



**KSR** College of  
Engineering

AN AUTONOMOUS INSTITUTION



NAAC  
ACCREDITED **A++**

NBA  
ACCREDITED  
PROGRAMMES



**B.E. - ELECTRONICS AND COMMUNICATION ENGINEERING**

**REGULATIONS 2024**

**(Academic Year 2025-26 Onwards)**

**Curriculum & Syllabus  
Semester I - IV**





**K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215**  
**(Autonomous)**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**  
**B.E. – Electronics and Communication Engineering**  
**(REGULATIONS 2024)**

**Vision of the Institution**

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

<b>IM 1</b>	Deliver value-based quality education through modern pedagogy and experiential learning.
<b>IM 2</b>	Enrich Engineering and Managerial Skills through cutting-edge laboratories to meet evolving global demands.
<b>IM 3</b>	Empower research and innovation by integrating collaboration, social responsibility and commitment to sustainable development.

**Vision of the Department / Programme: (Electronics and Communication Engineering)**

<b>DV</b>	To be a globally recognized department in Electronics and Communication Engineering, fostering innovation, research and sustainable technological solutions through holistic education.
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**Mission of the Department / Programme: (Electronics and Communication Engineering)**

<b>DM 1</b>	Impart value-based quality education through experiential learning and modern pedagogy.
<b>DM 2</b>	Enrich professional skills and technical competence by equipping students with state-of-the-art laboratories to meet industry readiness.
<b>DM 3</b>	Nurture Innovation and Research towards sustainable solutions and societal well-being.

**Programme Educational Objectives (PEOs): (Electronics and Communication Engineering)**

<b>The graduates of the programme will be able to</b>	
<b>PEO 1</b>	<b>Employability and Higher Education:</b> Excel in Professional career and higher education by acquiring knowledge in mathematical, social, scientific & engineering principles.
<b>PEO 2</b>	<b>Core Competence:</b> Analyze, design and develop/implement core-engineering problems in communication systems that are technically sound, economically feasible and socially acceptable.
<b>PEO 3</b>	<b>Interpersonal Skills and Team Work:</b> Exhibit professionalism, ethical communicating skills and team work by engaging in lifelong learning for sustainable development of the society.

*C. Guntur*  
**Chairman (BoS)**



**Programme Outcomes (POs) of B.E. - Electronics and Communication Engineering**

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

*C. Guha*  
Chairman (BoS)



		<b>K.S.R. COLLEGE OF ENGINEERING (Autonomous)</b> <b>(Approved by AICTE &amp; Affiliated to Anna University)</b> <b>K.S.R. Kalvi Nagar, Tiruchengode - 637 215</b>								<b>CURRICULUM</b> <b>UG</b> <b>R - 2024</b>		
Department		Department of Electronics and Communication Engineering										
Programme		B.E. Electronics and Communication Engineering										
SEMESTER I												
S.No	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
Induction Programme			MC	-	-	-	-	-	-	-	-	-
THEORY COURSES												
1	24ENT19	Professional Communication	HSMC	45	0	0	45	90	3	40	60	100
2	24EET07	Basics of Electrical and Instrumentation	ESC	45	0	0	45	90	3	40	60	100
3	24GET19	தமிழர் மரபு / Heritage of Tamils	HSMC	15	0	0	15	30	1	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
4	24MAI19	Matrices and Calculus	BSC	45	0	30	45	120	4	50	50	100
5	24PHI07	Engineering Physics	BSC	45	0	30	45	120	4	50	50	100
6	24ITI16	Programming for Problem Solving	ESC	15	0	90	15	120	4	50	50	100
LABORATORY COURSES												
7	24MEP16	Engineering Graphics Laboratory	ESC	15	0	30	15	60	2	60	40	100
8	24GEP16	Engineering Experience Laboratory	ESC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9	24SDP19	Soft Skills Development-I	EEC	0	0	30	0	30	1	60	40	100
MANDATORY COURSE												
10	24MCP09	Mandatory Course - I	MC	0	0	30	0	30	0	-	-	-
<b>TOTAL</b>				<b>225</b>	<b>0</b>	<b>270</b>	<b>225</b>	<b>720</b>	<b>23</b>	<b>900</b>		

