and Customer retention – Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition & Reward and Performance Appraisal-- Continuous process improvement –Juran Trilogy, PDSA cycle, 5S and Kaizen –Supplierpartnership – Partnering, Supplier selection, Supplier Rating and Relationship development.		
Unit-III	TQM TOOLS & TECHNIQUES I	(9)
The seven traditional tools of quality - New management tools - Six-sigma Process Capability- Bench marking - Reasons to benchmark, Benchmarking process, What to Bench Mark, Understanding Current Performance,Planning,StudyingOthers,Learningfromthedata,Usingthefindings,PitfallsandCriticisms ofBench marking-FMEA-Intent,Documentation, Stages: Design FMEA and Process FMEA.		
Unit-IV	TQM TOOLS & TECHNIQUES II	(9)
Quality circles – Quality Function Deployment (QFD) - Taguchi quality loss function – TPM – Concepts, improvementneeds – Performance measures- Cost of Quality - BPR.		
Unit-V	QUALITY MANAGEMENT SYSTEM	(9)
Introduction-Benefits of ISO Registration-ISO 9000 Series of Standards-Sector-Specific Standards - AS 9100, TS16949 and TL 9000-- ISO 9001 Requirements-Implementation-Documentation-InternalAudits-Registration-ENVIRONMENTAL MANAGEMENT SYSTEM: Introduction—ISO 14000 Series Standards—Concepts of ISO 14001— Requirements of ISO 14001-Benefits of EMS.		
Total No of Periods to be Taught		45 periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Joel.E. Ross, "Total Quality Management – Text and Cases", Routledge., 2017.
2	Kiran.D.R, "Total Quality Management: Key concepts and case studies, Butterworth – Heinemann Ltd, 2016.
3	Oakland, J.S. "TQM – Text with Cases", Butterworth – Heinemann Ltd., Oxford, Third Edition, 2003.
4.	Suganthi,L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006 .

COURSE OUTCOMES:

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

CO1:	Ability to apply TQM concepts in a selected enterprise.
CO2:	Ability to apply TQM principles in a selected enterprise.
CO3:	Ability to understand Six Sigma and apply Traditional tools, New tools, Benchmarking and FMEA.
CO4:	Ability to understand Taguchi's Quality Loss Function, Performance Measures and apply QFD, TPM, COQ and BPR.
CO5:	Ability to apply QMS and EMS in any organization.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1		3									3	2		3
CO2								3			3		2	
CO3					3	3	2						2	3
CO4		2			3	3	2				3	3	2	
CO5			3			3	2	3						
Avg.		2.5	3		3						3	2.5	2	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	103-CIVIL
-------------------	-------	----------------------------------	-----------

Semester VII

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24701	CREATIVE AND INNOVATIVE PROJECT	L 0	T 0	P 4	C 3	100
Course Objectives	To use the knowledge acquired in Civil Engineering to do a mini project, which allows the students to come up with designs, fabrication or algorithms and programs expressing their ideas in a novel way.					

Strategy

To identify a topic of interest in consultation with Faculty/Supervisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carry out the design / fabrication or develop computer code. Demonstrate the novelty of the project through the results and outputs.

Total No of Periods to be Taught

Total: 60 periods

COURSE OUTCOMES:

On completion of the course, the student is expected to

CO1:	Identify civil engineering problems reviewing available literature
CO2:	Identify appropriate techniques to analyze complex civil engineering problems
CO3:	Apply engineering and management principles through efficient handling of Projects have a clear idea of his/her area of work and they are in a position to carry out the work in a systematic way.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	1	3	1	3	2	2	1	1	3	3	3	3
CO2	3	3	1	3	1	3	1	1	1	1	3	3	3	3
CO3	2	2	2	1	1	2	2	2	1	1	3	1	1	1
CO4	3	2	1	3	1	3	2	2	1	1	3	3	3	3
CO5	3	1	1	3	1	3	2	2	1	1	3	3	3	3
Avg.	3	3	1	3	1	3	1	1	1	1	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	103-CIVIL
------------	-------	-----------------------	-----------

Semester VIII

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEL24801	PROJECT WORK / INTERNSHIP	L	T	P	C	100
		0	0	20	10	
Course Objectives	●To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.					

Strategy

•The student works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction. The student will be evaluated based on the report and the viva voce examination by a team of examiners including one external examiner.

Total No of Periods to be Taught

Total: 300 periods

COURSE OUTCOMES:

On Completion of the project works students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

CO1:	Identify civil engineering problems reviewing available literature.
CO2:	Identify appropriate techniques to analyze complex civil engineering problems.
CO3:	Apply engineering and management principles through efficient handling of Project have a clear idea of his/her area of work and they are in a position to carry out the work in a systematic way.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	1	3	1	3	2	2	1	1	3	3	3	3
CO2	3	3	1	3	1	3	1	1	1	1	3	3	3	3
CO3	2	2	2	1	1	2	2	2	1	1	3	1	1	1
CO4	3	2	1	3	1	3	2	2	1	1	3	3	3	3
CO5	3	1	1	3	1	3	2	2	1	1	3	3	3	3
Avg.	3	3	1	3	1	3	1	1	1	1	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy														


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2401	ARCHITECTURAL HERITAGE OF INDIA	L	T	P	C	100
		3	0	0	3	
Course Objectives	● To help students understand the history and styles of Indian architecture. ● To create awareness about preserving India’s architectural heritage.					

Unit-I	INDUS VALLEY CIVILIZATION	(9)
Indus valley civilization – Chronological introduction – Construction style – Materials used – The cities Harappa, lothal and Mohenjo-Daro, The great bath – The granary at Harappa – The assembly hall – Ajanta-Ellora Cave temples – Mahabodhi temple complex		
Unit-II	SOUTH INDIAN ARCHITECTURE	(9)
Chera-Chola-Pandya architecture – Chronological introduction – Construction style – Materials used – Brihadeeswarar Temple – Meenakshi Temple – Kalinga – Chalukya – Pallava architecture – Mahabalipuram stone temples – Khajuraho – Muskin Bhanvi – Konark Sun Temple – Hoysala – Vijayanagara architecture – twin temples Mosale – Virupaksha temple Raya Gopura at Hampi		
Unit-III	MUGHAL ARCHITECTURE	(9)
Mughal architecture – Chronological introduction – Construction style – Materials used – Qutub Minar – Taj Mahal – Humayun's Tomb – Redfort – Fatehpur Sikri – Agra fort – Jama Masjid – Rajput civil architecture – Chronological introduction – Construction style – Materials used – All hill forts of Rajasthan		
Unit-IV	BRITISH ARCHITECTURE	(9)
British colonial architecture – Chronological introduction – Construction style – Materials used – Buildings in Chennai, Mumbai, Shimla – Churches – Mountain railways of India-bridges.		
Unit-V	COLONIAL ARCHITECTURE	(9)
Other colonial architecture – Portuguese-Dutch-French-Danish – Chronological introduction – Construction style – Materials used – Churches – Churches and Convents of Goa and Cochi – French town of Puducherry – Tranquebar fort – Bungalow on the beach		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Bindia Thapar, Surat Kumar Manto, and Suparna Bhalla., Introduction to Indian Architecture: Arts of Asia, Periplus Editions (HK) Ltd, Hong Kong, First Edition, 2005
2	Sandhya Ketkar., The History of Indian Art, Jyotsna Prakashan Publisher, Maharashtra, E – Edition, 2020



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Christopher Tadgell., The History of Architecture in India, Phaidon Press Ltd, New York, First Edition, 1990
2	Mark M. Jarzombek, Vikramaditya Prakash, Francis D. K. Ching., A Global History of Architecture, John Wiley & Sons, Hoboken, Second Edition, 2010
3	https://nptel.ac.in/courses/124106009
4	https://ncert.nic.in/textbook/pdf/kefa106.pdf

COURSE OUTCOMES:

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

CO1:	Illustrate various materials used and construction style of Indus Valley Civilization
CO2:	Demonstrate the materials used and construction style of Chera, Chola and Pandya architecture
CO3:	Describe the materials used and construction style of Mughal architecture
CO4:	Explain the various materials and construction style of British architecture
CO5:	Describe various materials and construction style of Portuguese, Dutch, French and Danish

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2402	BUILDING PLANNING AND CONSTRUCTION	L	T	P	C	100
		3	0	0	3	
Course Objectives	● To teach the basic principles of building planning and design. ● To provide knowledge about construction methods and materials.					

Unit-I	FUNCTIONAL PLANNING OF BUILDINGS	(9)
Types of Buildings, Aspects and Principles of Building Planning, Building By - laws and Regulations, Site Selection criteria, Orientation of Building and its relation to surrounding environment, Sustainability and Green Buildings - Building Bye - laws and Building code of India 2016.		
Unit-II	BUILDING COMPONENTS AND FOUNDATIONS	(9)
Lintels, arches, different types of floors-concrete, mosaic, terrazzo floors, pitched, flat and curved roofs, lean-to roof, coupled roofs, trussed roofs, king and queen post trusses; RCC roofs, madras terrace/shell roofs. Foundations: Shallow foundations, spread, combined, strap and mat footings.		
Unit-III	ALTERNATIVE MATERIALS AND MASONRY	(9)
Structure, properties, seasoning of timber; Classification of various types of woods used in buildings, defects in timber; Alternative materials for wood, galvanized iron, fibre-reinforced plastics, steel, aluminium and glass; Types of masonry, English and Flemish bonds, rubble and ashlar masonry, cavity and partition walls - Light weight concrete blocks – merits and demerits.		
Unit-IV	FLOORS, ROOFS AND STAIRCASES	(9)
Components of a floor, materials used for floor construction, Different types of flooring, Ground floor and upper floors, Types of roofs, Basic roofing elements and Roof coverings. Functional requirements of a good stair, type of stairs, planning a stair case.		
Unit-V	DAMP PROOFING AND FIRE PROTECTION	(9)
Damp proofing and Fire protection: Causes and effect of dampness on buildings, Materials and methods used for damp proofing, Fire hazards, Grading of buildings according to fire resistance, Fire resisting properties of common building materials, Fire resistant construction.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Varghese P. C., Building construction, PHI Learning Pvt. Ltd, New Delhi ,Second Edition, 2016.
2	B. C. Punmia , Ashok Kumar Jain, Arun Kumar Jain, Building Construction, Laxmi Publications, New Delhi, Eleventh Edition,2019.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	S. K. Duggal, Building Materials , New Age International (P) Limited, New Delhi ,Fourth Edition, 2016,
2	Bulding Bye-laws 2019
3	National Building Code of India, 2016.
4	www.nptel.ac.in/courses/105101088/2 home.htm

COURSE OUTCOMES:

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

CO1:	Outline the factors to be considered in planning and construction of buildings
CO2:	Infer the different components and Foundations of building in their construction practices.
CO3:	Interpret masonry and alternative materials of wood, aluminum and glass.
CO4:	Discuss different types of floors, roofs and the materials which are commonly used for construction.
CO5:	Explain about dampness and fire resistance in buildings

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2403	ELEMENTARY CIVIL ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To introduce the fundamental concepts and branches of civil engineering. • To create awareness about basic materials, tools, and construction practices.					

Unit-I	OVERVIEW OF CIVIL ENGINEERING	(9)
History of Civil Engineering - Role and Functions of Civil Engineer - Fields of Civil Engineering - Importance of Civil Engineering		
Unit-II	BASICS OF SURVEYING	(9)
Introduction - Basic Definitions (Surveying, leveling, Plans, Maps, Scales) - Introduction to divisions of surveying - Classification of surveying - Fundamental principles of surveying - Measurement in Surveying - Phases of Surveying MODERN TOOLS OF SURVEYING AND MAPPING: Introduction to Global Positioning System - Remote Sensing and Geographic Information System		
Unit-III	FUNDAMENTALS OF BUILDING MATERIALS	(9)
Bricks – stones – sand – M-sand - cement – fly ash - silica fume - mortar- concrete – steel – glass - wood plastics – ceramics		
Unit-IV	COMPONENTS OF BUILDING	(9)
Foundations – stone masonry – brick masonry – beams – columns – lintels – roofing – flooring – plastering- damp proofing weathering course		
Unit-V	STRUCTURES	(9)
Introduction to dams, weirs, barrages and check dams - Role of transportation in national development - Modes of transportation - Introduction to road traffic and traffic control - Introduction to mass transportation system		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Anurag Kandya, Elements of Civil Engineering, Charotar Publishing House Pvt. Ltd, Gujarat, Third Edition, 2017.
2	Palanichamy M.S., Basic Civil Engineering, Tata McGraw-Hill, New Delhi, Fourth Edition, 2011.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Poonam Sharma & Swati Rajput, Sustainable Smart Cities in India – Challenges and Future Perspectives, Springer, First Edition, 2017.
2	Dr.B.C.Punamia, Surveying, Laxmi Publication, New Delhi, Seventh Edition, 2016.
3	https://nptel.ac.in/courses/105102088
4	https://byjusexamprep.com/civil-engineering-exams/building-materials

COURSE OUTCOMES:

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

CO1:	Provide an overview of civil engineering
CO2:	Explain the basics of surveying , modern tools of surveying and mapping
CO3:	Summarize the fundamentals of building materials in civil engineering
CO4:	Explain the components of building structures.
CO5:	Interpret various infrastructures of civil engineering in construction

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2404	ENERGY AND ENVIRONMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	● To provide basic knowledge about different energy sources and their uses. ● To create awareness about environmental issues and sustainable practices.					

Unit-I	INTRODUCTION	(9)
Overview on the Earth's energy requirements-Climate Change-Origins of the terrestrial atmosphere-Earth's early atmosphere- Introduction to Climate-Layers of the atmosphere.		
Unit-II	GLOBAL ATMOSPHERIC ISSUES	(9)
Composition of the present day atmosphere-Introduction to Atmospheric chemistry-Green House Gases, and the O3 - depletion problem-Post Industrial Revolution Scenario		
Unit-III	ENERGY BALANCE	(9)
Earth Atmosphere System- Solar and Terrestrial Radiation- Absorption of Radiation by gases.-Energy balance- Solar variability and the Earth's Energy Balance.		
Unit-IV	ATMOSPHERIC CHEMISTRY AND CLIMATE	(9)
The Global Temperature Record.-Possible effects of Global Warming. – Indian Context. Atmospheric Chemistry and Climate Change- Atmospheric Aerosol and Cloud Effects on Climate.		
Unit-V	ENVIRONMENTAL VARIABILITY	(9)
Natural (volcanoes, forest fires) and Anthropogenic (Antarctic Ozone Hole, Global Warming).-Green House Gas theory.- Effects of urbanization- Landscape changes-Influence of Irrigation-Desertification and Deforestation		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Peter E Hodgson, Energy the Environment and Climate Change, Imperial College Press, London, First Edition, 2010
2	Ahluwalia V K, Energy and Environment, The Energy and Resources Institute, New Delhi, First Edition, 2019



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Richard Wolfson, Energy, Environment, and Climate, Publisher: W. W. Norton & Company, New York, Second Edition, 2011
2	Saeed Moaveni, Energy, Environment, and Sustainability with Mind Tap, Cengage India Private Limited, New Delhi, First Edition, 2017
3	Wilbanks, T., Bilello D, Schmalzer D, Scott, Climate Change and Energy Supply and Use: Technical Report for the U.S. Department of Energy in Support of the National Climate Assessment., Island Press, Washington, 2013
4	Frank T. Princiotta, Global Climate Change - The Technology Challenge, Springer Publisher, New York, First Edition, 2011

COURSE OUTCOMES:

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

CO1:	Outline the earth's energy, environment and the processes leading to climate change
CO2:	Infer the atmospheric issues related to the chemistry, green house gases
CO3:	Summarize the role of the terrestrial energy-environment-climate system
CO4:	Interpret the Possible effects of Global Warming and climate change.
CO5:	Outline the Natural and Anthropogenic and Green House Gas theory

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2405	GLOBAL WARMING AND CLIMATE CHANGE	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To explain the causes and effects of global warming and climate change. • To promote awareness of mitigation strategies and sustainable solutions.					

Unit-I	EARTH'S CLIMATE SYSTEM	(9)
Role of ozone in environment – Ozone layer – Ozone depleting gases – Greenhouse gases and its sources – Green House Effect, Radiative Effects of Greenhouse Gases -The Hydrological Cycle – Green House Gases and Global Warming – Effects and causes of Global Warming, Carbon Cycle.		
Unit-II	ATMOSPHERE AND ITS COMPONENTS	(9)
Importance of Atmosphere – Physical Chemical Characteristics of Atmosphere - Vertical structure of the atmosphere - Composition of the atmosphere - Atmospheric stability -Temperature profile of the atmosphere - Lapse rates- Temperature inversion - effects of inversion on pollution dispersion.		
Unit-III	OBSERVED CHANGES AND ITS CAUSES	(9)
Causes of Climate change – Change of Temperature in the environment - Melting of ice Pole-sea level rise - Impacts of Climate Change on various sectors – Agriculture, Forestry and Ecosystem – Water Resources – Human Health – Industry, Settlement and Society – Methods and Scenarios – Projected Impacts for Different Regions – Uncertainties in the Projected Impacts of Climate Change – Risk of Irreversible Changes.		
Unit-IV	OBSERVED CHANGES AND ITS CAUSES	(9)
Climate change and Carbon credits – CDM- Initiatives in India - Kyoto Protocol - Intergovernmental Panel on Climate change - Climate Sensitivity and Feedbacks – The Montreal Protocol – UNFCCC – IPCC – Evidences of Changes in Climate and Environment – on a Global Scale and in India		
Unit-V	CLIMATE CHANGE AND MITIGATION MEASURES	(9)
Clean Development Mechanism – Carbon Trading – Examples of future Clean Technology – Biodiesel – Natural Compost – Eco- Friendly Plastic – Alternate Energy – Hydrogen – Bio-fuels – Solar Energy – Wind – Hydroelectric Power – Mitigation Efforts in India and Adaptation funding - Key Mitigation Technologies and Practices – Energy Supply – Transport – Buildings – Industry – Agriculture – Forestry - Carbon sequestration – Carbon capture and storage (CCS) - Waste(MSW & Bio waste, Biomedical, Industrial waste – International and Regional cooperation.		
Total No of Periods to be Taught		45 periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Kandarp Tarkeshprasad Vaishnav., Climate Change Solutions, Global Warming Solutions & Innovative Ideas For Construction of World Development, Notion Press, Chennai, First Edition, 2018
2	Vivian Moritz., Climate Change and Global Warming, Syrawood Publishing House, New York, First Edition, 2017

REFERENCES:

1	Marie Antonette and Chloe Marechal., Climate Change Past, Present & Future, Wiley-Blackwell, New Jersey, First Edition, 2015.
2	Empereur Raymond., Global Warming and Climate Change, Litfire Publishing, Atlanta, First Edition, 2017.
3	Agarwal S.K., Global Warming and Climate Change Past, Present & Future, Ashish Publishing House, New Delhi, First Edition, 2004.
4	https://onlinecourses.swayam2.ac.in/arp19_ap55/preview

COURSE OUTCOMES:

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

CO1:	Outline the concept of the causes and effects of global warming
CO2:	Summarize about physical and chemical characteristics of atmosphere
CO3:	Identify the causes and effects of climate change
CO4:	Infer the agreements took place among the countries regarding climate change
CO5:	Summarize about the concept of mitigation measures against climate change

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	3	-	-	-	-	2	-	-	-
CO2	3	2	-	-	-	3	-	-	-	2	2	-	-	-
CO3	3	-	-	2	-	3	-	-	-	2	3	-	-	-
CO4	3	2	-	2	-	3	-	2	-	-	2	-	-	-
CO5	3	2	-	-	-	3	-	3	-	2	3	-	-	-
Avg.	3	2	2	2	-	3	-	3	-	2	3	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2406	INTRODUCTION TO DISASTER MANAGEMENT AND MITIGATION	L	T	P	C	100
		3	0	0	3	
Course Objectives	● Provide adequate knowledge about disaster mitigation, preparedness, response, and recovery to face disaster among government bodies, institutions, N O's, etc. ● Obtain the knowledge different disaster and its preparedness and mitigation methods. ● Provide adequate knowledge about applications of space technology in disaster monitoring and information dissemination					

Unit-I	INTRODUCTION TO DISASTER	(9)
Definition of Disaster, hazard, global and Indian scenario, general perspective, importance of study in human life, Direct and indirect effects of disasters, long term effects of disasters. Introduction to global warming and climate change		
Unit-II	NATURAL DISASTER AND MANMADE DISASTERS	(9)
Natural Disaster: Meaning and nature of natural disaster, Flood, Flash flood, drought, cloud burst, Earthquake, Landslides, Avalanches, Volcanic eruptions, Mudflow, Cyclone, Storm, Storm Surge, climate change, global warming, sea level rise, ozone depletion. Manmade Disasters: Chemical, Industrial, Nuclear and Fire Hazards. Role of growing population and subsequent industrialization, urbanization and changing lifestyle of human beings in frequent occurrences of manmade disasters.		
Unit-III	DISASTER MANAGEMENT CYCLE AND FRAMEWORK	(9)
Disaster Management Cycle, Paradigm Shift in Disaster Management Pre-Disaster Risk Assessment and Analysis, Risk Mapping, zonation and Micro zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development, Awareness During Disaster Evacuation, Disaster Communication, Search and Rescue, Emergency Operation Centre, Incident Command System, Relief and Rehabilitation, Damage and Needs Assessment, Restoration of Critical Infrastructure, Early Recovery, Reconstruction and Redevelopment, IDNDR, Yokohama Strategy, Hyogo Framework of Action.		
Unit-IV	DISASTER MANAGEMENT IN INDIA DISASTER PROFILE OF INDIA	(9)
Mega Disasters of India and Lessons Learnt, Disaster Management Act 2005, Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management, Role of Government, Non-Government and Inter-Governmental Agencies.		
Unit-V	APPLICATIONS OF SCIENCE AND TECHNOLOGY FOR DISASTER MANAGEMENT & MITIGATION	(9)
Geo-informatics in Disaster Management, Disaster Communication System, Land Use Planning and Development Regulations, Structural and Non Structural Mitigation of Disasters, S&T Institutions for Disaster Management in India.		
Total No of Periods to be Taught		45 periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	R B Singh., Disaster Management and Mitigation, World focus Publisher, New Delhi, First Edition, 2016.
2	Satish Modh, Introduction to disaster management, Macmillan publishers India ltd, New Delhi, Second Edition, 2019.

REFERENCES:

1	R B Singh., Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi, Reprint Edition, 2006.
2	Pardeep Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, Fourth Edition, 2018.
3	M. Saravanakumar, Disaster Management, Himalaya Publishing House, Bangalore, First Edition, 2017
4	Singh, Disaster Management: Future Challenges, IK International, New Delhi, First Edition, 2017.

COURSE OUTCOMES:

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

CO1:	Explain the concepts of disaster and its effect in Indian scenario.
CO2:	Elaborate the difference between natural and manmade disasters.
CO3:	Outline the disaster management cycle and its operation.
CO4:	Outline the disaster management in India and its profile
CO5:	Propose the application of geo-informatics for disaster management and mitigation.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Chemical Engineering	Programme Code & Name	Open to all Departments
-------------------	----------------------	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCHOE2401	NANOMATERIALS AND APPLICATIONS	L	T	P	C	100
		3	0	0	3	
Course Objectives	- Understanding the classification and types of polymers. understand different types of nanomaterials for the future engineering applications - Gaining knowledge on polymer analysis and solution properties - Having knowledge on the structure and properties of bulk polymers - Having knowledge on the commercial polymers - Acquiring knowledge on polymer processing techniques					

Unit-I	NANOMATERIALS	(9)
Introduction, Classification: 0D, 1D, 2D, 3D nanomaterials and nano-composites, their mechanical, electrical, optical, magnetic properties; Nanomaterials versus bulk materials.		
Unit-II	THERMODYNAMICS & KINETICS OF NANOSTRUCTURED MATERIALS	(9)
Size and interface/interphase effects, interfacial thermodynamics, phase diagrams, diffusivity, grain growth, and thermal stability of nanomaterials.		
Unit-III	PROCESSING	(9)
Bottom-up and top-down approaches for the synthesis of nanomaterials, mechanical alloying, chemical routes, severe plastic deformation, and electrical wire explosion technique.		
Unit-IV	STRUCTURAL CHARACTERISTICS	(9)
Principles of emerging nanoscale X-ray techniques such as small angle X-ray scattering and X-ray absorption fine structure (XAFS), electron and neutron diffraction techniques and their application to nanomaterials; SPM, Nanoindentation, Grain size, phase formation, texture, stress analysis		
Unit-V	APPLICATIONS	(9)
Applications of nanoparticles, quantum dots, nanotubes, nanowires, nanocoatings; applications in electronic, electrical and medical industries.		
Total No of Periods to be Taught		45

TEXT BOOK:

1	Bhusan, Bharat (Ed), "Springer Handbook of Nanotechnology", 2nd edition, 2007.
2	Carl C. Koch (ed.), Nanostructured Materials, Processing, Properties and Potential Applications, NOYES PUBLICATIONS, Norwich, New York, U.S.A.

8.10.11
CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Poole C.P, and Owens F.J., Introduction to Nanotechnology, John Wiley 2003.
2	Nalwa H.S., Encyclopedia of Nanoscience and Nanotechnology, American Scientific Publishers 2004.

COURSE OUTCOMES:

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

CO1:	Evaluate nanomaterials and understand the different types of nanomaterials
CO2:	Recognise the effects of dimensionality of materials on the properties
CO3:	Process different nanomaterials and use them in engineering applications
CO4:	Use appropriate techniques for characterizing nanomaterials
CO5:	Identify and use different nanomaterials for applications in different engineering fields.

Mapping of COs with POs and PSOs

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	3	-	-	-	-	-	-	-	2	1	2
CO2	3	1	2	2	-	-	-	-	-	-	-	2	2	2
CO3	3	2	1	2	-	-	-	-	-	-	-	2	2	2
CO4	3	1	-	3	-	-	-	-	-	-	-	2	2	2
CO5	3	2	2	2	-	-	-	-	-	-	-	2	2	2
Avg.	2.8	1.6	1.7	2.2	-	-	-	-	-	-	-	2	1.8	2

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

f. 10. 11
CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Chemical Engineering	Programme Code & Name	Open to all Departments
-------------------	----------------------	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCHOE2402	POLYMER TECHNOLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	- Understanding the classification and types of polymers. understand different types of nanomaterials for the future engineering applications - Gaining knowledge on polymer analysis and solution properties - Having knowledge on the structure and properties of bulk polymers - Having knowledge on the commercial polymers - Acquiring knowledge on polymer processing techniques					

Unit-I	INTRODUCTION TO POLYMERS AND POLYMERIZATIONS	(9)
Polymers - Basic concepts - Classification - Natural and synthetic polymers, thermoplasts and thermosets. Polymerization - Addition, condensation, ring opening, copolymerization, ionic and coordination polymerization - Kinetics of polymerization.		
Unit-II	POLYMER ANALYSIS AND SOLUTION PROPERTIES	(9)
Molecular weight and distribution- Number average, weight average, viscosity average and Z-average molecular weight - Determination by light scattering, solution viscosity and gel permeation chromatography. Degree of polymerization. Glass transition temperature - Theory and measurements. Polymer solutions- Solubility and swelling, Thermodynamics of polymer solutions, Phase separation in polymer solutions.		
Unit-III	STRUCTURE AND PROPERTIES OF BULK POLYMERS	(9)
Morphology and order in crystalline polymers -crystal structure of polymers, morphology of polymer single crystals. Rheology and the mechanical properties of polymers - Viscous flow, kinetic theory of rubber elasticity and viscoelasticity, stress-strain behavior, compression vs tensile tests, deformation of solid polymers. Thermal analysis of polymers using TGA and DSC.		
Unit-IV	MANUFACTURE AND PROPERTIES OF COMMERCIAL POLYMERS	(9)
Hydrocarbon plastics and elastomers - low density (branched) polyethylene, high density (linear) polyethylene, polypropylene, natural rubber, rubbers derived from butadiene. Other carbon chain polymers polystyrene, acrylic polymers, poly(vinyl esters) and derived polymers. Heterochain thermoplastics - Polyamides. Thermosetting resins - Phenolic resins and amino resins.		
Unit-V	POLYMER PROCESSING TECHNIQUES	(9)
Plastic molding techniques - Injection, blow, extrusion and compression. Processing agents - Fillers, plasticizers, and other additives. Fiber Technology - Textile and fabric properties, spinning - wet and dry methods - fiber treatments. Elastomer technology - Compounding and elastomer properties, vulcanization and reinforcement.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Billmeyer F.W., Textbook of Polymer Science, Third Edition, Wiley Interscience, 1984.
2	Charles E., Carraher Jr., Seymour/carraher's polymer chemistry, Seventh Edition, CRC Press, 2012.

REFERENCES:

1	Fried J.R., Polymer Science and Technology, Second Edition, Prentice Hall of India Pvt Ltd., 2003.
2	Bhatnagar M.S., A Textbook of Polymers, Vol. 2, S.Chand and Company Ltd., 2012s.

COURSE OUTCOMES:

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

CO1:	Understand the basic concepts of polymer science and identify the polymerization techniques and its kinetics.
CO2:	Assess the molecular weight distribution techniques, glass transition, and solution properties like thermodynamics, phase separations.
CO3:	Explain the morphology, rheology, mechanical and thermal properties of bulk polymers.
CO4:	Compare and analyze the manufacture and properties of commercial polymers.
CO5:	Apply the knowledge in assessing the polymeric, fiber and elastomer processing techniques.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Chemical Engineering	Programme Code & Name			Open to all Departments	
Semester						
Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCHOE2403	ENZYME ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	Focuses on the introduction to enzymes and gives an overview of kinetics, production immobilization, fermentation process and its industrial applications.					

Unit-I	ENZYMES AND KINETICS	(9)
Classification of enzymes; Principle of enzymatic catalysis; Enzyme kinetics-Factors affecting the enzyme activity- Concentration, pH and temperature. Kinetics of a single-substrate enzyme catalysed reaction, Michealis-Menten Equation, Km, Vmax, L.B Plot, Turnover number, Kcat. Kinetics of Enzyme Inhibition.		
Unit-II	ENZYME PRODUCTION	(9)
Extraction of crude enzyme from plant, animal and microbial source; Purification of enzymes by the help of different methods. Methods of characterization of enzymes; criteria of purity. Unit of enzyme activity - definition and importance. Development of enzyme assays.		
Unit-III	ENZYME IMMOBILIZATION	(9)
Immobilization Type: Adsorption, Matrix entrapment, Encapsulation, Cross linking, Covalent binding and their examples; Advantages and disadvantages of different immobilization techniques. Structure & stability of immobilized enzymes, kinetic properties of immobilized enzymes- partition effect, diffusion effect.		
Unit-IV	LARGE SCALE PRODUCTION	(9)
Fermentation using continuously stirred aerated tank bioreactors. Mixing power correlation. Determination of volumetric mass transfer rate of oxygen from air bubbles and effect of mechanical mixing and aeration on oxygen transfer rate, heat transfer and power.		
Unit-V	INDUSTRIAL APPLICATIONS OF ENZYMES	(9)
Industrial Enzymes in:Dairy, Bread making, Starch processing, Brewing; Bioethanol production and other fermentation processes; Thermophilic enzymes, amylases, lipases, proteolytic enzymes in Meat and Leather industry, Cellulose degrading enzymes in Paper and Pulp industry; Metal degrading and pollutant degradation. Biosensors		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Nicolas C. Price and Lewis Stevens, "Fundamentals of enzymology: Cell and Molecular Biology of Catalytic Proteins", 3rd Edition, Oxford University Press, United States of America, 2000 for Unit I.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Young JeYoo, Yan Feng, Yong Hwan Kim Camila Flor J. Yagonia, "Fundamentals of Enzyme Engineering", 1st Edition, Springer Inc, United Kingdom, 2017 for Units II, III, IV & V.
---	---

REFERENCES:

1	Trevor Palmer and Philip Bonner, "Enzymes: Biochemistry, Biotechnology and Clinical Chemistry", 2nd Edition, Woodhead Publishing, United Kingdom, 2001.
2	Nalwa H.S., Encyclopedia of Nanoscience and Nanotechnology, American Scientific Publishers 2004

COURSE OUTCOMES:

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

CO1:	Classify enzymes and elaborate the principles of catalysis and enzyme kinetics
CO2:	Describe the enzyme production, purification, characterisation and assay
CO3:	Outline the immobilization of enzymes
CO4:	Elaborate the large scale fermentation process using bioreactors
CO5:	Apply enzyme science in its industrial applications

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

8.6.11
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College.
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Chemical Engineering	Programme Code & Name			Open to all Departments	
Semester						
Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCHOE2404	Bio Energy Resources	L	T	P	C	100
		3	0	0	3	
Course Objectives	Focuses on the introduction to bioenergy and gives an overview of resources, gasification and combustion processes.					

Unit-I	(9)
Energy perspective: Current methods, Biomass possibilities. Fundamental concepts in understanding biofuel and bioenergy production: Mass Balances, Energy Balances, Thermodynamics, Organic compounds, Chemistry of plant materials resources.	
Unit-II	(9)
Biogas technology: Feedstock for producing biogas; Microbial and biochemical aspects and operating parameters for biogas production, Kinetics and mechanism. Dry and wet fermentation, Digestors for rural application-High rate digesters for industrial waste water treatment.	
Unit-III	(9)
Pyrolysis and thermo-chemical conversion: Thermo-chemical conversion of lignocellulosic biomass. Incineration for safe disposal of hazardous waste, Biomass processing for liquid fuel production, Pyrolysis of biomass-pyrolysis regime, effect of particle size, temperature, and products obtained.	
Unit-IV	(9)
Comparison of Bio-energy Sources, Biorefinery, Biofuels for Transportation, Vegetable Oils as Engine Fuels. Biodiesel as Engine Fuel: Engine Emissions from Biodiesel, Biodiesel production by using various microorganisms, algae and Transesterification process, methods of biodiesel production.	
Unit-V	(9)
Combustion of biomass and cogeneration systems: Combustion of woody biomass-theory, calculations and design of equipment, Cogeneration in biomass processing industries. Case studies: Combustion of rice husk, Use of bagasse for cogeneration	
Total No of Periods to be Taught	45

TEXT BOOK:	
1	Anju Dahiya, Bioenergy: Biomass to biofuels First Edition, Academic Press, 2014.
2	Li, Yebo, and Samir Kumar Khanal. Bioenergy: principles and applications. John Wiley & Sons, 2016.





THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Vaughn C Nelson, Kenneth L. Starcher. Introduction to bioenergy. CRC Press, 2017.
2	Wall, Judy D., Caroline S. Harwood, and Arnold Demain. "Bioenergy." Bioenergy.. ASM Press, 2008.

COURSE OUTCOMES:

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

CO1:	Understand the fundamental knowledge on energy perspective
CO2:	Learn the production of biogas
CO3:	Gather knowledge on the operations of incineration, pyrolysis.
CO4:	Understand the comparison of bioenergy sources
CO5:	Knowledge on the types of combustion of biomass.

Mapping of COs with POs and PSOs

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	1	2	2	2	1	1	1	1	2	1	2
CO2	2	-	2	1	2	2	2	1	1	1	2	2	2	2
CO3	2	1	2	1	2	2	2	2	1	1	2	2	1	2
CO4	2	1	2	1	2	2	2	1	1	1	2	2	2	2
CO5	2	2	2	2	2	2	2	1	1	1	2	2	1	2
Avg.	2	1	2	1	2	2	2	1	1	1	1	2	1	2

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

S. U. N.
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Chemical Engineering	Programme Code & Name	Open to all Departments
-------------------	----------------------	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCHOE2405	CHEMICAL PROCESS SAFETY	L	T	P	C	100
		3	0	0	3	
Course Objectives	- Teach the principles of safety applicable to the design, and operation of chemical process plants. - Ensure that potential hazards are identified and mitigation measures are in place to prevent unwanted release of energy. - Learn about the hazardous chemicals into locations that could expose employees and others to serious harm. - Focuses on preventing incidents and accidents during large scale manufacturing of chemicals and pharmaceuticals. - Ensure that the general design of the plant is capable of complying with the dose limits in force and with the radioactive releases.					

Unit-I	SAFETY IN THE STORAGE AND HANDLING OF CHEMICALS AND GASES	(9)
Types of storage-general considerations for storage layouts- atmospheric venting, pressure and temperature relief - relief valve sizing calculations - storage and handling of hazardous chemicals and industrial gases, safe disposal methods, reaction with other chemicals, hazards during transportation - pipe line transport - safety in chemical laboratories.		
Unit-II	CHEMICAL REACTION HAZARDS	(9)
Hazardous inorganic and organic reactions and processes, Reactivity as a process hazard, Detonations, Deflagrations, and Runaways, Assessment and Testing strategies, Self - heating hazards of solids, Explosive potential of chemicals, Structural groups and instability of chemicals, Thermochemical screening.		
Unit-III	SAFETY IN THE DESIGN OF CHEMICAL PROCESS PLANTS	(9)
Design principles -Process design development -types of designs, feasibility survey, preliminary design, Flow diagrams, piping and instrumentation diagram, batch versus continuous operation, factors in equipment scale up and design, equipment specifications - reliability and safety in designing - inherent safety - engineered safety - safety during startup and shutdown - non destructive testing methods - pressure and leak testing - emergency safety devices - scrubbers and flares- new concepts in safety design and operation- Pressure vessel testing standards- Inspection techniques for boilers and reaction vessels.		
Unit-IV	SAFETY IN THE OPERATION OF CHEMICAL PROCESS PLANTS	(9)
Properties of chemicals - Material Safety Data Sheets - the various properties and formats used - methods available for property determination. Operational activities and hazards -standards operating procedures - safe operation of pumps, compressors, heaters, column, reactors, pressure vessels, storage vessels, piping systems - effects of pressure, temperature, Flow rate and humidity on operations - corrosion and control measures- condition monitoring - control valves - safety valves - pressure reducing valves, drains, bypass valves, inert gases. Chemical splashes, eye irrigation and automatic showers.		



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Unit-V	SAFETY AND ANALYSIS	(9)
Safety vs reliability- quantification of basic events, system safety quantification, Human error analysis, Accident investigation and analysis, OSHAS 18001 and OSHMS.		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	George Kanwaty, "Introduction to Work Study ", ILO, Geneva, 1996, ISBN: 9221071081 ISBN-13: 9789221071082
2	Enrick N. L., "Time study manual for Textile industry", Wiley Eastern (P) Ltd., 1989, ISBN: 0898740444 ISBN-13: 9780898740448
REFERENCES:	
1	Norberd Lloyd Enrick., "Industrial Engineering Manual for Textile Industry", Wiley Eastern (P) Ltd., New Delhi, 1988, ISBN: 0882756311 ISBN-13: 9780882756318
2	Chuter A. J., "Introduction to Clothing Production Management", Wiley-Black well Science, U.S. A., 1995, ISBN: 0632039396 ISBN-13: 9780632039395

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	Differentiate between inherent safety and engineered safety and recognize the importance of safety in the design of chemical process plants.
CO2:	Develop thorough knowledge about safety in the operation of chemical plants.
CO3:	Apply the principles of safety in the storage and handling of gases.
CO4:	Identify the conditions that lead to reaction hazards and adopt measures to prevent them.
CO5:	Develop thorough knowledge about safety and analysis.