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SEMESTER II												
S.No	Course Code	Course Title	Category	Periods per semester					Credit $C = T/30$	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24ECT21	Design Thinking	PCC	30	0	0	30	60	2	40	60	100
2	24GET29	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	HSMC	15	0	0	15	30	1	40	60	100
3	24ECT22	Circuit Theory	PCC	45	15	0	60	120	4	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
4	24MAI29	Probability and Statistics	BSC	45	0	30	45	120	4	50	50	100
5	24CHI06	Chemistry for Engineers	BSC	45	0	30	45	120	4	50	50	100
6	24CBI26	Python Programming	ESC	45	0	30	45	120	4	50	50	100
<b>LABORATORY COURSES</b>												
7	24ENP29	Professional Communication Laboratory	HSMC	0	0	30	0	30	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
8	24SDP29	Soft Skills Development- II	EEC	0	0	30	0	30	1	60	40	100
<b>TOTAL</b>				<b>225</b>	<b>15</b>	<b>150</b>	<b>240</b>	<b>630</b>	<b>21</b>	<b>800</b>		
<b>SEMESTER III</b>												
S.No	Course Code	Course Title	Category	Periods per semester					Credit $C = T/30$	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24MAT31	Random Processes and Numerical Analysis	BSC	45	15	0	60	120	4	40	60	100
2	24ECT31	Electron Devices	PCC	45	0	0	45	90	3	40	60	100
3	24ECT32	Electromagnetic Waves	PCC	45	0	0	45	90	3	40	60	100
4	24ECT33	Microprocessors and Microcontrollers	PCC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
5	24ECI31	Digital Electronics	PCC	45	0	30	45	120	4	50	50	100
<b>LABORATORY COURSES</b>												
6	24ECP31	Electron Devices Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7	24ECP32	Microprocessors and Microcontrollers Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8	24ECP36	Design Studio - I	ESC	0	0	30	0	30	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
9	24SDP39	Soft Skills Development - III	EEC	0	0	30	0	30	1	60	40	100
<b>TOTAL</b>				<b>225</b>	<b>15</b>	<b>180</b>	<b>240</b>	<b>660</b>	<b>22</b>	<b>900</b>		

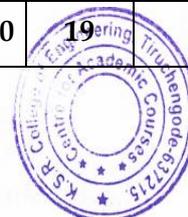
*C. Gurbh*  
Chairman (BoS)



SEMESTER IV												
S.No	Course Code	Course Title	Category	Periods per semester					Credit $C = \frac{T}{30}$	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24ECT41	Electronic Circuits	PCC	45	0	0	45	90	3	40	60	100
2	24ECT42	Verilog HDL	PCC	45	0	0	45	90	3	40	60	100
3	24ECT43	Linear Integrated Circuits	PCC	45	0	0	45	90	3	40	60	100
4	24GET09	Universal Human Values and Ethics	HSMC	45	0	0	45	90	3	40	60	100
5		Open Elective	OEC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
6	24ECI41	Signals and Systems	PCC	45	0	30	45	120	4	50	50	100
<b>LABORATORY COURSES</b>												
7	24ECP41	Analog Electronics Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8	24ECP46	Design Studio - II	ESC	0	0	30	0	30	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
9	24SDP49	Soft Skills Development - IV	EEC	0	0	30	0	30	1	60	40	100
<b>TOTAL</b>				<b>255</b>	<b>15</b>	<b>135</b>	<b>270</b>	<b>675</b>	<b>22.5</b>	<b>900</b>		
<b>SEMESTER V</b>												
S.No	Course Code	Course Title	Category	Periods per semester					Credit $C = \frac{T}{30}$	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24ECT51	Analog Communication Systems	PCC	45	0	0	45	90	3	40	60	100
2	24ECT52	System Verilog	PCC	45	0	0	45	90	3	40	60	100
3		Professional Elective - I	PEC	45	0	0	45	90	3	40	60	100
4		Open Elective - II	OEC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
5	24ECI51	Computer Networks	PCC	45	0	30	45	120	4	50	50	100
6	24ECI52	Digital Signal Processing	PCC	45	0	30	45	120	4	50	50	100
<b>LABORATORY COURSES</b>												
7	24ECP51	VLSI and Chip Design Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
8	24ECP52	Internship - I*	EEC	0	0	0	0	0	1	100	-	100
9	24ECP53	Industry oriented Course	EEC	0	0	30	0	30	1	100	-	100
10	24ECP54	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
<b>MANDATORY COURSE</b>												
11		Mandatory Course - II	MC	30	0	0	0	30	0	100	-	100
<b>TOTAL</b>				<b>300</b>	<b>0</b>	<b>165</b>	<b>270</b>	<b>735</b>	<b>24.5</b>	<b>1100</b>		
<ul style="list-style-type: none"> <li>The Students should undergo internship during the IV semester summer vacation.</li> </ul>												