Mapping of COs with POs and PSOs														
COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	1	2	1	1	2	2	1	1	1
CO2	1	2	2	2	2	1	2	1	2	2	2	2	1	1
CO3	1	2	2	1	1	2	2	1	2	1	2	2	1	3
CO4	1	2	2	1	1	1	2	1	1	1	1	2	2	1
CO5	2	2	3	2	2	1	2	1	1	2	2	1	1	3
Avg.	2	1	1	1	2	1	2	2	2	2	2	2	1	2
1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy														


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		CSE		Programme Code & Name			OPEN TO ALL DEPARTMENTS	
Course Code	Course Name			Hours/Week		Credit	Maximum Marks	
UCSOE2401	Introduction to C Programming			L	T	P	C	100
				2	0	2	3	
Course Objectives	- Understand the basic structure and syntax of C programming language. - Develop logical thinking and problem-solving skills. - Apply control structures, functions, and arrays. - Understand pointers, structures, and file handling. - Gain practical experience through lab exercises.							

Unit-I	INTRODUCTION TO C PROGRAMMING	(6)
History and Features of C-Structure of C Program-Character Set, Tokens, Keywords, -Identifiers- Constants and Variables-Data Types (int, float, char, double)-Operators: Arithmetic, Relational, Logical, Assignment-Expressions and Precedence-Input and Output Functions (printf, scanf).		
Unit-II	CONTROL STATEMENTS	(6)
Decision Making: if, if-else, nested if, switch-case -Looping: for, while, do-while-Nested loops Jump Statements: break, continue, goto-Applications of loops.		
Unit-III	FUNCTIONS	(6)
Function Definition and Declaration-Types of Functions-Recursion-Storage Classes: auto, static, extern, register-Parameter Passing: Call by Value, Call by Reference.		
Unit-IV	ARRAYS AND STRINGS	(6)
One Dimensional Arrays - Two Dimensional Arrays - Matrix Operations-String Declaration and Initialization-String Functions: strlen, strcpy, strcat, strcmp-Applications of Arrays and Strings.		
Unit-V	POINTERS, STRUCTURES AND FILE HANDLING	(6)
Pointers and Pointer Arithmetic-Pointers with Arrays and Functions-Structures and Unions-File Handling: fopen, fclose, fprintf, fscanf, fgets, fputs-File Modes and Applications.		
Total No of Periods to be Taught		30 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

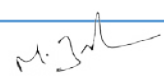
1	E. Balagurusamy, Programming in ANSI C, McGraw Hill, 9th Edition, 2024.
2	Kernighan & Ritchie, The C Programming Language, 2nd Edition, 1988.

REFERENCES:

1	Yashavant Kanetkar, Let Us C, BPB, 20th Edition, 2024.
2	Herbert Schildt, C: The Complete Reference, McGraw Hill, 4th Edition, 2000.
3	Byron Gottfried, Programming with C, McGraw Hill, 1996.

List of Exercises/Experiments

1. Implement a C program to display Hello World.	
2. Implement programs using input and output operations.	
3. Implement programs using arithmetic and logical operators.	
4. Implement decision making programs (if, switch).	
5. Implement looping programs (for, while, do-while).	
6. Implement functions and recursive programs.	
7. Implement array operations (1D and 2D arrays).	
8. Implement string handling programs.	
9. Implement pointer-based programs.	
10. Implement structure and file handling programs.	
Total No of Periods to be Taught	30 Periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Explain C fundamentals.
CO2:	Apply control structures.
CO3:	Develop programs using arrays and functions.
CO4:	Implement pointers and structures.
CO5:	Design file-based applications neural networks for various tasks.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Windows 11 requires a modern 64-bit processor (1 GHz or faster, 4 GB RAM, 64 GB+ storage)	30
2.	Turbo C Compiler	

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	0	0	1	0	0	0	0	0	1	3	2	1
CO2	3	3	2	0	1	0	0	0	0	0	1	3	3	2
CO3	3	3	3	2	2	0	0	0	0	0	1	3	3	2
CO4	3	3	3	2	2	0	0	0	0	0	1	3	3	2
CO5	3	3	3	2	3	0	0	0	0	0	2	3	3	3
Avg.	3	2.8	2.2	1.2	1.8	0	0	0	0	0	1.2	3	2.8	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

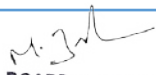
An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		CSE		Programme Code & Name			OPEN TO ALL DEPARTMENTS	
Course Code	Course Name			Hours/Week		Credit	Maximum Marks	
UCSOE2402	Introduction to Data Structures			L	T	P	C	100
				2	0	2	3	
Course Objectives	• To understand fundamental data structures. • To analyze and design algorithms. • To implement linear and non-linear data structures. • To evaluate performance of algorithms. • To apply data structures in problem solving.							

Unit-I	Introduction to Data Structures	(6)
Definition and Classification of Data Structures-Abstract Data Types (ADT)-Algorithm -Analysis: Time and Space Complexity-Asymptotic Notations: Big-O, Theta, Omega-Recursion and its applications.		
Unit-II	Linear Data Structures	(6)
Arrays and their operations-Linked Lists: Singly, Doubly, Circular-Stack ADT: Operations and Applications-Queue ADT: Linear Queue, Circular Queue, Deque-Applications of Stacks and Queues.		
Unit-III	Searching and Sorting	(6)
Linear Search and Binary Search-Sorting Techniques: Bubble, Selection, Insertion-Divide and Conquer: Merge Sort, Quick Sort-Hashing: Hash Functions, Collision Handling-Performance Analysis of Searching and Sorting.		
Unit-IV	Trees	(6)
Tree ADT and Terminologies-Binary Trees and Traversals (Inorder, Preorder, Postorder)-Binary Search Trees-AVL Trees-Heaps and Priority Queues.		
Unit-V	Graphs	(6)
Graph ADT and Representations-Graph Traversals: BFS and DFS-Directed Acyclic Graphs (DAG)-Shortest Path Algorithms-Minimum Spanning Trees.		
Total No of Periods to be Taught		30 Periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

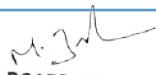
1	Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Pearson, 2nd Edition, 1997.
2	Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structures, Galgotia, 1976.

REFERENCES:

1	Seymour Lipschutz, Data Structures, Schaum's Outline, McGraw Hill, 2011.
2	Reema Thareja, Data Structures Using C, Oxford University Press, 2014.
3	YedidyahLangsam, Moshe Augenstein, Data Structures Using C and C++, Pearson.

List of Exercises/Experiments

1. Implement array operations.	
2. Implement singly linked list operations.	
3. Implement doubly and circular linked lists.	
4. Implement stack operations using array/linked list.	
5. Implement queue operations (linear and circular)	
6. Implement searching algorithms (linear, binary).	
7. Implement sorting algorithms (bubble, selection, insertion).	
8. Implement divide and conquer sorting (merge, quick sort).	
9. Implement tree traversals.	
10.Implement graph traversals (BFS, DFS).	
Total No of Periods to be Taught	30 Periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Explain basic data structures concepts.
CO2:	Apply linear data structures.
CO3:	Implement searching and sorting techniques.
CO4:	Analyze trees and graphs.
CO5:	Design efficient algorithms using data structures.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Windows 11 requires a modern 64-bit processor (1 GHz or faster, 4 GB RAM, 64 GB+ storage)	30
2.	Turbo C Compiler	

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	0	0	1	0	0	0	0	0	1	3	2	1
CO2	3	3	2	0	2	0	0	0	0	0	1	3	3	2
CO3	3	3	3	2	2	0	0	0	0	0	1	3	3	2
CO4	3	3	3	3	2	0	0	0	0	0	1	3	3	3
CO5	3	3	3	3	3	0	0	0	0	0	2	3	3	3
Avg.	3	2.8	2.2	1.6	2	0	0	0	0	0	1.2	3	2.8	2.2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

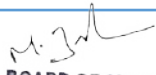
An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		CSE	Programme Code & Name				OPEN TO ALL DEPARTMENTS	
Course Code	Course Name		Hours/Week			Credit	Maximum Marks	
UCSOE2403	Data Science Fundamentals	L	T	P	C	100		
		2	0	2	3			
Course Objectives	• Familiarize students with the data science process. • Understand the data manipulation functions in Numpy and Pandas. • Explore different types of machine learning approaches. • Understand and practice visualization techniques using tools. • Learn to handle large volumes of data with case studies.							

Unit-I	INTRODUCTION	(6)
Data Science: Benefits and uses – facets of data - Data Science Process: Overview – Defining research goals – Retrieving data – data preparation - Exploratory Data analysis – build the model – presenting findings and building applications - Data Mining - Data Warehousing – Basic statistical descriptions of Data.		
Unit-II	DATA MANIPULATION	(9)
Python Shell - Jupyter Notebook - IPython Magic Commands - NumPy Arrays-Universal Functions – Aggregations – Computation on Arrays – Fancy Indexing – Sorting arrays – Structured data – Data manipulation with Pandas – Data Indexing and Selection – Handling missing data – Hierarchical indexing – Combining datasets – Aggregation and Grouping – String operations – Working with time series – High performance.		
Unit-III	MACHINE LEARNING	(5)
The modeling process - Types of machine learning - Supervised learning - Unsupervised learning - Semi-supervised learning- Classification, regression - Clustering – Outliers and Outlier Analysis.		
Unit-IV	DATA VISUALIZATION	(5)
Importing Matplotlib – Simple line plots – Simple scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three dimensional plotting - Geographic Data with Basemap - Visualization with Seaborn.		
Unit-V	HANDLING LARGE DATA	(5)
Problems - techniques for handling large volumes of data - programming tips for dealing with large data sets- Case studies: Predicting malicious URLs, Building a recommender system - Tools and techniques needed - Research question - Data preparation - Model building – Presentation and automation.		


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

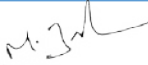


Total No of Periods to be Taught	30 Periods
---	-------------------

TEXT BOOK:	
1	David Cielen, Arno D. B. Meysman, and Mohamed Ali, “Introducing Data Science”, Manning Publications, 2016.
2	Jake VanderPlas, “Python Data Science Handbook”, O’Reilly, 2016.

REFERENCES:	
1	Robert S. Witte and John S. Witte, “Statistics”, Eleventh Edition, Wiley Publications, 2017.
2	Allen B. Downey, “Think Stats: Exploratory Data Analysis in Python”, Green Tea Press, 2014.

List of Exercises/Experiments	
1. Download, install and explore the features of Python for data analytics	
2. Working with Numpy arrays.	
3. Working with Pandas data frames.	
4. Basic plots using Matplotlib.	
5. Statistical and Probability measures a) Frequency distributions b) Mean, Mode, Standard Deviation c) Variability d) Normal curves e) Correlation and scatter plots f) Correlation coefficient g) Regression.	
6. Use the standard benchmark data set for performing the following: a) Univariate Analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis. b) Bivariate Analysis: Linear and logistic regression modelling.	
7. Apply supervised learning algorithms and unsupervised learning algorithms on any data set.	
8. Apply and explore various plotting functions on any data set.	
Note: Example data sets like: UCI, Iris, Pima Indians Diabetes etc.	
Total No of Periods to be Taught	30 Periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Gain knowledge on data science process.
CO2:	Perform data manipulation functions using Numpy and Pandas.
CO3:	Understand different types of machine learning approaches.
CO4:	Perform data visualization using tools.
CO5:	Handle large volumes of data in practical scenarios.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Windows 11 requires a modern 64-bit processor (1 GHz or faster, 4 GB RAM, 64 GB+ storage)	30
2.	Idle Python (latest version)	
3.	Jupyter Notebook	

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	0	1	0	0	0	0	0	1	3	2	1
CO2	3	3	2	1	3	0	0	0	0	0	1	3	3	2
CO3	3	3	3	2	2	0	0	0	0	0	1	3	3	2
CO4	3	2	2	1	3	0	0	0	0	0	1	3	3	2
CO5	3	3	3	3	3	0	0	0	0	0	2	3	3	3
Avg.	3	2.6	2.2	1.4	2.4	0	0	0	0	0	1.2	3	2.8	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

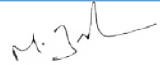
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		CSE	Programme Code & Name				OPEN TO ALL DEPARTMENTS
Course Code	Course Name		Hours/Week			Credit	Maximum Marks
UCSOE2404	Introduction of Data Analytics		L	T	P	C	100
			2	0	2	3	
Course Objectives	- Understand the fundamental concepts of Data analytics. - Learn about various types of data formats and its manipulations. - It helps students to learn exploratory data analysis and visualization techniques in addition to R/Python/Tableau programming language.						

Unit-I	INTRODUCTION TO DATA SCIENCE	(5)
Introduction to Data Science, Need for Data Science, the 5 V's, Evolution of Data Science, Data Science Lifecycle, types of Data Analysis, Data Science Tools and technologies, Applications of Data Science in various fields.		
Unit-II	DATA HANDLING	(7)
Types of Data: structured, semi-structured, unstructured data, Numeric, Categorical, Graphical, High Dimensional Data, Transactional Data, Spatial Data, Social Network Data, standard datasets, Data Classification, Sources of Data, Data manipulation in various formats, import and export data in R/Python.		
Unit-III	DATA PRE-PROCESSING	(6)
Data Cleaning: - missing values, noisy data; Data Transformation: -Normalization, Attribute Selection, Discretization, Hierarchy Generation; Data Reduction: - Attribute Subset Selection, Numerosity and Dimensional Reduction, Exploratory Data Analysis techniques, Concept of data munging and data wrangling, Feature generation and Feature selection algorithms.		
Unit-IV	DATA VISUALIZATION	(6)
Introduction and importance of Data Visualization, Benefits, Idea and tools; Types of Data visualization, Libraries for Data visualization, Data visualization using Python/R, Creating Dashboards & Stories Tableau: Getting started with Tableau Software, Using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps).		
Unit-V	APPLICATION	(5)
Application of Data Science, Data Science and Ethical Issues-Discussion on privacy, security, Ethics-A look back at data science-next generation data scientists. Case Study of Data science-Facebook, uber and Amazon.		


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Total No of Periods to be Taught	30 Periods
---	-------------------

TEXT BOOK:

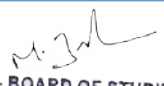
1	Glenn J. Myatt, Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, John Wiley Publishers, 2007.
2	Data Analysis and Data Mining, 2nd Edition, John Wiley & Sons Publication, 2014.

REFERENCES:

1	Open Data for Sustainable Community: Glocalised Sustainable Development Goals, Neha Sharma, Santanu Ghosh, MonodeepSaha, Springer, 2021.
2	The Data Science Handbook, Field Cady, John Wiley & Sons, Inc, 2017.
3	Data Mining Concepts and Techniques, Third Edition, Jiawei Han, Micheline Kamber, Jian Pei, Morgan Kaufmann, 2012.

List of Exercises/Experiments

1. Downloading and installing Hadoop; Understanding different Hadoop modes. Startup scripts, Configuration files.	
2. Hadoop Implementation of file management tasks, such as Adding files and directories, retrieving files and Deleting files.	
3. Implement of Matrix Multiplication with Hadoop Map Reduce.	
4. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.	
5. Installation of Hive along with practice examples.	
6. Installation of HBase, Installing thrift along with Practice examples.	
7. Practice importing and exporting data from various databases.	
Total No of Periods to be Taught	30 Periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Understand the fundamental concepts of data analytics in the areas that plays major role within the realm of data science.
CO2:	Explain and exemplify the most common forms of data and its representations.
CO3:	Understand and apply data pre-processing techniques.
CO4:	Illustrate various visualization methods for different types of data sets and application scenarios.
CO5:	Understand application and ethics of Data Science.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Windows 11 requires a modern 64-bit processor (1 GHz or faster, 4 GB RAM, 64 GB+ storage)	30
2.	Idle Python (latest version)	
3.	Jupyter Notebook	

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	0	1	0	0	0	0	0	1	3	2	1
CO2	3	3	2	1	2	0	0	0	0	0	1	3	3	2
CO3	3	3	3	2	2	0	0	0	0	0	1	3	3	2
CO4	3	2	2	1	3	0	0	0	0	0	1	3	3	2
CO5	3	3	2	2	2	1	1	1	0	0	2	3	3	3
Avg.	3	2.6	2	1.2	2	0.2	0.2	0.2	0	0	1.2	3	2.8	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

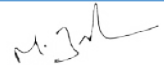
An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		CSE		Programme Code & Name			OPEN TO ALL DEPARTMENTS	
Course Code	Course Name			Hours/Week		Credit	Maximum Marks	
UCSOE2405	Artificial Intelligence and Machine Learning Fundamentals			L	T	P	C	100
				2	0	2	3	
Course Objectives	- Understand the importance, principles, and search methods of AI - Provide knowledge on predicate logic and Prolog. - Introduce machine learning fundamentals. - Study of supervised learning algorithms. - Study about unsupervised learning algorithms.							

Unit-I	INTELLIGENT AGENT AND UNINFORMED SEARCH	(6)
Introduction - Foundations of AI - History of AI - The state of the art - Risks and Benefits of AI - Intelligent Agents - Nature of Environment - Structure of Agent - Problem Solving Agents - Formulating Problems - Uninformed Search - Breadth First Search - Dijkstra's algorithm or uniformcost search - Depth First Search - Depth Limited Search.		
Unit-II	PROBLEM SOLVING WITH SEARCH TECHNIQUES	(7)
Informed Search - Greedy Best First - A* algorithm - Adversarial Game and Search - Game theory - Optimal decisions in game - Min Max Search algorithm - Alpha-beta pruning - Constraint Satisfaction Problems (CSP) - Examples - Map Coloring - Job Scheduling - Backtracking Search for CSP.		
Unit-III	LEARNING	(6)
Machine Learning: Definitions – Classification - Regression - approaches of machine learning models - Types of learning - Probability - Basics - Linear Algebra – Hypothesis space and inductive bias, Evaluation. Training and test sets, cross validation, Concept of over fitting, under fitting, Bias and Variance - Regression: Linear Regression - Logistic Regression.		
Unit-IV	SUPERVISED LEARNING	(6)
Neural Network: Introduction, Perceptron Networks – Adaline - Back propagation networks - Decision Tree: Entropy – Information gain - Gini Impurity - classification algorithm - Rule based Classification - Naïve Bayesian classification - Support Vector Machines (SVM).		
Unit-V	UNSUPERVISED LEARNING	(6)


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Unsupervised Learning – Principle Component Analysis - Neural Network: Fixed Weight Competitive Nets
- Kohonen Self-Organizing Feature Maps – Clustering: Definition - Types of Clustering – Hierarchical clustering algorithms – k-means algorithm.

Total No of Periods to be Taught

30 Periods

TEXT BOOK:

- | | |
|---|--|
| 1 | S. Russell and P. Norvig, “Artificial Intelligence: A Modern Approach”, Prentice Hall, Fourth Edition, 2021. |
| 2 | S.N.Sivanandam and S.N.Deepa, Principles of soft computing-Wiley India.3 rd ed. |

REFERENCES:

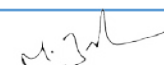
- | | |
|---|---|
| 1 | Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997. |
| 2 | I. Bratko, “Prolog: Programming for Artificial Intelligence”, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011. |
| 3 | C. Muller & Sarah Alpaydin, Ethem. Introduction to machine learning. MIT press, 2020. |

List of Exercises/Experiments

1. Implement breadth first search.
2. Implement depth first search.
3. Analysis of breadth first and depth first search in terms of time and space.
4. Implement and compare Greedy and A* algorithms.

Supervised learning

5. Implement the non-parametric locally weighted regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
6. Write a program to demonstrate the working of the decision tree based algorithm.
7. Build an artificial neural network by implementing the back propagation algorithm and test the same using appropriate data sets.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



8. Write a program to implement the naïve Bayesian classifier.	
Unsupervised learning	
9. Implementing neural network using self-organizing maps.	
10. Implementing k-Means algorithm to cluster a set of data.	
11. Implementing hierarchical clustering algorithm.	
Total No of Periods to be Taught	30 Periods

COURSE OUTCOMES:

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

CO1:	Understand the foundations of AI and the structure of Intelligent Agents.
CO2:	Use appropriate search algorithms for any AI problem.
CO3:	Study of learning methods.
CO4:	Solving problem using Supervised Learning.
CO5:	Solving problem using Unsupervised Learning.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	0	1	0	0	0	0	0	1	3	2	1
CO2	3	3	2	1	2	0	0	0	0	0	1	3	3	2
CO3	3	3	2	2	2	0	0	0	0	0	1	3	3	2
CO4	3	3	3	2	3	0	0	0	0	0	1	3	3	3
CO5	3	3	3	3	3	0	0	0	0	0	2	3	3	3
Avg.	3	2.8	2.2	1.6	2.2	0	0	0	0	0	1.2	3	2.8	2.2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Windows 11 requires a modern 64-bit processor (1 GHz or faster, 4 GB RAM, 64 GB+ storage)	30
2.	Idle Python (latest version)	
3.	Anaconda	

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		CSE		Programme Code & Name			OPEN TO ALL DEPARTMENTS	
Course Code	Course Name			Hours/Week			Credit	Maximum Marks
UCSOE2406	IOT CONCEPTS AND APPLICATIONS			L	T	P	C	100
				2	0	2	3	
Course Objectives	• To apprise students with basic knowledge of IoT that paves a platform to understand physical and logical design of IOT. • To teach a student how to analyse requirements of various communication models and protocols for cost-effective design of IoT applications on different IoT platforms. • To introduce the technologies behind Internet of Things(IoT). • To explain the students how to code for an IoT application using Arduino/Raspberry Pi open platform. • To apply the concept of Internet of Things in real world scenario.							

Unit-I	INTRODUCTION TO INTERNET OF THINGS	(5)
Evolution of Internet of Things – Enabling Technologies – IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT Models – Simplified IoT Architecture and Core IoT Functional Stack – Fog, Edge and Cloud in IoT .		
Unit-II	COMPONENTS IN INTERNET OF THINGS	(5)
Functional Blocks of an IoT Ecosystem – Sensors, Actuators, and Smart Objects – Control Units - Communication modules (Bluetooth, Zigbee,Wifi, GPS, GSM Modules).		
Unit-III	PROTOCOLS AND TECHNOLOGIES BEHIND IOT	(6)
IOT Protocols - IPv6, 6LoWPAN, MQTT, CoAP - RFID, Wireless Sensor Networks, BigData Analytics, Cloud Computing, Embedded Systems.		
Unit-IV	OPEN PLATFORMS AND PROGRAMMING	(7)
IOT deployment for Raspberry Pi /Arduino platform-Architecture –Programming – Interfacing – Accessing GPIO Pins – Sending and Receiving Signals Using GPIO Pins – Connecting to the Cloud.		
Unit-V	IOT APPLICATIONS	(7)
Business models for the internet of things, Smart city, Smart mobility and transport, Industrial IoT, Smart health, Environment monitoring and surveillance – Home Automation – Smart Agriculture.		
Total No of Periods to be Taught		30 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

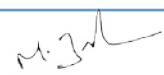
1	Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry, Gonzalo Salgueiro, “IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things”, CISCO Press, 2017.
2	Samuel Greengard, The Internet of Things, The MIT Press, 2015.

REFERENCES:

1	Perry Lea, “Internet of things for architects”, Packt, 2018.
2	. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012.
3	IOT (Internet of Things) Programming: A Simple and Fast Way of Learning, IOT Kindle Edition.
4	Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet of Things”, Springer, 2011.

List of Exercises/Experiments

1. Introduction to Arduino platform and programming.	
2. Interfacing Arduino to Zigbee module.	
3. Interfacing Arduino to GSM module.	
4. Interfacing Arduino to Bluetooth Module.	
5. Introduction to Raspberry PI platform and python programming.	
6. Interfacing sensors to Raspberry PI.	
7. Communicate between Arduino and Raspberry PI using any wireless medium.	
8. Setup a cloud platform to log the data.	
9. Log Data using Raspberry PI and upload to the cloud platform.	
10. Design an IOT based system.	
Total No of Periods to be Taught	30 Periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Explain the concept of IoT.
CO2:	Understand the communication models and various protocols for IoT.
CO3:	Design portable IoT using Arduino/Raspberry Pi /open platform.
CO4:	Apply data analytics and use cloud offerings related to IoT.
CO5:	Analyze applications of IoT in real time scenario..

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	0	1	0	0	0	0	0	1	3	2	1
CO2	3	3	2	1	2	0	0	0	0	0	1	3	3	2
CO3	3	3	3	2	3	0	0	0	0	0	1	3	3	3
CO4	3	3	2	2	3	0	0	0	0	0	1	3	3	3
CO5	3	3	3	3	3	1	1	1	0	0	2	3	3	3
Avg.	3	2.8	2.2	1.6	2.4	0.2	0.2	0.2	0	0	1.2	3	2.8	2.4

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Windows 11 requires a modern 64-bit processor (1 GHz or faster, 4 GB RAM, 64 GB+ storage)	30
2.	https://www.arduino.cc/en/software/	
3.	https://www.raspberrypi.com/software/operating-systems/	

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2401	INDUSTRIAL ELECTRONICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• Study the overview of different types of power semi-conductor devices and their switching characteristics. • Acquire the knowledge of characteristics and performance parameters of controlled converters. • Measure and analyze the characteristics of DC Amplifiers. • Study about the different modulation techniques of pulse width modulated inverters and to understand the harmonic reduction methods. • Expose the practical application for power electronics converters in conditioning the power supply.					

Unit-I	POWER DEVICES	(9)
Power diode --Power transistor -- Power MOSFET - SCR -- TRIAC - GTO - IGBT - MCT -- Protection of power devices		
Unit-II	CONVERTERS	(9)
Introduction to half wave, full wave and bridge rectifiers - Single phase and three phase -Half controlled and fully controlled converters -- Dual converters -- Introduction to cycle converters and ac controllers		
Unit-III	AMPLIFIERS	(9)
Need for DC amplifiers, DC amplifiers - Drift, Causes, Darlington Emitter Follower, Cascade amplifier, Stabilization, Differential amplifiers -- Chopper stabilization, Operational Amplifiers, Ideal specifications of Operational Amplifiers, Instrumentation Amplifiers		
Unit-IV	MOTORS	(9)
Steady state characteristic of dc motors - Control of DC motor using converters and choppers Regenerative and dynamic braking -- Closed loop control scheme - Speed-torque characteristic of induction motor -- Static stator voltage control -- V/f control -- Static rotor resistance control -- Slip power recovery scheme -- Self control of synchronous motor.		
Unit-V	INDUSTRIAL APPLICATIONS	(9)
Electronic timers -- Digital counters -- Voltage regulators - Online and offline ups -- Switched modepower supply -- Principle and application of induction and dielectric heating.		
Total No of Periods to be Taught		45 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Bogdan M Wilamowski and J David Irwin, "Fundamentals of Industrial Electronics" Second Edition, 2011
---	--

REFERENCES:

1	M. H. Rashid, "power Electronics Circuits, Devices and Application", PHI, third edition, 2004.
2	G. M. Chute and R. D. Chute, "Electronics in Industry", McGraw Hill Ltd, Tokyo, Second Edition 1995.
3	F. D. Petruzulla, "Industrial Electronics", McGraw Hill, Singapore, Second Edition 1996.

COURSE OUTCOMES:

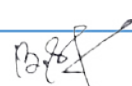
On completion of the course, the students will be able to

CO1:	Enumerate the functions of various power devices.
CO2:	Explain the various types of converters.
CO3:	Illustrate the various types of amplifiers and analyze the function.
CO4:	Construct the characteristics of DC motors and AC drives.
CO5:	Construct the application of timers and counters.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	2	-	-	-	-	-	-	-	3	2	-
CO2	3	2	3	3	-	-	-	-	-	-	-	3	2	-
CO3	3	2	2	2	-	-	-	-	-	-	-	3	3	-
CO4	3	3	2	2	-	-	-	-	-	-	-	3	3	-
CO5	3	2	2	3	-	-	-	-	-	-	-	3	2	-
Avg.	3	2	3	3	-	-	-	-	-	-	-	3	3	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2402	IMAGE PROCESSING AND COMPUTER VISION	L	T	P	C	100
		3	0	0	3	
Course Objectives	• This subject emphasis on fundamentals of Image processing and Computer vision. • Students will gain the knowledge of Image Formation, Image Enhancement and Segmentation. • Students will also learn various feature extraction techniques. • This subject has more emphasis on core vision tasks through Motion estimation and Object as well as pattern recognition. • Students shall explore the areas where automation can be possible through Image processing and Computer Vision.					

Unit-I	INTRODUCTION	(9)
Digital Image fundamentals, Image Sensing and acquisition, Sampling and Quantization, Image formation models, Overview of Computer Vision, Applications of Image processing and Computer Vision		
Unit-II	IMAGE ENHANCEMENT	(9)
Image enhancement in spatial domain, Basic grey level Transformations, Histogram Processing Techniques, Spatial Filtering, Image smoothing and Image Sharpening, Image enhancement process in frequency domain, Low pass filtering, High pass Filtering		
Unit-III	IMAGE SEGMENTATION	(9)
Point, line and edge detection, Thresholding, Regions Based segmentation, Edge linking and boundary detection		
Unit-IV	FEATURE EXTRACTION	(9)
Importance of Features, Feature extraction techniques, Histogram of Oriented Gradient (HOG), Scale Invariant Feature Transform (SIFT), Background subtraction techniques, Image Matching, Principal Component Analysis (PCA)		
Unit-V	OBJECT RECOGNITION AND MOTION ESTIMATION & APPLICATIONS OF IMAGE PROCESSING AND COMPUTER VISION	(9)
Object Recognition techniques: Viola-Jones, Yolo, Deep learning algorithms for Object Recognition. Optical Flow, Gaussian Mixture Model (GMM), Structure of Motion, Motion Estimation.& Face Recognition, Facial Expression Recognition, Optical Character Recognition, Automated Video Surveillance		
Total No of Periods to be Taught		45 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	NPTEL Courses: https://onlinecourses.nptel.ac.in/noc19_cs58/preview https://onlinecourses.nptel.ac.in/noc19_ee55/preview
2	Course era Courses on Image Processing, Computer Vision

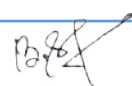
REFERENCES:

1	Digital Image Processing- Refael C. Gonzalez and Richard E. Woods, Wesley
2	Computer Vision - A modern approach, by D. Forsyth and J. Ponce, Prentice Hall Robot Vision, by B. K. P. Horn, McGraw-Hill.
3	Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher: Prentice Hall.
4	Computer Vision, D. H. Ballard, C. M. Brown, Prentice-Hall, Englewood Cliffs, 1982.

COURSE OUTCOMES:

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

CO1:	Understand fundamentals of image processing and computer vision.
CO2:	Understand and apply concepts of Image formation and Image Enhancement.
CO3:	Understand and apply image segmentation and feature extraction methods.
CO4:	Acquire knowledge about various Object Detection, Object Recognition, Motion estimation techniques and their applications.
CO5:	Ability to apply various Image processing and Computer vision algorithms to solve real time problems.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

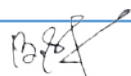
Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

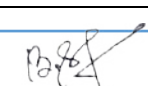


Department	ECE	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2403	4G / 5G COMMUNICATION NETWORKS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To learn the evolution of wireless networks. • To get acquainted with the fundamentals of 5G networks. • To study the processes associated with 5G architecture. • To study spectrum sharing and spectrum trading. • To learn the security features in 5G networks.					

Unit-I	EVOLUTION OF WIRELESS NETWORKS	(9)
Networks evolution: 2G,3G,4G, evolution of radio access networks, need for 5G. 4G versus 5G, Next Generation core(NG-core), visualized Evolved Packet core(vEPC)		
Unit-II	5G CONCEPTS AND CHALLENGES	(9)
Fundamentals of 5G technologies, overview of 5G core network architecture,5G new radio and cloud technologies, Radio Access Technologies (RATs), EPC for 5G		
Unit-III	NETWORK ARCHITECTURE AND THE PROCESSES	(9)
5G architecture and core, network slicing, multi access edge computing(MEC)visualization of 5G components, end-to-end system architecture, service continuity, relation to EPC, and edge computing. 5G protocols: 5G NAS,NGAP, GTP-U, IPSec and GRE		
Unit-IV	DYNAMIC SPECTRUM MANAGEMENT AND MM-WAVES	(9)
Mobility management, Command and control, spectrum sharing and spectrum trading, cognitive radio based on 5G, millimeter waves		
Unit-V	SECURITY IN 5G NETWORKS	(9)
Security features in 5G networks, network domain security, user domain security, flow based QoS frame work, mitigating the threats in 5G		
Total No of Periods to be Taught		45 Periods

TEXT BOOK:	
1	5G Core networks: Powering Digitalization , Stephen Rommer, Academic Press,2019


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	An Introduction to 5G Wireless Networks : Technology, Concepts and Use cases, Saro Velrajan, First Edition, 2020.
---	---

REFERENCES:

1	5G Simplified: ABCs of Advanced Mobile Communications Jyrki. T.J.Penttinen, Copyrighted Material.
2	5G system Design: An end to end Perspective , Wan Lee Anthony, Springer Publications, 2019.

COURSE OUTCOMES:

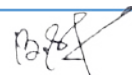
On completion of the course, the students will be able to

CO1:	To understand the evolution of wireless networks.
CO2:	To learn the concepts of 5G networks.
CO3:	To comprehend the 5G architecture and protocols
CO4:	To understand the dynamic spectrum management
CO5:	To learn the security aspects in 5G networks.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2404	WIRELESS COMMUNICATION	L	T	P	C	100
		3	0	0	3	
Course Objectives	• Know the characteristic of wireless channel • Learn the various cellular architectures • Understand the concepts behind various digital signaling schemes for fading channels • Be familiar the various multipath mitigation techniques • Understand the various multiple antenna systems					

Unit-I	WIRELESS CHANNELS	(9)
Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading		
Unit-II	CELLULAR ARCHITECTURE	(9)
Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service – Coverage and capacity improvement		
Unit-III	DIGITAL SIGNALING FOR FADING CHANNELS	(9)
Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR		
Unit-IV	MULTIPATH MITIGATION TECHNIQUES	(9)
Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macro diversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver		
Unit-V	MULTIPLE ANTENNA TECHNIQUES	(9)
MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels		
Total No of Periods to be Taught		45 Periods

TEXT BOOK:	
1	Rappaport,T.S., —Wireless communications , Pearson Education, Second Edition, 2010.(UNIT I, II, IV)

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Andreas.F. Molisch, —Wireless Communications , John Wiley – India, 2006. (UNIT III,V)
---	--

REFERENCES:

1	Wireless Communication –Andrea Goldsmith, Cambridge University Press, 2011
2	Van Nee, R. and Ramji Prasad, —OFDM for wireless multimedia communications, Artech House, 2000
3	David Tse and Pramod Viswanath, —Fundamentals of Wireless Communication, Cambridge University Press, 2005.
4	AUpena Dalal, —Wireless Communication , Oxford University Press, 2009.

COURSE OUTCOMES:

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

CO1:	Gain information on the various types of wireless channels and its parameters associated with it.
CO2:	Design cellular networks.
CO3:	Analyze probability of error of different digital modulation schemes.
CO4:	Understand receiver processing schemes for wireless communication systems for improved transceiver
CO5:	Update latest topics in wireless communication systems and its capacity analysis

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

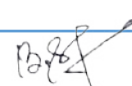
Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2405	EMBEDDED AND REAL TIME SYSTEMS	L 3	T 0	P 0	C 3	100
Course Objectives	- Study the basic of Real time systems - Learn the various uni processor and Multiprocessor scheduling mechanisms - Familiarize the real time memory and design considerations - Introduce the fault tolerant architectures - Understand the Integration of Hardware and software in real time applications					

Unit-I	INTRODUCTION	(9)
Introduction to real time computing - Concepts-Example of real-time applications -- Structure of a real time system - Characterization of real time systems and tasks - Performance metrics • Prediction of Execution Time-Source code analysis, Micro-architecture level analysis, Cache and pipeline issues- Programming Languages for Real-Time Systems		
Unit-II	DESIGN TECHNIQUES	(9)
Real time Kernels- Process Scheduling- Round Robin Scheduling-Cyclic Executives-Fixed Priority Scheduling-Rate Monotonic Approach- Dynamic Priority Scheduling-Earliest Deadline First Approach- Inter task Communication and Synchronization		
Unit-III	MEMORY MANAGEMENT	(9)
Process Stack Management - Runtime Ring Buffer - Maximum Stack Size - Multiple Stack Arrangements- Memory Management in the Task-Control - Block Model - Swapping- Overlays- Block or Page Management- Replacement Algorithms- Memory Locking- Working Sets- Real-Time Garbage Collection- Contiguous File Systems- Building versus Buying Real-Time Operating Systems- Selecting Real Time Kernels		
Unit-IV	FAULT TOLERANT ARCHITECTURES	(9)
Faults- The Role of Testing- Testing Techniques- System-Level Testing- Design of Testing Plans- Fault-Tolerance		
Unit-V	SYSTEM INTEGRATION	(9)
Goals of System Integration- System Unification- System Verification- System Integration Tools- A Simple Integration Strategy- Patching- The Probe Effect- Case Study : Fault Tolerant Design		
Total No of Periods to be Taught		45 Periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Laplante Philip. A, "Real-time systems design and analysis: An engineer's handbook", PHI Publication, Second Edition, 1994.
2	C.M. Krishna, Kang G. Shin, "Real Time Systems", International Edition, McGraw Hill Companies, Inc, New York, Third Edition, 2010.

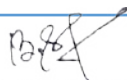
REFERENCES:

1	Jane W.S. Liu, "Real-Time Systems", Pearson Education India, First Edition, 2000.
2	Raymond J.A. Buhr, Donald L. Bailey, "An Introduction to Real Time Systems from Design to Networking with C/C++", Prentice Hall, First Edition, 1999.

COURSE OUTCOMES:

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

CO1:	Describe issues related to the design and analysis of system time constraints.
CO2:	Illustrate about various Scheduling Techniques
CO3:	Explain the various types of memory concepts Real time management
CO4:	Determine the concepts of testing and fault tolerance
CO5:	Discover the real time systems by Integration


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

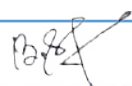
An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	1	-	3	3	1	-	-	-	1	-	3
CO2	-	-	-	1	-	3	3	2	-	-	-	1	-	3
CO3	-	-	-	1	-	3	2	2	-	-	-	1	-	3
CO4	-	-	-	1	-	3	3	1	-	-	-	1	-	3
CO5	-	-	-	1	-	3	3	1	-	-	-	1	-	3
Avg.	-	-	-	1	-	3	3	1	-	-	-	1	-	3
1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy														


 CHAIRMAN - BOARD OF STUDIES
 The Kavary Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week				Credit	Maximum Marks
UECOE2406	ROBOTICS AND ITS INDUSTRIAL APPLICATIONS	L	T	P	C		100
		3	0	0	3		
Course Objectives	- Explain 3D translation and orientation representation & illustrate the robot arm kinematics and use of robot operating system usage. - Classify the robot which meets kinematic requirements. - Apply localization and mapping aspects of mobile robotics. - Illustrate ROS applications. - Test robot programming.						