SEMESTER VI												
S.No	Course Code	Course Title	Category	Periods per semester					Credit	Max. Marks		
				L	T	P	SL	Tot		C = T/30	CA	ES
<b>THEORY COURSES</b>												
1	24GET69	Entrepreneurship Development	HSMC	45	0	0	45	90	3	40	60	100
2	24ECT61	Digital Communication Systems	PCC	45	15	0	60	120	4	40	60	100
3	24ECT62	Embedded Systems	PCC	45	0	0	45	90	3	40	60	100
4		Open Elective - III	OEC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
5		Professional Elective - II/ VLSI Design	PEC	45	0	0	45	90	4	40	60	100
<b>LABORATORY COURSES</b>												
6	24ECP61	Communication Systems Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7	24ECP62	Embedded Systems Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
8	24ECP63	Mini Project	EEC	0	0	60	0	60	2	60	40	100
9	24ECP64	Industry Oriented Course - II	EEC	0	0	30	0	30	1	60	40	100
10	24ECP65	Technical Comprehension	EEC	0	0	30	0	30	1	60	40	100
<b>MANDATORY COURSE</b>												
11		Mandatory Course - III	MC	30	0	0	0	30	0	100	-	100
<b>TOTAL</b>				<b>255</b>	<b>15</b>	<b>210</b>	<b>240</b>	<b>720</b>	<b>24</b>	<b>1100</b>		
<b>SEMESTER VII</b>												
S.No	Course Code	Course Title	Category	Periods per semester					Credit	Max. Marks		
				L	T	P	SL	Tot		C = T/30	CA	ES
<b>THEORY COURSES</b>												
1	24GET79	Project Management	EEC	45	0	0	45	90	3	40	60	100
2	24ECT71	Standard in Electronics and Communication Engineering	PCC	15	0	0	15	30	1	100	-	100
3		Professional Elective - III	PEC	45	0	0	45	90	3	40	60	100
4		Professional Elective - IV	PEC	45	0	0	45	90	3	40	60	100
5		Professional Elective - V	PEC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
6	24ECI71	RF and Microwave Engineering	PCC	30	15	30	45	120	4	50	50	100
<b>EMPLOYABILITY ENHANCEMENT COURSES</b>												
7	24ECP71	Project Work Phase - I	EEC	0	0	60	0	60	2	60	40	100
<b>TOTAL</b>				<b>225</b>	<b>15</b>	<b>90</b>	<b>240</b>	<b>570</b>	<b>19</b>	<b>700</b>		

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SEMESTER VIII												
S.No	Course Code	Course Title	Category	Periods per semester					Credit $C = \frac{T}{30}$	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
1	24ECP81	Project Work Phase - II	EEC	0	0	240	0	240	8	60	40	100
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>240</b>	<b>0</b>	<b>240</b>	<b>8</b>	<b>100</b>		
<b>Total Number of Credits to be Earned for the Award of the Degree = 163</b>												
Note: HSMC - Humanities and Social Sciences including Management Courses, BSC - Basic Science Courses, ESC - Engineering Sciences Courses, PCC - Professional Core Courses, PEC - Professional Elective Courses, OEC - Open Elective Courses, EEC - Employability Enhancement Courses & MC - Mandatory Courses, SL - Self Learning.												

*C. Guntf*  
Chairman (BoS)



K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode - 637 215										CURRICULUM UG R - 2024		
Department		Department of Electronics and Communication Engineering										
Programme		B.E. Electronics and Communication Engineering										
HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSES (HSMC)												
S.No.	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot .		CA	ES	Tot.
1	24ENT19	Professional Communication	HSMC	45	0	0	45	90	3	40	60	100
2	24GET19	தமிழர் மரபு/ Heritage of Tamils	HSMC	15	0	0	15	30	1	40	60	100
3	24GET29	தமிழரும் தொழில் நுட்பமும்/ Tamils and Technology	HSMC	15	0	0	15	30	1	40	60	100
4	24ENP29	Professional Communication Laboratory	HSMC	0	0	30	0	30	1	60	40	100
5	24GET09	Universal Human Values and Ethics	HSMC	45	0	0	45	90	3	40	60	100
6	24GET69	Entrepreneurship Development	HSMC	45	0	0	45	90	3	40	60	100
<b>TOTAL</b>				<b>165</b>	<b>0</b>	<b>30</b>	<b>165</b>	<b>360</b>	<b>12</b>	<b>-</b>	<b>-</b>	<b>-</b>
BASIC SCIENCE COURSES (BSC)												
S.No.	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot .		CA	ES	Tot.
1	24MAI19	Matrices and Calculus	BSC	45	0	30	45	120	4	50	50	100
2	24PHI07	Engineering Physics	BSC	45	0	30	45	120	4	50	50	100
3	24MAI29	Probability and Statistics	BSC	45	0	30	45	120	4	50	50	100
4	24CHI06	Chemistry for Engineers	BSC	45	0	30	45	120	4	50	50	100
5	24MAT31	Random Processes and Numerical Analysis	BSC	45	15	0	60	120	4	40	60	100
<b>TOTAL</b>				<b>225</b>	<b>15</b>	<b>120</b>	<b>240</b>	<b>600</b>	<b>20</b>	<b>-</b>	<b>-</b>	<b>-</b>