Unit-I	INTRODUCTION & MATERIAL HANDLING	(9)
Automation In Production System - Manual Labor in production systems -Principles and Strategies of Automation - Basic Elements of An Automated System - Levels of Automation - production concepts and mathematical models - Material Handling: Introduction to Material Handling- Material Handling Equipment's - Principles and Design Consideration in material handling Material Transport Equipment - Automated Storage systems		
Unit-II	FLUID POWER AND PNEUMATIC SYSTEMS	(9)
Introduction to Fluid power - Pascal's Law, Hydraulic Circuit Design and Analysis- Introduction - Control of A Single - Acting Hydraulic Cylinder Circuit - Control of a Double Acting Hydraulic Cylinder Circuit - Regenerative Cylinder Circuit. Basic Pneumatic systems: Types of Cylinders - Single acting Cylinder - Double acting Cylinder - Direction Control Valves- Valve position - Shuttle Valve		
Unit-III	MANUFACTURING SYSTEMS	(9)
Introduction to Manufacturing systems - Components of Manufacturing systems - Classification scheme for Manufacturing systems - Simple problems using Mathematic models of production performance - single station manufacturing cells - fundamentals of manual assembly lines		
Unit-IV	AUTOMATED PRODUCTION LINES AND ASSEMBLY SYSTEMS	(9)
Fundamentals of Automated Production Lines - Applications Of Automated production lines - System configurations - Work Part Transfer Mechanisms - Storage Buffers - Power Transmission Systems - Gears - Power Screws (Linear Guide ways)		
Unit-V	CELLULAR MANUFACTURING AND FLEXIBLE MANUFACTURING SYSTEMS	(9)
Introduction - Part Families - Manufacturing Cells - Cellular Manufacturing - Part classification and coding - Production Flow Analysis - Group Technology and its applications. Introduction to FMS - FMS Industrial Applications and its benefits - FMS components		
Total No of Periods to be Taught		45 Periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Automation, Production Systems and Computer Integrated Manufacturing- M. P. Groover, Pearson Education. Third edition/Fifth edition, 2009*.
---	---

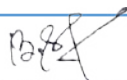
REFERENCES:

1	Fluid Power with Applications-Anthony Esposito, Peason, Sixth Addition.Edition
2	Pneumatic Systems, Principles and Maintenance- SR Majumdar, 2011 Edition.
3	Industrial Robotics, Technology, Programming, and applications- MikellP.Groover
4	Computer Based Industrial Control- Krishna Kant, EEE-PHI,2nd edition,2010
5	Engineering Metrology and Measurements -- N.V. Raghavendra, L.Krishnamurthy, 2018

COURSE OUTCOMES:

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

CO1:	Select & identify suitable automation hardware for the given understand application.
CO2:	Describe & explain potential areas of automation, material handling, Understand and Fluid power systems.
CO3:	Estimate of Manufacturing systems & Mathematical models of apply production lines
CO4:	Identify Industrial Automated production lines, work part transfer analyze mechanism and buffer storage analysis. Analyze Cellular Manufacturing, Flexible manufacturing Systems.
CO5:	planning implementation issues and implementation of quality Analyze programs in production systems.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

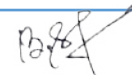
Mecheri, Salem Dt-636453, Tamilnadu



Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2407	INDUSTRIAL IOT	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand the fundamentals of Internet of Things. • To learn about the basics of IOT protocols. • To build a small low cost embedded system using IoT. • To apply the concept of IOT in the real world scenario.					

Unit-I	INTRODUCTION AND ARCHITECTURE OF IoT	(9)
Introduction – Definition and characteristics of IoT – Physical and Logical Design of IoT - Communication models and APIs – Challenges in IoT - Evolution of IoT- Components of IoT - A Simplified IoT Architecture – Core IoT Functional Stack.		
Unit-II	INDUSTRIAL IoT	(9)
IIoT-Introduction, Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models, Industrial IoT- Layers: IIoT Sensing, IIoT Processing, IIoT Communication, IIoT Networking		
Unit-III	IIOT ANALYTICS	(9)
Big Data Analytics and Software Defined Networks, Machine Learning and Data Science, Julia Programming, Data Management with Hadoop		
Unit-IV	IOT SECURITY	(9)
Industrial IoT: Security and Fog Computing - Cloud Computing in IIoT, Fog Computing in IIoT, Security in IIoT		
Unit-V	CASE STUDY	(9)
Industrial IOT- Application Domains: Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Real case studies: Milk Processing and Packaging Industries, Manufacturing Industries		
Total No of Periods to be Taught		45 Periods

TEXT BOOK:	
1	Industry 4.0: The Industrial Internet of Things”, by Alasdair Gilchrist (Apress), 2017

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Hands-On Industrial Internet of Things: Create a powerful Industrial IoT by Giacomo Veneri, Antonio Cap
2	"Industrial Internet of Things: Cyber manufacturing Systems" by Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat (Springer), 2017

COURSE OUTCOMES:

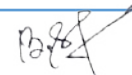
On completion of the course, the students will be able to

CO1:	Understand the basic concepts and Architectures of Internet of Things.
CO2:	Understand various IoT Layers and their relative importance.
CO3:	Realize the importance of Data Analytics in IoT.
CO4:	Study various IoT platforms and Security
CO5:	Understand the concepts of Design Thinking.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	2	-	-	-	-	2	3	2	2
CO2	3	2	2	2	1	2	-	-	-	-	2	3	3	2
CO3	3	2	2	2	2	2	-	-	-	-	2	3	3	2
CO4	3	2	3	2	3	2	-	-	-	-	2	3	3	2
CO5	3	3	3	3	3	3	-	-	-	-	1	3	2	3
Avg.	3	2.3	2.4	2.3	2	2.3	-	-	-	-	1.8	3	2.6	2.3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2408	SENSORS AND TRANSDUCERS	L 3	T 0	P 0	C 3	100
Course Objectives	The objective of this course is to make the students to list common types of sensor and actuators used in automotive vehicles.					

Unit-I	INTRODUCTION	(9)
Basics of Measurement – Classification of errors – Error analysis – Static and dynamic characteristics of transducers – Performance measures of sensors – Classification of sensors –Sensor calibration techniques – Sensor Output Signal Types		
Unit-II	MOTION, PROXIMITY AND RANGING SENSORS	(9)
Motion Sensors – Potentiometers, Resolver, Encoders – Optical, Magnetic, Inductive, Capacitive, LVDT – RVDT – Synchro – Microsyn, Accelerometer.,– GPS, Bluetooth, Range Sensors – RF beacons, Ultrasonic Ranging, Reflective beacons, Laser Range Sensor (LIDAR)		
Unit-III	FORCE, MAGNETIC AND HEADING SENSORS	(9)
Strain Gauge, Load Cell, Magnetic Sensors –types, principle, requirement and advantages: Magneto resistive – Hall Effect – Current sensor Heading Sensors – Compass, Gyroscope, Inclometers		
Unit-IV	OPTICAL, PRESSURE AND TEMPERATURE SENSORS	(9)
Photo conductive cell, photo voltaic, Photo resistive, LDR – Fiber optic sensors – Pressure –Diaphragm, Bellows, Piezoelectric – Tactile sensors, Temperature – IC, Thermistor, RTD, Thermocouple. Acoustic Sensors – flow and level measurement, Radiation Sensors - Smart Sensors - Film sensor, MEMS & Nano Sensors, LASER sensors		
Unit-V	SIGNAL CONDITIONING AND DAQ SYSTEMS	(9)
Amplification – Filtering – Sample and Hold circuits – Data Acquisition: Single channel and multichannel data acquisition – Data logging - applications - Automobile, Aerospace, Home appliances, Manufacturing, Environmental monitoring		
Total No of Periods to be Taught		45 Periods

TEXT BOOK:	
1	Ernest O Doebelin, “Measurement Systems – Applications and Design”, Tata McGraw-Hill, 2009.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Sawney A K and Puneet Sawney, "A Course in Mechanical Measurements and Instrumentation and Control", 12th edition, Dhanpat Rai & Co, New Delhi, 2013.
---	---

REFERENCES:

1	Patranabis D, "Sensors and Transducers", 2nd Edition, PHI, New Delhi, 2010.
2	John Turner and Martyn Hill, "Instrumentation for Engineers and Scientists", Oxford Science Publications, 1999.

COURSE OUTCOMES:

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

CO1:	List common types of sensor and actuators used in vehicles.
CO2:	Design measuring equipment's for the measurement of pressure force, temperature and flow
CO3:	Generate new ideas in designing the sensors and actuators for automotive application
CO4:	Understand the operation of the sensors, actuators and electronic control
CO5:	Design temperature control actuators for vehicles

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	2	-	-	-	-	2	3	3	2
CO2	3	2	2	2	1	2	-	-	-	-	2	3	3	2
CO3	3	2	2	2	2	2	-	-	-	-	2	3	3	2
CO4	3	2	2	2	3	2	-	-	-	-	2	3	3	2
CO5	3	2	3	3	3	3	-	-	-	-	2	3	2	3
Avg.	3	2	2.3	2.3	2	2.3	-	-	-	-	2	3	2.8	2.3

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	ECE	Programme Code & Name	Open to all Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UECOE2409	SPACE SCIENCE	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To outline the space environment and their effects. • To extend the origin of universe and development. • To classify the galaxies and their evolution. • To interpret the variable stars in the galaxies. • To explain theory of formation of our solar system.					

Unit-I	INTRODUCTION	(9)
Introduction to space science and applications – historical development – Space Environment-Vacuum and its Effects, Plasma & Radiation Environments and their Effects, Debris Environment and its Effects - Newton's Law of gravitation – Fundamental Physical Principles		
Unit-II	ORIGIN OF UNIVERSE	(9)
Early history of the universe – Big-Bang and Hubble expansion model of the universe – cosmic microwave background radiation – dark matter and dark energy		
Unit-III	GALAXIES	(9)
Galaxies, their evolution and origin – active galaxies and quasars – Galactic rotation – Stellar populations – galactic magnetic field and cosmic rays		
Unit-IV	STARS	(9)
Stellar spectra and structure – stellar evolution – Nucleo-synthesis and formation of elements – Classification of stars – Harvard classification system – Hertsprung-Russel diagram – Luminosity of star – variable stars – composite stars (white dwarfs, Neutron stars, black hole, star clusters, supernova and binary stars) – Chandrasekhar limit		
Unit-V	SOLAR SYSTEM	(9)
Nebular theory of formation of our Solar System – Solar wind and nuclear reaction as the source of energy – Sun and Planets: Brief description about shape size – period of rotation about axis and period of revolution – distance of planets from sun – Bode's law – Kepler's Laws of planetary motion – Newton's deductions from Kepler's Laws – correction of Kepler's third law – determination of mass of earth – determination of mass of planets with respect to earth – Brief description of Asteroids – Satellites and Comets		
Total No of Periods to be Taught		45 Periods

TEXT BOOK:	
1	Hess W., "Introduction to Space Science", Gordon & Breach Science Pub; Revised Ed., 1968

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Krishnaswami K. S., “Astrophysics: A modern Perspective”, New Age International, 2006.
---	--

REFERENCES:

1	Arnab Rai Choudhuri, “Astrophysics for Physicists”, Cambridge University Press, New York, 2010.
2	Krishnaswami K. S., “Understanding cosmic Panorama”, New Age International, 2008.

COURSE OUTCOMES:

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

CO1:	Obtain a broad, basic knowledge of the space sciences.
CO2:	Explain the scientific concepts such as evolution by means of natural selection, age of the Earth and solar system and the Big-Bang.
CO3:	Describe the main features and formation theories of the various types of observed galaxies, in particular the Milky Way.
CO4:	Explain stellar evolution, including red giants, supernovas, neutron stars, pulsars, white dwarfs and black holes, using evidence and presently accepted theories;
CO5:	Describe the presently accepted formation theories of the solar system based upon observational and physical constraints.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	1	-	1	-	1	3	3	3
CO2	3	2	2	3	2	3	-	-	-	-	1	3	3	3
CO3	3	3	3	2	1	3	-	-	-	-	1	3	3	3
CO4	3	3	2	3	2	3	-	-	-	-	1	3	3	3
CO5	3	2	3	2	2	1	-	-	-	-	1	3	3	3
Avg.	3	2.3	2.3	2.3	2	2.3	1	-	1	-	1	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to All Departments
-------------------	------------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2401	REVERSE ENGINEERING	L	T	P	C	100
		2	0	2	3	
Course Objectives	- To Applying the fundamental concepts and principles of reverse engineering in product design and development. - Applying the concept and principles material characteristics, part durability and life limitation in reverse engineering of product design and development. - Applying the concept and principles of material identification and process verification in reverse engineering of product design and development. - Applying the concept and principles of data processing, part performance and system compatibility in reverse engineering of product design and development. - Analyzing the various legal aspect and applications of reverse engineering in product design and development.					

Unit-I	INTRODUCTION TO REVERSE ENGINEERING & GEOMETRIC FORM	(6)
Definition – Uses – The Generic Process – Phases – Computer Aided Reverse Engineering - Surface and Solid Model Reconstruction – Dimensional Measurement – Prototyping.		
Unit-II	MATERIAL CHARACTERISTICS, PART DURABILITY AND LIFE LIMITATION	(6)
Alloy Structure Equivalency – Phase Formation and Identification – Mechanical Strength – Hardness –Part Failure Analysis – Fatigue – Creep and Stress Rupture – Environmentally Induced Failure		
Unit-III	MATERIAL IDENTIFICATION AND PROCESS de VERIFICATION	(6)
Material Specification - Composition Determination - Microstructure Analysis - Manufacturing Process Verification.		
Unit-IV	DATA PROCESSING, PART PERFORMANCE AND SYSTEM COMPATIBILITY	(6)
Statistical Analysis – Data Analysis – Reliability and the Theory of Interference – Weibull Analysis – Data Conformity and Acceptance – Data Report – Performance Criteria – Methodology of Performance Evaluation – System Compatibility.		
Unit-V	ACCEPTANCE, LEGALITY AND INDUSTRIAL APPLICATIONS OF REVERSE ENGINEERING	(6)
Legality of Reverse Engineering – Patent – Copyrights –Trade Secret – Third-Party Materials – Reverse Engineering in the Automotive Industry; Aerospace Industry; Medical Device Industry.		
Total No of Periods to be Taught		30


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Reverse Engineering, Kathryn, A. Ingle, McGraw-Hill, 1994
2	Reverse Engineering, Linda Wills, Kluiver Academic Publishers, 1996

REFERENCES:

1	Co-ordinate Measurement and reverse engineering, Donald R. Honsa, ISBN 1555897, American Gear Manufacturers Association
2	Data Reverse Engineering, Aiken, Peter, McGraw-Hill, 1996
3	Design Recovery for Maintenance and Reuse, T J Biggerstaff, IEEE Corpn. July 1991
4	White paper on RE, S. Rugaban, Technical Report, Georgia Instt. of Technology, 1994

List of Exercises/Experiments

1.	Study of reverse engineering concepts, workflow, and industrial applications.
2.	Measurement of engineering components using Vernier caliper, micrometer, and height gauge.
3.	Hardness testing of engineering materials using Rockwell/Brinell methods.
4.	Study of creep and stress rupture characteristics of materials.
5.	3D Laser scanning of components.
6.	Reverse engineering of Automotive components-cam shaft.
7.	Material identification and process verification of welded components.
8.	Preparation of technical inspection and data analysis reports.
9.	Case study on reverse engineering applications in automotive systems.
10.	Reverse engineering of dental components - Bio medical applications.
Total No of Periods to be Taught	
30	


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Apply the fundamental concepts and principles of reverse engineering in product design and development.
CO2:	Apply the concept and principles material characteristics, part durability and life limitation in reverse engineering of product design and development.
CO3:	Apply the concept and principles of material identification and process verification in reverse engineering of product design and development.
CO4:	Apply the concept and principles of data processing, part performance and system compatibility in reverse engineering of product design and development.
CO5:	Analyze the various legal aspect and applications of reverse engineering in product design and development

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Vernier caliper	05 Each
2.	Micrometer	05 Each
3.	Height Gauge with Surface Plate	05 Each
4.	Rockwell Hardness Testing Machine	01 No
5.	Brinell Hardness Testing Machine	01 No
6.	Tool Maker Microscope	01 No
7.	Reverse Engineering software and 3D Modeling software	15 License
8.	3D Printer (FDM Type)	01 No
9.	3D Laser Scanner	01 No
10.	Surface Roughness Tester	01 No

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to all departments
-------------------	------------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2402	NON DESTRUCTIVE TESTING	L	T	P	C	100
		2	0	2	3	
Course Objectives	- Understanding the basic importance of NDT in quality assurance. - Imbibing the basic principles of various NDT techniques, its applications, limitations, codes and standards. - Equipping themselves to locate a flaw in various materials, products. - Applying apply the testing methods for inspecting materials in accordance with industry specifications and standards. - Acquiring the knowledge on the selection of the suitable NDT technique for a given application.					
Unit-I	INTRODUCTION TO NDT & VISUAL TESTING					(6)
Concepts of Non-destructive testing-relative merits and limitations-NDT Versus mechanical testing, Fundamentals of Visual Testing – vision, lighting, material attributes, environmental factors, visual perception, direct and indirect methods – mirrors, magnifiers, boroscopes and fibroscopes – light sources and special lighting.						
Unit-II	LIQUID PENETRANT & MAGNETIC PARTICLE TESTING					(6)
Liquid Penetrant Inspection: principle, applications, advantages and limitations, dyes, developers and cleaners, Methods & Interpretation. Magnetic Particle Inspection: Principles, applications, magnetization methods, magnetic particles, Testing Procedure, demagnetization, advantages and limitations, – Interpretation and evaluation of test indications.						
Unit-III	EDDY CURRENT TESTING & THERMOGRAPHY					(6)
Eddy Current Testing: Generation of eddy currents– properties– eddy current sensing elements, probes, Instrumentation, Types of arrangement, applications, advantages, limitations – Factors affecting sensing elements and coil impedance, calibration, Interpretation/Evaluation. Thermography- Principle, Contact & Non-Contact inspection methods, Active & Passive methods, Liquid Crystal – Concept, example, advantages & limitations. Electromagnetic spectrum, infrared thermography- approaches, IR detectors, Instrumentation and methods, applications.						
Unit-IV	ULTRASONIC TESTING & AET					(6)
Ultrasonic Testing: Types of ultrasonic waves, characteristics, attenuation, couplants, probes, EMAT. Inspection methods-pulse echo, transmission and phased array techniques, types of scanning and displays, angle beam inspection of welds, time of flight diffraction (TOFD) technique, Thickness determination by ultrasonic method, Study of A, B and C scan presentations, calibration. Acoustic Emission Technique – Introduction, Types of AE signal, AE wave propagation, Source location, Kaiser effect, AE transducers, Principle, AE parameters, AE instrumentation, Advantages & Limitations, Interpretation of Results, Applications.						
Unit-V	RADIOGRAPHY TESTING					(6)
Sources-X-rays and Gamma rays and their characteristics-absorption, scattering. Filters and screens, Imaging modalities-film radiography and digital radiography (Computed, Direct, Real Time, CT scan). Problems in shadow formation, exposure factors, inverse square law, exposure charts, Penetrameters, safety in radiography.						
Total No of Periods to be Taught		30				


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Baldev Raj, T. Jayakumar and M. Thavasimuthu, Practical Non Destructive Testing, Alpha Science International Limited, 3rd edition, 2002.
2	J. Prasad and C. G. K. Nair, Non-Destructive Test and Evaluation of Materials, Tata McGraw Hill Education, 2nd edition, 2011.

REFERENCES:

1	ASM Metals Handbook, V-17, "Non-destructive Evaluation and Quality Control", American Society of Metals, USA, 2001.
2	Barry Hull and Vernon John, "Non-destructive Testing", Macmillan, 1989.
3	Chuck Hellier, "Handbook of Non-destructive Evaluation", Mc Graw Hill, 2012.
4	Louis Cartz, "Non-destructive Testing", ASM International, USA, 1995.

List of Exercises/Experiments

1. Conducting experiment using liquid penetrant testing.	
2. Study of lighting conditions and their effect on defect visibility.	
3. Conducting experiment using magnetic particle testing.	
4. Study of demagnetization techniques and evaluation of indications.	
5. Conducting experiment using ultrasonic testing.	
6. Study of A-scan, B-scan, and C-scan presentations.	
7. Conducting experiment using electromagnetic testing.	
8. Study of Eddy Current Sorter	
9. Conducting experiment using acoustic emission testing.	
10. Study of inverse square law and exposure charts.	
Total No of Periods to be Taught	30


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Realize the importance of NDT in various engineering fields.
CO2:	Have a basic knowledge of surface NDE techniques which enables to carry out various inspection in accordance with the established procedures.
CO3:	Calibrate the instrument and inspect for in-service damage in the components by means of Eddy current testing as well as Thermography testing.
CO4:	Differentiate various techniques of UT and AET and select appropriate NDT methods for better evaluation.
CO5:	Interpret the results of Radiography testing and also have the ability to analyse the influence of various parameters on the testing.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Dye penetrant kits.	01 No
2.	Test specimens with surface cracks.	02 Nos
3.	Ultrasonic flaw detectors.	01 No
4.	Eddy current instruments.	01 No
5.	Magnetic Particle Testing Instruments.	01 No

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	3	-	-	2	2	-	-	2	1	2	-
CO2	3	1	2	2	-	-	2	2	-	-	2	2	2	1
CO3	3	2	1	2	-	-	2	2	-	-	2	2	2	-
CO4	3	1	2	2	-	-	2	2	-	-	2	2	2	2
CO5	3	2	2	2	-	-	2	2	-	-	2	2	2	1
Avg.	2.8	1.6	1.8	2.2	-	-	2	2	-	-	2	1.8	2	1.3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to all departments
------------	------------	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2403	ADDITIVE MANUFACTURING TECHNOLOGY	L	T	P	C	100
		2	0	2	3	
Course Objectives	• To introduce the development of Additive Manufacturing (AM), various business opportunities and applications • To familiarize various software tools, processes and techniques to create physical objects that satisfy product development / prototyping requirements, using AM. • To be acquainted with vat polymerization and direct energy deposition processes • To be familiar with powder bed fusion and material extrusion processes. • To gain knowledge on applications of binder jetting, material jetting and sheet lamination processes					

Unit-I	INTRODUCTION	(6)
Overview - Need - Development of Additive Manufacturing (AM) Technology: Rapid Prototyping- Rapid Tooling - Rapid Manufacturing - Additive Manufacturing. AM Process Chain- ASTM/ISO 52900 Classification - Benefits. Applications: Building Printing - Bio Printing - Food Printing-Electronics Printing. Business Opportunities and Future Directions – Case studies: Automobile, Aerospace, Healthcare.		
Unit-II	DESIGN FOR ADDITIVE MANUFACTURING (DfAM)	(6)
Concepts and Objectives - AM Unique Capabilities - Part Consolidation – Topology Optimization- Generative design - Lattice Structures - Multi-Material Parts and Graded Materials - Data Processing: CAD Model Preparation - AM File formats: STL-Problems with STL- AMF Design for Part Quality Improvement: Part Orientation - Support Structure - Slicing - Tool Path Generation – Design rules for Extrusion based AM.		
Unit-III	VAT POLYMERIZATION AND DIRECTED ENERGY DEPOSITION	(6)
Photo polymerization: Stereolithography Apparatus (SLA)- Materials -Process – top down and bottom up approach - Advantages - Limitations - Applications. Digital Light Processing (DLP) - Process - Advantages - Applications. Continuous Liquid Interface Production (CLIP)Technology. Directed Energy Deposition: Laser Engineered Net Shaping (LENS)- Process - Material Delivery -Materials -Benefits -Applications.		
Unit-IV	POWDER BED FUSION AND MATERIAL EXTRUSION	(6)
Powder Bed Fusion: Selective Laser Sintering (SLS): Process - Powder Fusion Mechanism - Materials and Application. Selective Laser Melting (SLM), Electron Beam Melting (EBM): Materials - Process - Advantages and Applications. Material Extrusion: Fused Deposition Modeling (FDM)- Process-Materials -Applications and Limitations.		
Unit-V	OTHER ADDITIVE MANUFACTURING PROCESSES	(6)
Sources-X-rays and Gamma rays and their characteristics-absorption, scattering. Filters and screens, Imaging modalities-film radiography and digital radiography (Computed, Direct, Real Time, CT scan). Problems in shadow formation, exposure factors, inverse square law, exposure charts, Penetrameters, safety in radiography.		
Total No of Periods to be Taught		30


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Ian Gibson, David Rosen, Brent Stucker, Mahyar Khorasani “Additive manufacturing technologies”. 3rd edition Springer Cham, Switzerland. (2021). ISBN: 978-3-030-56126-0
2	Andreas Gebhardt and Jan-Steffen Hötter “Additive Manufacturing: 3D Printing for Prototyping and Manufacturing”, Hanser publications, United States, 2015, ISBN: 978-1-56990-582-1.

REFERENCES:

1	Andreas Gebhardt, “Understanding Additive Manufacturing: Rapid Prototyping, Rapid Manufacturing”, Hanser Gardner Publication, Cincinnati., Ohio, 2011, ISBN :9783446425521.
2	Milan Brandt, “Laser Additive Manufacturing: Materials, Design, Technologies, and Applications”, Woodhead Publishing., United Kingdom, 2016, ISBN: 9780081004333.
3	Amit Bandyopadhyay and Susmita Bose, “Additive Manufacturing”, 1st Edition, CRC Press., United States, 2015, ISBN-13: 978-1482223590.
4	Kamrani A.K. and Nasr E.A., “Rapid Prototyping: Theory and practice”, Springer., United States ,2006, ISBN: 978-1-4614-9842-1.
5	Liou, L.W. and Liou, F.W., “Rapid Prototyping and Engineering applications: A tool box for prototype development”, CRC Press., United States, 2011, ISBN: 9780849334092.

List of Exercises/Experiments

1. Modelling and converting CAD models into STL file.	
2. Manipulation and error fixing of STL file.	
3. Design and fabrication of parts by varying part orientation and support structures.	
4. Fabrication of parts with material extrusion AM process.	
5. Fabrication of parts with vat polymerization AM process.	
6. Design and fabrication of topology optimized parts.	
7. Extrusion based AM machine	
8. Resin based AM machine	
9. Mechanical design software	
10. Open-source AM software for STL editing, manipulation and slicing	
Total No of Periods to be Taught	30


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Recognize the development of AM technology and how AM technology propagated into various businesses and developing opportunities.
CO2:	Acquire knowledge on process of transforming a concept into the final product in AM technology.
CO3:	Elaborate the vat polymerization and direct energy deposition processes and its applications.
CO4:	Acquire knowledge on process and applications of powder bed fusion and material extrusion.
CO5:	Evaluate the advantages, limitations, applications of binder jetting, material jetting and sheet lamination processes.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1.	Workstations	15 Nos
2.	FDM - 3D printers	01 No
3.	SLA/DLP resin printers	01 No
4.	Mechanical design software (Solid Edge, Solidworks)	15 License
5.	Hybrid AM machines	01 No

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

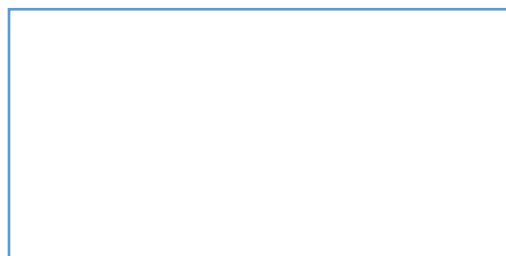
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to all Departments
------------	------------	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2404	ENERGY TECHNOLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To introduce students to the basic principles, characteristics, and importance of renewable energy sources, highlighting their differences compared to conventional fossil fuels. - To prepare students for careers in energy engineering by equipping them with technical knowledge, analytical skills, and practical exposure to renewable energy systems. - To enable students to compare and evaluate different renewable energy technologies, selecting the most suitable options based on local resources, environmental conditions, and economic feasibility. - To explain the scientific and engineering principles behind harnessing renewable energy sources such as solar, wind, biomass, hydro, and emerging technologies. - To develop the ability to critically assess current developments, innovations, and future directions in renewable energy, fostering advanced technical understanding of global energy challenges.					
Unit-I	INTRODUCTION					(9)
Units of energy, conversion factors, general classification of energy, world energy resources and energy consumption, Indian energy resources and energy consumption, energy crisis, energy alternatives, Renewable and non-renewable energy sources and their availability. Prospects of Renewable energy sources						
Unit-II	CONVENTIONAL ENERGY					(9)
Conventional energy resources, Thermal, hydel and nuclear reactors, thermal, hydel and nuclear power plants, efficiency, merits and demerits of the above power plants, combustion processes, fluidized bed combustion.						
Unit-III	NON-CONVENTIONAL ENERGY					(9)
Solar energy, solar thermal systems, flat plate collectors, focusing collectors, solar water heating, solar cooling, solar distillation, solar refrigeration, solar dryers, solar pond, solar thermal power generation, solar energy application in India, energy plantations. Wind energy, types of windmills, types of wind rotors, Darrius rotor and Gravina rotor, wind electric power generation, wind power in India, economics of wind farm, ocean wave energy conversion, ocean thermal energy conversion, tidal energy conversion, geothermal energy.						
Unit-IV	BIOMASS ENERGY					(9)
Biomass energy resources, thermo-chemical and biochemical methods of biomass conversion, combustion, gasification, pyrolysis, biogas production, ethanol, fuel cells, alkaline fuel cell, phosphoric acid fuel cell, molten carbonate fuel cell, solid oxide fuel cell, solid polymer electrolyte fuel cell, magneto hydrodynamic power generation, energy storage routes like thermal energy storage, chemical, mechanical storage and electrical storage.						
Unit-V	ENERGY CONSERVATION					(9)
Energy conservation in chemical process plants, energy audit, energy saving in heat exchangers, distillation columns, dryers, ovens and furnaces and boilers, steam economy in chemical plants, energy conservation.						
Total No of Periods to be Taught		45				





THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Rao, S. and Parulekar, B.B., Energy Technology, Khanna Publishers, 2005.
2	Rai, G.D., Non-conventional Energy Sources, Khanna Publishers, New Delhi, 1984.
3	Bansal, N.K., Kleeman, M. and Meliss, M., Renewable Energy Sources and Conversion Technology, Tata McGraw Hill, 1990.
4	Nagpal, G.R., Power Plant Engineering, Khanna Publishers, 2008.

REFERENCES:

1	Nejat Vezirog, Alternate Energy Sources, IT, McGraw Hill, New York.
2	El. Wakil, Power Plant Technology, Tata McGraw Hill, New York, 2002.
3	Sukhatme. S.P., Solar Enery - Thermal Collection and Storage, Tata McGraw hill, New Delhi, 1981.

COURSE OUTCOMES:

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

CO1:	Students will be able to describe the fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels.
CO2:	Students will excel as professionals in the various fields of energy engineering
CO3:	Compare different renewable energy technologies and choose the most appropriate based on local conditions
CO4:	Explain the technological basis for harnessing renewable energy sources.
CO5:	Identify and critically evaluate current developments and emerging trends within the field of renewable energy technologies and to develop in-depth technical understanding of energy problems at an advanced level.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to all Departments
------------	------------	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2405	RENEWABLE ENERGY TECHNOLOGIES	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To know the Indian and global energy scenario - To learn the various solar energy technologies and its applications. - To educate the various wind energy technologies. - To explore the various bio-energy technologies. - To study the ocean and geothermal technologies					

Unit-I	ENERGY SCENARIO	(9)
Indian energy scenario in various sectors – domestic, industrial, commercial, agriculture, transportation and others – Present conventional energy status – Present renewable energy status Potential of various renewable energy sources-Global energy status-Per capita energy consumption - Future energy plans		
Unit-II	SOLAR ENERGY	(9)
Solar radiation – Measurements of solar radiation and sunshine – Solar spectrum - Solar thermal collectors – Flat plate and concentrating collectors – Solar thermal applications – Solar thermal energy storage – Fundamentals of solar photo voltaic conversion – Solar cells – Solar PV Systems – Solar PV applications.		
Unit-III	WIND ENERGY	(9)
Wind data and energy estimation – Betz limit - Site selection for windfarms – characteristics - Wind resource assessment - Horizontal axis wind turbine – components - Vertical axis wind turbine – Wind turbine generators and its performance – Hybrid systems – Environmental issues - Applications		
Unit-IV	BIO-ENERGY	(9)
Bio resources – Biomass direct combustion – thermochemical conversion - biochemical conversion mechanical conversion - Biomass gasifier - Types of biomass gasifiers - Cogeneration – Carbonisation – Pyrolysis - Biogas plants – Digesters – Biodiesel production – Ethanol production - Applications.		
Unit-V	OCEAN AND GEOTHERMAL ENERGY	(9)
Small hydro - Tidal energy – Wave energy – Open and closed OTEC Cycles – Limitations – Geothermal energy – Geothermal energy sources - Types of geothermal power plants – Applications - Environmental impact.		
Total No of Periods to be Taught		45
TEXT BOOK:		
1	Fundamentals and Applications of Renewable Energy Indian Edition, by Mehmet Kanoglu, Yunus A. Cengel, John M. Cimbala, cGraw Hill; First edition (10 December 2020), ISBN-10 : 9390385636	
2	Renewable Energy Sources and Emerging Technologies, by Kothari, Prentice Hall India Learning Private Limited; 2nd edition (1 January 2011), ISBN-10 : 8120344707.	


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Godfrey Boyle, “Renewable Energy, Power for a Sustainable Future”, Oxford University Press, U.K., 2012.
2	Rai.G.D., “Non-Conventional Energy Sources”, Khanna Publishers, New Delhi, 2014.
3	Sukhatme.S.P., “Solar Energy: Principles of Thermal Collection and Storage”, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2009.
4	Tiwari G.N., “Solar Energy – Fundamentals Design, Modelling and applications”, Alpha Science Intl Ltd, 2015.
5	Twidell, J.W. & Weir A., “Renewable Energy Resources”, EFNSpon Ltd., UK, 2015

COURSE OUTCOMES:

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

CO1:	Discuss the Indian and global energy scenario.
CO2:	Describe the various solar energy technologies and its applications.
CO3:	Explain the various wind energy technologies
CO4:	Explore the various bio-energy technologies.
CO5:	Discuss the ocean and geothermal technologies

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1	1	1	2	3	2	2	1	1	2	1	2
CO2	3	2	2	1	1	1	3	1	1	1	2	2	1	2
CO3	3	2	3	1	2	1	3	1	1	1	1	1	1	2
CO4	2	2	2	1	2	1	3	1	1	1	2	2	2	2
CO5	2	1	2	1	2	1	3	1	1	1	1	2	1	2
Avg.	3	2	2	1	2	1	3	1	1	1	1	2	1	2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to all Departments
------------	------------	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2406	INTRODUCTION TO INDUSTRIAL ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	- Understand the concepts productivity and productivity measurement approaches. - Understand the basic principles in facilities planning and plant location - Apply work study and ergonomic principles to design workplaces for the improvement of human performance - Impart knowledge to design and implement Statistical Process control in any industry - Recognize the concept of Production and Operations Management in creating and enhancing a firm's competitive advantages					
Unit-I	INTRODUCTION					(9)
Concepts of Industrial Engineering – History and development of Industrial Engineering – Roles of Industrial Engineer – Applications of Industrial Engineering – Production Management Vs Industrial Engineering – Production System – Input Output Model – Productivity – Factors affecting Productivity – Increasing Productivity of resources – Kinds of Productivity measures						
Unit-II	PLANT LOCATION AND LAYOUT					(9)
Factors affecting Plant location – course objectives of Plant Layout – Principles of Plant Layout – Types of Plant Layout – Methods of Plant and Facility Layout – Storage Space requirements – Plant Layout procedure – Line Balancing methods.						
Unit-III	WORK SYSTEM DESIGN& ERGONOMICS					(9)
Solar energy, solar thermal systems, flat plate collectors, focusing collectors, solar water heating, solar cooling, solar distillation, solar refrigeration, solar dryers, solar pond, solar thermal power generation, solar energy application in India, energy plantations. Wind energy, types of windmills, types of wind rotors, Darrieus rotor and Gravian rotor, wind electric power generation, wind power in India, economics of wind farm, ocean wave energy conversion, ocean thermal energy conversion, tidal energy conversion, geothermal energy.						
Unit-IV	STATISTICAL QUALITY CONTROL					(9)
Definition and Concepts – Fundamentals – Control Charts for variables – Control Charts for attributes – Acceptance Sampling- O.C curve –Single sampling plan- Double sampling plan						
Unit-V	PRODUCTION PLANNING AND CONTROL					(9)
Forecasting – Qualitative and Quantitative forecasting techniques – Types of production – Process planning – Economic Batch Quantity– Loading – Scheduling and control of production – Dispatching–Progress contro						
Total No of Periods to be Taught		45				

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	O.P.Khanna, 2010, Industrial Engineering and Management, Dhanpat Rai Publications.
2	Koontz.H.andWeihrich.H.,“EssentialsofManagement:AnInternationalPerspective”,8th Edition, Tata McGraw-Hill, New Delhi, 2010.

REFERENCES:

1	Ravi Shankar, 2009, Industrial Engineering and Management, Galgotia Publications & Private Limited.
2	Martand Telsang,2006, Industrial Engineering and Production Management, S. Chand and Company

COURSE OUTCOMES:

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

CO1:	Ability To define the concepts of productivity and productivity measurement approaches.
CO2:	Ability to evaluate appropriate location models for various facility types and design various facility layouts
CO3:	To conduct a method study and time study to improve the efficiency of the system.
CO4:	Ability to Control the quality of processes using control charts in manufacturing/service industries.
CO5:	Ability to define the Planning strategies and Material Requirement Plan.

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	2	2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	1	1	-	-	2	-	-	1	2	-	-
CO4	2	2	3	1	1	-	-	-	-	-	-	-	-	-
CO5	1	2	2	-	-	-	-	-	-	-	-	-	-	3
Avg.	2.2	2	2.5	1.3	1	-	-	2	-	-	1	2	1	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to all Departments
------------	------------	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2407	FIBRE REINFORCED PLASTICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	- Understand the basic definition and unique properties of nanomaterials arising from size effects. - Explore various synthesis methods for fabricating nanomaterials using top-down and bottom-up approaches. - Study the types and properties of nanocomposites, and the role of interface, shape, and structure in determining their behavior. - Familiarize with classification schemes and characterization techniques such as spectroscopy, diffraction, thermal analysis, and surface area measurements. - Evaluate the diverse and emerging applications of nanomaterials in electronics, medicine, energy, coatings, and environmental technologies.					
Unit-I	INTRODUCTION					(9)
General definition and size effects–important nano structured materials and nano particles- importance of nano materials- Size effect on thermal, electrical, electronic, mechanical, optical and magnetic properties of nanomaterials- surface area - band gap energy and applications. Photochemistry and Electrochemistry of nanomaterials –Ionic properties of nanomaterials- Nano catalysis						
Unit-II	SYNTHESIS OF NANOMATERIALS					(9)
Bottom up and Top-down approach for obtaining nano materials – Precipitation methods – sol gel technique – high energy ball milling, CVD and PVD methods, gas phase condensation, magnetron sputtering and laser deposition methods – laser ablation, sputtering.						
Unit-III	NANO COMPOSITES					(9)
Definition- importance of nanocomposites- nano composite materials-classification of composites- metal/metal oxides, metal-polymer- thermoplastic based, thermoset based and elastomer based- influence of size, shape and role of interface in composites applications.						
Unit-IV	NANO STRUCTURES AND CHARACTERIZATION TECHNIQUES					(9)
Classifications of nanomaterials - Zero dimensional, one-dimensional and two-dimensional nanostructures- Kinetics in nanostructured materials- multilayer thin films and superlattice- clusters of metals, semiconductors and nanocomposites. Spectroscopic techniques, Diffraction methods, thermal analysis method, BET analysis method.						
Unit-V	APPLICATIONS OF NANO MATERIALS					(9)
Overview of nanomaterials properties and their applications, nano painting, nano coating, nanomaterials for renewable energy, Molecular Electronics and Nanoelectronics – Nanobots- Biological Applications. Emerging technologies for environmental applications- Practice of nanoparticles for environmental remediation and water treatment.						
Total No of Periods to be Taught		45				


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmom, Burkhard Raguse, “ Nano Technology: Basic Science & Engineering Technology”, 2005, Overseas PressG.
2	Cao, “Nanostructures & Nanomaterials: Synthesis, Properties & Applications” Imperial College Press, 2004

REFERENCES:

1	R.H.J.Hannink & A.J.Hill, Nanostructure Control, Wood Head Publishing Ltd.,Cambridge, 2006.
2	C.N.R.Rao, A.Muller, A.K.Cheetham, The Chemistry of Nanomaterials: Synthesis, Properties and Applications Vol. I & II, 2nd edition, 2005, Wiley VCH Verlag Gibtl & Co
3	Ivor Brodie and Julius J.Muray, 'The physics of Micro/Nano – Fabrication', Springer International Edition, 2010

COURSE OUTCOMES:

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

CO1:	Understand the basic properties such as structural, physical, chemical properties of nanomaterials and their applications
CO2:	Able to acquire knowledge about the different types of nano material synthesis
CO3:	Describes about the shape, size, structure of composite nano materials and their interference
CO4:	Understand the different characterization techniques for nano materials
CO5:	Develop a deeper knowledge in the application of nano materials in different fields.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	Mechanical	Programme Code & Name	Open to all Departments
------------	------------	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UMEOE2408	NANO TECHNOLOGY AND ITS APPLICATIONS	L	T	P	C	100
		3	0	0	3	
Course Objectives	To introduce the basic concepts, structures, and kinetics of nanoparticles and nanostructured materials.					
	To provide knowledge of synthesis methods and characterization techniques for nanomaterials.					
	To understand the optical, electrical, and mechanical properties of nanomaterials and their measurement methods.					
	To explore different nanostructures and their applications in engineering, medicine, and materials science.					
	To explain the role of nanotechnology in electronics, sensors, diagnostics, environment, agriculture, and energy systems.					

Unit-I	INTRODUCTION TO NANOTECHNOLOGY	(9)
Basic Structure of Nanoparticles- Kinetics in Nanostructured Materials- Zero-dimensional, size and shape of nanoparticles; one-dimensional and two-dimensional nanostructures- clusters of metals and semiconductors, bio nano-particles.		
Unit-II	FABRICATION AND CHARACTERIZATION OF NANOMATERIALS	(9)
Types of Nanomaterials (Quantum dots, Nanoparticles, Nanocrystals, Dendrimers, Buckyballs, Nanotubes); Gas, liquid, and solid –phase synthesis of nanomaterials; Lithography techniques (Photolithography, Dip-pen and Electron beam lithography); Thin film deposition; Electrospinning. Bio-synthesis of nanomaterials.		
Unit-III	PROPERTIES AND MEASUREMENT OF NANOMATERIALS	(9)
Optical Properties: Absorption, Fluorescence, and Resonance; Methods for the measurement of nanomaterials; Microscopy measurements: SEM, TEM, AFM and STM. Confocal and TIRF imaging.		
Unit-IV	NANO STRUCTURES	(9)
Carbon Nanotubes, Fullerenes, Nanowires, Quantum Dots. Applications of nanostructures. Reinforcement in Ceramics, Drug delivery, Giant magnetoresistance, etc. Cells response to Nanostructures.		
Unit-V	APPLICATIONS OF NANOTECHNOLOGY	(9)
Nano electronics, Nano sensors, Nanotechnology in Diagnostics applications, Environmental and Agricultural Applications of nanotechnology, Nano technology for energy systems		
Total No of Periods to be Taught		45


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Springer Handbook of Nanotechnology by Bharat Bhushan 2004.(Unit I – V)
2	Encyclopedia of Nanotechnology - Hari Singh Nalwa 2004. (Unit I – V)

REFERENCES:

1	Nanomaterials, Nanotechnologies and Design: an Introduction to Engineers and Architects, D. Michael Ashby, Paulo Ferreira, Daniel L. Schodek, Butterworth-Heinemann, 2009.
2	Handbook of Nanophase and Nanostructured Materials (in four volumes), Eds: Z.L. Wang, Y. Liu, Z. Zhang, Kluwer Academic/Plenum Publishers, 2003.
3	Handbook of Nanoceramics and their Based Nanodevices (Vol. 2) Edited by Tseung-Yuen Tseng and Hari Singh Nalwa, American Scientific Publishers.

COURSE OUTCOMES:

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

CO1:	Describe the fundamentals and structural characteristics of nanoparticles and nanostructures.
CO2:	Demonstrate knowledge of fabrication techniques and characterization tools for nanomaterials.
CO3:	Analyze the properties of nanomaterials using advanced measurement methods.
CO4:	Evaluate the applications of nanostructures in ceramics, drug delivery, magnetoresistance, and biological systems.
CO5:	Apply nanotechnology concepts to electronics, sensors, diagnostics, environmental, agricultural, and energy systems.

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	1	2	2	1	2	1	1	1	1	3	2	2
CO2	3	3	2	3	3	2	2	1	2	2	2	3	2	2
CO3	3	3	2	3	3	2	2	1	2	2	2	3	2	2
CO4	3	3	3	3	3	2	3	2	2	2	2	2	3	2
CO5	3	3	3	3	3	3	3	2	2	2	2	2	3	3
Avg.	3	3	2.2	2.8	2.8	2	2.4	1.4	1.8	1.8	1.8	2.6	2.4	2.2

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B



Mecheri, Salem Dt-636453, Tamilnadu

Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2401	ARCHITECTURAL HERITAGE OF INDIA	L	T	P	C	100
		3	0	0	3	
Course Objectives	● To help students understand the history and styles of Indian architecture. ● To create awareness about preserving India’s architectural heritage.					

Unit-I	INDUS VALLEY CIVILIZATION	(9)
Indus valley civilization – Chronological introduction – Construction style – Materials used – The cities Harappa, lothal and Mohenjo-Daro, The great bath – The granary at Harappa – The assembly hall – Ajanta-Ellora Cave temples – Mahabodhi temple complex		
Unit-II	SOUTH INDIAN ARCHITECTURE	(9)
Chera-Chola-Pandya architecture – Chronological introduction – Construction style – Materials used – Brihadeeswarar Temple – Meenakshi Temple – Kalinga – Chalukya – Pallava architecture – Mahabalipuram stone temples – Khajuraho – Muskin Bhanvi – Konark Sun Temple – Hoysala – Vijayanagara architecture – twin temples Mosale – Virupaksha temple Raya Gopura at Hampi		
Unit-III	MUGHAL ARCHITECTURE	(9)
Mughal architecture – Chronological introduction – Construction style – Materials used – Qutub Minar – Taj Mahal – Humayun's Tomb – Redfort – Fatehpur Sikri – Agra fort – Jama Masjid – Rajput civil architecture – Chronological introduction – Construction style – Materials used – All hill forts of Rajasthan		
Unit-IV	BRITISH ARCHITECTURE	(9)
British colonial architecture – Chronological introduction – Construction style – Materials used – Buildings in Chennai, Mumbai, Shimla – Churches – Mountain railways of India-bridges.		
Unit-V	COLONIAL ARCHITECTURE	(9)
Other colonial architecture – Portuguese-Dutch-French-Danish – Chronological introduction – Construction style – Materials used – Churches – Churches and Convents of Goa and Cochi – French town of Puducherry – Tranquebar fort – Bungalow on the beach		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Bindia Thapar, Surat Kumar Manto, and Suparna Bhalla., Introduction to Indian Architecture: Arts of Asia, Periplus Editions (HK) Ltd, Hong Kong, First Edition, 2005
2	Sandhya Ketkar., The History of Indian Art, Jyotsna Prakashan Publisher, Maharashtra, E – Edition, 2020



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Christopher Tadgell., The History of Architecture in India, Phaidon Press Ltd, New York, First Edition, 1990
2	Mark M. Jarzombek, Vikramaditya Prakash, Francis D. K. Ching., A Global History of Architecture, John Wiley & Sons, Hoboken, Second Edition, 2010
3	https://nptel.ac.in/courses/124106009
4	https://ncert.nic.in/textbook/pdf/kefa106.pdf

COURSE OUTCOMES:

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

CO1:	Illustrate various materials used and construction style of Indus Valley Civilization
CO2:	Demonstrate the materials used and construction style of Chera, Chola and Pandya architecture
CO3:	Describe the materials used and construction style of Mughal architecture
CO4:	Explain the various materials and construction style of British architecture
CO5:	Describe various materials and construction style of Portuguese, Dutch, French and Danish

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2402	BUILDING PLANNING AND CONSTRUCTION	L	T	P	C	100
		3	0	0	3	
Course Objectives	● To teach the basic principles of building planning and design. ● To provide knowledge about construction methods and materials.					

Unit-I	FUNCTIONAL PLANNING OF BUILDINGS	(9)
Types of Buildings, Aspects and Principles of Building Planning, Building By - laws and Regulations, Site Selection criteria, Orientation of Building and its relation to surrounding environment, Sustainability and Green Buildings - Building Bye - laws and Building code of India 2016.		
Unit-II	BUILDING COMPONENTS AND FOUNDATIONS	(9)
Lintels, arches, different types of floors-concrete, mosaic, terrazzo floors, pitched, flat and curved roofs, lean-to roof, coupled roofs, trussed roofs, king and queen post trusses; RCC roofs, madras terrace/shell roofs. Foundations: Shallow foundations, spread, combined, strap and mat footings.		
Unit-III	ALTERNATIVE MATERIALS AND MASONRY	(9)
Structure, properties, seasoning of timber; Classification of various types of woods used in buildings, defects in timber; Alternative materials for wood, galvanized iron, fibre-reinforced plastics, steel, aluminium and glass; Types of masonry, English and Flemish bonds, rubble and ashlar masonry, cavity and partition walls - Light weight concrete blocks – merits and demerits.		
Unit-IV	FLOORS, ROOFS AND STAIRCASES	(9)
Components of a floor, materials used for floor construction, Different types of flooring, Ground floor and upper floors, Types of roofs, Basic roofing elements and Roof coverings. Functional requirements of a good stair, type of stairs, planning a stair case.		
Unit-V	DAMP PROOFING AND FIRE PROTECTION	(9)
Damp proofing and Fire protection: Causes and effect of dampness on buildings, Materials and methods used for damp proofing, Fire hazards, Grading of buildings according to fire resistance, Fire resisting properties of common building materials, Fire resistant construction.		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Varghese P. C., Building construction, PHI Learning Pvt. Ltd, New Delhi ,Second Edition, 2016.
2	B. C. Punmia , Ashok Kumar Jain, Arun Kumar Jain, Building Construction, Laxmi Publications, New Delhi, Eleventh Edition,2019.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	S. K. Duggal, Building Materials , New Age International (P) Limited, New Delhi ,Fourth Edition, 2016,
2	Bulding Bye-laws 2019
3	National Building Code of India, 2016.
4	www.nptel.ac.in/courses/105101088/2 home.htm

COURSE OUTCOMES:

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

CO1:	Outline the factors to be considered in planning and construction of buildings
CO2:	Infer the different components and Foundations of building in their construction practices.
CO3:	Interpret masonry and alternative materials of wood, aluminum and glass.
CO4:	Discuss different types of floors, roofs and the materials which are commonly used for construction.
CO5:	Explain about dampness and fire resistance in buildings

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2403	ELEMENTARY CIVIL ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To introduce the fundamental concepts and branches of civil engineering. • To create awareness about basic materials, tools, and construction practices.					

Unit-I	OVERVIEW OF CIVIL ENGINEERING	(9)
History of Civil Engineering - Role and Functions of Civil Engineer - Fields of Civil Engineering - Importance of Civil Engineering		
Unit-II	BASICS OF SURVEYING	(9)
Introduction - Basic Definitions (Surveying, leveling, Plans, Maps, Scales) - Introduction to divisions of surveying - Classification of surveying - Fundamental principles of surveying - Measurement in Surveying - Phases of Surveying MODERN TOOLS OF SURVEYING AND MAPPING: Introduction to Global Positioning System - Remote Sensing and Geographic Information System		
Unit-III	FUNDAMENTALS OF BUILDING MATERIALS	(9)
Bricks – stones – sand – M-sand - cement – fly ash - silica fume - mortar- concrete – steel – glass - wood plastics – ceramics		
Unit-IV	COMPONENTS OF BUILDING	(9)
Foundations – stone masonry – brick masonry – beams – columns – lintels – roofing – flooring – plastering- damp proofing weathering course		
Unit-V	STRUCTURES	(9)
Introduction to dams, weirs, barrages and check dams - Role of transportation in national development - Modes of transportation - Introduction to road traffic and traffic control - Introduction to mass transportation system		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Anurag Kandya, Elements of Civil Engineering, Charotar Publishing House Pvt. Ltd, Gujarat, Third Edition, 2017.
2	Palanichamy M.S., Basic Civil Engineering, Tata McGraw-Hill, New Delhi, Fourth Edition, 2011.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Poonam Sharma & Swati Rajput, Sustainable Smart Cities in India – Challenges and Future Perspectives, Springer, First Edition, 2017.
2	Dr.B.C.Punamia, Surveying, Laxmi Publication, New Delhi, Seventh Edition, 2016.
3	https://nptel.ac.in/courses/105102088
4	https://byjusexamprep.com/civil-engineering-exams/building-materials

COURSE OUTCOMES:

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

CO1:	Provide an overview of civil engineering
CO2:	Explain the basics of surveying , modern tools of surveying and mapping
CO3:	Summarize the fundamentals of building materials in civil engineering
CO4:	Explain the components of building structures.
CO5:	Interpret various infrastructures of civil engineering in construction

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2404	ENERGY AND ENVIRONMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To provide basic knowledge about different energy sources and their uses. • To create awareness about environmental issues and sustainable practices.					

Unit-I	INTRODUCTION	(9)
Overview on the Earth's energy requirements-Climate Change-Origins of the terrestrial atmosphere-Earth's early atmosphere- Introduction to Climate-Layers of the atmosphere.		
Unit-II	GLOBAL ATMOSPHERIC ISSUES	(9)
Composition of the present day atmosphere-Introduction to Atmospheric chemistry-Green House Gases, and the O3 - depletion problem-Post Industrial Revolution Scenario		
Unit-III	ENERGY BALANCE	(9)
Earth Atmosphere System- Solar and Terrestrial Radiation- Absorption of Radiation by gases.-Energy balance- Solar variability and the Earth's Energy Balance.		
Unit-IV	ATMOSPHERIC CHEMISTRY AND CLIMATE	(9)
The Global Temperature Record.-Possible effects of Global Warming. – Indian Context. Atmospheric Chemistry and Climate Change- Atmospheric Aerosol and Cloud Effects on Climate.		
Unit-V	ENVIRONMENTAL VARIABILITY	(9)
Natural (volcanoes, forest fires) and Anthropogenic (Antarctic Ozone Hole, Global Warming).-Green House Gas theory.- Effects of urbanization- Landscape changes-Influence of Irrigation-Desertification and Deforestation		
Total No of Periods to be Taught		45 periods

TEXT BOOK:	
1	Peter E Hodgson, Energy the Environment and Climate Change, Imperial College Press, London, First Edition, 2010
2	Ahluwalia V K, Energy and Environment, The Energy and Resources Institute, New Delhi, First Edition, 2019



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Richard Wolfson, Energy, Environment, and Climate, Publisher: W. W. Norton & Company, New York, Second Edition, 2011
2	Saeed Moaveni, Energy, Environment, and Sustainability with Mind Tap, Cengage India Private Limited, New Delhi, First Edition, 2017
3	Wilbanks, T., Bilello D, Schmalzer D, Scott, Climate Change and Energy Supply and Use: Technical Report for the U.S. Department of Energy in Support of the National Climate Assessment., Island Press, Washington, 2013
4	Frank T. Princiotta, Global Climate Change - The Technology Challenge, Springer Publisher, New York, First Edition, 2011

COURSE OUTCOMES:

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

CO1:	Outline the earth's energy, environment and the processes leading to climate change
CO2:	Infer the atmospheric issues related to the chemistry, green house gases
CO3:	Summarize the role of the terrestrial energy-environment-climate system
CO4:	Interpret the Possible effects of Global Warming and climate change.
CO5:	Outline the Natural and Anthropogenic and Green House Gas theory

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2405	GLOBAL WARMING AND CLIMATE CHANGE	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To explain the causes and effects of global warming and climate change. • To promote awareness of mitigation strategies and sustainable solutions.					

Unit-I	EARTH'S CLIMATE SYSTEM	(9)
Role of ozone in environment – Ozone layer – Ozone depleting gases – Greenhouse gases and its sources – Green House Effect, Radiative Effects of Greenhouse Gases -The Hydrological Cycle – Green House Gases and Global Warming – Effects and causes of Global Warming, Carbon Cycle.		
Unit-II	ATMOSPHERE AND ITS COMPONENTS	(9)
Importance of Atmosphere – Physical Chemical Characteristics of Atmosphere - Vertical structure of the atmosphere - Composition of the atmosphere - Atmospheric stability -Temperature profile of the atmosphere - Lapse rates- Temperature inversion - effects of inversion on pollution dispersion.		
Unit-III	OBSERVED CHANGES AND ITS CAUSES	(9)
Causes of Climate change – Change of Temperature in the environment - Melting of ice Pole-sea level rise - Impacts of Climate Change on various sectors – Agriculture, Forestry and Ecosystem – Water Resources – Human Health – Industry, Settlement and Society – Methods and Scenarios – Projected Impacts for Different Regions – Uncertainties in the Projected Impacts of Climate Change – Risk of Irreversible Changes.		
Unit-IV	OBSERVED CHANGES AND ITS CAUSES	(9)
Climate change and Carbon credits – CDM- Initiatives in India - Kyoto Protocol - Intergovernmental Panel on Climate change - Climate Sensitivity and Feedbacks – The Montreal Protocol – UNFCCC – IPCC – Evidences of Changes in Climate and Environment – on a Global Scale and in India		
Unit-V	CLIMATE CHANGE AND MITIGATION MEASURES	(9)
Clean Development Mechanism – Carbon Trading – Examples of future Clean Technology – Biodiesel – Natural Compost – Eco- Friendly Plastic – Alternate Energy – Hydrogen – Bio-fuels – Solar Energy – Wind – Hydroelectric Power – Mitigation Efforts in India and Adaptation funding - Key Mitigation Technologies and Practices – Energy Supply – Transport – Buildings – Industry – Agriculture – Forestry - Carbon sequestration – Carbon capture and storage (CCS) - Waste(MSW & Bio waste, Biomedical, Industrial waste – International and Regional cooperation.		
Total No of Periods to be Taught		45 periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Kandarp Tarkeshprasad Vaishnav., Climate Change Solutions, Global Warming Solutions & Innovative Ideas For Construction of World Development, Notion Press, Chennai, First Edition, 2018
2	Vivian Moritz., Climate Change and Global Warming, Syrawood Publishing House, New York, First Edition, 2017

REFERENCES:

1	Marie Antonette and Chloe Marechal., Climate Change Past, Present & Future, Wiley-Blackwell, New Jersey, First Edition, 2015.
2	Empereur Raymond., Global Warming and Climate Change, Litfire Publishing, Atlanta, First Edition, 2017.
3	Agarwal S.K., Global Warming and Climate Change Past, Present & Future, Ashish Publishing House, New Delhi, First Edition, 2004.
4	https://onlinecourses.swayam2.ac.in/arp19_ap55/preview

COURSE OUTCOMES:

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

CO1:	Outline the concept of the causes and effects of global warming
CO2:	Summarize about physical and chemical characteristics of atmosphere
CO3:	Identify the causes and effects of climate change
CO4:	Infer the agreements took place among the countries regarding climate change
CO5:	Summarize about the concept of mitigation measures against climate change

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	3	-	-	-	-	2	-	-	-
CO2	3	2	-	-	-	3	-	-	-	2	2	-	-	-
CO3	3	-	-	2	-	3	-	-	-	2	3	-	-	-
CO4	3	2	-	2	-	3	-	2	-	-	2	-	-	-
CO5	3	2	-	-	-	3	-	3	-	2	3	-	-	-
Avg.	3	2	2	2	-	3	-	3	-	2	3	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B



Mecheri, Salem Dt-636453, Tamilnadu

Department	CIVIL	Programme Code & Name	Open to all Departments
-------------------	-------	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCEOE2406	INTRODUCTION TO DISASTER MANAGEMENT AND MITIGATION	L	T	P	C	100
		3	0	0	3	
Course Objectives	● Provide adequate knowledge about disaster mitigation, preparedness, response, and recovery to face disaster among government bodies, institutions, N O's, etc. ● Obtain the knowledge different disaster and its preparedness and mitigation methods. ● Provide adequate knowledge about applications of space technology in disaster monitoring and information dissemination					

Unit-I	INTRODUCTION TO DISASTER	(9)
Definition of Disaster, hazard, global and Indian scenario, general perspective, importance of study in human life, Direct and indirect effects of disasters, long term effects of disasters. Introduction to global warming and climate change		
Unit-II	NATURAL DISASTER AND MANMADE DISASTERS	(9)
Natural Disaster: Meaning and nature of natural disaster, Flood, Flash flood, drought, cloud burst, Earthquake, Landslides, Avalanches, Volcanic eruptions, Mudflow, Cyclone, Storm, Storm Surge, climate change, global warming, sea level rise, ozone depletion. Manmade Disasters: Chemical, Industrial, Nuclear and Fire Hazards. Role of growing population and subsequent industrialization, urbanization and changing lifestyle of human beings in frequent occurrences of manmade disasters.		
Unit-III	DISASTER MANAGEMENT CYCLE AND FRAMEWORK	(9)
Disaster Management Cycle, Paradigm Shift in Disaster Management Pre-Disaster Risk Assessment and Analysis, Risk Mapping, zonation and Micro zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development, Awareness During Disaster Evacuation, Disaster Communication, Search and Rescue, Emergency Operation Centre, Incident Command System, Relief and Rehabilitation, Damage and Needs Assessment, Restoration of Critical Infrastructure, Early Recovery, Reconstruction and Redevelopment, IDNDR, Yokohama Strategy, Hyogo Framework of Action.		
Unit-IV	DISASTER MANAGEMENT IN INDIA DISASTER PROFILE OF INDIA	(9)
Mega Disasters of India and Lessons Learnt, Disaster Management Act 2005, Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management, Role of Government, Non-Government and Inter-Governmental Agencies.		
Unit-V	APPLICATIONS OF SCIENCE AND TECHNOLOGY FOR DISASTER MANAGEMENT & MITIGATION	(9)
Geo-informatics in Disaster Management, Disaster Communication System, Land Use Planning and Development Regulations, Structural and Non Structural Mitigation of Disasters, S&T Institutions for Disaster Management in India.		
Total No of Periods to be Taught		45 periods



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	R B Singh., Disaster Management and Mitigation, World focus Publisher, New Delhi, First Edition, 2016.
2	Satish Modh, Introduction to disaster management, Macmillan publishers India Ltd, New Delhi, Second Edition, 2019.

REFERENCES:

1	R B Singh., Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi, Reprint Edition, 2006.
2	Pardeep Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, Fourth Edition, 2018.
3	M. Saravanakumar, Disaster Management, Himalaya Publishing House, Bangalore, First Edition, 2017
4	Singh, Disaster Management: Future Challenges, IK International, New Delhi, First Edition, 2017.

COURSE OUTCOMES:

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

CO1:	Explain the concepts of disaster and its effect in Indian scenario.
CO2:	Elaborate the difference between natural and manmade disasters.
CO3:	Outline the disaster management cycle and its operation.
CO4:	Outline the disaster management in India and its profile
CO5:	Propose the application of geo-informatics for disaster management and mitigation.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		AGRI		Programme Code & Name				Open to All Departments	
Course Code	Course Name			Hours/Week		Credit	Maximum Marks		
UAIOE2401	INTRODUCTION TO FOOD PROCESSING			L	T	P	C	100	
				3	0	0	3		
Course Objectives									
The course aims to introduce the students to the area of Food Processing. This is necessary for effective understanding of a detailed study of food processing and technology subjects. This course will enable students to appreciate the importance of food processing with respect to the producer, manufacturer and consumer.									
UNIT I		PROCESSING OF FOOD AND ITS IMPORTANCE						9	
Source of food - plant, animal and microbial origin; different foods and groups of foods as raw materials for processing – cereals, pulses, grains, vegetables and fruits, milk and animal foods, sea weeds, algae, oil seeds & fats, sugars, tea, coffee, cocoa, spices and condiments, additives; need and significance of processing these foods.									
UNIT II		METHODS OF FOOD HANDLING AND STORAGE						9	
Nature of harvested crop, plant and animal; storage of raw materials and products using low temperature, refrigerated gas storage of foods, gas packed refrigerated foods, sub atmospheric storage, Gas atmospheric storage of meat, grains, seeds and flour, roots and tubers; freezing of raw and processed foods.									
UNIT III		LARGE-SCALE FOOD PROCESSING						9	
Milling of grains and pulses; edible oil extraction; Pasteurization of milk and yoghurt; canning and bottling of foods; drying – Traditional and modern methods of drying, Dehydration of fruits, vegetables, milk, animal products etc; preservation by use of acid, sugar and salt; Pickling and curing with microorganisms, use of salt, and microbial fermentation; frying, baking, extrusion cooking, snack foods.									
UNIT IV		FOOD WASTES IN VARIOUS PROCESSES						9	
Waste disposal-solid and liquid waste; rodent and insect control; use of pesticides; ETP; selecting and installing necessary equipment.									
UNIT V		FOOD HYGIENE						9	
Food related hazards – Biological hazards – physical hazards – microbiological considerations in foods. Food adulteration – definition, common food adulterants, contamination with toxic metals, pesticides and insecticides; Safety in food procurement, storage handling and preparation; Relationship of microbes to sanitation, Public health hazards due to contaminated water and food; Personnel hygiene; Training& Education for safe methods of handling and processing food; sterilization and disinfection of manufacturing plant; use of sanitizers, detergents, heat, chemicals, Cleaning of equipment and premises.									
Total								45 Periods	



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

- 1 Karnal, Marcus and D.B. Lund “Physical Principles of Food Preservation”. Rutledge, 2003.

REFERENCES:

- 1 VanGarde, S.J. and Woodburn. M “Food Preservation and Safety Principles and Practice”.Surbhi Publications, 2001.
- 2 Sivasankar, B. “Food Processing & Preservation”, Prentice Hall of India, 2002.
- 3 Khetarpaul, Neelam, “Food Processing and Preservation”, Daya Publications, 2005.

COURSE OUTCOMES:

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

- | | |
|------|--|
| CO1: | Be aware of the different methods applied to processing foods. |
| CO2: | Be able to understand the significance of food processing and the role of food and beverage industries in the supply of foods. |
| CO3: | Describe about large-scale food processing methods. |
| CO4: | Distinguish Food Wastes in Various Processes techniques. |
| CO5: | Understand the concepts of Food process methods, Storage techniques, food handling methods, reduces food waste and food hygiene process. |

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		AGRI		Programme Code & Name				Open to All Departments	
Course Code	Course Name			Hours/Week		Credit	Maximum Marks		
UAIOE2402	TRADITIONAL INDIAN FOODS			L	T	P	C	100	
				3	0	0	3		
Course Objectives									
To help students acquire a sound knowledge on diversities of foods, food habits and patterns in India with focus on traditional foods.									
UNIT – I		HISTORICAL AND CULTURAL PERSPECTIVES						9	
Food production and accessibility - subsistence foraging, horticulture, agriculture and pastoralization, origin of agriculture, earliest crops grown. Food as source of physical sustenance, food as religious and cultural symbols; importance of food in understanding human culture - variability, diversity, from basic ingredients to food preparation; impact of customs and traditionson food habits, heterogeneity within cultures (social groups) and specific social contexts - festive occasions, specific religious festivals, mourning etc. Kosher, Halal foods; foods for religious and other fasts.									
UNIT II		TRADITIONAL METHODS OF FOOD PROCESSING						9	
Traditional methods of milling grains –rice, wheat and corn –equipments and processes as compared to modern methods. Equipments and processes for edible oil extraction, paneer, butter and ghee manufacture – comparison of traditional and modern methods. Energy costs, efficiency, yield,nshelf life and nutrient content comparisons. Traditional methods of food preservation – sun drying, osmotic drying, brining, pickling and smoking.									
UNIT III		TRADITIONAL FOOD PATTERNS						9	
Typical breakfast, meal and snack foods of different regions of India. Regional foods that have gone Pan Indian / Global. Popular regional foods; Traditional fermented foods, pickles and preserves,beverages, snacks, desserts and sweets, street foods; IPR issues in traditional foods									
UNIT IV		COMMERCIAL PRODUCTION OF TRADITIONAL FOODS						9	
Commercial production of traditional breads, snacks, ready-to-eat foods and instant mixes, frozen foods – types marketed, turnover; role of SHGs, SMES industries, national and multinational companies; commercial production and packaging of traditional beverages such as tender coconut water, neera, lassi, butter milk, dahi. Commercial production of intermediate foods –ginger and garlic pastes, tamarind pastes, masalas (spicemixes), idli and dosa batters.									
UNIT V		HEALTH ASPECTS OF TRADIONAL FOODS						9	
Comparison of traditional foods with typical fast foods / junk foods – cost, food safety, nutrient composition, bioactive components; energy and environmental cost soft raditional foods; traditional foods used for specific ailments /illnesses.									
Total								45 Periods	



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Sen, Colleen Taylor“ Food Culture in India” Green wood Press, 2005.
2	Davidar, Ruth N.“Indian Food Science: A Health and Nutrition Guide to Traditional Recipes: East West Books, 2001

COURSE OUTCOMES:

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

CO1:	Provide a comprehensive understanding of the origins, evolution, and regional diversity of Indian cuisine.
CO2:	Highlight the traditional ingredients, cooking methods, and food preparation techniques used across various parts of India.
CO3:	Explore the cultural, religious, and seasonal influences on traditional Indian dietary practices.
CO4:	Analyze the nutritional and therapeutic value of traditional Indian foods and their relevance in modern diets.
CO5:	Introduce traditional food preservation methods like fermentation, pickling, drying, and smoking.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		AGRI		Programme Code & Name				Open to All Departments	
Course Code	Course Name			Hours/Week		Credit		Maximum Marks	
UAIOE2403	FUNDAMENTALS OF FOOD ENGINEERING			L	T	P	C	100	
				3	0	0	3		
Course Objectives									
- Acquaint and equip the students with different techniques of measurement of engineering properties. - Make the students understand the nature of food constituents in the design of processing equipment									
UNIT – I		ENGINEERING PROPERTIES OF FOOD MATERIALS						9	
Engineering properties of food materials: physical, thermal, aerodynamic, mechanical, optical and electromagnetic properties.									
UNIT II		DRYING AND DEHYDRATION IN FOOD PROCESSING						9	
Drying and dehydration: Basic drying theory, heat and mass transfer in drying, drying rate curves, calculation of drying times, dryer efficiencies; classification and selection of dryers; tray, vacuum, osmotic, fluidized bed, pneumatic, rotary, tunnel, trough, bin, belt, microwave, IR, heat pump and freeze dryers; dryers for liquid: Drum or roller dryer, spray dryer and foammat dryers.									
UNIT III		SIZE REDUCTION IN FOOD PROCESSING: PRINCIPLES, BENEFITS, ANALYSIS & EQUIPMENT						9	
Size reduction: Benefits, classification, determination and designation of the fineness of ground material, sieve/screen analysis, principle and mechanisms of comminution of food, Rittinger’s, Kick’s and Bond’s equations, work index, energy utilization; Size reduction equipment: Principal types, crushers (jaw crushers, gyratory, smooth roll), hammer mills and impactors, attrition mills, buhr mill, tumbling mills, tumbling mills, ultra fine grinders, fluid jet pulverizer, colloid mill, cutting machines (slicing, dicing, shredding, pulping).									
UNIT IV		MIXING IN FOOD AND CHEMICAL PROCESSING						9	
Mixing: theory of solids mixing, criteria of mixer effectiveness and mixing indices, rate of mixing, theory of liquid mixing, power requirement for liquids mixing; Mixing equipment: Mixers for low- or medium-viscosity liquids (paddle agitators, impeller agitators, powder- liquid contacting devices, other mixers), mixers for high viscosity liquids and pastes, mixers for dry powders and particulate solids.									
UNIT V		DOMESTIC UTILIZATION OF ELECTRICAL ENERGY						9	
Mechanical Separations: Theory, centrifugation, liquid-liquid centrifugation, liquid-solid centrifugation, clarifiers, desludging and decanting machine, Filtration: Theory of filtration, rate of filtration, pressure drop during filtration, applications, constant-rate filtration and constant-pressure filtration, derivation of equation; Filtration equipment; plate and frame filter press, rotary filters, centrifugal filters and air filters, filter aids, Membrane separation : General considerations, materials for membrane construction, ultra-filtration, microfiltration, concentration, polarization, processing variables, membrane fouling, applications of ultra-filtration in food processing, reverse osmosis, mode of operation, and applications; Membrane separation methods, demineralization by electro-dialysis, gel filtration, ion exchange, per-evaporation and osmotic dehydration.									
Total								45 Periods	



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	R.L. Earle. 2004. Unit Operations in Food Processing. The New Zealand Institute of Food Science & Technology, Nz. Warren L. McCabe, Julian Smith, Peter Harriott. 2004.
2	Unit Operations of Chemical Engineering, 7 th Ed. McGraw-Hill, Inc., NY, USA. Christie John Geankoplis. 2003.
	Transport Processes and Separation Process Principles (Includes Unit Operations), 4th Ed. Prentice-Hall, NY, USA.

COURSE OUTCOMES:

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

CO1:	To understand the importance of food polymers
CO2:	To understand the effect of various methods of processing on the structure and texture of food materials
CO3:	To evaluate domestic wiring connection and debug any faults occurred.
CO4:	To understand the interaction of food constituents with respect to thermal, electrical properties to develop new technologies for processing and preservation.
CO5:	Promote awareness of the role of food engineering in ensuring food quality, safety, and sustainability.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		AGRI		Programme Code & Name				Open to All Departments	
Course Code	Course Name			Hours/Week		Credit	Maximum Marks		
UAIOE2404	REMOTE SENSING CONCEPTS			L	T	P	C	100	
				3	0	0	3		
Course Objectives									
- To introduce the concepts of remote sensing processes and its components. - To expose the various remote sensing platforms and sensors and to introduce the elements of data interpretation									
UNIT – I		REMOTE SENSING AND ELECTROMAGNETIC RADIATION						9	
Definition–components of RS – History of Remote Sensing –Merits and demerits of data collation between conventional and remote sensing methods Electromagnetic Spectrum– Radiation principles - Wave theory, Planck’s law, Wien’s Displacement Law, Stefan’s Boltzmann law, Kirchoff’s law – Radiation sources : active & passive - Radiation Quantities.									
UNIT II		EMRINTERACTION WITH ATMOSPHERE AND EARTH MATERIAL						9	
Standard atmospheric profile – main atmospheric regions and its characteristics – interaction of radiation with atmosphere – Scattering, absorption and refraction – Atmospheric windows - Energy balance equation – Specular and diffuse reflectors – Spectral reflectance & emittance – Spectro radio meter–Spectral Signature concepts –Typical spectral reflectance curves for vegetation, soil and water – solid surface scattering in microwave region.									
UNIT III		ORBITS AND PLATFORMS						9	
Motions of planets and satellites – Newton’s law of gravitation - Gravitational field and potential - Escape velocity - Kepler ‘s law of planetary motion - Orbit elements and types – Orbital per turbations and maneuvers–Types of remote sensing platforms- Ground based, Airborne platforms and Space borne platforms –Classification of satellites –Sun synchronous and Geosynchronous satellites – Lagrange Orbit.									
UNIT IV		SENSING TECHNIQUES						9	
Classification of remote sensors – Resolution concept : spatial, spectral, radiometric and temporal resolutions - Scanners - Along and across track scanners – Optical-infrared sensors – Thermal sensors – microwave sensors – Calibration of sensors - High Resolution Sensors - LIDAR , UAV – Orbital and sensor characteristics of live Indian earth observation satellites									
UNIT V		DATA PRODUCTS AND INTERPRETATION						9	
Photographic and digital products –Types, levels and open source satellite data products – selection and procurement of data– Visual interpretation: basic elements and interpretation keys - Digital interpretation – Concepts of Image rectification, Image enhancement and Image classification									
Total								45 Periods	



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Thomas M. Lilles and, Ralph W. Kiefer and Jonathan W. Chipman, Remote Sensing and Image interpretation, John Wiley and Sons, Inc, New York,2015.
2	George Joseph and C Jeganathan, Fundamentals of Remote Sensing, Third Edition Universities Press (India) Private limited, Hyderabad, 2018

COURSE OUTCOMES:

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

CO1:	Understand the concepts and laws related to remote sensing
CO2:	Understand the interaction of electromagnetic radiation with atmosphere and earth material.
CO3:	Acquire knowledge about satellite or bits and different types of satellites.
CO4:	Understand the different types of remote sensors.
CO5:	Gain knowledge about the concepts of interpretation of satellite imagery

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department		AGRI		Programme Code & Name				Open to All Departments	
Course Code	Course Name			Hours/Week		Credit	Maximum Marks		
UAIOE2405	BASICS OF INTEGRATED WATER RESOURCES MANAGEMENT			L	T	P	C	100	
				3	0	0	3		
Course Objectives									
- To introduce the inter disciplinary approach of water management. - To develop knowledge base and capacity building on IWRM.									
UNIT – I		OVER VIEW OF INTEGRATED WATER RESOURCES MANAGEMENT						9	
Facts about water – Definition – Key challenges – Paradigm shift – Water management Principles – Social equity – Ecological sustainability – Economic efficiency - SDGs- World Water Forums.									
UNIT II		WATER USE SECTORS : IMPACTS AND SOLUTION						9	
Water users : People, Agriculture, ecosystem and others - Impacts of the water use sectors on water resources -Securing water for people, food production, ecosystems and other uses - IWRM relevance in water resources management.									
UNIT III		WATER ECONOMICS						9	
Economic characteristics of water good and services –Economic instruments –Private sector involvement in water resources management - PPP experiences through case studies.									
UNIT IV		RECENTTRE AND SIN WATER MANAGEMENT						9	
Riverbasin management - Ecosystem Regeneration –5 Rs - WASH – Sustainable livelihood – Water management in the context of climate change.									
UNIT V		IMPLEMENTATION OF IWRM						9	
Barriers to implementing IWRM - Policy and legal framework - Bureaucratic reforms and inclusive development - Institutional Transformation - Capacity building - Case studies on conceptual framework of IWRM.									
Total								45 Periods	

TEXT BOOK:

1	Cech Thomas V., Principles of water resources: history, development, management and policy. John Wiley and Sons Inc., New York. 2003.
2	Mollinga P. <i>et al.</i> “Integrated Water Resources Management”, Water in South Asia Volume I, Sage Publications, 2006.