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ENGINEERING SCIENCES COURSES (ESC)												
S.No.	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot.
1	24EET07	Basics of Electrical and Instrumentation	ESC	45	0	0	45	90	3	40	60	100
2	24ITI16	Programming for Problem Solving	ESC	15	0	90	15	120	4	50	50	100
3	24MEP16	Engineering Graphics Laboratory	ESC	15	0	30	15	60	2	60	40	100
4	24GEP16	Engineering Experience Laboratory	ESC	0	0	30	0	30	1	60	40	100
5	24CBI26	Python Programming	ESC	15	0	90	15	120	4	50	50	100
6	24ECP36	Design Studio - I	ESC	0	0	30	0	30	1	60	40	100
7	24ECP46	Design Studio - II	ESC	0	0	30	0	30	1	60	40	100
<b>TOTAL</b>				<b>90</b>	<b>0</b>	<b>300</b>	<b>90</b>	<b>480</b>	<b>16</b>	<b>-</b>	<b>-</b>	<b>-</b>
EMPLOYABILITY ENHANCEMENT COURSES (EEC)												
S.No.	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot.
1	24SDP19	Soft Skill Development - I	EEC	0	0	30	0	30	1	60	40	100
2	24SDP29	Soft Skill Development - II	EEC	0	0	30	0	30	1	60	40	100
3	24SDP39	Soft Skills Development - III	EEC	0	0	30	0	30	1	60	40	100
4	24SDP49	Soft Skills Development - IV	EEC	0	0	30	0	30	1	60	40	100
5	24ECP42	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
6	24ECP52	Internship - I*	EEC	0	0	0	0	0	1	100	-	100
7	24ECP53	Industry oriented Course - I	EEC	0	0	30	0	30	1	100	-	100
8	24ECP63	Mini Project	EEC	0	0	60	0	60	2	60	40	100
9	24ECP64	Industry oriented Course - II	EEC	0	0	30	0	30	1	60	40	100
10	24ECP65	Technical Comprehension	EEC	0	0	30	0	30	1	60	40	100
11	24GET79	Project Management	EEC	45	0	0	45	90	3	40	60	100
12	24ECP71	Project Work Phase - I	EEC	0	0	60	0	60	2	60	40	100
13	24ECP81	Project Work Phase - II	EEC	0	0	240	0	240	8	60	40	100
<b>TOTAL</b>				<b>45</b>	<b>0</b>	<b>600</b>	<b>45</b>	<b>690</b>	<b>24</b>	<b>-</b>		

*C. Guntur*  
Chairman (BoS)



PROFESSIONAL CORE COURSES (PCC)												
S.No.	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1.	24ECT21	Design Thinking	PCC	30	0	0	30	60	2	40	60	100
2.	24ECT22	Circuit Theory	PCC	45	15	0	60	120	4	40	60	100
3.	24ECT31	Electron Devices	PCC	45	0	0	45	90	3	40	60	100
4.	24ECT32	Electromagnetic Waves	PCC	45	0	0	45	90	3	40	60	100
5.	24ECT33	Microprocessors and Microcontrollers	PCC	45	0	0	45	90	3	40	60	100
6.	24ECI3I	Digital Electronics	PCC	45	0	30	45	120	4	40	60	100
7.	24ECP31	Electron Devices Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8.	24ECP32	Microprocessors and Microcontrollers Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9.	24ECT41	Electronic Circuits	PCC	45	0	0	45	90	3	40	60	100
10.	24ECT42	Verilog HDL	PCC	45	0	0	45	90	3	40	60	100
11.	24ECT43	Linear Integrated Circuits	PCC	45	0	0	45	90	3	40	60	100
12.	24ECI41	Signals and Systems	PCC	45	0	30	45	120	4	50	50	100
13.	24ECP41	Analog Electronics Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
14.	24ECT51	Analog Communication Systems	PCC	45	0	0	45	90	3	40	60	100
15.	24ECT52	VLSI and Chip Design	PCC	45	0	0	45	90	3	40	60	100
16.	24ECI51	Computer Networks	PCC	45	0	30	45	120	4	50	50	100
17.	24ECI52	Digital Signal Processing	PCC	45	0	30	45	120	4	50	50	100
18.	24ECP51	VLSI and Chip Design Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
19.	24ECT61	Digital Communication Systems	PCC	45	15	0	60	120	4	40	60	100
20.	24ECT62	Embedded Systems	PCC	45	0	0	45	90	3	40	60	100
21.	24ECP61	Communication Systems Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
22.	24ECP62	Embedded Systems Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
23.	24ECT71	Standard in Electronics and Communication Engineering	PCC	15	0	0	15	30	1	100	-	100
24.	24ECI71	RF and Microwave Engineering	PCC	30	15	30	45	120	4	50	50	100
<b>TOTAL</b>				<b>735</b>	<b>60</b>	<b>420</b>	<b>795</b>	<b>2010</b>	<b>67</b>	<b>-</b>		

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PROFESSIONAL ELECTIVE COURSES (PEC): VERTICALS					
Vertical- I	Vertical - II	Vertical - III	Vertical- IV	Vertical - V	Vertical - VI
<b>Semiconductor Chip Design and Testing</b>	<b>Signal Processing</b>	<b>Sensor Technologies and IoT</b>	<b>High Speed Communications</b>	<b>Biomedical Technologies</b>	<b>Advanced Communication Techniques</b>
VLSI Design	DSP Architecture and Programming	Real Time Operating Systems	Optical Communication & Networks	Medical Electronics	Digital Communication Systems - II
UVM	Advanced Digital Signal Processing	Embedded System Networking	Wireless Cellular Communication	Therapeutic Equipment	Information Theory and Coding
CAD For VLSI	Digital Image processing	Internet of Things	5G/6G Communication Networks	Tele Health Technologies	Ultra-Wideband Communications
Physical Design	Pattern Recognition	Industrial IoT and Industry 4.0	Wireless Networks	Introduction to Wearable Devices	Software Defined Radio
ASIC Design	Fundamentals of AI and ML	ARM System Architecture	ADHOC Networks	Body Area Networks	Cognitive Radio Network
Low Power IC Design	Soft Computing	Wireless Sensor Network Design	Satellite Communication	Internet of Medical Things	Antenna and wave propagation

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S.No.	Course Code	Course Title	Category	Periods per semester					Credit C = T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot.
<b>VERTICAL 1: SEMICONDUCTOR CHIP DESIGN AND TESTING</b>												
1	24ECE01	Low Power IC Design	PEC	45	0	0	45	90	3	40	60	100
2	24ECE02	Mixed Signal IC Design Testing	PEC	45	0	0	45	90	3	40	60	100
3	24ECE03	ASIC Design	PEC	45	0	0	45	90	3	40	60	100
4	24ECE04	RISC V & ARM	PEC	45	0	0	45	90	3	40	60	100
5	24ECE05	System Verilog	PEC	45	0	0	45	90	3	40	60	100
6	24ECE06	DFT & UVM	PEC	45	0	0	45	90	3	40	60	100
<b>VERTICAL 2: SIGNAL PROCESSING</b>												
1	24ECE07	DSP Architecture and Programming	PEC	45	0	0	45	90	3	40	60	100
2	24ECE08	Advanced Digital Signal Processing	PEC	45	0	0	45	90	3	40	60	100
3	24ECE09	Digital Image processing	PEC	45	0	0	45	90	3	40	60	100
4	24ECE10	Pattern Recognition	PEC	45	0	0	45	90	3	40	60	100
5	24ECE11	Fundamentals of AI and ML	PEC	45	0	0	45	90	3	40	60	100
6	24ECE12	Soft Computing	PEC	45	0	0	45	90	3	40	60	100
<b>VERTICAL 3: SENSOR TECHNOLOGIES AND IOT</b>												
1	24ECE13	Real Time Operating Systems	PEC	45	0	0	45	90	3	40	60	100
2	24ECE14	Embedded System Networking	PEC	45	0	0	45	90	3	40	60	100
3	24ECE15	Internet of Things	PEC	45	0	0	45	90	3	40	60	100
4	24ECE16	Industrial IoT and Industry 4.0	PEC	45	0	0	45	90	3	40	60	100
5	24ECE17	ARM System Architecture	PEC	45	0	0	45	90	3	40	60	100
6	24ECE18	Wireless Sensor Network Design	PEC	45	0	0	45	90	3	40	60	100
<b>VERTICAL 4: HIGH SPEED COMMUNICATIONS</b>												
1	24ECE19	Optical Communication & Networks	PEC	45	0	0	45	90	3	40	60	100
2	24ECE20	Wireless Cellular Communication	PEC	45	0	0	45	90	3	40	60	100
3	24ECE21	5G/6G Communication Networks	PEC	45	0	0	45	90	3	40	60	100
4	24ECE22	Wireless Networks	PEC	45	0	0	45	90	3	40	60	100