REFERENCES:

1	Technical Advisory Committee, Background Papers No:1, 4 and 7, Stockholm, Sweden.2002.
2	IWRM Guidelines at River Basin Level (UNESCO, 2008).

COURSE OUTCOMES:

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

CO1:	Describe the context and principles of IWRM; Compare the conventional and integrated ways of water management.
CO2:	Discuss on the different water uses; how it is impacted and ways to tackle the seimpacts.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



CO3:	Explain the economic aspects of water and choose the best economic option among the alternatives; illustrate the pros and cons of PPP through case studies.
CO4:	Illustrate the recent trend in water management.
CO5:	Understand the implementation hitches and the institutional framework.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name			Open to all Departments		
Semester							
Course Code	Course Name		Hours/Week			Credit	Maximum Marks
UBMOE2401	BASICS OF MICROBIAL TECHNOLOGY		L	T	P	C	100
			3	0	0	3	
Course Objectives	The student should be made to: The objective is to offer basic concepts of biochemistry to students with diverse background in life sciences including but not limited to the structure and function of various biomolecules and their metabolism.						

Unit-I	BASICS OF MICROBES AND ITS TYPES	(9)
Introduction to microbes, existence of microbes, inventions of great scientist and history, types of microorganisms – Bacteria, Virus, Fungi.		
Unit-II	MICROBIAL TECHNIQUES	(9)
Sterilization – types – physical and chemical sterilization, Decontamination, Preservation methods, fermentation, Cultivation and growth of microbes, Diagnostic methods.		
Unit-III	PATHOGENIC MICROBES	(9)
Infectious Disease – Awareness, Causative agent, Prevention and control - Cholera, Dengu, Malaria, Diarrhea, Tuberculosis, Typhoid, Covid, HIV.		
Unit-IV	BENEFICIAL MICROBES	(9)
Applications of microbes–Clinical microbiology, agricultural microbiology, Food Microbiology, Environmental Microbiology, Animal Microbiology, Marine Microbiology.		
Unit-V	PRODUCTS FROM MICROBES	(9)
Fermented products–Fermented Beverages, Curd, Cheese, Mushroom, Agricultural products– Biopesticide, Biofertilizers, Vermi compost, Pharmaceutical products - Antibiotics, Vaccines		
Total No of Periods to be Taught		45 periods

TEXT BOOK:		
1	TalaronK,TalaronA,Casita,PelczarandReid.FoundationsinMicrobiology,W.C.Brown Publishers, 1993.	
2	PelczarMJ,ChanECSandKreinNR,Microbiology,TataMcGrawHillEdition,NewDelhi, India.	
3	PrescottL.M.,HarleyJ.P.,Kl3einDA,Microbiology,3rdEdition,Wm.C.BrownPublishers, 1996.	


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Berg, Jeremy M.etal.“Biochemsitry”,6thEdition,W.H.Freeman&Co., 2006.
2	Murray,R.K.,etal“Harper’sllustratedBiochemistry”,31stEdition,McGraw-Hill,2018.
3	Voet,D.andVoet,J.G.,“Biochemistry”,4thEdition,JohnWiley&SonsInc.,2010.

COURSE OUTCOMES:

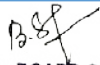
On completion of the course, the students will be able to

CO1:	Students will learn about various kinds of biomolecules and their physiological role.
CO2:	Students will gain knowledge about various metabolic disorders and will help them to know the importance of various biomolecules in terms of disease correlation.
CO3:	Students will learn about various kinds of Infectious Disease – Awareness, Causative agent, Prevention and control
CO4:	Students will gain knowledge beneficial microbes
CO5:	Students will learn about various kinds of products from microorganisms

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2	PSO3
CO1	3	3	1	1	1	-	-	-	-	-	1		-	-
CO2	3	3	1	1	1	-	-	-	-	-	1		-	-
CO3	3	3	1	1	1	-	-	-	-	-	1		-	-
CO4	3	3	1	1	1	-	-	-	-	-	1		-	-
CO5	3	3	1	1	1	-	-	-	-	-	1		-	-
Avg.	3	3	1	1	1	-	-	-	-	-	1		-	-

1 – Slight, 2 – Moderate, 3 –Substantial, BT – Bloom’s Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBMOE2402	RADIOLOGICAL EQUIPMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	The student should be made to: • Understand generation of x-rays and its uses in imaging. • Learn different types of radio diagnostic techniques. • Know techniques used for visualizing different sections of the body. • Learn radiation therapy methodologies and the radiation safety.					

Unit-I	MEDICAL X-RAY EQUIPMENT	(9)
Nature of X-rays- X-Ray absorption – Tissue contrast. X- Ray Equipment (Block Diagram) – X-Ray Tube, the collimator, Bucky Grid, power supply, Digital Radiography- discrete digital detectors, storage phosphor and film scanning, X-ray Image Intensifier tubes – Fluoroscopy – Digital Fluoroscopy. Angiography, cine Angiography. Digital subtraction Angiography. Mammography.		
Unit-II	COMPUTED TOMOGRAPHY	(9)
Principles of tomography, CT Generations, X- Ray sources- collimation- X- Ray detectors-Viewing systems- spiral CT scanning – Ultra fast CT scanners. Image reconstruction techniques- back projection and iterative method.		
Unit-III	MAGNETIC RESONANCE IMAGING	(9)
Fundamentals of magnetic resonance- Interaction of Nuclei with static magnetic field and Radio frequency wave- rotation and precession – Induction of magnetic resonance signals – bulk magnetization – Relaxation processes T1 and T2. Block Diagram approach of MRI system- system magnet (Permanent, Electromagnet and Super conductors), generations of gradient magnetic fields, Radio Frequency coils (sending and receiving), shim coils, Electronic components, MRI.		
Unit-IV	NUCLEAR MEDICINE SYSTEM	(9)
Applications of microbes–Clinical microbiology, agricultural microbiology, Food Microbiology, Environmental Microbiology, Animal Microbiology, Marine Microbiology.		
Unit-V	RADIATION THERAPY AND RADIATION SAFETY	(9)
Radiation therapy – linear accelerator, Telegamma Machine. SRS –SRT,-Recent Techniques in radiation therapy - 3DCRT – IMRT – IGRT and Cyber knife- radiation measuring instruments- Dosimeter, film badges, Thermo Luminescent dosimeters- electronic dosimeter- Radiation protection in medicine- radiation protection principles.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Steve Webb, The Physics of Medical Imaging, Adam Hilger, Philadelphia, 1988 (Units I, II, III & IV).
2	R.Hendee and Russell Ritenour "Medical Imaging Physics", Fourth Edition William, Wiley-Liss, 2002.

REFERENCES:

1	Gopal B. Saha "Physics and Radiobiology of Nuclear Medicine"- Third edition Springer, 2006.
2	B.H.Brown, PV Lawford, R H Small wood , D R Hose, D C Barber, "Medical physics and biomedical Engineering", - CRC Press, 1999
3	Myer Kutz, "Standard handbook of Biomedical Engineering and design", McGraw Hill, 2003.
4	P.Ragunathan, "Magnetic Resonance Imaging and Spectroscopy in Medicine

COURSE OUTCOMES:

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

CO1:	Describe the working principle of X-ray machine and its applications.
CO2:	Illustrate the principle of Computed Tomography (CT).
CO3:	Interpret the techniques used for visualizing various sections of the body using Magnetic Resonance Imaging (MRI).
CO4:	Demonstrate the applications of radionuclide imaging / nuclear medicine imaging.
CO5:	Outline the methods of radiation safety and protection.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	1	1	-	-	-	-	-	-	1	-	-	-
CO2	3	3	1	1	-	-	-	-	-	-	1	-	-	-
CO3	3	3	1	1	-	-	-	-	-	-	1	-	-	-
CO4	3	3	1	1	-	-	-	-	-	-	1	-	-	-
CO5	3	3	1	1	1	-	-	-	-	-	1	-	-	-
Avg.	3	3	1	1	1	-	-	-	-	-	1	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBMOE2403	FUNDAMENTALS OF CELL AND MOLECULAR BIOLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To provide knowledge on the fundamentals of cell biology. • To understand the signalling mechanisms. • To Understand basic principles of molecular biology at intracellular level to regulate growth, division and development					

Unit-I	INTRODUCTION TO CELL	(9)
Cell, cell wall and Extracellular Matrix (ECM), composition, cellular dimensions, Evolution, Organization, differentiation of prokaryotic and Eukaryotic cells, Virus, bacteria, cyanobacteria, mycoplasma and prions		
Unit-II	CELL ORGANELLES	(9)
Molecular organization, biogenesis and function Mitochondria, endoplasmic reticulum, Golgi apparatus, plastids, chloroplast, leucoplast, centrosome, lysosome, ribosome, peroxisome, Nucleus and nucleolus. Endo membrane system, concept of compartmentalization		
Unit-III	BIO-MEMBRANE TRANSPORT	(9)
Physiochemical properties of cell membranes. Molecular constitute of membranes, asymmetrical organization of lipids and proteins. Solute transport across membrane's-fick's law, simple diffusion, passive-facilitated diffusion, active transport- primary and secondary, group translocation, transport ATP ases, membrane transport in bacteria and animals. Transport mechanism- mobile carriers and pores mechanisms. Transport by vesicle formation, endocytosis, exocytosis, cell respiration		
Unit-IV	CELL CYCLE	(9)
Cell cycle- Cell division by mitosis and meiosis, Comparison of meiosis and mitosis, regulation of cell cycle, cell lysis, Cytokinesis, Cell signaling, Cell communication, Cell adhesion and Cell junction, cell cycle checkpoints.		
Unit-V	CENTRAL DOGMA	(9)
Overview of Central dogma DNA replication: Meselson & Stahl experiment, bi-directional DNA replication, Okazaki fragments. Structure and function of mRNA, rRNA and tRNA. RNA synthesis: Initiation, elongation and termination of RNA synthesis Introduction to Genetic code- Steps in translation: Initiation, Elongation and termination of protein synthesis.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Cooper, G.M. and R.E. Hansman “The Cell: A Molecular Approach”, 8th Edition, Oxford University Press, 2018
2	Friefelder, David. “Molecular Biology.” Narosa Publications, 1999

REFERENCES:

1	Lodish H, Berk A, Matsudaira P, Kaiser CA, Krieger M, Schot MP, Zipursky L, Darnell J. Molecular Cell Biology, 6th Edition, 2007
2	Becker, W.M. etal., “The World of the Cell”, 9 th Edition, Pearson Education, 2003.
3	Campbell, N.A., J.B. Reece and E.J. Simon “Essential Biology”, VIIrd Edition, Pearson International, 2007

COURSE OUTCOMES:

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

CO1:	Understanding of cell at structural and functional level.
CO2:	Understand the central dogma of life and its significance.
CO3:	Comprehend the basic mechanisms of cell division.
CO4:	Study on the Cell cycle
CO5:	Students will learn about Central dogma

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO11	PSO1	PSO2	PSO3
CO1	3	2	3	1	-	-	-	-	-	-	1	-	-	-
CO2	3	2	3	1	-	-	-	-	-	-	1	-	-	-
CO3	3	2	3	1	-	-	1	1	-	-	1	-	-	-
CO4	3	2	3	1	-	-	1	1	-	-	1	-	-	-
CO5	3	2	3	1	-	-	-	-	-	-	1	-	-	-
Avg.	3	2	3	1	-	-	-	-	-	-	1	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial, BT – Bloom’s Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBMOE2404	HUMAN PHYSIOLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	The student should be made to: The objective is to offer basic concepts of biochemistry to students with diverse background in life sciences including but not limited to the structure and function of various biomolecules and their metabolism.					

Unit-I	BASIC ELEMENTS OF HUMAN BODY	(9)
Cell: Structure and organelles - Functions of each component in the cell. Cell membrane –transport across membrane – origin of cell membrane potential – Action potential. Tissue: Types – Specialized tissues – functions.		
Unit-II	SKELETAL AND RESPIRATORY SYSTEM	(9)
Skeletal system: Bone types and functions – Joint - Types of Joint - Cartilage and functions. Respiratory System: Components of respiratory system – Respiratory Mechanism. Types of respiration - Oxygen and carbon dioxide transport and acid base regulation		
Unit-III	CIRCULATORY SYSTEM	(9)
Blood composition - functions of blood – functions of RBC. WBC types and their functions. Blood groups – importance of blood groups – identification of blood groups. Blood vessels- Structure of heart – Properties of Cardiac muscle – Conducting system of heart – Cardiac cycle – ECG - Heart sound		
Unit-IV	URINARY AND SPECIAL SENSORY SYSTEM	(9)
Urinary system: Structure of Kidney and Nephron. Mechanism of Urine formation and acid base regulation – Urinary reflex – Homeostasis and blood pressure regulation by urinary system. Special senses: Eye and Ear.		
Unit-V	NERVOUS SYSTEM	(9)
Structure of a Neuron – Types of Neuron. Synapses and types. Conduction of action potential in neuron. Brain – Divisions of brain lobes - Cortical localizations and functions - EEG. Spinal cord – Tracts of spinal cord - Reflex mechanism – Types of reflex. Autonomic nervous system and its functions.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Elaine.N. Marieb, “Essential of Human Anatomy and Physiology”, Eight Edition, Pearson Education, New Delhi ,2007.
---	---

REFERENCES:

1	Gillian Pocock, Christopher D. Richards, The human Body – An introduction for Biomedical and Health Sciences, Oxford University Press, USA, 2009
2	William F.Ganong, “Review of Medical Physiology”, 22 nd Edition, Mc Graw Hill, New Delhi, 2005

COURSE OUTCOMES:

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

CO1:	Describe basic structural and functional elements of human body.
CO2:	Explain organs and structures involving in system formation and functions.
CO3:	Identify all systems in the human body.
CO4:	Study on the Urinary system and sensory system
CO5:	Students will learn about nervous system

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO11	PSO1	PSO2	PSO3
CO1	3	2	3	1	-	-	-	-	-	-	1	-	-	-
CO2	3	2	3	1	-	-	-	-	-	-	1	-	-	-
CO3	3	2	3	1	-	-	1	1	-	-	1	-	-	-
CO4	3	2	3	1	-	-	1	1	-	-	1	-	-	-
CO5	3	2	3	1	-	-	-	-	-	-	1	-	-	-
Avg.	3	2	3	1	-	-	-	-	-	-	1	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

BSP
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

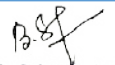
Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBMOE2405	LIFESTYLE DISEASES	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To study the cell types and differentiation. • To study basics about stem cells and its applications • To understand the methods and design involved in tissue engineering					

Unit-I	INTRODUCTION	(9)
Lifestyle diseases – Definition ; Risk factors – Eating, smoking, drinking, stress, physical activity, illicit drug use ; Obesity, diabetes, cardiovascular diseases, respiratory diseases, cancer; Prevention – Diet and exercise		
Unit-II	CANCER	(9)
Types - Lung cancer, Mouth cancer, Skin cancer, Cervical cancer, Carcinoma oesophagus; Causes Tobacco usage, Diagnosis – Biomarkers, Treatment		
Unit-III	CARDIOVASCULAR DISEASES	(9)
Coronary atherosclerosis – Coronary artery disease; Causes -Fat and lipids, Alcohol abuse -- Diagnosis - Electrocardiograph, echocardiograph, Treatment, Exercise and Cardiac rehabilitation		
Unit-IV	DIABETES AND OBESITY	(9)
Types of Diabetes mellitus; Blood glucose regulation; Complications of diabetes – Paediatric and adolescent obesity – Weight control and BMI		
Unit-V	RESPIRATORY DISEASES	(9)
Chronic lung disease, Asthma, COPD; Causes - Breathing pattern (Nasal vs mouth), Smoking – Diagnosis - Pulmonary function testing		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	R. Kumar & Meenal Kumar, “Guide to Prevention of Lifestyle Diseases”, Deep & Deep Publications, 2003
2	Gary Eggar et al, “Lifestyle Medicine”, 3rd Edition, Academic Press, 2017


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	James M.R, “Lifestyle Medicine”, 2nd Edition, CRC Press, 2013
2	Akira Miyazaki et al, “New Frontiers in Lifestyle-Related Disease”, Springer, 2008

COURSE OUTCOMES:

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

CO1:	Explain the concept of lifestyle diseases, their causes, risk factors, and preventive measures.
CO2:	Describe different types of cancer, their causes, diagnosis methods, and treatment approaches.
CO3:	Analyze cardiovascular diseases, their risk factors, diagnostic techniques, treatment, and rehabilitation.
CO4:	Illustrate the types of diabetes mellitus, obesity, complications, and methods for weight control using BMI.
CO5:	Discuss respiratory diseases such as asthma and COPD, their causes, diagnosis, and prevention.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	Open to all Departments
-------------------	------------	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBMOE2406	PATHOLOGY AND MICROBIOLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	• Gain a knowledge on the structural and functional aspects of living organisms. • Know the etiology and remedy in treating the pathological diseases. • Empower the importance of public health.					

Unit-I	CELL DEGENERATION, REPAIR AND NEOPLASIA	(9)
Cell injury and Necrosis, Apoptosis, Intracellular accumulations, Pathological calcification, cellular adaptations of growth and differentiation, Inflammation and Repair including fracture healing, Neoplasia, Classification, Benign and Malignant tumours, carcinogenesis, spread of tumours. Autopsy and biopsy.		
Unit-II	FLUID AND HEMODYNAMIC DERRANGEMENTS	(9)
Edema, normal hemostasis, thrombosis, disseminated intravascular coagulation, embolism, infarction, shock. Hematological disorders-Bleeding disorders, Leukaemias, Lymphomas		
Unit-III	MICROSCOPES	(9)
Light microscope – bright field, dark field, phase contrast, fluorescence, Electron microscope (TEM & SEM). Preparation of samples for electron microscope. Staining methods – simple, gram staining and AFB staining.		
Unit-IV	MICROBIAL CULTURES	(9)
Morphological features and structural organization of bacteria, growth curve, identification of bacteria , culture media and its types , culture techniques and observation of culture.		
Unit-V	IMMUNOLOGY	(9)
Natural and artificial immunity, opsonization, phagocytosis, inflammation, Immune deficiency syndrome, antibodies and its types, antigen and antibody reactions, immunological techniques: immune diffusion, immuno electrophoresis, RIA and ELISA, monoclonal antibodies. Disease caused by bacteria, fungi, protozoal, virus and helminthes		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Old RW, Primrose SB, “Principles of Gene Manipulation, An Introduction to Genetic Engineering”, Blackwell Science Publications, 1993.
2	Principles of Genome Analysis and Genomics by S.B.Primrose and R.M.Twyman, 3rd Ed. (Blackwell Publishing).

REFERENCES:

1	Isil Aksan Kurnaz, “Techniques in Genetic Engineering”, CRC Press, 2015.
2	Oksana Ableitner, “Introduction to Molecular Biology: Working with DNA and RNA (essentials)”, Springer International, 2022.
3	Arun K. Shukla, “Proteomics in Biology”, Academic Press, 2017.o

COURSE OUTCOMES:

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

CO1:	Analyze structural and functional aspects of living organisms.
CO2:	Explain the function of microscope
CO3:	Discuss the importance of public health.
CO4:	Describe methods involved in treating the pathological diseases
CO5:	Study about the immunology and immune system

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

BSP
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBMOE2407	MEDICAL ELECTRONICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	The students will be exposed to electrical and non-electrical physiological measurements and bioamplifiers					

Unit-I	BIO POTENTIAL ELECTRODES	(9)
Origin of bio potential and its propagation. Electrode-electrolyte interface, electrode-skin interface, half cell potential, impedance, polarization effects of electrode – nonpolarizable electrodes. Types of electrodes - surface, needle and micro electrodes and their equivalent circuits		
Unit-II	ELECTRODE CONFIGURATIONS	(9)
Biosignals characteristics – frequency and amplitude ranges. ECG – Einthoven’s triangle, standard 12 lead system. EEG – 10-20 electrode system, unipolar, bipolar and average mode. EMG– unipolar and bipolar mode.		
Unit-III	BIO AMPLIFIER	(9)
Need for bio-amplifier - single ended bio-amplifier, differential bio-amplifier – right leg driven ECG amplifier. Band pass filtering, isolation amplifiers – transformer and optical isolation - isolated DC amplifier and AC carrier amplifier. Chopper amplifier. Power line interference		
Unit-IV	MEASUREMENT OF NON-ELECTRICAL PARAMETERS	(9)
Blood Pressure: indirect methods - auscultatory method, oscillometric method, direct methods. Blood flow measurement Electromagnetic and ultrasound blood flow measurement. Cardiac output measurement: Indicator dilution, thermal dilution and dye dilution method,		
Unit-V	BIO-CHEMICAL MEASUREMENT	(9)
Biochemical sensors - pH, pO ₂ and pCO ₂ , Ion selective Field effect Transistor (ISFET), Immunologically sensitive FET (IMFET), Blood glucose sensors - Blood gas analyzers, colorimeter, flame photometer, spectrophotometer, blood cell counter, auto analyzer (simplified schematic description).		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	John G. Webster, "Medical Instrumentation Application and Design", John Wiley and sons, New York, 2004. (Units I, II & V)
2	Khandpur R.S, "Handbook of Biomedical Instrumentation", Tata McGraw-Hill, New Delhi, 2003. (Units II & IV)

COURSE OUTCOMES:

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

CO1:	Perform electrical and non-electrical physiological measurements
CO2:	Explain the function of bio amplifiers.
CO3:	Students will learnt about bio amplifier AC and DC
CO4:	Measurement of non-electrical parameters blood pressure
CO5:	Students will learnt about biochemical measurements

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	POS1	PSO2	PSO3
CO1	3	2	1	-	-	1	1	-	-	-	-	-	-	-
CO2	3	2	1	-	-	1	1	-	-	-	-	-	-	-
CO3	3	2	1	-	-	1	1	-	-	-	-	-	-	-
CO4	3	2	1	-	-	1	1	-	-	-	-	-	-	-
CO5	3	2	1	-	-	1	1	-	-	-	-	-	-	-
Avg.	3	2	1	-	-	1	1	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	Open to all Departments
-------------------	-----	----------------------------------	-------------------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UBMOE2408	ASSIST DEVICES	L	T	P	C	100
		3	0	0	3	
Course Objectives	• Study various mechanical techniques that will help failing heart. • Learn the functioning of the unit which does the clearance of urea from the blood • Understand the tests to assess the hearing loss and development of electronic devices to compensate for the loss. • Know the various orthotic devices and prosthetic devices to overcome orthopedic problems. • Understand electrical stimulation techniques used in clinical applications.					

Unit-I	CARDIAC ASSIST DEVICES	(9)
Principle of External counter pulsation techniques, intra-aortic balloon pump, Auxillary ventricle and schematic for temporary bypass of left ventricle, prosthetic heart valves.		
Unit-II	HEMODIALYSERS	(9)
Artificial kidney, Dialysis action, hemodialyser unit, membrane dialysis, portable dialyser monitoring and functional parameters.		
Unit-III	HEARING AIDS	(9)
Common tests – audiograms, air conduction, bone conduction, masking techniques, SISI, Hearing aids – principles, drawbacks in the conventional unit, DSP based hearing aids.		
Unit-IV	PROSTHETIC AND ORTHODIC DEVICES	(9)
Hand and arm replacement – different types of models, externally powered limb prosthesis, feedback in orthodic system, functional electrical stimulation, and sensory assist devices.		
Unit-V	RECENT TRENDS	(9)
Transcutaneous electrical nerve stimulator, bio-feedback.		
Total No of Periods to be Taught	45 periods	


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Levine S.N. (ed), "Advances in Bio-medical Engineering and Medical physics", Vol. I, II, IV, inter university publications, New York, 1968 (Unit I, IV, V).
2	Kolff W.J, "Artificial Organs", John Wiley and sons, New York, 1976. (Unit II).

REFERENCES:

1	D.S. Sunder, "Rehabilitation Medicine", 3 rd Edition, Jaypee Medical Publication, 2010.
---	--

COURSE OUTCOMES:

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

CO1:	Explain the functioning and usage of electromechanical units which will restore normal functional ability of particular organ that is defective temporarily or permanently
CO2:	Explain the functioning and usage of hemodialysers and its functional parameters
CO3:	To study about the Common tests – audiograms, air conduction, bone conduction
CO4:	Knowledge on prosthetic and orthodic devices
CO5:	To know about the knowledge on recent trends

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	EEE	Programme Code & Name	Open to All Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
UEEOE2401	ELECTRICAL SAFETY	3	0	0	3	100
Course Objectives	- To provide an overview of electrical safety, shocks and their prevention. - To Understand the electrical safety in residential, commercial and agricultural installations - To familiarise with electrical safety during installation, testing and commissioning, operation and maintenance - To provide an overview of electrical hazardous areas					

Unit-I	INTRODUCTION TO ELECTRICAL SAFETY, SHOCKS AND THEIR PREVENTION	(9)
Terms and definitions, objectives of safety and security measures, Hazards associated with electric current and voltage, who is exposed, principles of electrical safety, Approaches to prevent Accidents, scope of subject electrical safety. Primary and secondary electrical shocks, possibilities of getting electrical shock and its severity, medical analysis of electric shocks and its effects, shocks due to flash/ Spark over's, prevention of shocks, safety precautions against contact shocks, flash shocks, burns, residential buildings and shop.		
Unit-II	ELECTRICAL SAFETY IN RESIDENTIAL, COMMERCIAL AND AGRICULTURAL INSTALLATIONS	(9)
Wiring and fitting –Domestic appliances –water tap giving shock –shock from wet wall –fan firing shock –multi-storied building –Temporary installations – Agricultural pump installation Do's and Don'ts for safety in the use of domestic electrical appliances.		
Unit-III	ELECTRICAL SAFETY DURING INSTALLATION, TESTING AND COMMISSIONING, OPERATION AND MAINTENANCE	(9)
Preliminary preparations –safe sequence –risk of plant and equipment –safety documentation –field quality and safety - personal protective equipment –safety clearance notice –safety precautions –safeguards for operators –safety..		
Unit-IV	ELECTRICAL SAFETY IN HAZARDOUS AREAS	(9)
Hazardous zones –class 0,1 and 2 spark, flashovers and corona discharge and functional requirements –Specifications of electrical plants, equipment's for hazardous locations –Classification of equipment enclosure for various hazardous gases and vapours –classification of equipment/enclosure for hazardous locations		
Unit-V	FIRE EXTINGUISHERS	(9)
Fundamentals of fire-initiation of fires, types; extinguishing techniques, prevention of fire, types of fire extinguishers, fire detection and alarm system;CO2 and Halogen gas schemes; foam schemes.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Rao, S. and Saluja, H.L., “Electrical Safety, Fire Safety Engineering and Safety Management”, Khanna Publishers, 1988
---	---

REFERENCES:

1	Cooper.W.F, “Electrical safety Engineering”, Newnes-Butterworth Company, 1978.
2	John Codick, “Electrical safety hand book”, McGraw Hill Inc., New Delhi, 2000.
3	Nagrath, I.J. and Kothari, D.P., “Power System Engineering”, Tata McGraw Hill, 1998.
4	Wadhwa, C.L., “Electric Power Systems”, New Age International, 2004.

COURSE OUTCOMES:

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

CO1:	Understand the Indian power sector organization and Electricity rules, electrical safety in residential, commercial, agriculture, hazardous areas and use of fire extinguishers.
CO2:	Apply various fire extinguishers and the Electrical Safety to prevent the Electric Shocks in residential, commercial, agriculture and hazardous areas;
CO3:	Apply the Electrical Safety to prevent the Electric Shocks during installation, testing, commissioning, Operation and Maintenance
CO4:	Analyse the Electrical Safety, Electric Shocks and Their Prevention.
CO5:	Examine the Electrical Safety in hazardous areas and the use of various fire extinguishers.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
UEEOE2402	INTRODUCTION TO ELECTRICAL MACHINES	3	0	0	3	100
Course Objectives	- To introduce the principles of operations of DC machines as motor and generator - To introduce the principles of operations of Transformers - To introduce the principles of operations of Induction machines. - To introduce the principles of operations of Synchronous machines. - To introduce other special machines					

Unit-I	D.C. MACHINES	(9)
D.C. Machines – Principle of operation and construction of motor and generator – torque and EMF equation — Characteristics of Motor and Generator – Starting, Speed control and braking of D.C. Motor		
Unit-II	TRANSFORMERS	(9)
Principle , Construction and Types of Transformer - EMF equation - Equivalent circuits - Phasor diagrams - Regulation and efficiency of a transformer-three phase transformer Connection.		
Unit-III	SYNCHRONOUS MACHINES	(9)
Principle of Operation, type - EMF Equation and Phasor diagrams - Synchronous motor-Rotating Magnetic field Starting Methods , Torque V-Curves, inverted – V curves		
Unit-IV	THREE PHASE INDUCTION MOTORS	(9)
Constructional details – Types of rotors — Principle of operation – Slip - Equivalent circuit – Torque-Slip characteristics - Starting, Speed control and induction motor.		
Unit-V	SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES	(9)
Types of single phase induction motors – Capacitor start capacitor run motors – Shaded pole motor – Repulsion type motor – Universal motor – Hysteresis motor - Permanent magnet synchronous motor – Switched reluctance motor – Brushless D.C motor.		
Total No of Periods to be Taught		45

TEXT BOOK:

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



1	B.S.Guru and H.R.Hiziroglu, “Electric Machinery and Transformer”, Oxford university Press 2007
2	M.N.Bandyopadhyay, Electrical Machines Theory and Practice, PHI Learning PVT LTD., New Delhi, 2009
3	Deshpande M. V., “Electrical Machines” PHI Learning Pvt. Ltd., New Delhi, 2011.

REFERENCES:

1	Del Toro, V., “Electrical Engineering Fundamentals”, Prentice Hall of India, New Delhi, 1995.
2	Fitzgerald A.E, Kingsley C., Umans, S. and Umans S.D., “Electric Machinery”, McGraw- Hill, Singapore, 2000.
3	Nagrath I. J and Kothari D. P. ‘Electric Machines’, Fourth Edition, Tata McGraw Hill. Publishing Company Ltd, 2010
4	M.S. Sarma and M.K.Pathak, “Electric Machines”, Cengage Learning, 2012. 5. C.A.Gross, “Electric Machines”, CRC Press 2010

COURSE OUTCOMES:

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

CO1:	Explain the construction and working principle of DC machines.
CO2:	Describe the working principle of auto transformer, three phase transformer with different types of connections.
CO3:	Ability to understand the construction and working principle of Synchronous Machines
CO4:	Ability to understand the construction and working principle of Three Phase Induction Motor and knowledge about the starting and speed control of induction motors.
CO5:	To gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
UEEOE2403	ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION	3	0	0	3	100
Course Objectives	- To study the generation, conservation of electrical power and energy efficient equipments. - To understand the principle, design Of Illumination Systems and energy Efficiency lamps. - To study the methods of industrial heating and welding. - To understand the electric traction systems and their performance.					

Unit-I	GENERATION OF ELECTRIC POWER CONVENTIONAL SOURCES	(9)
Hydro station, Thermal Power Plant, Nuclear Power Plant and Gas Turbine Plant. Non-Conventional Sources (Qualitative): Ocean Energy, Tidal Energy, wind Energy, and Solar Energy.		
Unit-II	ILLUMINATION	(9)
Importance of lighting – properties of good lighting scheme – laws of illumination – photometry types of lamps–lighting calculations–basic design of illumination schemes for residential, commercial, street lighting, factory lighting and flood lighting – LED lighting and energy efficient lamps.		
Unit-III	TRACTION	(9)
Merits of electric traction–requirements of electric traction system–supply systems - mechanics of train movement – traction motors and control – braking – recent trends in electric traction		
Unit-IV	HEATING AND WELDING	(9)
Role of electric heating for industrial applications–resistance heating–induction heating– dielectric heating - electric arc furnaces. Brief introduction to electric welding–welding generator, welding transformer and the characteristics		
Unit-V	DOMESTIC UTILIZATION OF ELECTRICAL ENERGY	(9)
Domestic utilization of electrical energy – House wiring. Induction based appliances, Online and OFF line UPS, Batteries - Power quality aspects – nonlinear and domestic loads – Earthing.		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Wadhwa, C.L. “Generation, Distribution and Utilization of Electrical Energy”, New Age International Pvt. Ltd, 2003.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Dr.Uppal S.L.and Prof.S. Rao, 'Electrical Power Systems', Khanna Publishers, New Delhi, 15th Edition, 2014.
3	Energy Efficiency in Electric Utilities, BEE Guide Book,2010

REFERENCES:

1	Partab.H, “Art and Science of Utilisation of Electrical Energy”, Dhanpat Rai and Co, New Delhi, 2004.
2	OpenshawTaylor.E, “UtilizationofElectricalEnergyinSIUnits”,OrientLongmanPvt.Ltd, 2003.
3	Gupta.J.B, “UtilizationofElectricPowerandElectricTraction”,S.K.KatariaandSons, 2002.
4	Cleaner Production – Energy Efficiency Manual for GERIAP, UNEP, Bangkok prepared by National Productivity Council.

COURSE OUTCOMES:

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

CO1:	To understand them a in aspects of generation, utilization and conservation.
CO2:	To understand them a in aspects of illuminations
CO3:	To realize the appropriate type of electric supply system as well as to evaluate the performance of a traction unit.
CO4:	To understand the main aspects of Traction and method of heating
CO5:	To evaluate domestic wiring connection and debug any faults occurred

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week	Credit	Maximum Marks
UEEOE2404		L T P	C	100

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



	POWER ELECTRONICS AND DRIVES	3	0	0	3	
Course Objectives	- Comprehensive introduction to various power electronic devices, their structure, operating principle and characteristics - Give exposure to Various topologies, working principle and analysis of controlled rectifiers and ac controllers - Detailed knowledge on Classifications, structure, operating principle of dc choppers. - Introduction to different types of Inverters , their principle of operation and waveform control - Overview on dc and ac drives and their control using power electronic circuits.					

Unit-I	POWER SEMICONDUCTOR DEVICES AND CHARACTERISTICS	(9)
Operating principle and switching Characteristics: Power diodes, Power BJT, Power MOSFET, IGBT, SCR, TRIAC, GTO, MCT, Power integrated circuits (PIC) – Drive and Protection circuits.		
Unit-II	CONTROLLED RECTIFIERS AND AC CONTROLLERS	(9)
Single phase – Three phase – Half controlled – Fully controlled rectifiers – Dual converters -Effect of source and load inductance - AC voltage controllers –Introduction to Cyclo converters, Matrix converters		
Unit-III	DC TO DC CONVERTERS	(9)
Step up and Step down Chopper – Chopper classification - quadrant of operation – Switching mode Regulators – Buck, Boost, Buck-Boost, and Cuk Regulators		
Unit-IV	INVERTERS	(9)
Voltage source Inverters – Half bridge – Full bridge – Three Phase Bridge Inverters – Voltage control– PWM Techniques – Current Source Inverters: Capacitor Commutated Inverter- Resonant inverters: Series, Parallel, ZVS, ZCS – Introduction to multilevel Inverters		
Unit-V	DRIVES AND CONTROL	(9)
Static and Dynamic equations of dc and ac machines – Electrical breaking – Rectifier and chopper control of DC drives – Principles of v/f control of AC drives – Open loop and Closed loop schemes for DC and AC drives(Block diagram approach only)– Introduction to vector control of AC drives..		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Rashid, M.H., “Power Electronics – Circuits, Devices and Applications”, PHI, 3rd Edition, 2004.
2	Mohan, Udeland and Robbins., “Power Electronics”, John Wiley and Sons, New York, 1995.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Singh, M.D., and Khanchandani, K.B., "Power Electronics", 2nd Edition., Tata McGraw-Hill, 2011.
2	2. Bose, B.K., "Modern Power Electronics and AC Drives", Pearson Education, 2002.
3	Bimbira, P.S., "Power Electronics", Khanna Publishers, 2006.
4	Moorthi, V.R., "Power Electronics - Devices, Circuits and Industrial Applications", Oxford University Press, 2005
5	NPTEL Lecture Series on "Power Electronics" by Dr.B.G.Fernandes, IIT Bombay.

COURSE OUTCOMES:

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

CO1:	Ability to explain various devices and their structure, operating characteristics in the field of electronics.
CO2:	Ability to classify, analyze and design, Control rectifiers and AC controllers
CO3:	Ability to classify, analyze and design, DC to DC convertors,
CO4:	Ability to classify, analyze and design, inverters
CO5:	Will have ability to apply power electronic circuits for the control of popular applications.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
UEEOE2405	ELECTRICAL ESTIMATION AND COSTING	3	0	0	3	100

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Course Objectives	- Emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost availability. - Exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations design. - These techniques should help the students to successfully estimate costing of the products/projects that are part of our everyday usage. - A basic knowledge on methods and types of estimation and its merits and demerits. - To prepare the schedule of materials with specifications and estimates for different types of electrical installations.
--------------------------	---

Unit-I	DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS	(9)
Electric Supply System, Three phase four wire distribution system, General requirements of Electrical Installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution Board		
Unit-II	ELECTRICAL INSTALLATION OF BUILDINGS AND SMALL INDUSTRIES	(9)
Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.		
Unit-III	OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES	(9)
Introduction, Supports for Transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.		
Unit-IV	SUBSTATIONS:	(9)
Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substation, Floor mounted type.		
Unit-V	DESIGN OF ILLUMINATION SCHEMES:	(9)
Introduction, Terminology in Illumination, laws of illumination, various types of light sources, Practical lighting schemes		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Electrical Design Estimating and Costing, K.B. Raina, S.K. Bhattacharya, New Age International Publisher
2	Design of Electrical Installations, Dr. V.K. Jain, Dr. Amitabh Bajaj, University Science Press.
3	Electricity pricing Engineering Principles and Methodologies, Lawrence J. Vogt, P.E., CRC Press.