S.No.	Course Code	Course Title	Category	Periods per semester					Credit $C = T/30$	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot.
5	24ECE23	ADHOC Networks	PEC	45	0	0	45	90	3	40	60	100
6	24ECE24	Satellite Communication	PEC	45	0	0	45	90	3	40	60	100
<b>VERTICAL 5: BIOMEDICAL TECHNOLOGIES</b>												
1		Medical Electronics	PEC	45	0	0	45	90	3	40	60	100
2		Therapeutic Equipment	PEC	45	0	0	45	90	3	40	60	100
3		Tele Health Technologies	PEC	45	0	0	45	90	3	40	60	100
4		Introduction to Wearable Devices	PEC	45	0	0	45	90	3	40	60	100
5		Body Area Networks	PEC	45	0	0	45	90	3	40	60	100
6		Internet of Medical Things	PEC	45	0	0	45	90	3	40	60	100
<b>VERTICAL 6: ADVANCED COMMUNICATION TECHNIQUES</b>												
1	24ECE25	Digital Communication Systems - II	PEC	45	0	0	45	90	3	40	60	100
2	24ECE26	Information Theory and Coding	PEC	45	0	0	45	90	3	40	60	100
3	24ECE27	Ultra-Wideband Communications	PEC	45	0	0	45	90	3	40	60	100
4	24ECE28	Software Defined Radio	PEC	45	0	0	45	90	3	40	60	100
5	24ECE29	Cognitive Radio Network	PEC	45	0	0	45	90	3	40	60	100
6	24ECE30	Antenna and wave propagation	PEC	45	0	0	45	90	3	40	60	100
<b>MANDATORY COURSE - I,II,III</b>												
1	24MCP09	Yoga for Stress Management	MC	0	0	30	0	30	0	-	-	-
2	24MCT01	Constitution of India	MC	30	0	0	0	30	0	100	-	100
3	24MCT02	Environmental Science and Sustainability	MC	30	0	0	0	30	0	100	-	100
4	24MCT03	Introduction to Gender Studies	MC	30	0	0	0	30	0	100	-	100
5	24MCT04	Life Science for Engineers	MC	30	0	0	0	30	0	100	-	100
6	24MCT05	Industrial Safety	MC	30	0	0	0	30	0	100	-	100
7	24MCT06	Essence of Indian Knowledge System	MC	30	0	0	0	30	0	100	-	100
8	24MCT07	Elements of Literature	MC	30	0	0	0	30	0	100	-	100
9	24MCT08	Disaster Management	MC	30	0	0	0	30	0	100	-	100