REFERENCES:	
1	Guide for Electrical Layout in residential buildings, Indian Standard Institution, IS:4648-1968

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Electrical Installation buildings Indian Standard Institution, IS:2032
---	--

COURSE OUTCOMES:

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

CO1:	The estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
CO2:	Exposure to design and estimation of wiring,
CO3:	Design of overhead and underground distribution lines, substations and illuminations design.
CO4:	Understand types of substations and their ratings
CO5:	To design illumination systems.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
UEEOE2406	BASICS OF ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	3	0	0	3	100

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Course Objectives	- To educate the fundamental concepts and characteristics of measurement and errors - To impart the knowledge on the functional aspects of measuring instruments - To infer the importance of various bridge circuits used with measuring instruments. - To educate the fundamental working of sensors and transducers and their applications - To summarize the overall measurement and instrumentation with the knowledge on digital instrumentation principles.
--------------------------	--

Unit-I	CONCEPTS OF MEASUREMENTS	(9)
Instruments: classification, working and applications – Elements of a generalized measurement system - Static and dynamic characteristics - Errors in measurement -Statistical evaluation of measurement data.		
Unit-II	MEASUREMENT OF PARAMETERS IN ELECTRICAL SYSTEMS	(9)
Classification of instruments – moving coil and moving iron meters – Induction type, dynamometer type watt meters – Energy meter – Megger – Instrument transformers (CT & PT).		
Unit-III	AC/DC BRIDGES AND INSTRUMENTATION AMPLIFIERS	(9)
Wheatstone bridge, Kelvin double bridge - Maxwell, Hay, Wien and Schering bridges – Errors and compensation in A.C. bridges - Instrumentation Amplifiers.		
Unit-IV	TRANSDUCERS FOR MEASUREMENT OF NON- ELECTRICAL PARAMETERS	(9)
Classification of transducers – Measurement of pressure, temperature, displacement, flow, angular velocity – Digital transducers – Smart Sensors.		
Unit-V	OTHER ENERGY SOURCES	(9)
A/D converters: types and characteristics – Sampling, Errors- Measurement of voltage, Current, frequency and phase - D/A converters: types and characteristics- DSO- Data Loggers – Basics of PLC programming and Introduction to Virtual Instrumentation - Instrument standards		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	A.K. Sawhney, PuneetSawhney ‘A Course in Electrical & Electronic Measurements & Instrumentation’, DhanpatRai and Co, New Delhi, Edition 2011.
2	H.S. Kalsi, ‘Electronic Instrumentation’, Tata McGraw-Hill, New Delhi, 2010
3	Scott Grinnell, “Renewable Energy & Sustainable Design”, CENGAGE Learning, USA, 2016.

REFERENCES:	
1	M.M.S. Anand, ‘Electronics Instruments and Instrumentation Technology’, Prentice Hall India, New Delhi, 2009
2	J.J. Carr, ‘Elements of Electronic Instrumentation and Measurement’, Pearson Education India, New Delhi, 2011

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



3	W.Bolton, Programmable Logic Controllers, 6th Edition, Elsevier, 2015.
4	R.B. Northrop, 'Introduction to Instrumentation and Measurements', Taylor & Francis, New Delhi, 3rd Edition 2014.
5	E. O. Doebelin and D. N. Manik, "Measurement Systems – Application and Design", Tata McGraw-Hill, New Delhi, 6th Edition 2017.
6	R. K. Rajput, "Electrical and Electronics Measurements and Instrumentation", Chand Pub, 2016

COURSE OUTCOMES:

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

CO1:	Ability to understand the fundamental art of measurement in engineering.
CO2:	Ability to understand the structural elements of various instruments.
CO3:	Ability to understand the importance of bridge circuits.
CO4:	Ability to understand about various transducers and their characteristics by experiments.
CO5:	Ability to understand the concept of digital instrumentation and virtual instrumentation by log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	-	3	2	-	2	-	-	3	3	3	3
CO2	3	2	3	2	-	-	-	-	-	3	3	3	3	3
CO3	3	2	3	-	3	2	-	-	-	-	3	3	3	3
CO4	3	2	3	-	-	-	-	2	-	-	-	3	3	3
CO5	3	2	3	2	3	-	-	-	-	3	3	3	3	3
Avg.	3	2	3	2	3	2	-	2	-	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UEEOE2407	INTRODUCTION TO CONTROL ENGINEERING	L	T	P	C	100
		3	0	0	3	

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Course Objectives	To introduce the control system components and transfer function model with their graphical representation To understand the analysis of system in time domain along with steady state error. To introduce frequency response analysis of systems To accord basic knowledge in design of compensators To introduce the state space models.
--------------------------	---

Unit-I	MATHEMATICAL MODELLING	(9)
Introduction – transfer function – simple electrical, mechanical, ,pneumatic , hydraulic and thermal systems–analogies		
Unit-II	FEEDBACK CONTROL SYSTEMS	(9)
Control system components - Block diagram representation of control systems, Reduction of block diagrams, Signal flow graphs, Output to input ratios		
Unit-III	STABILITY ANALYSIS	(9)
Response of systems to different inputs viz., Step impulse, pulse, parabolic and sinusoidal inputs, Time response of first and second order systems, steady state errors and error constants of unity feedback circuit		
Unit-IV	STATE SPACE TECHNIQUE	(9)
Necessary and sufficient conditions, Routh-Hurwitz criteria of stability, Root locus and Bode techniques, Concept and construction frequency response.		
Unit-V	OTHER ENERGY SOURCES	(9)
State vectors–state space models-Digital Controllers–design aspects		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Nagarath, I.J. and Gopal, M., “Control Systems Engineering”, New Age International Publishers,2017
2	Benjamin C. Kuo, “Automatic Control Systems”, Wiley, 2014

REFERENCES:	
1	Katsuhiko Ogata, “Modern Control Engineering”, Pearson, 2015.
2	Richard C. Dorf and Bishop, R.H., “Modern Control Systems”, Pearson Education,2009

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



3	John J.D., Azzo Constantine, H. and HoupisSttuart, N Sheldon, “Linear Control System Analysis and Design with MATLAB”, CRC Taylor& Francis Reprint 2009.
4	RamesC.Panda and T. Thyagarajan, “An Introduction to Process Modelling Identification and Control of Engineers”, Narosa Publishing House, 2017.
5	M. Gopal, “Control System: Principle and design”, McGraw Hill Education, 2012.
6	NPTEL Video Lecture Notes on “Control Engineering “by Prof. S. D. Agashe, IIT Bombay.

COURSE OUTCOMES:

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

CO1:	To represent and develop systems in different forms using the knowledge gained
CO2:	To analyses the system in time and frequency domain
CO3:	Ability to Derive Transfer function Model of Electrical and Mechanical Systems.
CO4:	Ability to Obtain the transfer Function by the Reduction of Block diagram & Signal flow graph
CO5:	To analyses the stability of physical systems

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO 2	PSO 3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	2	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	2.8	3	3	2.8	2	2	1	-	-	-	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy

Department	EEE	Programme Code & Name	Open to All Departments
-------------------	-----	----------------------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
UEEOE2408	FUNDAMENTALS OF ELECTRICAL DRIVES AND CONTROL	3	0	0	3	100

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Course Objectives	- To study the conventional and solid-state drives - To study the different methods of starting D.C motors and induction motors. - To understand the basic concepts of different types of electrical machines and their performance
--------------------------	---

Unit-I	INTRODUCTION	(9)
Basic Elements – Types of Electric Drives – factors influencing the choice of electrical drives – heating and cooling curves – Loading conditions and classes of duty – Selection of power rating for drive motors		
Unit-II	DRIVE MOTOR CHARACTERISTICS	(9)
Mechanical characteristics – Speed-Torque characteristics of various types of load and drive motors – Braking of Electrical motors – DC motors: Shunt, series and compound - single phase and three phase induction motors.		
Unit-III	STARTING METHODS	(9)
Types of D.C Motor starters – Typical control circuits for shunt and series motors – Three phase squirrel cage and slip ring induction motors		
Unit-IV	CONVENTIONAL AND SOLID STATE SPEED CONTROL OF D.C DRIVES	(9)
Speed control of DC series and shunt motors – Armature and field control, Ward-Leonard control system - Using controlled rectifiers and DC choppers –applications.		
Unit-V	CONVENTIONAL AND SOLID STATE SPEED CONTROL OF A.C. DRIVES	(9)
Speed control of three phase induction motor – Voltage control, voltage / frequency control, slip power recovery scheme – Using inverters and AC voltage regulators – applications..		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	VedamSubrahmaniam, “Electric Drives (Concepts and Applications”, Tata McGraw-Hill, 2001
2	Nagrath .I.J. & Kothari .D.P, “Electrical Machines”, Tata McGraw-Hill, 1998

REFERENCES:	
1	Pillai.S.K “A First Course on Electric Drives”, Wiley Eastern Limited, 1998

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



2	Singh. M.D., K.B.Khanchandani, “Power Electronics”, Tata McGraw-Hill, 1998
3	Partab. H., “Art and Science and Utilisation of Electrical Energy”, Dhanpat Rai and Sons, 1994.

COURSE OUTCOMES:

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

CO1:	Derive the heating and cooling curve and study the various classes of duty and Selection of power rating
CO2:	Understand the working principle of DC & AC motors and their characteristics and its braking methods
CO3:	Understand the Starting methods of DC & AC motors
CO4:	Understand the Concepts of speed control in DC motors
CO5:	Understand the Concepts of speed control in AC motors

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	3	-	3	2	2	-	-	-	3	3	3
CO2	3	2	3	2	-	-	-	-	3	-	3	3	3
CO3	3	2	3	-	3	2	-	-	-	-	3	3	3
CO4	3	2	3	-	-	-	2	-	-	-	-	3	3
CO5	3	2	3	2	3	-	-	-	3	-	3	3	3
Avg.	3	2	3	2	3	2	2	-	3	-	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	
UEEOE2409	ENERGY CONSERVATION AND MANAGEMENT	3	0	0	3	100

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Course Objectives	• Understand and analyses the energy data of industries • Carryout energy accounting and balancing • Conduct energy audit and suggest methodologies for energy savings. • Utilize the available resources in optimal ways
--------------------------	---

Unit-I	INTRODUCTION	(9)
Energy-Power-Past & Present scenario of World; National Energy consumption Data Environmental aspects associated with energy utilization – Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing.		
Unit-II	ELECTRICAL SYSTEMS	(9)
Power system structure, Electrical tariff and types- Illumination–Lux, Lumens, law of illumination -Types of lighting, LED Lighting and. Energy Efficient Lighting.		
Unit-III	THERMAL SYSTEMS	(9)
Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters–Efficiency computation and encon measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators& Refractories		
Unit-IV	ENERGY CONSERVATION IN MAJOR UTILITIES	(9)
Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems –Cooling Towers –D.G. sets.		
Unit-V	ECONOMICS	(9)
Energy Economics–Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing–ESCO concept		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Energy Manager Training Manual (4 Volumes) available at www.energymanagertraining.com . a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004. Power, Government of India, 2004

REFERENCES:

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



1	Witte.L.C.,P.S.Schmidt,D.R.Brown,“IndustrialEnergyManagementandUtilisation” Hemisphere Publ, Washington, 1988.
2	Callaghn,P.W.“Design and Management for Energy Conservation ”,Pergamon Press, Oxford, 1981.
3	Dryden.I.G.C.,“TheEfficientUseofEnergy”Butterworths,London,1982
4	Turner.W.C.,“EnergyManagementHandbook”,Wiley,NewYork,1982.
5	Murphy. W.R.andG.McKAY,“EnergyManagement”,Butterworths,London1987

COURSE OUTCOMES:

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

CO1:	Remember the knowledge for Basic combustion and furnace design and selection of thermal and mechanical energy equipment.
CO2:	Study the Importance of Stoichiometry relations, Theoretical air required for complete combustion.
CO3:	Skills on combustion thermodynamics and kinetics.
CO4:	Apply calculation and design tube still heaters.
CO5:	Studied different heat treatment furnace.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	2	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	3	3	3	2	2	2	1	-	-	-	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy														

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week	Credit	Maximum Marks
UEEOE2410		L T P	C	100

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



	AUTOMOTIVE AND ENGINEERING	ELECTRICAL ELECTRONICS	3	0	0	3	
Course Objectives	The objective of this course is to prepare the students to become familiar with the basic concepts and applications of different sensor and actuators used for electronic control, different communication protocols and networking in vehicles						

Unit-I	INTRODUCTION AND AUTOMOTIVE BATTERIES	(9)
Introduction Overview of vehicle electrical systems Electrical circuits Electrical power supply in conventional vehicle Dimensioning of wires Circuit diagrams and symbols. Batteries – Battery design – Method of operation – Lead acid battery construction – Battery ratings and testing Maintenance free batteries – Battery		
Unit-II	STARTING AND CHARGING SYSTEM	(9)
Starter Motors – Development and Starting requirements in the IC engines starter motor design – Starter motor design variations – starter motor control and power circuits		
Unit-III	IGNITION, LIGHTING AND AUXILLARY SYSTEM	(9)
Ignitions System Ignition fundamentals Electronic ignition Programmed ignition Distributor less ignition Direct ignition Spark plugs. Automotive lighting Technology –Technical demands Development of lighting technology Light sources – physical principles – Front and rear lighting system Interior lighting system – Special purpose lamps – Adaptive Lighting system Instrument clusters Wiper and Washer systems electric horns		
Unit-IV	AUTOMOTIVE ELECTRONICS AND SENSORS AND ACTUATORS	(9)
Automotive Electronics overview and Basic principles of semiconductor technology Electronic Components semiconductor components. Automotive Sensors – Basic Sensors : Position, speed, Force/Torque, Flow meters, Automotive Actuators Electromechanical actuators Fluid mechanical actuators		
Unit-V	VEHICLE NETWORKING	(9)
Data transfer between automotive Electronics systems Basic principles of networking- Network topology- Network organization OSI reference model Control mechanisms communication protocols in embedded systems Vehicle Communication Protocols		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Bosch Automotive Electrics and Automotive Electronics Systems and Components, Networking and Hybrid Drive, 5th Edition, 2007, ISBN No: 978-3-658-01783-5

REFERENCES:

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



1	Barry Hole beak, “Automotive Electrical and Electronics” , Delmar Publishers, Clifton Park,USA,2010
2	James D Halderman, “Automotive Electrical and Electronics”, Prentice Hall, USA, 2013
3	Tom Denton, “Automotive Electrical and Electronics Systems,” Third Edition, 2004, SAE International
4	William Ribbens, "Understanding Automotive Electronics - An Engineering Perspective," 7th Edition, Elsevier Butterworth-Heinemann Publishers, 2012.

COURSE OUTCOMES:

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

CO1:	Define the glossary related to vehicle electrical and electronic system
CO2:	Explain the need for starter batteries, starter motor and alternator in the vehicle.
CO3:	Differentiate the conventional and modern vehicle architecture and the data transfer among the different electronic control unit using different communication protocols
CO4:	List common types of sensor and actuators used in vehicles
CO5:	Understand networking in vehicles.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	-	-	-	3	3	3	3
CO2	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO3	2	3	3	3	2	2	1	-	-	-	3	3	3	3
CO4	3	3	3	3	2	2	1	-	-	-	3	3	3	3
CO5	3	3	3	3	2	2	1	-	-	-	3	3	3	3
Avg.	2.8	3	3	2.8	2	2	1	-	-	-	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy														

Department	EEE	Programme Code & Name	Open to All Departments
------------	-----	-----------------------	-------------------------

Course Code	Course Name	Hours/Week	Credit	Maximum Marks
-------------	-------------	------------	--------	---------------

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



UEEOE2411	INTRODUCTION TO EMBEDDED SYSTEMS	L	T	P	C	100
		3	0	0	3	
Course Objectives	To familiarize students with the fundamental concepts of embedded systems, including their architecture, hardware, and software components, and to provide experience in designing and implementing simple embedded systems					

Unit-I	BASICS OF COMPUTER ARCHITECTURE AND THE BINARY NUMBER SYSTEM	(9)
Basics of computer architecture, computer languages, RISC and CISC architectures, number systems, number format conversions, computer arithmetic, units of memory capacity.		
Unit-II	INTRODUCTION TO EMBEDDED SYSTEMS	(9)
Application domain of embedded systems, desirable features and general characteristics of embedded systems, model of an embedded system, microprocessor Vs microcontroller, example of a simple embedded system, merit for an embedded system, classification of MCUs: 4/8/16/32 bits, history of embedded systems		
Unit-III	EMBEDDED SYSTEMS-THE HARDWARE POINT OF VIEW	(9)
Microcontroller unit(MCU), a popular 8-bit MCU, memory for embedded systems, low power design, pull up and pull down resistors		
Unit-IV	SENSORS, ADCs AND ACTUATORS	(9)
Sensors: Temperature Sensor, Light Sensor, Proximity/range Sensor; Analog to digital converters: ADC Interfacing; Actuators Displays, Motors, Opto couplers / Opto isolators, relays.		
Unit-V	EXAMPLES OF EMBEDDED SYSTEMS	(9)
Mobile phone, automotive electronics, radio frequency identification (RFID), wireless sensor networks(WISENET), robotics, biomedical applications, brain machine interface		
Total No of Periods to be Taught		45

TEXT BOOK:	
1	Lyla B Das, Embedded systems: An Integrated Approach, 1st Ed., Pearson, 2013

REFERENCES:

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



1	Shibu, K.V., Introduction to Embedded Systems, 1st Ed., TMH, 2009
2	KantaRao B, Embedded Systems, 1st Ed., PHI
3	Frank Vahid& Tony Givargis, Embedded System Design, 2nd Edition, John Wiley,

COURSE OUTCOMES:

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

CO1:	learn about the general principles of computer architecture
CO2:	learn about the working of a simple embedded system and embedded system applications
CO3:	learn the hardware aspects of embedded systems
CO4:	Understand the sensors, ADCs and actuators used in embedded systems
CO5:	Understand the real world examples of embedded systems

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	3	-	3	2	2	-	-	-	3	3	3
CO2	3	2	3	2	-	-	-	-	3	-	3	3	3
CO3	3	2	3	-	3	2	-	-	-	-	3	3	3
CO4	3	2	3	-	-	-	2	-	-	-	-	3	3
CO5	3	2	3	2	3	-	-	-	3	-	3	3	3
Avg.	3	2	3	2	3	2	2	-	3	-	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2401	FINANCIAL MANAGEMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To acquire the knowledge of the decision areas in finance. • To learn the various sources of Finance • To describe about capital budgeting and cost of capital. • To discuss on how to construct a robust capital structure and dividend policy • To develop an understanding of tools on Working Capital Management.					

Unit-I	INTRODUCTION TO FINANCIAL MANGEMENT	(9)
Definition and Scope of Finance Functions - Objectives of Financial Management - Profit Maximization and Wealth Maximization- Time Value of money- Risk and return concepts.		
Unit-II	SOURCES OF FINANCE	(9)
Long term sources of Finance -Equity Shares – Debentures - Preferred Stock – Features – Merits and Demerits. Short term sources - Bank Sources, Trade Credit, Overdrafts, Commercial Papers, Certificate of Deposits, Money market mutual funds etc.		
Unit-III	INVESTMENT DECISIONS	(9)
Investment Decisions: capital budgeting – Need and Importance – Techniques of Capital Budgeting - Payback -ARR – NPV – IRR –Profitability Index.Cost of Capital - Cost of Specific Sources of Capital - Equity -Preferred Stock- Debt - Reserves - Concept and measurement of cost of capital - Weighted Average Cost of Capital.		
Unit-IV	FINANCING AND DIVIDEND DECISION	(9)
Operating Leverage and Financial Leverage- EBIT-EPS analysis. Capital Structure – determinants of Capital structure- Designing an Optimum capital structure . Dividend policy - Aspects of dividend policy - practical consideration - forms of dividend policy - - Determinants of Dividend Policy.		
Unit-V	WORKING CAPITAL DECISION	(9)
Working Capital Management: Working Capital Management - concepts - importance -Determinants of Working capital. Cash Management: Motives for holding cash – Objectives and Strategies of Cash Management. Receivables Management: Objectives - Credit policies.		
Total No of Periods to be Taught		45 periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	M.Y. Khan and P.K.Jain Financial management, Text, Tata McGraw Hill.
2	M. Pandey Financial Management, Vikas Publishing House Pvt. Ltd.

REFERENCES:

1	James C. Vanhorne –Fundamentals of Financial Management– PHI Learning,
2	Prasanna Chandra, Financial Management.
3	Srivatsava, Mishra, Financial Management, Oxford University Press, 2011.

COURSE OUTCOMES:

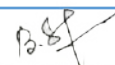
On completion of the course, the students will be able to

CO1:	Understand the fundamental concepts and objectives of financial management.
CO2:	Analyze various sources of finance and their suitability for business needs.
CO3:	Apply capital budgeting techniques and calculate cost of capital for investment decisions.
CO4:	Evaluate financing and dividend decisions to design an optimal capital structure.
CO5:	Manage working capital and related components effectively.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	-	-	-	1	-	-	-	3	2	-
CO2	3	3	2	2	2	-	-	1	-	-	-	3	3	-
CO3	3	3	3	3	3	-	-	1	-	-	-	3	3	-
CO4	3	3	3	2	2	-	-	2	2	-	-	3	3	-
CO5	3	3	3	2	3	-	-	2	-	-	-	3	3	-
Avg.	3	3	2.6	2.3	2	-	-	2.2	1	-	-	3	3	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

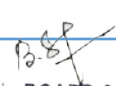


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2402	FUNDAMENTALS OF INVESTMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	- Describe the investment environment in which investment decisions are taken. - Explain how to Value bonds and equities - Explain the various approaches to value securities - Describe how to create efficient portfolios through diversification - Discuss the mechanism of investor protection in India.					

Unit-I	THE INVESTMENT ENVIRONMENT	(9)
The investment decision process, Types of Investments – Commodities, Real Estate and Financial Assets, the Indian securities market, the market participants and trading of securities, security market indices, sources of financial information, Concept of return and risk, Impact of Taxes and Inflation on return.		
Unit-II	FIXED INCOME SECURITIES	(9)
Bond features, types of bonds, estimating bond yields, Bond Valuation types of bond risks, default risk and credit rating.		
Unit-III	APPROACHES TO EQUITY ANALYSIS	(9)
Introduction to Fundamental Analysis, Technical Analysis and Efficient Market Hypothesis, dividend capitalisation models, and price-earnings multiple approach to equity valuation.		
Unit-IV	PORTFOLIO ANALYSIS AND FINANCIAL DERIVATIVES	(9)
Portfolio and Diversification, Portfolio Risk and Return; Mutual Funds; Introduction to Financial Derivatives; Financial Derivatives Markets in India.		
Unit-V	INVESTOR PROTECTION	(9)
Role of SEBI and stock exchanges in investor protection; Investor grievances and their redressal system, insider trading, investors' awareness and activism.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Charles P. Jones, Gerald R. Jensen. Investments: analysis and management. Wiley, 14TH Edition, 2019.
2	Chandra, Prasanna. Investment analysis and portfolio management. McGraw-hill education, 5th, Edition, 2017.
3	Rustagi, R. P. Investment Management Theory and Practice. Sultan Chand & Sons, 2021.
4	ZviBodie, Alex Kane, Alan J Marcus, PitabusMohanty, Investments, McGraw Hill Education (India), 11 Edition (SIE), 2019.

COURSE OUTCOMES:

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

CO1:	Understand the investment environment, types of investment avenues, and the functioning of the Indian securities market.
CO2:	Analyze fixed income securities by evaluating bond features, pricing, yields, and various types of bond-related risks.
CO3:	Apply fundamental and technical analysis, and evaluate equity securities using valuation models like dividend and P/E models.
CO4:	Assess portfolio risk and return, understand mutual funds, and gain foundational knowledge of financial derivatives.
CO5:	Understand the role of regulatory bodies like SEBI in investor protection and analyze the mechanisms for grievance redressal.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

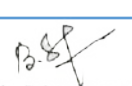


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2403	BANKING, FINANCIAL SERVICES AND INSURANCE	L	T	P	C	100
		3	0	0	3	
Course Objectives	- Understand the Banking system in India. - Grasp how banks raise their sources and how they deploy it - Understand the development in banking technology - Understand the financial services in India - Understand the insurance Industry in India					

Unit-I	INTRODUCTION TO INDIAN BANKING SYSTEM	(9)
Overview of Banking system – Structure – Functions –Banking system in India - Key Regulations in Indian Banking sector –RBI. Relationship between Banker and Customer - Retail & Wholesale Banking – types of Accounts - Opening and operation of Accounts.		
Unit-II	MANAGING BANK FUNDS/ PRODUCTS	(9)
Liquid Assets - Investment in securities - Advances - Loans. Negotiable Instruments – Cheques, Bills of Exchange & Promissory Notes. Designing deposit schemes– Asset and Liability Management – NPA's – Current issues on NPA's – M&A's of banks into securities market.		
Unit-III	DEVELOPMENT IN BANKING TECHNOLOGY	(9)
Payment system in India – paper based – e payment –electronic banking –plastic money – e-money – forecasting of cash demand at ATM's –The Information Technology Act, 2000 in India – RBI's Financial Sector Technology vision document – security threats in e-banking & RBI's Initiative.		
Unit-IV	FINANCIAL SERVICES	(9)
Introduction – Need for Financial Services – Financial Services Market in India – NBFC — Leasing and Hire Purchase — mutual funds. Venture Capital Financing –Bill discounting –factoring – Merchant Banking.		
Unit-V	INSURANCE	(9)
Insurance –Concept - Need - History of Insurance industry in India. Insurance Act, 1938 –IRDA – Regulations – Life Insurance - Annuities and Unit Linked Policies - Lapse of the Policy – revival – settlement of claim.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Padmalatha Suresh and Justin Paul, "Management of Banking and Financial Services, Pearson, Delhi, 2017.
2	Meera Sharma, "Management of Financial Institutions – with emphasis on Bank and Risk Management", PHI Learning Pvt. Ltd., New Delhi 2010.
3	Peter S. Rose and Sylvia C. and Hudgins, "Bank Management and Financial Services", Tata McGraw Hill, New Delhi, 2017 .

COURSE OUTCOMES:

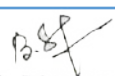
On completion of the course, the students will be able to

CO1:	Understand the structure, functions, and key regulations of the Indian banking system, including types of banking and accounts.
CO2:	Analyze bank fund management, various financial products, negotiable instruments, and current issues like NPAs and bank M&As.
CO3:	Examine advancements in banking technology, electronic payment systems, and cybersecurity in the context of RBI regulations.
CO4:	Evaluate various financial services in India such as NBFCs, leasing, mutual funds, venture capital, and merchant banking.
CO5:	Understand the concept and evolution of insurance in India, including regulatory frameworks and policy lifecycle management.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	-	-	2	-	-	-	3	2	-
CO2	3	3	3	2	3	2	-	2	-	-	-	3	3	-
CO3	2	2	3	3	3	2	2	2	2	-	-	2	3	-
CO4	3	3	3	2	2	-	-	1	1	-	-	3	3	-
CO5	2	2	2	3	2	3	2	1	1	2	2	2	2	-
Avg.	2	3	3	3	1	2.5	2	2	2	2	2	3	3	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2404	INTRODUCTION TO BLOCK CHAIN AND ITS APPLICATIONS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To introduce the fundamental concepts of block chain technology. • To provide a comprehensive understanding of cryptocurrencies • To explain the Ethereum ecosystem. • To familiarize students with Web3 technologies and enterprise block chain protocols. • To explore emerging trends, platforms, and tools in block chain.					

Unit-I	INTRODUCTION TO BLOCKCHAIN	(9)
Block chain: The growth of blockchain technology - Distributed systems - The history of blockchain and Bitcoin - Features of a blockchain - Types of blockchain, Consensus: Consensus mechanism - Types of consensus mechanisms - Consensus in blockchain. Decentralization: Decentralization using blockchain - Methods of decentralization - Routes to decentralization- Blockchain and full ecosystem decentralization - Smart contracts - Decentralized Organizations- Platforms for decentralization.		
Unit-II	INTRODUCTION TO CRYPTOCURRENCY	(9)
Bitcoin – Digital Keys and Addresses – Transactions – Mining – Bitcoin Networks and Payments – Wallets – Alternative Coins – Theoretical Limitations – Bitcoin limitations – Name coin – Prime coin – Zcash – Smart Contracts – Ricardian Contracts- Deploying smart contracts on a blockchain.		
Unit-III	ETHEREUM	(9)
Introduction - The Ethereum network - Components of the Ethereum ecosystem - Transactions and messages - Ether cryptocurrency / tokens (ETC and ETH) - The Ethereum Virtual Machine (EVM), Ethereum Development Environment: Test networks - Setting up a private net - Starting up the private network.		
Unit-IV	WEB3 AND HYPERLEDGE	(9)
Introduction to Web3 – Contract Deployment – POST Requests – Development Frameworks – Hyperledger as a Protocol – The Reference Architecture – Hyperledger Fabric – Distributed Ledger – Corda.		
Unit-V	EMERGING TRENDS	(9)
Kadena – Ripple – Rootstock – Quorum – Tendermint – Scalability – Privacy – Other Challenges – Blockchain Research – Notable Projects – Miscellaneous Tools.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Imran. Bashir. Mastering block chain: Distributed Ledger Technology, Decentralization, and Smart Contracts Explained. Packt Publishing, 2nd Edition, 2018.
2	Peter Borovykh ,Blockchain Application in Finance, Blockchain Driven, 2nd Edition, 2018.
3	ArshdeepBahga, Vijay Madiseti, “Blockchain Applications: A Hands On Approach”, VPT, 2017.

COURSE OUTCOMES:

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

CO1:	Understand the foundational principles, architecture, and decentralization features of blockchain systems.
CO2:	Analyze cryptocurrencies such as Bitcoin and altcoins, their operations, smart contracts, and deployment mechanisms.
CO3:	Apply knowledge of Ethereum architecture, token systems, and virtual machines in blockchain development.
CO4:	Evaluate Web3 and enterprise blockchain solutions like Hyperledger and Corda for decentralized application development.
CO5:	Explore emerging platforms, challenges, and trends in blockchain technology, including scalability, privacy, and tools.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

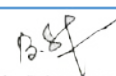


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2405	FINTECH PERSONAL FINANCE AND PAYMENTS	L	T	P	C	100
		3	0	0	3	
Course Objectives	•To introduce the concept and applications of cryptocurrencies and digital payment systems. •To explore the evolution of digital finance and alternative finance models. •To examine the emergence of InsurTech. •To understand Peer-to-Peer (P2P) lending and crowdfunding ecosystems. •To analyze the regulatory framework and challenges in FinTech and RegTech.					

Unit-I	CURRENCY EXCHANGE AND PAYMENT	(9)
Understand the concept of Crypto currency- Bitcoin and Applications -Cryptocurrencies and Digital Crypto Wallets -Types of Cryptocurrencies - Cryptocurrencies and Applications, block chain, Artificial Intelligence, machine learning. Fintech users, Individual Payments, RTGS Systems, Immediate Page 54 of 90 Payment Service (IMPS), Unified Payments Interface (UPI).Legal and Regulatory Implications of Crypto currencies, Payment systems and their regulations. Digital Payments Smart Cards, Stored-Value Cards, EC Micropayments, Payment Gateways, Mobile Payments, Digital and Virtual Currencies, Security, Ethical, Legal, Privacy, and Technology Issues.		
Unit-II	DIGITAL FINANCE AND ALTERNATIVE FINANCE	(9)
A Brief History of Financial Innovation, Digitization of Financial Services, Crowd funding, Charity and Equity,. Introduction to the concept of Initial Coin Offering.		
Unit-III	INSURETECH	(9)
InsurTech Introduction , Business model disruption AI/ML in Insur Tech ● IoT and InsurTech ,Risk Modeling ,Fraud Detection Processing claims and Underwriting Innovations in Insurance Services.		
Unit-IV	PEER TO PEER LENDING	(9)
P2P and Marketplace Lending, New Models and New Products in market place lending P2P Infrastructure and technologies , Concept of CrowdfundingCrowdfunding Architecture and Technology ,P2P and Crowdfunding unicorns and business models , SME/MSME Lending: Unique opportunities and Challenges, Solutions and Innovations.		
Unit-V	REGULATORY ISSUES	(9)
FinTech Regulations: Global Regulations and Domestic Regulations, Evolution of RegTech, RegTech Ecosystem: Financial Institutions, RegTech Ecosystem: StartupsRegTech, Startups: Challenges, RegTech Ecosystem: Regulators, Use of AI in regulation and Fraud detection.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Swanson Seth, Fintech for Beginners: Understanding and Utilizing the power of technology, Createspace Independent Publishing Platform, 2016.
2	Models AuTanda, FintechBigtech And Banks Digitalization and Its Impact On Banking Business, Springer, 2019.
3	Henning Diedrich, Ethereum: Blockchains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations, Wildfire Publishing, 2016.
4	Jacob William, FinTech: The Beginner's Guide to Financial Technology, Createspace Independent Publishing Platform, 2016.
5	IIBF, Digital Banking, Taxmann Publication, 2016.

COURSE OUTCOMES:

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

CO1:	Understand the fundamentals of cryptocurrencies, digital wallets, payment systems (e.g., UPI, RTGS), and associated legal and ethical issues.
CO2:	Analyze digital finance innovations and alternative financial models, including crowdfunding, ICOs, and equity-based platforms.
CO3:	Examine the role of InsurTech and how AI, ML, and IoT are transforming risk modeling, fraud detection, and insurance operations.
CO4:	Understand peer-to-peer lending and crowdfunding technologies, and evaluate their applications for SMEs and MSMEs.
CO5:	Analyze FinTech and RegTech regulatory environments globally and domestically, including AI-driven compliance and fraud detection.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

10-8/1
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2406	INTRODUCTION TO FINTECH	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To learn about history, importance and evolution of Fintech. • To acquire the knowledge of Fintech in payment industry. • To acquire the knowledge of Fintech in insurance industry. • To learn the Fintech developments around the world. • To know about the future of Fintech.					

Unit-I	INTRODUCTION	(9)
Fintech - Definition, History, concept, meaning, architecture, significance, Goals, key areas in Fintech, Importance of Fintech, role of Fintech in economic development, opportunities and challenges in Fintech, Evolution of Fintech in different sectors of the industry - Infrastructure, Banking Industry, Startups and Emerging Markets, recent developments in FinTech, future prospects and potential issues with Fintech.		
Unit-II	PAYMENT INDUSTRY	(9)
FinTech in Payment Industry-Multichannel digital wallets, applications supporting wallets, on boarding and KYC application, FinTech in Lending Industry- Formal lending, Informal lending, P2P lending, POS lending, Online lending, Payday lending, Microfinance, Crowdfunding.		
Unit-III	INSURANCE INDUSTRY	(9)
FinTech in Wealth Management Industry-Financial Advice, Automated investing, Socially responsible investing, Fractional Investing, Social Investing. FinTech in Insurance Industry- P2P insurance, On-Demand Insurance, On-Demand Consultation, Customer engagement through Quote to sell, policy servicing, Claims Management, Investment linked health insurance.		
Unit-IV	PEER TO PEER LENDING	(9)
FinTech developments - US, Europe and UK, Germany, Sweden, France, China, India, Africa, Australia, New Zealand, Brazil and Middle East, Regulatory and Policy Assessment for Growth of FinTech. FinTech as disruptors, Financial institutions collaborating with FinTech companies, The new financial world.		
Unit-V	FUTURE OF FINTECH	(9)
How emerging technologies will change financial services, the future of financial services, banking on innovation through data, why FinTech banks will rule the world, The FinTech Supermarket, Banks partnering with FinTech start-ups, The rise of BankTech, Fintech impact on Retail Banking, A future without money, Ethics in Fintech.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Arner D., Barbers J., Buckley R, The evolution of FinTech: a new post crisis paradigm, University of New South Wales Research Series, 2015
2	Susanne Chishti, Janos Barberis, The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries, Wiley Publications, 2016.
3	Richard Hayen, FinTech: The Impact and Influence of Financial Technology on Banking and the Finance Industry, 2016.
4	Parag Y Arjunwadkar, FinTech: The Technology Driving Disruption in the financial service industry CRC Press, 2018.
5	Sanjay Phadke, FintechFuture : The Digital DNA of Finance Paperback .Sage Publications, 2020.

COURSE OUTCOMES:

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

CO1:	Understand the evolution, scope, architecture, and economic significance of FinTech across various industries.
CO2:	Analyze FinTech applications in payments and lending, including wallet systems, KYC, P2P lending, and crowdfunding.
CO3:	Evaluate FinTech innovations in insurance and wealth management, including digital advice, P2P insurance, and claim automation.
CO4:	Compare global FinTech developments, regulatory policies, and collaborations between traditional institutions and FinTech firms.
CO5:	Explore the future of FinTech with emerging technologies, ethics, partnerships, and innovations in banking and finance.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	3	2	2	2	-	-	-	2	-	-	-	3	2
CO2	3	3	3	3	3	-	1	-	2	1	-	-	3	3
CO3	3	3	3	3	3	2	2	1	2	2	-	-	3	3
CO4	3	2	2	3	2	3	2	2	1	2	1	-	2	3
CO5	2	3	2	3	3	3	3	2	2	2	2	2	2	3
Avg.	3	3	3	3	3	2	2	2	2	2	2	2	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2407	FOUNDATIONS OF ENTREPRENEURSHIP	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To develop and strengthen the entrepreneurial quality and motivation of learners. • To impart the entrepreneurial skills and traits essential to become successful entrepreneurs. • To apply the principles and theories of entrepreneurship and management in Technology oriented businessess. • To empower the learners to run a Technology driven business efficiently and effectivelyTo know about the future of Fintech.					

Unit-I	INTRODUCTION TO ENTREPRENEURSHIP	(9)
Entrepreneurship- Definition, Need, Scope - Entrepreneurial Skill & Traits - Entrepreneur vs. Intrapreneur; Classification of entrepreneurs, Types of entrepreneurs -Factors affecting entrepreneurial development – Achievement Motivation – Contributions of Entrepreneurship to Economic Development.		
Unit-II	BUSINESS OWNERSHIP & ENVIRONMENT	(9)
Types of Business Ownership – BuinessEnvrionemental Factors – Political-Economic-Sociological-Technological-Environmental-Legal aspects – Human Reosurces Mobilisation-Basics of Managing Finance- Eentials of Marketing Management - Production and Operations Planning – Systems Management and Administration.		
Unit-III	FUNDAMENTALS OF TECHNOPRENEURSHIP.	(9)
Introduction to Technopreneurship - Definition, Need, Scope- Emerging Concepts- Principles - Characterisitcis of a technopreneur - Impacts of Technopreneurship on Society – Economy- Job Opportuinites in Technopreneurship - Recent trends.		
Unit-IV	APPLICATIONS OF TECHNOPRENEURSHIP	(9)
Technology Entrepreneurship - Local, National and Global practices - Intrapreneurship and Technology interactions, Networking of entrepreneurial activities – Launching - Managing Technology based Product / Service entrepreneurship -- Success Stories of Technopreneurs - Case Studies.		
Unit-V	EMERGING TRENDS IN ENTREPRENERUSHIP	(9)
Effective Business Management Strategies For Franchising - Sub-Contracting- Leasing- Technopreneurs – Agripreneurs - Netpreneurs- Portfolio entrepreneuruship - NGO Entrepreneurship – Recent EntrperneruialDeveloments - Local – National – Global perspectives.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	S.S.Khanka, "Entrepreneurial Development" S.Chand& Co. Ltd. Ram Nagar New Delhi, 2021.
2	Donal F Kuratko Entrepreneurship (11th Edition) Theory, Process, Practice by Published 2019 by Cengage Learning.

REFERENCES:

1	Daniel Mankani. 2003. Technopreneurship: The successful Entrepreneur in the new Economy. Prentice Hall.
2	Edward Elgar. 2007. Entrepreneurship, Cooperation and the Firm: The Emergence and Survival of High-Technology Ventures in Europe. Edi: Jan Ulijn, Dominique Drillon, and Frank Lasch. Wiley Pub.
3	Lang, J. 2002, The High Tech Entrepreneur's Handbook, Ft.com.

COURSE OUTCOMES:

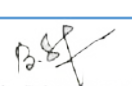
On completion of the course, the students will be able to

CO1:	Learn the basics of Entrepreneurship.
CO2:	Understand the business ownership patterns and environment.
CO3:	Understand the Job opportunites in Industries relating to Technopreneurship.
CO4:	Learn about applications of tehnpreneurship and successful technopreneurs.
CO5:	Acquaint with the recent and emerging trends in entrepreneurship.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

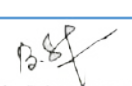


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2408	TEAM BUILDING & LEADERSHIP MANAGEMENT FOR BUSINESS	L	T	P	C	100
		3	0	0	3	
Course Objectives	•To develop and strengthen the Leadership qualities and motivation of learners. •To impart the Leadership skills and traits essential to become successful entrepreneurs. • To apply the principles and theories of Team Building in managing Technology oriented businessess. •To empower the learners.					

Unit-I	INTRODUCTION TO MANAGING TEAMS	(9)
Introduction to Team - Team Dynamics - Team Formation – Stages of Team Development - Enhancing teamwork within a group - Team Coaching - Team Decision Making - Virtual Teams - Self Directed Work Teams (SDWTs) -Multicultural Teams.		
Unit-II	MANAGING AND DEVELOPING EFFECTIVE TEAMS	(9)
Team-based Organisations- Leadership roles in team-based organisations - Offsite training and team development - Experiential Learning - Coaching and Mentoring in team building - Building High-Performance Teams - Building Credibility and Trust - Skills for Developing Others - Team Building at the Top - Leadership in Teamwork Effectiveness.		
Unit-III	INTRODUCTION TO LEADERSHIP.	(9)
Introduction to Leadership - Leadership Myths – Characteristics of Leader, Follower and Situation - Leadership Attributes - Personality Traits and Leadership- Intelligence Types and Leadership - Power and Leadership - Delegation and Empowerment .		
Unit-IV	LEADERSHIP IN ORGANISATIONS	(9)
Leadership Styles – LMX Theory- Leadership Theory and Normative Decision Model - Situational Leadership Model - Contingency Model and Path Goal Theory – Transactional and Transformational Leadership - Charismatic Leadership - Role of Ethics and Values in Organisational Leadership.		
Unit-V	LEADERSHIP EFFECTIVENESS	(9)
Leadership Behaviour - Assessment of Leadership Behaviors - Destructive Leadership - Motivation and Leadership - Managerial Incompetence and Derailment Conflict Management - Negotiation and Leadership - Culture and Leadership - Global Leadership – Recent Trends in Leadership.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Hughes, R.L., Ginnett, R.C., &Curphy, G.J., Leadership: Enhancing the lessons of experience ,9th Ed, McGraw Hill Education, Chennai, India. (2019).
2	Katzenback, J.R., Smith, D.K., The Wisdom of Teams: Creating the High Performance Organisations, Harvard Business Review Press, (2015).
3	Halдар, U.K., Leadership and Team Building, Oxford University Press, (2010).
4	Daft, R.L., The Leadership Experience, Cengage, (2015).
5	Daniel Levi, Group Dynamics for Teams ,4th Ed, (2014), Sage Publications.
6	Dyer, W. G., Dyer, W. G., Jr., & Dyer, J. H..Team building: Proven strategies for improving team performance, 5thed, Jossey-Bass, (2013).

COURSE OUTCOMES:

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

CO1:	Learn the basics of managing teams for business.
CO2:	Understand developing effective teams for business management.
CO3:	Understand the fundamentals of leadership for running a business.
CO4:	Learn about the importance of leadership for business development.
CO5:	Acquaint with emerging trends in leadership effectiveness for entrepreneurus.”

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2				2		3				3	2	
CO2	2	3	3		3	3		3	2		1	2	3	
CO3	3		2			2		2				3	2	
CO4	2	2	3	3	2	2	2	3	2	1	2	2	3	
CO5	2		3	2	2	3	3	3	3	2	3	3	2	
Avg.	3	3	3	3	3	3	3	3	3	2	3	3	3	

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2409	CREATIVITY & INNOVATION IN ENTREPRENEURSHIP	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To develop the creativity skills among the learners - To impart the knowledge of creative intelligence essential for entrepreneurs - To know the applications of innovation in entrepreneurship. - To develop innovative business models for business.					

Unit-I	CREATIVITY	(9)
Creativity: Definition- Forms of Creativity-Essence, Elaborative and Expressive Creativities- Quality of Creativity-Existential, Entrepreneurial and Empowerment Creativities – Creative Environment- Creative Technology- - Creative Personality and Motivation.		
Unit-II	CREATIVE INTELLIGENCE	(9)
Creative Intelligence: Convergent thinking ability – Traits Congenial to creativity – Creativity Training-- Criteria for evaluating Creativity-Credible Evaluation- Improving the quality of our creativity – Creative Tools and Techniques - Blocks to creativity- fears and Disabilities- Strategies for Unblocking- Designing Creativity Enabling Environment.		
Unit-III	INNOVATION.	(9)
Innovation: Definition- Levels of Innovation- Incremental Vs Radical Innovation-Product Innovation and Process- Technological, Organizational Innovation – Indicators- Characteristics of Innovation in Different Sectors. Theories in Innovation and Creativity- Design Thinking and Innovation- Innovation as Collective Change-Innovation as a system.		
Unit-IV	INNOVATION AND ENTREPRENEURSHIP	(9)
Innovation and Entrepreneurship: Entrepreneurial Mindset , Motivations and Behaviours- Opportunity Analysis and Decision Making- Industry Understanding - Entrepreneurial Opportunities- Entrepreneurial Strategies – Technology Pull/Market Push – Product -Market fit.		
Unit-V	INNOVATIVE BUSINESS MODELS	(9)
Innovative Business Models: Customer Discovery-Customer Segments-Prospect Theory and Developing Value Propositions- Developing Business Models: Elements of Business Models – Innovative Business Models: Elements, Designing Innovative Business Models- Responsible Innovation and Creativity.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Creativity and Innovation in Entrepreneurship, Kankha, Sultan Chand.
2	Pradip N Khandwalla, Lifelong Creativity, An Unending Quest, Tata McGraw Hill, 2004.
3	Paul Trott, Innovation Management and New Product Development, 4e, Pearson, 2018.
4	Vinnie Jauhari, Sudanshu Bhushan, Innovation Management, Oxford Higher Education, 2014.
5	Innovation Management, C.S.G. Krishnamacharyulu, R. Lalitha, Himalaya Publishing House, 2010.
6	A. Dale Timpe, Creativity, Jaico Publishing House, 2003.

COURSE OUTCOMES:

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

CO1:	Learn the basics of creativity for developing Entrepreneurship.
CO2:	Understand the importance of creative intelligence for business growth.
CO3:	Understand the advances through Innovation in Industries.
CO4:	Learn about the importance of leadership for business development.
CO5:	Acquaint with developing innovative business models to run the business efficiently and effectively.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2				2		2			1	3	2	
CO2	2	3	2		2	3		2	2		2	3	2	
CO3	3	2	3	3	3	2	2	3	2	1	2	3	2	
CO4	2	3	3	3	3	3	2	3	3	2	3	3	3	
CO5	2	2	3	3	3	3	3	3	3	3	3	3	3	
Avg.	3	3	3	3	3	3	3	3	3	2	3	3	3	

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

BSP
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2410	PRINCIPLES OF MARKETING MANAGEMENT FOR BUSINESS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To provide basic knowledge of concepts, principles, tools and techniques of marketing for entrepreneurs • To provide an exposure to the students pertaining to the nature and Scope of marketing, which they are expected to possess when they enter the industry as practitioners. • To give them an understanding of fundamental premise underlying market driven strategies and the basic philosophies and tools of marketing management for business owners.					

Unit-I	INTRODUCTION TO MARKETING MANAGEMENT	(9)
Introduction - Market and Marketing – Concepts- Functions of Marketing - Importance of Marketing - Marketing Orientations - Marketing Mix-The Traditional 4Ps - The Modern Components of the Mix - The Additional 3Ps - Developing an Effective Marketing Mix.		
Unit-II	MARKETING ENVIRONMENT	(9)
Introduction - Environmental Scanning - Analysing the Organisation's Micro Environment and Macro Environment - Differences between Micro and Macro Environment – Techniques of Environment Scanning - Marketing organization - Marketing Research and the Marketing Information System, Types and Components.		
Unit-III	PRODUCT AND PRICING MANAGEMENT	(9)
Product- Meaning, Classification, Levels of Products – Product Life Cycle (PLC) - Product Strategies - Product Mix - Packaging and Labelling - New Product Development - Brand and Branding - Advantages and disadvantages of branding Pricing - Factors Affecting Price Decisions - Cost Based Pricing - Value Based and Competition Based Pricing - Pricing Strategies - National and Global Pricing.		
Unit-IV	PROMOTION AND DISTRIBUTION MANAGEMENT	(9)
Introduction to Promotion – Marketing Channels- Integrated Marketing Communications (IMC) - Introduction to Advertising and Sales Promotion – Basics of Public Relations and Publicity - Personal Selling - Process - Direct Marketing - Segmentation, Targeting and Positioning (STP)-Logistics Management- Introduction to Retailing and Wholesaling.		
Unit-V	CONTEMPORARY ISSUES IN MARKETING MANAGEMENT	(9)


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Introduction - Relationship Marketing Vs. Relationship Management - Customer Relationship Management (CRM) - Forms of Relationship Management - CRM practices - Managing Customer Loyalty and Development – Buyer-Seller Relationships- Buying Situations in Industrial / Business Market - Buying Roles in Industrial Marketing - Factors that Influence Business - Services Marketing - E-Marketing or Online Marketing.

Total No of Periods to be Taught

45 periods

REFERENCES:

1	Marketing Management, Sherlekar S.A, Himalaya Publishing House, 2016.
2	Marketing Management , Philip Kortler and Kevin Lane Keller, PHI 15th Ed, 2015.
3	Paul Trott, Innovation Management and New Product Development, 4e, Pearson, 2018.
4	Marketing Management- An Indian perspective, Vijay PrakashAnand, Biztantra, Second edition, 2016.
5	Marketing Management, S.H.H. Kazmi, 2013, Excel Books India.
6	Marketing Management- text and Cases, Dr.C.B.Gupta&Dr.N.Rajan Nair, 17th edition, 2016.

COURSE OUTCOMES:

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

CO1:	Have the awareness of marketing management process.
CO2:	Understand the marketing environment.
CO3:	Acquaint about product and pricing strategies.
CO4:	Knowledge of promotion and distribution in marketing management.
CO5:	Comprehend the contemporary marketing scenairos and offer solutions to marketing issues.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2				2		2	2		1	3	2	
CO2	3	3	2	2		2		2	2		2	3	2	
CO3	3	3	3	2	2	2	2	3	2	2	2	3	3	
CO4	2	3	2	2	2	3	2	3	3	2	2	2	3	
CO5	3	3	3	3	2	3	3	3	3	3	3	3	3	
Avg.	3	3	3	3	2	3	3	3	3	2	3	3	3	

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2411	HUMAN RESOURCE MANAGEMENT FOR ENTREPRENEURS	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To introduce the basic concepts, structure and functions of human resource management for entrepreneurs. - To create an awareness of the roles, functions and functioning of human resource department. - To understand the methods and techniques followed by Human Resource Management practitioners.					

Unit-I	INTRODUCTION TO HRM	(9)
Concept, Definition, Objectives- Nature and Scope of HRM - Evolution of HRM - HR Manager Roles- Skills - Personnel Management Vs. HRM - Human Resource Policies - HR Accounting - HR Audit - Challenges in HRM.		
Unit-II	HUMAN RESOURCE PLANNING	(9)
HR Planning - Definition - Factors- Tools - Methods and Techniques - Job analysis- Job rotation- Job Description - Career Planning - Succession Planning - HRIS - Computer Applications in HR - Recent Trends.		
Unit-III	RECRUITMENT AND SELECTION	(9)
Sources of recruitment- Internal Vs. External - Domestic Vs. Global Sources -eRecruitment - Selection Process- Selection techniques -eSelection- Interview Types- Employee Engagement.		
Unit-IV	TRAINING AND EMPLOYEE DEVELOPMENT	(9)
Types of Training - On-The-Job, Off-The-Job - Training Needs Analysis – Induction and Socialisation Process - Employee Compensation - Wages and Salary Administration – Health and Social Security Measures- Green HRM Practices.		
Unit-V	CONTROLLING HUMAN RESOURCES	(9)
Performance Appraisal – Types - Methods - Collective Bargaining - Grievances Redressal Methods – Employee Discipline – Promotion – Demotion - Transfer – Dismissal - Retrenchment - Union Management Relationship - Recent Trends.		
Total No of Periods to be Taught		45 periods

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Gary Dessler and BijuVarkkey, Human Resource Management, 14e , Pearson, 2015.
2	Mathis and Jackson, Human Resource Management, Cengage Learning 15e, 2017.
3	David A. Decenzo, Stephen.P.Robbins, and Susan L. Verhulst, Human Resource Management, Wiley, International Student Edition, 11th Edition, 2014.
4	R. Wayne Mondy, Human Resource Management, Pearson , 2015.
5	Luis R.Gomez-Mejia, David B.Balkin, Robert L Cardy. Managing Human Resource. PHI Learning. 2012.
6	John M. Ivancevich, Human Resource Management, 12e, McGraw Hill Irwin, 2013.

COURSE OUTCOMES:

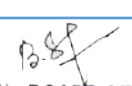
On completion of the course, the students will be able to

CO1:	To understand the Evolution of HRM and Challenges faced by HR Managers.
CO2:	To learn about the HR Planning Methods and practices.
CO3:	To acquaint about the Recruitment and Selection Techniques followed in Industries.
CO4:	To known about the methods of Training and Employee Development.
CO5:	To comprehend the techniques of controlling human resources in organisations.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1		2		2	2	2	2	2	1	
CO2	3	3	2	2	2	2		3	2	2	2	3	2	
CO3	3	3	3	2	2	2		3	3	3	2	3	3	
CO4	2	3	2	2	2	3	1	3	3	3	2	3	2	
CO5	3	3	3	3	2	3	2	3	3	3	3	3	3	
Avg.	3	3	3	3	2	3	3	3	3	2	3	3	3	

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2412	FINANCING NEW BUSINESS VENTURES	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To develop the basics of business venture financing. • To impart the knowledge essential for entrepreneurs for financing new ventures. • To acquaint the learners with the sources of debt and equity financing. • To empower the learners towards fund raising for new ventures effectively.					

Unit-I	ESSENTIALS OF NEW BUSINESS VENTURE	(9)
Setting up new Business Ventures – Need - Scope - Franchising - Location Strategy, Registration Process - State Directorate of Industries- Financing for New Ventures - Central and State Government Agencies - Types of loans – Financial Institutions - SFC, IDBI, NSIC and SIDCO.		
Unit-II	INTRODUCTION TO VENTURE FINANCING	(9)
Venture Finance – Definition – Historic Background - Funding New Ventures- Need – Scope – Types - Cost of Project - Means of Financing - Estimation of Working Capital - Requirement of funds – Mix of Debt and Equity - Challenges and Opportunities.		
Unit-III	SOURCES OF DEBT FINANCING	(9)
Fund for Capital Assets - Term Loans - Leasing and Hire-Purchase - Money Market instruments – Bonds, Corporate Papers – Preference Capital- Working Capital Management- Fund based Credit Facilities - Cash Credit - Over Draft.		
Unit-IV	SOURCES OF EQUITY FINANCING	(9)
Own Capital, Unsecured Loan - Government Subsidies , Margin Money- Equity Funding - Private Equity Fund- Schemes of Commercial banks - Angel Funding – Crowdfunding- Venture Capital.		
Unit-V	METHODS OF FUND RAISING FOR NEW VENTURES	(9)
Investor Decision Process - Identifying the appropriate investors- Targeting investors- Developing Relationships with investors - Investor Selection Criteria- Company Creation- Raising Funds - Seed Funding- VC Selection Criteria – Process- Methods- Recent Trends.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Principles of Corporate Finance by Brealey and Myers et al., 12TH ed, McGraw Hill Education (India) Private Limited, 2018.
2	Prasanna Chandra, Projects : Planning ,Analysis,Selection ,Financing,Implementation and Review, McGraw Hill Education India Pvt Ltd ,New Delhi , 2019.
3	Introduction to Project Finance. Andrew Fight, Butterworth-Heinemann, 2006
4	R. Wayne Mondy, Human Resource Management, Pearson , 2015.
5	May, John; Simons, Cal. Every Business Needs An Angel: Getting The Money You Need To Make Your Business Grow. Crown Business, 2001.
6	Feld, Brad; Mendelson, Jason. Venture Deals. Wiley, 2011.

COURSE OUTCOMES:

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

CO1:	Learn the basics of starting a new business venture.
CO2:	Understand the basics of venture financing.
CO3:	Understand the sources of debt financing.
CO4:	Understand the sources of equity financing.
CO5:	Acquaint with the methods of fund raising for new business ventures.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

P. S. P.
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

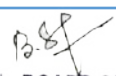


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2413	PRINCIPLES OF PUBLIC ADMINISTRATION	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To introduce the meaning, nature, and scope of Public Administration and its relevance in contemporary governance and administrative systems. • To provide an understanding of the evolution of Public Administration including traditional, New Public Administration, and New Public Management perspectives. • To examine the relationship between Public Administration and other social sciences, and analyze classical and scientific approaches to administrative theory. • To explore the major administrative approaches such as the bureaucratic, human relations, and ecological approaches, along with their key proponents and impacts. • To understand essential administrative functions including leadership, communication, and decision-making processes and techniques in public administration.					

Unit-I	FUNDAMENTALS OF PUBLIC ADMINISTRATION	(9)
1. Meaning, Nature and Scope of Public Administration. 2. Importance of Public Administration. 3. Evolution of Public Administration.		
Unit-II	CONTEMPORARY APPROACHES TO PUBLIC ADMINISTRATION	(9)
1. New Public Administration. 2. New Public Management. 3. Public and Private Administration.		
Unit-III	THEORETICAL FOUNDATIONS AND INTERDISCIPLINARY PERSPECTIVES	(9)
1. Relationships with Political Science, History and Sociology. 2. Classical Approach. 3. Scientific Management Approach.		
Unit-IV	ADMINISTRATIVE APPROACHES AND THINKERS	(9)
1. Bureaucratic Approach: Max Weber. 2. Human Relations Approach : Elton Mayo. 3. Ecological Approach : Riggs.		
Unit-V	ADMINISTRATIVE SKILLS AND DECISION-MAKING PROCESSES	(9)
1. Leadership: Leadership - Styles – Approaches. 2. Communication: Communication Types - Process – Barriers. 3. Decision Making: Decision Making - Types, Techniques and Processes.		
Total No of Periods to be Taught		45 periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Avasthi and Maheswari: Public Administration in India, Agra:LakshmiNarain Agarwal,2013.
2	Ramesh K Arora: Indian Public Administration, New Delhi: WishwaPrakashan, 2012.
3	R.B. Jain: Public Administration in India,21st Century Challenges for Good Governance, New Delhi: Deep and Deep, 2002.
4	RumkiBasu: Public Administration:Concept and Theories, New Delhi:Sterling, 2013.
5	R. Tyagi, Public Administration, Atma Ram & Sons, New Delhi, 1983.

COURSE OUTCOMES:

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

CO1:	Understand the meaning, nature, scope, importance, and historical evolution of Public Administration.
CO2:	Explain the concepts and developments in New Public Administration and New Public Management, and compare with private administration.
CO3:	Analyze the interdisciplinary nature of Public Administration and classical theories including Scientific Management.
CO4:	Evaluate the relevance of key administrative approaches such as Bureaucratic, Human Relations, and Ecological theories.
CO5:	Apply leadership, communication, and decision-making principles in the context of public administration.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2				2		2	1		1	2	1	
CO2	3	3			2	2		2	2		1	2	1	
CO3	3	3	2			2		2	2		2	3	2	
CO4	3	3	3			2		2	2		2	3	2	
CO5	2	2	3	2		3	1	3	3	2	2	3	2	
Avg.	3	3	3	3	2	3	3	3	3	2	3	3	3	

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2414	CONSTITUTION OF INDIA	L	T	P	C	100
		3	0	0	3	

Course Objectives	- To provide foundational knowledge of the constitutional development in India from 1909 to 1947 and the making of the Indian Constitution. - To familiarize students with the core features of the Constitution including Fundamental Rights, Duties, and Directive Principles of State Policy. - To understand the structure and functioning of the Union Government – President, Parliament, and the Supreme Court. - To explore the federal structure by analyzing the role and powers of the Governor, State Legislature, and High Courts. - To develop awareness about the constitutional principles of secularism, social justice, and the rights and safeguards for minorities in India.
-------------------	--

Unit-I	HISTORICAL BACKGROUND AND MAKING OF THE INDIAN CONSTITUTION	(9)
1. Meaning, Nature and Scope of Public Administration. 2. Importance of Public Administration. 3. Evolution of Public Administration.		
Unit-II	FUNDAMENTAL RIGHTS, DUTIES, AND DIRECTIVE PRINCIPLES OF STATE POLICY	(9)
1. Fundamental Rights 2. Fundamental Duties 3. Directive Principles of State Policy.		
Unit-III	THE PRESIDENT, PARLIAMENT, AND SUPREME COURT OF INDIA	(9)
1. President 2. Parliament 3. Supreme Court.		
Unit-IV	GOVERNOR, STATE LEGISLATURE, AND HIGH COURT	(9)
1. Governor. 2. State Legislature. 3. High Court.		
Unit-V	SECULARISM, SOCIAL JUSTICE, AND MINORITY SAFEGUARDS	(9)
1. Secularism. 2. Social Justice. 3. Minority Safeguards.		


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Total No of Periods to be Taught	45 periods
----------------------------------	------------

REFERENCES:

1	Basu. D.D.: Introduction to Indian Constitution ; Prentice Hall; New Delhi.
2	Kapur. A.C: Indian Government and Political System; S.Chand and Company Ltd., New Delhi.
3	Johari J.C.: Indian Politics, Vishal Publications Ltd, New Delhi.
4	Agarwal R.C: Indian Political System; S.Chand& Co., New Delhi.

COURSE OUTCOMES:

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

CO1:	Understand the historical development of the Indian Constitution from 1909 to 1947, including the framing process and role of the Constituent Assembly.
CO2:	Explain the significance and provisions of Fundamental Rights, Fundamental Duties, and Directive Principles of State Policy.
CO3:	Analyze the structure, powers, and functions of the President, Parliament, and Supreme Court of India.
CO4:	Describe the roles and responsibilities of the Governor, State Legislature, and High Courts within the Indian federal system.
CO5:	Evaluate the constitutional principles of secularism, social justice, and the safeguards provided for minorities in India.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2						2	1		1	3	2	
CO2	3	3						2	1		2	3	2	
CO3	3	3	2					2	2		2	3	3	
CO4	3	2	2					2	2		2	3	3	
CO5	3	3	3	2		2		3	3	2	2	3	3	
Avg.	3	3	3	2	2	2		3	3	2	2	3	3	

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

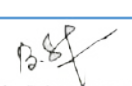


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2415	PUBLIC PERSONNEL ADMINISTRATION	L	T	P	C	100
Course Objectives	• To understand the meaning, scope, and importance of personnel administration and its systems. • To examine the roles of generalists, specialists, and civil servants in relation to the political executive. • To explore recruitment methods, training types, and promotion practices in public administration. • To analyze the structure, functions, and service conditions of All India Services and State Public Service Commissions. • To study employer-employee relations, wage systems, and employee benefits in public administration.					

Unit-I	INTRODUCTION TO PERSONNEL ADMINISTRATION	(9)
1. Meaning, Scope and Importance of Personnel Administration. 2. Types of Personnel Systems: Bureaucratic, Democratic and Representative systems.		
Unit-II	ROLES AND ETHICS IN PERSONNEL ADMINISTRATION	(9)
1. Meaning, Scope and Importance of Personnel Administration. 2. Types of Personnel Systems: Bureaucratic, Democratic and Representative systems.		
Unit-III	PERSONNEL DEVELOPMENT AND CAREER MANAGEMENT	(9)
1. Recruitment: Direct Recruitment and Recruitment from Within 2. Training: Kinds of Training 3. Promotion.		
Unit-IV	PUBLIC SERVICE STRUCTURE AND REGULATORY BODIES	(9)
1. All India Services 2. Service Conditions 3. State Public Service Commission.		
Unit-V	EMPLOYEE RELATIONS AND COMPENSATION MANAGEMENT	(9)
1. Employer Employee Relations. 2. Wage and Salary Administration. 3. Allowances and Benefits.		
Total No of Periods to be Taught		45 periods


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Stahl Glean O: Public Personnel Administration.
2	ParnandikarPai V.A: Personnel System for Development Administration.
3	Bhambhiru . P: Bureaucracy and Policy in India.
4	Dwivedi O.P and Jain R.B: India's Administrative state.
5	Muttalis M.A: Union Public Service Commission.
6	BhakaraRao .V: Employer Employee Relations in India

COURSE OUTCOMES:

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

CO1:	Understand the meaning, scope, importance, and types of personnel systems in public administration.
CO2:	Analyze the roles of generalists and specialists, and evaluate the ethical relationship between civil servants and political executives.
CO3:	Explain the processes of recruitment, training, and promotion in personnel administration.
CO4:	Examine the structure, roles, and functions of the All India Services and State Public Service Commissions, including service conditions.
CO5:	Evaluate employer-employee relations, wage and salary administration, and the system of allowances and benefits in public sector employment.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	0	0	0	0				3	2	
CO2	3	3	2	2	1	1	0	0				3	2	
CO3	3	3	3	2	1	1	0	0				3	3	
CO4	2	3	3	2	2	1	1	0				2	3	
CO5	2	2	2	3	3	2	1	1				2	3	
Avg.	3	3	3	3	3	2	1	1				3	3	

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2416	ADMINISTRATIVE THEORIES	L	T	P	C	100
Course Objectives	- To understand the meaning, scope, significance, and historical evolution of Public Administration as a discipline.. - To study major organizational theories including Scientific Management, Classical, and Human Relations theories. - To analyze organizational goals, behavior, group dynamics, and organizational design principles. - To examine various motivation and leadership theories along with decision-making processes and techniques. - To learn about key administrative thinkers and their contributions to the field of Public Administration.					

Unit-I	INTRODUCTION TO PUBLIC ADMINISTRATION: MEANING, SCOPE, SIGNIFICANCE, AND EVOLUTION	(9)
Meaning, Scope and significance of Public Administration, Evolution of Public Administration as a discipline and Identity of Public Administration.		
Unit-II	THEORIES OF ORGANIZATION: SCIENTIFIC MANAGEMENT, CLASSICAL, AND HUMAN RELATIONS THEORIES	(9)
Theories of Organization: Scientific Management Theory, Classical Model, Human Relations Theory.		
Unit-III	ORGANIZATIONAL GOALS, BEHAVIOR, GROUP DYNAMICS, AND DESIGN	(9)
Organization goals and Behaviour, Groups in organization and group dynamics, Organizational Design.		
Unit-IV	MOTIVATION, LEADERSHIP THEORIES, AND DECISION-MAKING PROCESSES	(9)
Motivation Theories, content, process and contemporary; Theories of Leadership: Traditional and Modern: Process and techniques of decision-making.		
Unit-V	CONTRIBUTIONS OF ADMINISTRATIVE THINKERS	(9)
Administrative thinkers: Kautilya, Woodrow Willson, C.I. Barnard . Peter Drucker.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	CrozierM : The Bureaucratic phenomenon (Chand).
2	Blau. P.M and Scott. W : Formal Organizations (RKP).
3	Presthus. R : The Organizational Society (MAC).
4	Dwivedi O.P and Jain R.B: India's Administrative state.
5	Alvi, Shum Sun Nisa : Eminent Administrative Thinkers.
6	Keith Davis : Organization Theory (MAC).

COURSE OUTCOMES:

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

CO1:	Understand the scope, significance, and evolution of Public Administration as a discipline.
CO2:	Explain key organizational theories including Scientific Management, Classical, and Human Relations.
CO3:	Analyze organizational goals, behavior, group dynamics, and design.
CO4:	Evaluate motivation and leadership theories, and apply decision-making techniques.
CO5:	Assess the contributions of major administrative thinkers to the field of Public Administration.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1					3	2	
CO2	3	2	1	1	1	1	1					3	3	
CO3	2	3	2	1	2	2	1					2	3	
CO4	2	3	2	2	3	3	2					2	3	
CO5	3	3	2	2	2	2	1					3	3	
Avg.	3	3	2	2	3	3	2					3	3	

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

B.S.P.
CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2417	INDIAN ADMINISTRATIVE SYSTEM	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To understand the evolution and constitutional framework of Indian Administration. - To learn about the structure and functioning of district and local administration. - To examine the key features of the 73rd and 74th Constitutional Amendments. - To explore the effects of coalition politics and administrative vigilance mechanisms. - To gain knowledge about anti-corruption institutions like Lokpal and Lokayukta.					

Unit-I	CONSTITUTIONAL FRAMEWORK AND AUTHORITIES IN INDIAN ADMINISTRATION	(9)
Evolution and Constitutional Context of Indian Administration, Constitutional Authorities: Finance Commission, Union Public Services Commission, Election Commission, Comptroller and Auditor General of India, Attorney General of India.		
Unit-II	DISTRICT ADMINISTRATION AND LOCAL GOVERNANCE	(9)
Role & Functions of the District Collector, Relationship between the District Collector and Superintendent of Police, Role of Block Development Officer in development programmes, Local Government		
Unit-III	PANCHAYATI RAJ AND URBAN LOCAL GOVERNANCE: 73RD AND 74TH CONSTITUTIONAL AMENDMENTS	(9)
Main Features of 73rd Constitutional Amendment Act 1992, Salient Features of 74th Constitutional Amendment Act 1992.		
Unit-IV	COALITION POLITICS, INTEGRITY, AND VIGILANCE IN INDIAN ADMINISTRATION	(9)
Coalition politics in India, Integrity and Vigilance in Indian Administration.		
Unit-V	CORRUPTION AND ANTI-CORRUPTION INSTITUTIONS	(9)
Corruption – Ombudsman, Lok Pal & LokAyuktha.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	S.R. Maheswari : Indian Administration.
2	Khera. S.S : Administration in India.
3	Ramesh K. Arora : Indian Public Administration.
4	T.N. Chaturvedi : State administration in India.
5	Basu, D.D : Introduction to the Constitution of India.

COURSE OUTCOMES:

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

CO1:	Understand the evolution and constitutional framework of Indian administration and key constitutional authorities.
CO2:	Explain the roles of district administration and local government officials in governance and development.
CO3:	Analyze the features and impacts of the 73rd and 74th Constitutional Amendments on local self-government.
CO4:	Evaluate coalition politics, integrity, and vigilance in Indian administration.
CO5:	Assess anti-corruption mechanisms including Ombudsman, Lok Pal, and LokAyuktha.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1						3	2	
CO2	3	2	1	1	1	1						3	3	
CO3	2	3	2	1	2	2						2	3	
CO4	2	3	2	2	3	3						2	3	
CO5	3	3	2	2	2	2						3	3	
Avg.	3	3	2	2	3	3						3	3	

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2418	PUBLIC POLICY ADMINISTRATION	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To introduce the concept and significance of Public Policy. • To familiarize students with various approaches to policy analysis. • To understand the policy-making process. • To explore the institutional and political framework of policy-making. • To provide insight into specific public policies.					

Unit-I	FOUNDATIONS OF PUBLIC POLICY	(9)
Meaning and Definition of Public Policy - Nature, Scope and Importance of public policy – Public policy relationship with social sciences especially with political science and Public Administration.		
Unit-II	APPROACHES TO POLICY ANALYSIS	(9)
Approaches in Policy Analysis - Institutional Approach – Incremental Approach and System's Approach – Dror's Optimal Model.		
Unit-III	STAGES OF THE POLICY-MAKING PROCESS	(9)
Major stages involved in Policy making Process – Policy Formulation – Policy Implementation – Policy Evaluation.		
Unit-IV	INSTITUTIONAL FRAMEWORK OF PUBLIC POLICY-MAKING	(9)
Institutional Framework of Policy making – Role of Bureaucracy – Role of Interest Groups and Role of Political Parties.		
Unit-V	INTRODUCTION TO KEY PUBLIC POLICIES IN INDIA	(9)
Introduction to the following Public Policies – New Economic Policy – Population Policy –Agriculture policy - Information Technology Policy.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Rajesh Chakrabarti&KaushikSanyal : Public Policy in India, Oxford University Press, 2016.
2	KuldeepMathur : Public Policy and Politics in India, Oxford University Press, 2016.
3	BidyutvChakrabarty: Public Policy: Concept, Theory and Practice, 2015.
4	PradeepSaxena : Public Policy Administration and Development
5	Sapru R.K. : Public Policy: Formulation, Implementation and Evaluation, Sterling Publishers, 2016.

COURSE OUTCOMES:

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

CO1:	Explain the meaning, nature, scope, and importance of public policy and its relationship with social sciences.
CO2:	Analyze various approaches to policy analysis including institutional, incremental, systems, and Dror's optimal model.
CO3:	Describe and evaluate the major stages in the public policy-making process—formulation, implementation, and evaluation.
CO4:	Examine the roles of bureaucracy, interest groups, and political parties in the institutional framework of policy-making.
CO5:	Demonstrate an understanding of key public policies in India, including economic, population, agriculture, and IT policies.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	0	2	0							3	3	
CO2	3	3	2	0	0							3	3	
CO3	3	3	2	2	0							3	3	
CO4	3	3	0	2	2							3	3	
CO5	3	3	2	2	2							3	3	
Avg.	3	3	2	2	2							3	3	

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2419	STATISTICS FOR MANAGEMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	To learn the applications of statistics in business decision making.					

Unit-I	INTRODUCTION	(9)
Basic definitions and rules for probability, Baye's theorem and random variables, Probability distributions: Binomial, Poisson, Uniform and Normal distributions.		
Unit-II	SAMPLING DISTRIBUTION AND ESTIMATION	(9)
Introduction to sampling distributions, Central limit theorem and applications, sampling techniques, Point and Interval estimates of population parameters.		
Unit-III	TESTING OF HYPOTHESIS - PARAMETIRC TESTS	(9)
Hypothesis testing: one sample and two sample tests for means of large samples (z-test), one sample and two sample tests for means of small samples (t-test), ANOVA one way.		
Unit-IV	NON-PARAMETRIC TESTS	(9)
Chi-square tests for independence of attributes and goodness of fit, Kolmogorov-Smirnov – test for goodness of fit, Mann – Whitney U test and Kruskal Wallis test.		
Unit-V	CORRELATION AND REGRESSION	(9)
Correlation –Rank Correlation – Regression – Estimation of Regression line – Method of Least Squares – Standard Error of estimate.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Richard I. Levin, David S. Rubin, Masood H. Siddiqui, Sanjay Rastogi, Statistics for Management, Pearson Education, 8th Edition, 2017.
2	Prem. S. Mann, Introductory Statistics, Wiley Publications, 9th Edition, 2015.
3	T N Srivastava and Shailaja Rego, Statistics for Management, Tata McGraw Hill, 3rd Edition 2017.
4	Ken Black, Applied Business Statistics, 7th Edition, Wiley India Edition, 2012.
5	David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, Jeffrey D. Camm, James J. Cochran, Statistics for business and economics, 13th edition, Thomson (South – Western) Asia, Singapore, 2016.

COURSE OUTCOMES:

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

CO1:	To facilitate objective solutions in business decision making.
CO2:	To understand and solve business problems.
CO3:	To apply statistical techniques to data sets, and correctly interpret the results.
CO4:	To develop skill-set that is in demand in both the research and business environments.
CO5:	To enable the students to apply the statistical techniques in a work setting.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	0							3	2	
CO2	3	3	3	1	0							3	3	
CO3	3	3	3	2	1							3	3	
CO4	3	3	3	2	1							2	3	
CO5	3	3	3	2	1							3	3	
Avg.	3	3	3	2	1							3	3	

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

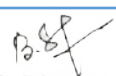
Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name				121-BE- BME	
Semester							
Course Code	Course Name		Hours/Week			Credit	Maximum Marks
UCMG2420	DATAMINING FOR BUSINESS INTELLIGENCE		L	T	P	C	100
			3	0	0	3	
Course Objectives	- To know how to derive meaning form huge volume of data and information. - To understand how knowledge discovering process is used in business decision making.						

Unit-I	INTRODUCTION	(9)
Data mining, Text mining, Web mining, Data ware house.		
Unit-II	DATA MINING PROCESS	(9)
Data mining process – KDD, CRISP-DM, SEMMA Prediction performance measures		
Unit-III	PREDICTION TECHNIQUES	(9)
Data visualization, Time series – ARIMA, Winter Holts,		
Unit-IV	CLASSIFICATION AND CLUSTERING TECHNIQUES	(9)
Classification, Association, Clustering.		
Unit-V	MACHINE LEARNING AND AI	(9)
Genetic algorithms, Neural network, Fuzzylogic, AntColony optimization, Particle Sparm optimization		
Total No of Periods to be Taught		45 periods

REFERENCES:	
1.	1. JaiweiHamandMichelineKamber, DataMiningconceptsand techniques, Kauffmann Publishers 2006
2.	Efraim Turban, Ramesh Sharda, Jay E. Aronson and David King, Business Intelligence, Prentice Hall, 2008.
3.	W.H.Inmon, Building the Data Warehouse, fourth edition Wiley India pvt. Ltd. 2005.
4.	Ralph Kimball and Richard Merz, The data warehouse toolkit, John Wiley, 3rd edition,2013.
5.	Michel Berry and Gordon Linoff, Mastering Data mining, John Wiley and Sons Inc, 2nd Edition, 2011
6.	.Michel Berry and Gordon Linoff, Data mining techniques for Marketing, Sales and Customer support, John Wiley, 2011
7.	G. K. Gupta, Introduction to Data mining with Case Studies, Prentice hall of India, 2011


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Learn to apply various data mining techniques into various areas of different domains.
CO2:	Be able to interact competently on the topic of data mining for business intelligence.
CO3:	Apply various prediction techniques.
CO4:	Learn about supervised and unsupervised learning technique.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
CMG2421	HUMAN RESOURCE ANALYTICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To develop the ability of the learners to define and implement HR metrics that are aligned with the overall business strategy. - To know the different types of HR metrics and understand their respective impact and application. - To understand the impact and use of HR metrics and their connection with HR analytics. - To understand common workforce issues and resolving them using people analytics.					