## Open Elective Details

S. No.	Dept.	Course Code	Course Name	L	T	P	SL	Credit
1.	AUTO	24AUO01	Basics of Automobile Engineering	45	0	0	45	3
2.		24AUO02	Hybrid Vehicles	45	0	0	45	3
3.	BME	24BMO01	Basics of Biomedical Instrumentation	45	0	0	45	3
4.		24BMO02	Biometric systems	45	0	0	45	3
5.	CIVIL	24CEO01	Smart Buildings	45	0	0	45	3
6.		24CEO02	Climate Change	45	0	0	45	3
7.	CSE	24CSO01	Data structures using C	45	0	30	45	4
8.		24CSO02	Fundamentals of Java Programming	15	0	90	15	4
9.		24CSO03	Full Stack Development	45	0	0	45	3
10.		24CBO03	Applied Java Programming	15	0	90	15	4
11.		24CSO04	Digital Marketing	45	0	0	45	3
12.	CSE (Cyber Security)	24CB001	Ethical Hacking	45	0	0	45	3
13.		24CB002	Digital and Mobile Forensics	45	0	0	45	3
14.	AIDS	24CSO06	Data Science Fundamentals	45	0	0	45	3
15.		24CSO07	Artificial Intelligence and Machine learning	45	0	0	45	3
16.		24CSO08	Data Exploration and Visualization	45	0	0	45	3
17.	IOT	24IOO01	Industrial Internet of things	45	0	0	45	3
18.		24IOO02	Introduction to Sensors and IoT	45	0	0	45	3
19.	ECE	24ECO01	Drone Technology	45	0	0	45	3
20.		24ECO02	Wearable Devices	45	0	0	45	3
21.		24ECO03	5G /6G Communication	45	0	0	45	3
22.		24ECO04	Embedded IoT	45	0	0	45	3
23.	EEE	24EEO01	Solar and Wind Energy System	45	0	0	45	3
24.		24EEO02	Hydrogen and Hybrid Energy System	45	0	0	45	3
25.		24EEO03	Electric Vehicle Technology	45	0	0	45	3
26.		24EEO04	Energy Conservation and Management	45	0	0	45	3
27.	IT	24ITO01	Introduction to Mobile App and Development	45	0	0	45	3
28.		24ITO02	Introduction to Big Data and Analytics	45	0	0	45	3
29.		24ITO03	Augmented Reality / Virtual Reality	45	0	0	45	3
30.	Mech	24MEO01	3D Printing	45	0	0	45	3
31.		24MEO02	Robotics and Automation	45	0	0	45	3
32.		24MEO03	Lean Manufacturing	45	0	0	45	3
33.	SFE	24SFO01	Occupational health and safety	45	0	0	45	3
34.		24SFO02	Electrical safety	45	0	0	45	3
35.		24SFO03	Building Fire Safety	45	0	0	45	3

36.		24SFO04	Construction Safety	45	0	0	45	3
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### Industry Offered Courses

S.No	Course Name
1.	Embedded Systems Using ARM Cortex-M0
2.	Embedded System and SOC Protocol
3.	Advanced Embedded Systems Applications & IoT Programming
4.	IoT and Edge AI implementation
5.	Digital Design Fundamentals Using Verilog HDL
6.	Functional Verification Using System Verilog

CREDIT SUMMARY										
Name of the Programme: B.E Electronics and Communication Engineering										
CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL CREDITS	%
HSMC	4	2	-	3	-	3	-	-	12	7.40
BSC	8	8	4	-	-	-	-	-	20	12.34
ESC	10	4	1	-	-	-	-	-	15	9.25
PCC	-	6	16	14.5	15.5	10	5	-	67	40.35
PEC	-	-	-	-	3	4	9	-	15	9.25
OEC	-	-	-	3	3	3	-	-	9	5.48
EEC	1	1	1	2	3	4	5	8	24	14.81
MC	√	-	-	-	√	√	-	-	-	-
<b>Total</b>	<b>23</b>	<b>21</b>	<b>22</b>	<b>22.5</b>	<b>24.5</b>	<b>24</b>	<b>19</b>	<b>8</b>	<b>163</b>	<b>-</b>

**Total No. of Credits = 163**

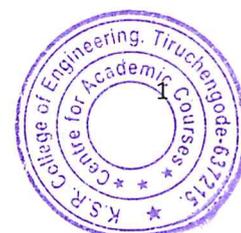
**Total No. of Credits for Lateral Entry Students = 118**

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

*Praveen*  
Chairman (Bos)



**COURSE OUTCOMES:**

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

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

**TEXT BOOKS:**

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

**REFERENCES:**

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

**Mapping of COs with POs and PSOs**

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

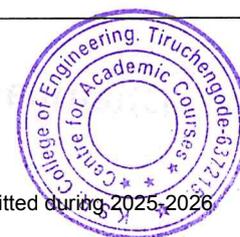
1-Low, 2-Medium, 3-High

*Pragathi*  
Chairman (BoS)