Unit-I	INTRODUCTION TO HR ANALYTICS	(9)
People Analytics - stages of maturity - Human Capital in the Value Chain : impact on business – HR metrics and KPIs.		
Unit-II	HR ANALYTICS I: RECRUITMENT	(9)
Recruitment Metrics : Fill-up ratio - Time to hire - Cost per hire - Early turnover - Employee referral hires - Agency hires - Lateral hires - Fulfillment ratio- Quality of hire.		
Unit-III	HR ANALYTICS - TRAINING AND DEVELOPMENT	(9)
Training & Development Metrics : Percentage of employees trained- Internally and externally trained - Training hours and cost per employee - ROI		
Unit-IV	HR ANALYTICS EMPLOYEE ENGAGEMENT AND CAREER	(9)
Employee Engagement Metrics : Talent Retention index - Voluntary and involuntary turnover- grades, performance, and service tenure - Internal hired index Career Progression Metrics: Promotion index - Rotation index - Career path index.		
Unit-V	HR ANALYTICS IV: WORKFORCE DIVERSITY AND DEVELOPMENT	(9)
Employee Engagement Metrics : Talent Retention index - Voluntary and involuntary turnover- grades, performance, and service tenure - Internal hired index Career Progression Metrics: Promotion index - Rotation index - Career path index.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	JacFitzenz , The New HR Analytics, AMACOM , 2010.
2	Edwards M. R., & Edwards K, Predictive HR Analytics: Mastering the HR Metric.London: Kogan Page.2016.
3	Human Resources kit for Dummies – 3 rd edition – Max Messmer, 2003
4	Dipak Kumar Bhattacharyya, HR Analytics ,Understanding Theories and Applications, SAGE Publications India ,2017.
5	Sesil, J. C. , Applying advanced analytics to HR management decisions: Methods fo selection, developing incentives, and improving collaboration. Upper Saddle River,New Jersey: Pearson Education,2014.
6	Pease, G., & Beresford, B, Developing Human Capital: Using Analytics to Plan and Optimize Your Learning and Development Investments. Wiley ,2014.

COURSE OUTCOMES:

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

CO1:	The learners will be conversant about HR metrics and ready to apply at work settings.
CO2:	The learners will be able to resolve HR issues using people analytics


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2422	MARKETING AND SOCIAL MEDIA WEB ANALYTICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	To showcase the opportunities that exist today to leverage the power of the web and social media.					

Unit-I	MARKETING ANALYTICS	(9)
Marketing Budget and Marketing Performance Measure, Marketing - Geographical Mapping, Data Exploration, Market Basket Analysis		
Unit-II	COMMUNITY BUILDING AND MANAGEMENT	(9)
History and Evolution of Social Media-Understanding Science of Social Media –Goals for using Social Media- Social Media Audience and Influencers - Digital PR- Promoting Social Media Pages- Linking Social Media Accounts-The Viral Impact of Social Media.		
Unit-III	SOCIAL MEDIA POLICIES AND MEASUREMENTS	(9)
Social Media Policies-Etiquette, Privacy- ethical problems posed by emerging social media technologies - The Basics of Tracking Social Media.		
Unit-IV	WEB ANALYTICS	(9)
Data Collection, Overview of Qualitative Analysis, Business Analysis, KPI and Planning, Critical Components of a Successful Web Analytics Strategy, Proposals & Reports, Web Data Analysis.		
Unit-V	SEARCH ANALYTICS	(9)
Search engine optimization (SEO), user engagement, user-generated content, web traffic analysis, online security, online ethics, data visualization		
Total No of Periods to be Taught		45 periods

REFERENCES:

1	K. M. Shrivastava, SocialMedia inBusiness andGovernance, SterlingPublishers Private Limited, 2013
2	Christian Fuchs, Social Media a critical introduction, SAGE Publications Ltd, 2014
3	Bittu Kumar, Social Networking, V & S Publishers, 2013

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



4	AvinashKaushik, Web Analytics - An Hour a Day, Wiley Publishing, 2007
5	Ric T. Peterson, Web Analytics Demystified, Celilo Group Media and Café Press 2004
6	Takeshi Moriguchi, Web Analytics Consultant Official Textbook, 7th Edition, 2016

COURSE OUTCOMES:

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

CO1:	The Learners will understand social media, web and social media analytics and their potential impact.
------	---

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2423	OPERATION AND SUPPLY CHAIN ANALYTICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	To treat the subject in depth by emphasizing on the advanced quantitative models and methods in operations and supply chain management and its practical aspects and the latest developments in the field.					

Unit-I	INTRODUCTION	(9)
Descriptive, predictive and prescriptive analytics, Data Driven Supply Chains–Basics, transforming supply chains.		
Unit-II	WAREHOUSING DECISIONS	(9)
P-Median Methods-Guided LP Approach, Greedy Drop Heuristics, Dynamic Location Models, Space Determination and Layout Methods.		
Unit-III	INVENTORY MANAGEMENT	(9)
Dynamic Lot sizing Methods, Multi-Echelon Inventory models, Aggregate Inventory system and LIMIT, Risk Analysis in Supply Chain, Risk pooling strategies.		
Unit-IV	TRANSPORTATION NETWORK MODELS	(9)
Minimal Spanning Tree, Shortest Path Algorithms, Maximal Flow Problems, Transportation Problems, Set covering and Set Partitioning Problems, Travelling Sales man Problem, Scheduling Algorithms.		
Unit-V	MCDM MODELS	(9)
Analytic Hierarchy Process (AHP), Data Envelopment Analysis(DEA), Fuzzy Logic and Techniques, the analytical network process(ANP), TOPSIS.		
Total No of Periods to be Taught		45

REFERENCES:

1	Nada R. Sanders, Big data driven supply chain management: A frame work for implementing analytic and turning information into intelligence, Pearson Education, 2014.
2	Michael Watson, Sara Lewis, Peter Cacioppi, Jay Jaya raman, Supply Chain Network Design: Applying Optimization and Analytics to the Global Supply Chain, Pearson Education, 2013


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



3	Anna Nagurney, Min Yu, Amir H. Masoumi, Ladimer S. Nagurney, Networks Against Time: Supply Chain Analytics for Perishable Products, Springer, 2013.
4	Muthu Mathirajan, Chandrasekharan Rajendran, Sowmyanarayanan Sadagopan, Arunachalam Ravindran, Parasuram Balasubramanian, Analytics in Operations/Supply Chain Management, I.K. International Publishing House Pvt. Ltd., 2016.
5	Gerhard J. Plenert, Supply Chain Optimization through Segmentation and Analytics, CRC Press, Taylor & Francis Group, 2014.

COURSE OUTCOMES:

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

CO1:	To Enable Quantitative Solutions in Business Decision Making Under Conditions Of certainty, risk and uncertainty.
------	---


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCMG2424	FINANCIAL ANALYTICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	This course introduces a core set of modern analytical tools that specifically target finance applications.					

Unit-I	CORPORATE FINANCE ANALYSIS	(9)
Basic corporate financial predictive modelling- Project analysis- cash flow analysis- cost of capital, Financial Break even modelling, Capital Budget model-Payback, NPV, IRR.		
Unit-II	FINANCIAL MARKET ANALYSIS	(9)
Estimation and prediction of risk and return (bond investment and stock investment) –Time series-examining nature of data, Value at risk, ARMA, ARCH and GARCH.		
Unit-III	PORTFOLIO ANALYSIS	(9)
Portfolio Analysis – capital asset pricing model, Sharpe ratio, Option pricing models- binomial model for options, Black Scholes model and Option implied volatility.		
Unit-IV	TECHNICAL ANALYSIS	(9)
Prediction using charts and fundamentals – RSI, ROC, MACD, moving average and candle charts, simulating trading strategies. Prediction of share prices.		
Unit-V	CREDIT RISK ANALYSIS	(9)
Credit Risk analysis- Data processing, Decision trees, logistic regression and evaluating credit risk model.		
Total No of Periods to be Taught		45 periods

REFERENCES:

1	Financial analytics with R by Mark J. Bennett, Dirk L. Hugen, Cambridge university press.
2	Haskell Financial Data Modeling and Predictive Analytics Paperback – Import, 25 Oct 2013 by Pavel Ryzhov.
3	Quantitative Financial Analytics: The Path To Investment Profits Paperback – Import, 11 Sep 2017 by Edward E Williams (Author), John A Dobelman.
4	Python for Finance - Paperback – Import, 30 Jun 2017 by Yuxing Yan (Author).

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



5	Mastering Python for Finance Paperback – Import, 29 Apr 2015 by James Ma Weiming.
---	---

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	The learners should be able to perform financial analysis for decision making using excel, Python and R.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



VERTICAL5: ENVIRONMENT AND SUSTAINABILITY

Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES2425	SUSTAINABLE INFRASTRUCTURE DEVELOPMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	To impart knowledge about sustainable Infrastructure development goals, practices and to understand the concepts of sustainable planning, design, construction, maintenance and decommissioning of infrastructure projects.					

Unit-I	SUSTAINABLE DEVELOPMENT GOALS	(9)
Definitions, principles and history of Sustainable Development - Sustainable development goals (SDG): global and Indian – Infrastructure Demand and Supply - Environment and Development linkages - societal and cultural demands – Sustainability indicators - Performance indicators of sustainability and Assessment mechanism - Policy frameworks and practices: global and Indian – Infrastructure Project finance – Infrastructure project life cycle - Constraints and barriers for sustainable development - future directions.		
Unit-II	SUSTAINABLE INFRASTRUCTURE PLANNING	(9)
Overview of Infrastructure projects: Housing sector, Power sector, Water supply, road, rail and port transportation sector, rural and urban infrastructure. Environmental Impact Assessment (EIA), Land acquisition -Legal aspects, Resettlement & Rehabilitation and Development - Cost effectiveness Analysis - Risk Management Framework for Infrastructure Projects, Economic, demand, political, socio-environmental and cultural risks. Shaping the Planning Phase of Infrastructure Projects to mitigate risks, Designing Sustainable Contracts, Negotiating with multiple Stakeholders on Infrastructure Projects. Use of ICT tools in planning – Integrated planning - Clash detection in construction - BIM (Building Information Modelling).		
Unit-III	SUSTAINABLE CONSTRUCTION PRACTICES AND TECHNIQUES	(9)
Sustainability through lean construction approach - Enabling lean through information technology – Lean in planning and design - IPD (Integrated Project Delivery) - Location Based Management System - Geospatial Technologies for machine control, site management, precision control and real time progress monitoring - Role of logistics in achieving sustainable construction – Data management for integrated supply chains in construction - Resource efficiency benefits of effective logistics - Sustainability in geotechnical practice – Design considerations, Design Parameters and Procedures – Quality control and Assurance - Use of sustainable construction techniques: Precast concrete technology, Pre-engineered buildings.		


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Unit-IV	SUSTAINABLE CONSTRUCTION MATERIALS	(9)
Construction materials: Concrete, steel, glass, aluminium, timber and FRP- No/Low cement concrete - Recycled and manufactured aggregate- Role of QC and durability- Sustainable consumption – Eco-efficiency - green consumerism - product stewardship and green engineering - Extended producer responsibility– Design for Environment Strategies, Practices, Guidelines, Methods, And Tools. Eco-design strategies –Design for Disassembly - Dematerialization, rematerialization, transmaterialization – Green procurement and green distribution - Analysis framework for reuse and recycling – Typical constraints on reuse and recycling - Communication of Life Cycle Information - Indian Eco mark scheme- Environmental product declarations – Environmental marketing- Life cycle Analysis (LCA), Advances in LCA: Hybrid LCA, Thermodynamic LCA - Extending LCA - economic dimension, social dimension - Life cycle costing (LCC) - Combining LCA and LCC – Case studies		
Unit-V	SUSTAINABLE MAINTENANCE OF INFRASTRUCTURE PROJECTS	(9)
Case Studies - Sustainable projects in developed countries and developing nations - An Integrated Framework for Successful Infrastructure Planning and Management - Information Technology and Systems for Successful Infrastructure Management, - Structural Health Monitoring for Infrastructure projects - Innovative Design and Maintenance of Infrastructure Facilities - Capacity Building and Improving the Governments Role in Infrastructure Implementation, Infrastructure Management Systems and Future Directions. – Use of Emerging Technologies – IoT, Big Data Analytics and Cloud Computing, Artificial Intelligences, Machine and Deep Learning, Fifth Generation (5G) Network services for maintenance .		
Total No of Periods to be Taught		45 periods

REFERENCES:	
1	Charles J Kibert, Sustainable Construction : Green Building Design & Delivery, 4th Edition , Wiley Publishers 2016.
2	Steve Goodhew, Sustainable Construction Process, Wiley Blackwell,UK, 2016
3	Craig A. Langston & Grace K.C. Ding, Sustainable Practices in the Built Environment, Butterworth Heinemann Publishers, 2011.
4	William P Spence, Construction Materials, Methods & Techniques (3e), Yesdee Publication Pvt. Ltd, 2016.
5	New Building Materials and Construction World magazine
6	Kerry Turner. R, "Sustainable Environmental Management", Principles and Practice Publisher:Belhaven Press,ISBN:1852930039.
7	Munier N, "Introduction to Sustainability", Springer 2005
8	Sharma, "Sustainable Smart Cities In India: Challenges And Future Perspectives", SPRINGER, 2022.
9	Ralph Horne, Tim Grant, Karli Verghese, Life Cycle Assessment: Principles, Practice and Prospects, Csiro Publishing, 2009


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



10	European Commission - Joint Research Centre - Institute for Environment and Sustainability: International Reference Life Cycle Data System (ILCD) Handbook - General guide for Life Cycle Assessment - Detailed guidance. Luxembourg. European Union;2010
11	Hudson, Haas, Uddin, Infrastructure management: integrating design, construction, maintenance, rehabilitation, and renovation, McGraw Hill, (1997).

COURSE OUTCOMES:

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

CO1:	Understand the environment sustainability goals at global and Indian scenario.
CO2:	Understand risks in development of projects and suggest mitigation measures.
CO3:	Apply lean techniques, LBMS and new construction techniques to achieve sustainability in infrastructure construction projects.
CO4:	Explain Life Cycle Analysis and life cycle cost of construction materials.
CO5:	Explain the new technologies for maintenance of infrastructure projects.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2		1	1		2	3	1	1		2	1	1	2
CO2	3	1	3	2	1	2	2		1	1	1	2	2	2
CO3	2	2	3	1	1	1	1				1	1	1	3
CO4	3	1	3	2	2	1	3	1	1	1	1	2	2	2
CO5	3	1	2	2	2	2	3	1		1	1	2	2	3
Avg.	3	1	3	2	2	2	3	1	1	1	1	2	2	3

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

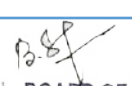


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES2426	SUSTAINABLE AGRICULTURE AND ENVIRONMENTAL MANAGEMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	To educate the students about the issues of sustainability in agro eco systems, introduce the concepts and principles of agro ecology as applied to the design and management of sustainable agricultural systems for a changing world.					

Unit-I	AGROECOLOGY, AGROECOLOGY, AND SUSTAINABLE CONCEPTS	(9)
Ecosystem definition - Biotic Vs. a biotic factors in an ecosystem - Ecosystem processes - Ecological services and agriculture-Problems associated with industrial agriculture/food systems- Defining sustainability - Characteristics of sustainable agriculture - Difference between regenerative and sustainable agriculture systems		
Unit-II	SOIL HEALTH, NUTRIENT AND PEST MANAGEMENT	(9)
Soil health definition-Factors to consider(physical, chemical and biological)-Composition of healthy soils-Soil erosion and possible control measures- Techniques to build healthy soil- Management practices for improving soil nutrient-Ecologically sustainable strategies for pest and disease control		
Unit-III	WATER MANAGEMENT	(9)
Soil water storage and availability-Plant yield response to water -Reducing evaporation in agriculture-Earth works and tanks for rain water harvesting-Options for improving the productivity of water-Localized irrigation -Irrigation scheduling-Fertigation-Advanced irrigation systems and agricultural practices for sustainable water use		
Unit-IV	ENERGY AND WASTE MANAGEMENT	(9)
Types and sources of agricultural wastes-Composition of agricultural wastes-Sustainable technologies for the management of agricultural wastes - Useful and high value materials produced using different processes from agricultural wastes-Renewable energy for sustainable agriculture		
Unit-V	EVALUATING SUSTAINABILITY IN AGROECOSYSTEMS	(9)
Indicators of sustainability in agriculture-On-farm evaluation of agro ecosystem sustainability- Alternative agriculture approaches/farming techniques for sustainable food production-Goals and components of a community food system-Case studies		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



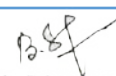
REFERENCES:

1	Approaches to Sustainable Agriculture–Exploring the Path ways Towards the Future of Farming, Oberc, B.P. & Arroyo Schnell, A., IUCN, Belgium, 2020
2	Natural bio active products in sustainable agriculture, Singh, J. & Yadav, A. N., Springer, 2020
3	Organic Farming for Sustainable Agriculture, Nandwani, D., Springer, 2016
4	Principles of Agronomy for Sustainable Agriculture, Villalobos, F. J. & Fereres, E., Springer, 2016
5	Sustainable Agriculture for Food Security: A Global Perspective, Balkrishna, A., CRC Press, 2021

COURSE OUTCOMES:

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

CO1:	The student is expected to be able to Have a depth knowledge about the concepts, principles and advantages of sustainable agriculture
CO2:	Discuss the sustainable ways in managing soil health, nutrients, pests and diseases
CO3:	Suggest the ways to optimize the use of water in agriculture top roomteam ecological use of resources
CO4:	Develop energy and waste management plans for promoting sustainable agriculture in non-sustainable farming areas
CO5:	Assess an ecosystem for its level of sustainability and prescribe ways of converting to a sustainable system through the red sign of a conventional agro ecosystem


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

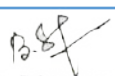


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES2427	SUSTAINABLE BIO MATERIALS	L	T	P	C	100
		3	0	0	3	
Course Objectives	● To Impart knowledge of bio materials and their properties ● To learn about Fundamentals aspects of Biopolymers and their applications ● To learn about bio ceramics and biopolymers ● To introduce the students about metals as biomaterials and their usage a simplants ● To make the students understand the significance of bio nanomaterials and its applications.					

Unit-I	INTRODUCTION TO BIOMATERIALS	(9)
Introduction: Definition of biomaterials, requirements & classification of biomaterials – Types of Biomaterials-Degradable and resorbable biomaterials- engineered natural materials- Biocompatibility-Hydrogels-pyrolitic carbon for long term medical implants-textured and porous materials-Bonding types-crystal structure-imperfection in crystalline structure-surface properties and adhesion of materials-strength of biological tissues-performance of implants-tissue response to implants- Impact and Future of Biomaterials		
Unit-II	BIO POLYMERS	(9)
Molecular structure of polymers-Molecular weight- Types of polymerization techniques-Types of polymerization reactions-Physical states of polymers-Common polymeric biomaterials- Polyethylene-Polymethylmeth crylate(PMMA-Polylactic acid(PLA)and polyglycolic acid(PGA)- Polycaprolactone (PCL)- Other bio degradable polymers-Polyurethan-reactions polymers for medical purposes-Collagens-Elastin-Cellulose and derivatives-Synthetic polymeric membranes and their biological applications		
Unit-III	BIO CERAMICS AND BIOCOMPOSITES	(9)
General properties-Bio ceramics-Silicate glass-Alumina (Al_2O_3)-Zirconia(ZrO_2)-Carbon- Calcium phosphates(CaP)-Resorbable Ceramics-surface reactive ceramics-Biomedical Composites-Polymer Matrix Composite (PMC)-Ceramic Matrix Composite(CMC)-Metal Matrix Composite(MMC)-glass ceramics- Ortho pedic implants-Tissue engineering scaffolds		
Unit-IV	METALS AS BIOMATERIALS	(9)
Biomedical metals-types and properties-stainless steel-Cobalt chromium alloys-Titanium alloys-Tantalum-Nickel titanium alloy (Nitinol)-magnesium-based biodegradable alloys-surface properties of metal implants for osteo integration-medical application-corrosion of metallic implants-biological tolerance of implant metals		
Unit-V	NANOBIOMATERIALS	(9)


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B



Mecheri, Salem Dt-636453, Tamilnadu

Meatllc nano biomaterials–Nano polymers–Nano ceramics–Nano composites–Carbon based nano biomaterials - transport of nanoparticles- release rate–positive and negative effect of nano size–nano fibres–Nano and micro features and their importance in implant performance- Nano surface and coats–Applications nano anti biotics–Nano medicines–Biochips–Biomimetics- Bio NEMs–Biosensor–Bioimaging/Molecular Imaging–challenges and future perspective.

Total No of Periods to be Taught

45 periods

REFERENCES:

- 1 C. Mauli Agrawal, Joo L. Ong, Mark R. Appleford, GopinathMani “Introduction to Biomaterials Basic Theory with Engineering Applications” Cambridge University Press,2014.
- 2 Donglushi“Introductionto Biomaterials” Tsinghua University press, 2006
- 3 JoonPark,R.S.Lakes“BiomaterialsAn Introduction” third edition,Springer2007.
- 4 M.Jaffe, W.Hammond, P.Tolias and T.Arinzeh“Characterization of Biomaterials” Wood head publishing, 2013.
- 5 BuddyD.RatnerandAllanS.HoffmanBiomaterialsScience“AnIntroductiontoMaterialinMedicine” ThirdEdition,2013.
- 6 VasifHasirci,NesrinHasirci“Fundamentals of Bio materials”Springer, 2018
- 7 LeopoidoJavierRiosGonzalez.“HandbookofResearchonBioenergyandBiomaterials: Consolidated and greenprocess” Apple academicpress, 2021.
- 8 DevarajanThangadurai,JeyabalanSangeetha,RamPrasad“Functional Bio nanomaterials”springer, 2020.
- 9 Sujata.V.BhatBiomaterials;Narosa Publishinghouse,2002.

COURSE OUTCOMES:

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

- | | |
|------|--|
| CO1: | Students will gain familiarity with Bio materials and they will understand their importance. |
| CO2: | Students will get an overview of different biopolymers and their properties |
| CO3: | Students gain knowledge on some of the important Bio ceramics and Bio composite materials |
| CO4: | Students gain knowledge on metals as biomaterials |
| CO5: | Student gains knowledge on the importance of nanobio materials in biomedical applications. |


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu

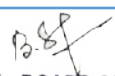


Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES2428	MATERIALS FOR ENERGY SUSTAINABILITY	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To familiarize the students about the challenges and demands of energy sustainability • To provide fundamental knowledge about electrochemical devices and the materials used. • To introduce the students to various types of fuel cell • To enable students to appreciate novel materials and their usage in photovoltaic application • To introduce students to the basic principles of various types Super capacitors and the materials used					

Unit-I	SUSTAINABLE ENERGY SOURCES	(9)
Introduction to energy demand and challenges ahead – sustainable source of energy (wind, solar etc.) – electrochemical energy systems for energy harvesting and storage – materials for sustainable electrochemical systems building – India-centric solutions based on locally available materials – Economics of wind and solar power generators vs. conventional coal plants – Nuclear energy		
Unit-II	ELECTRO CHEMICAL DEVICES	(9)
Electrochemical Energy – Difference between primary and secondary batteries – Secondary battery (Li-ion battery, Sodium-ion battery, Li-S battery, Li-O ₂ battery, Nickel Cadmium, Nickel Metal Hydride) – Primary battery (Alkaline battery, Zinc-Carbon battery) – Materials for battery (Anode materials – Lithiated graphite, Sodiated hard carbon, Silicon doped graphene, Lithium Titanate) (Cathode Materials – S, LiCoO ₂ , LiFePO ₄ , LiMn ₂ O ₄) – Electrolytes for Lithium-ion battery (ethylene carbonate and propylene carbonate based)		
Unit-III	FUEL CELLS	(9)
Principle of operation of fuel cells – types of fuel cells (Proton exchange membrane fuel cells, alkaline fuel cell, direct methanol fuel cells, direct borohydride fuel cells, phosphoric acid fuel cells, solid oxide fuel cells, and molten carbonate fuel cells) – Thermodynamics of fuel cell – Fuel utilization – electrolyte membrane (proton conducting and anion conducting) – Catalysts (Platinum, Platinum alloys, carbon supported platinum systems and metal oxides supported platinum catalysts) – Anatomy of fuel cells (gas diffusion layer, catalyst layer, flow field plate, current conductors, bipolar plates and mono polar plates).		
Unit-IV	PHOTO VOLTAIS	(9)


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

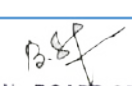
An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Physicsofthesolarcell–Theoreticallimitsofphotovoltaicconversion–bulkcrystal growthofSi and wafering for photo voltaicapplication– Crystallinesiliconsolarcells–thinfilmsiliconsolarcells–multijunctionsolarcells–amorphoussiliconbasedsolarcells– photovoltaicconcentrators– Cu(InGa)Se2 solarcells–CadiumTelluridesolarcells–dyesensitizedsolarcells–Perovskitesolarcells– Measurementandcharacterizationofsolarcells–Materialsusedinsolarcells(metallicoxides,CNTfilms,graphene,OD fullerenes,single-multiwalledcarbonnanotubes,two-dimensional Graphene, organic orSmall molecule-basedsolarcellsmaterials-copper-phthalocyanineandperylene-tetracarboxylicbis-benzene–fullerenes-boronsubphthalocyanine– tin (II)phthalocyanine		
Unit-V	SUPER CAPACITORS	(9)
Super capacitor –typesofsuper capacitors (electro staticdouble-layercapacitors,pseudocapacitors and hybrid capacitors) - design of super capacitor-three and two electrode cell-parametersof super capacitor-Faradaicandnon-Faradaiccapacitance–electrode materials(transitionmetal oxides(MO),mixed metal oxides,conductingpolymers(CP),Mxenes,nanocarbons,non-noble metal,chalcogenides,hydroxidesand1D-3Dmetal-organic framework(MOF),activatedcarbon fibres (ACF)-Hydroxides-BasedMaterials– Poly aniline (PANI),aternary hybridcomposite- conductivepoly pyrrolehydro gels–Different typesofnanocomposites fortheSCElectrodes (carbon–carbon composites,carbon-MOs composites,carbon-CPs composites and MOs-CPs composites) - Two-Dimensional (2D) Electrode Materials - 2D transition metal carbides, carbonitrides,andnitrides.		
Total No of Periods to be Taught		45 periods

REFERENCES:	
1	Functional materialsfor sustainable energy applications; John A. Kilner, StephenJ.Skinner,StuartJ.C. Irvineand Peter P.Edwards.
2	HandBookofFuelCells:FuelCellTechnologyandApplications,WolfVielstich,ArnoldLamm,Hubert AndreasGasteiger, Harumi Yokokawa,Wiley,London2003.
3	B.E.Conway,Electrochemicalsupercapacitors: scientific fundamentals andtechnological applications,KluwerAcademic/Plenumpublishers, NewYork,1999.
4	T.R.Crompton, Batteriesreference book,Newners,3rd Edition, 2002.
5	MaterialsforSupercapacitorapplications;B.Viswanathan. M.AuliceScibioh
6	Electrode Materials for Supercapacitors: A Review of Recent Advances, ParniaForouzandeh,VigneshKumaravel and Suresh C.Pillai,catalysts2022
7	Recentadvances,practical challenges,andperspectivesofintermediate temperaturesolid oxide fuel cell cathodesAmanda Ndubuisi,SaraAbouali,KalpanaSingh and VenkataramanThangadurai,J.Mater.Chem. A, 2022.
8	Reviewofnextgenerationphotovoltaicsolarcelltechnologyandcomparativematerialistic developmentNeerajKant, PushpendraSingh,MaterialsToday:Proceedings,2022


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Students will acquire knowledge about energy sustainability.
CO2:	Students understand the principles of different electrochemical devices.
CO3:	Students learn about the working of fuel cells and their application.
CO4:	Students will learn about various Photovoltaic applications and the materials used.
CO5:	The students gain knowledge on different types of super capacitors and the performance of various materials


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES2429	GREEN TECHNOLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To acquire knowledge on green systems and the environment, energy technology and efficiency, and sustainability. - To provide green engineering solutions to energy demand, reduced energy footprint.					

Unit-I	PRINCIPLES OF GREEN CHEMISTRY	(9)
Historical Perspectives and Basic Concepts. The twelve Principles of Green Chemistry and green engineering. Green chemistry metrics- atom economy, E factor, reaction mass efficiency, and other green chemistry metrics, application of green metrics analysis to synthetic plans.		
Unit-II	POLLUTION TYPES	(9)
Pollution-types, causes, effects, and abatement. Waste-sources of waste, different types of waste, chemical, physical and biochemical methods of waste minimization and recycling.		
Unit-III	GREEN REAGENTS AND GREEN SYNTHESIS	(9)
Environmentally benign processes- alternate solvents- supercritical solvents, ionic liquids, water as a reaction medium, energy-efficient design of processes- photo, electro and sono chemical methods, microwave-assisted reactions		
Unit-IV	DESIGNING GREEN PROCESSES	(9)
Safe design, process intensification, in process monitoring. Safe product and process design- Design for degradation, Real-time Analysis for pollution prevention, inherently safer chemistry for accident prevention		
Unit-V	GREEN NANOTECHNOLOGY	(9)
Nano materials for water treatment, nanotechnology for renewable energy, nanotechnology for environmental remediation and waste management, nanotechnology products as potential substitutes for harmful chemicals, environmental concerns with nanotechnology		
Total No of Periods to be Taught		45 periods

TEXT BOOK:

1	Green technology and design for the environment, Samir B. Billatos, Nadia A. Basaly, Taylor & Francis, Washington, DC, ©1997
2	Green Chemistry – An introductory text- M. Lancaster, RSC, 2016

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



3	Greenchemisrmetryrics- Alexi Lapkinanddavid Constable (Eds),Wileypublications,2008
---	--

REFERENCES:

1	Environmental chemistry,StanleyE Manahan, Taylorand Francis,2017
---	--

COURSE OUTCOMES:

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

CO1:	Tounderstandtheprinciples of greenengineering andtechnology
CO2:	Tolearn aboutpollution usinghazardous chemicalsandsolvents
CO3:	Tomodifyprocesses and productstomakethem green andsafe.
CO4:	Todesignprocesses and productsusinggreen technology
CO5:	To understandadvanced technology ingreensynthesis


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES2430	ENVIRONMENTAL QUALITY MONITORING AND ANALYSIS	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To understand and study the complexity of the environment in relation to pollutants generated due to industrial activity. - To analyze the quality of the environmental parameters and monitor the same for the purpose of environmental risk assessment.					

Unit-I	ENVIRONMENTAL MONITORING AND STANDARDS	(9)
Introduction- Environmental Standards-Classification of Environmental Standards- Global Environmental Standards- Environmental Standards in India-Ambient air quality standards-water quality standard-Environmental Monitoring-Need for environmental monitoring-Concepts of environmental monitoring-Techniques of Environmental Monitoring.		
Unit-II	MONITORING OF ENVIRONMENTAL PARAMETERS	(9)
Current Environmental Issues-Global Environmental monitoring programme-International conventions- Application of Environmental Monitoring-Atmospheric Monitoring-screening parameters – Significance of environmental sampling- sampling methods – water sampling - sampling of ambient air-sampling of flue gas.		
Unit-III	ANALYTICAL METHODS FOR ENVIRONMENTAL MONITORING	(9)
Classification of Instrumental Method-Analysis of Organic Pollutants by Spectrophotometric methods - Determination of nitrogen, phosphorus and, chemical oxygen demand (COD) in sewage; Biochemical oxygen demand (BOD)-Sampling techniques for air pollution measurements; analysis of particulates and air pollutants like oxides of nitrogen, oxides of sulfur, carbon monoxide, hydrocarbon; Introduction to advanced instruments for environmental analysis		
Unit-IV	ENVIRONMENTAL MONITORING PROGRAMME (EMP) & RISK ASSESSMENT	(9)
Water quality monitoring programme-national water quality monitoring-Parameters for National Water Quality Monitoring- monitoring protocol; Process of risk assessment-hazard identification-exposure assessment-dose-response assessment; risk characterization.		
Unit-V	AUTOMATED DATA ACQUISITION AND PROCESSING	(9)
Data Acquisition for Process Monitoring and Control-The Data Acquisition System- Online Data Acquisition, Monitoring, and Control-Implementation of a Data Management System-Review of Observational Networks-Sensors and transducers- classification of transducers-data acquisition system-types of data acquisition systems- data management and quality control; regulatory overview.		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



TEXT BOOK:

1	Environmental monitoring Handbook, FrankR. Burden, ©2002 by The McGraw-Hill Companies, Inc.
2	Handbook of environmental analysis: chemical pollutants in the air, water, soil, and solid wastes/Pradyot Patnaik, ©1997 by CRC Press, Inc

REFERENCES:

1	Environmental monitoring / edited by G. Bruce Wiersma, ©2004 by CRC Press LLC.
2	H.H. Willard, L. L. Merit, J. A. Dean and F. A. Settle, Instrumental Methods of Analysis, CBP Publishers and Distributors, New Delhi, 1988.
3	Heaslip, G. (1975) Environmental Data Handling. John Wiley & Sons. New York.

COURSE OUTCOMES:

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

CO1:	Basic concepts of environmental standards and monitoring.
CO2:	The ambient air quality and water quality standards;
CO3:	The various instrumental methods and their principles for environmental monitoring
CO4:	The significance of environmental standards in monitoring quality and sustainability of the environment.
CO5:	Know the standard research methods that are used worldwide for monitoring the environment.

Mapping of COs with POs and PSOs

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

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES243 1	INTEGRATED ENERGY PLANNING FOR SUSTAINABLE DEVELOPMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To create awareness on the energy scenario of India with respect to world • To understand the fundamentals of energy sources, energy efficiency and resulting environmental implications of energy utilization • Familiarisation on the concept of sustainable development and its benefits • Recognize the potential of renewable energy sources and its conversion technologies for attaining sustainable development • Acquainting with energy policies and energy planning for sustainable development					

Unit-I	ENERGY SCENARIO	(9)
Comparison of energy scenario – India and World (energy sources, generation mix, consumption pattern, T & D losses, energy demand, per capita energy consumption) – energy pricing – Energy security		
Unit-II	ENERGY AND ENVIRONMENT	(9)
Conventional Energy Sources - Emissions from fuels – Air, Water and Land pollution – Environmental standards - measurement and controls		
Unit-III	SUSTAINABLE DEVELOPMENT	(9)
Sustainable Development: Concepts and Stakeholders, Sustainable Development Goal (SDG)- Social development: Poverty, conceptual issues and measures, impact of poverty. Globalization and Economic growth - Economic development: Economic inequalities, Income and growth.		
Unit-IV	RENEWABLE ENERGY TECHNOLOGY	(9)
Renewable Energy – Sources and Potential – Technologies for harnessing from Solar, Wind, Hydro, Biomass and Oceans – Principle of operation, relative merits and demerits		
Unit-V	ENERGY PLANNING FOR SUSTAINABLE DEVELOPMENT	(9)
National & State Energy Policy - National solar mission - Framework of Central Electricity Authority - National Hydrogen Mission - Energy and climate policy - State Energy Action Plan, RE integration, Roadmap for ethanol blending, Energy Efficiency and Energy Mix		
Total No of Periods to be Taught		45 periods


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



REFERENCES:

1	Energy Manager Training Manual (4Volumes) available at http://www.em-ea.org/gbook1.asp , a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India. 2004
2	Robert Ristiri and Jack P. Kraushaar, "Energy and the environment", Wiley, 2005.
3	Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 2012
4	Twidell, J.W. & Weir A., "Renewable Energy Resources", EFN Spon Ltd., UK, 2015.
5	Dhandapani Alagiri, "Energy Security in India Current Scenario", The ICFAI University Press, 2006.

COURSE OUTCOMES:

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

CO1:	Understand the world and Indian energy scenario
CO2:	Analyse energy projects, its impact on environment and suggest control strategies
CO3:	Recognise the need of Sustainable development and its impact on human resource development
CO4:	Apply renewable energy technologies for sustainable development
CO5:	Fathom Energy policies and planning for sustainable development.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



Department	BME	Programme Code & Name	121-BE- BME
------------	-----	-----------------------	-------------

Semester

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
UCES2432	ENERGY EFFICIENCY FOR SUSTAINABLE DEVELOPMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To understand the types of energy sources, energy efficiency and environmental implications of energy utilization - To create awareness on energy audit and its impacts - To acquaint the techniques adopted for performance evaluation of thermal utilities - To familiarize on the procedures adopted for performance evaluation of electrical utilities - To learn the concept of sustainable development and the implication of energy usage					

Unit-I	ENERGY AND ENVIRONMENT	(9)
Primary energy sources-Coal, Oil, Gas-India Vs World with respect to energy production and consumption, Climate Change, Global Warming, Ozone Depletion, UNFCCC, COP		
Unit-II	ENERGY AUDITING	(9)
Need and types of energy audit. Energy management (audit) approach-understanding energy costs, benchmarking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel & energy substitution, energy audit instruments		
Unit-III	ENERGY EFFICIENCY IN THERMAL UTILITIES	(9)
Energy conservation avenues in steam generation and utilisation, furnaces, Thermic Fluid Heaters. Insulation and Refractories-Commercial waste heat recovery devices: recuperator, regenerator, heat pipe, heat exchangers (Plate, Shell & Tube), heat pumps, and thermo compression		
Unit-IV	ENERGY CONSERVATION IN ELECTRICAL UTILITIES	(9)
Demand side management-Power factor improvement-Energy efficient transformers-Energy conservation avenues in Motors, HVAC, fans, blowers, pumps, air compressors, illumination systems and cooling towers		
Unit-V	SUSTAINABLE DEVELOPMENT	(9)
Sustainable Development: Concepts and Stakeholders, Sustainable Development Goal (SDG). Globalization and Economic growth. Economic development: Economic inequalities, Income and growth. Social development: Poverty, conceptual issues and measures, impact of poverty,		
Total No of Periods to be Taught		45 periods

REFERENCES:


 CHAIRMAN - BOARD OF STUDIES
 The Kavery Engineering College,
 (Autonomous)
 Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636453, Tamilnadu



1	Energy Manager Training Manual (4Volumes) available at http://www.em-ea.org/gbook1.asp , a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India. 2004
2	Eastop, T.D. & Croft D.R, "Energy Efficiency for Engineers and Technologists", Logman Scientific & Technical, ISBN-0-582-03184, 1990
3	W.R. Murphy and G. McKay "Energy Management" Butterworths, London 1987
4	Pratap Bhattacharyya, "Climate Change and Greenhouse Gas Emission", New India Publishing Agency-Nipa, 2020
5	Matthew John Franchetti, Defne Apul "Carbon Footprint Analysis: Concepts, Methods, Implementation, and Case Studies" CRC Press, 2012
6	Robert A. Ristinen, Jack J. Kraushaar, Jeffrey T. Brack, "Energy and the Environment", 4 th Edition, Wiley, 2022

COURSE OUTCOMES:

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

CO1:	Understand the prevailing energy scenario
CO2:	Familiarise on energy audits and its relevance
CO3:	Apply the concept of energy audit on thermal utilities
CO4:	Employ relevant techniques for energy improvement in electrical utilities
CO5:	Understand Sustainable development and its impact on human resource development


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai.

Mecheri, Salem - 636 453. Tamilnadu, India.

[f kaveryinstitutions](#)

[thekaveryofficial](#)

[www.kavery.org.in](#)

[admission@kavery.org.in](#)

95249 28156 95249 16156 95249 82156 95249 36156