24EET07	BASICS OF ELECTRICAL AND INSTRUMENTATION	Category	L	T	P	SL	C
		ESC	45	0	0	45	3
<b>PREREQUISITE:</b> Students should be familiar with fundamental concepts of electric circuits and mathematical principles operation.							
<b>OBJECTIVE:</b> This course aims to build a strong foundation in electrical principles, laws, and the accurate use of key measurement instruments for analyzing electrical circuits. It emphasizes understanding error analysis, calibration, and the operational principles of various measuring instruments.							
<b>UNIT - I</b>	<b>BASIC ELECTRICAL CONCEPTS AND MEASURING INSTRUMENTS</b>	<b>(9)</b>					
Basic components and electric networks; charge, current, voltage and power, voltage and current sources, Faradays law and Lenz law, Ohms law, Kirchhoff's laws – Functional elements of a measurement system – Electronic Voltmeter and their advantages – True RMS voltmeter – Ohmmeter – Electronic multimeter – Current, Voltage and Power measurement.							
<b>UNIT - II</b>	<b>FUNDAMENTALS OF MEASUREMENT AND INSTRUMENTATION</b>	<b>(9)</b>					
Measurement standards – Errors – Types of Errors – Need for calibration – Classification of instruments, secondary instruments – indicating, integrating and recording operating forces – essentials of indicating instruments; deflecting, damping, controlling torques – moving coil, moving iron instruments; Ammeters and voltmeters, constructional details and operation.							
<b>UNIT - III</b>	<b>TRANSFORMERS</b>	<b>(9)</b>					
Constructional details – Principle of operation – EMF equation – Transformation ratio – Transformer on no load and load – Equivalent circuit – Load test – Voltage regulation – Auto transformer.							
<b>UNIT - IV</b>	<b>D.C. MACHINES</b>	<b>(9)</b>					
Laws of Electromagnetism – Construction of DC machines – DC generator: EMF equation – Shunt and series generators – Characteristics – DC Motor: Principle of operation, Shunt and series motors – Torque equation – Characteristics – Starting and speed control of D.C series and shunt motors.							
<b>UNIT - V</b>	<b>A.C MOTORS AND SPECIAL MACHINES</b>	<b>(9)</b>					
Three-phase induction motors: Construction, Principle of operation, Types – Starters – Applications – Single-phase induction motors: construction and operation – Split phase induction motor and capacitor start induction motor – Applications – Construction and operation of stepper motor.							
<b>LECTURE: 45, SELF LEARNING: 45, TOTAL: 90 PERIODS</b>							

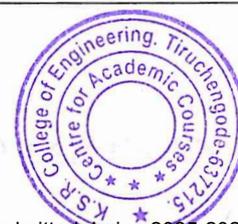
  
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COURSE OUTCOMES:		
At the end of the course, the students will be able to:		
COs	Course Outcome	Cognitive Level
CO1	Explain the fundamental electrical concepts and instruments to accurately measure charge, current, voltage, and power in electrical circuits.	Understand
CO2	Discuss the measurement standards, error and proficiently operate a range of electrical measuring instruments, ensuring accurate calibration and effective functionality.	Understand
CO3	Apply transformer concepts including constructional details, principles of operation to estimate EMF equation, transformation ratios, performance under no-load and load conditions.	Apply
CO4	Determine the speed, torque produced by DC machines and understand how it varies with different operating conditions.	Apply
CO5	Describe the construction, operation and applications of AC motors and special machines.	Understand
<b>TEXT BOOKS:</b>		
1 Sawhney A.K., A Course in Electrical and Electronic Measurements and Instrumentation, Eighteenth Edition, Dhanpat Rai Publications, New Delhi, 2001.		
2 Bhattacharya S.K., Electrical Machines, Tata McGraw Hill Publishing company Ltd, Second Edition, New Delhi, 1998.		
<b>REFERENCES:</b>		
1 Nagrath, I.J., Kothari, D. P., Electric Machines, Tata McGraw Hill Publishing Company Ltd, Fifth Reprint, New Delhi, 2012.		
2 Fitzgerald, A.E., Charles Kingsely Jr and Stephen D. Umans, Electric Machinery, McGraw Hill Books Company, Seventh Edition, New Delhi, 2020.		
3 David A Bell, Electronic Instrumentation and Measurements, Second Edition, PHI, New Delhi, 2003.		
4 Smarajit Ghosh., Fundamentals of Electrical and Electronics Engineering, PHI Learning, Second Edition, New Delhi, 2010.		

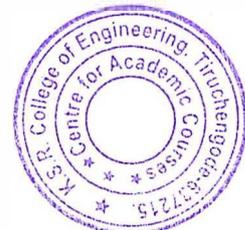
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	1	1	-	2	3	-
CO2	3	2	-	-	-	-	-	1	1	-	2	3	-
CO3	3	3	2	-	-	-	-	1	1	-	2	3	-
CO4	3	3	2	-	-	-	-	1	1	-	2	3	-
CO5	3	2	-	-	-	-	-	1	1	-	2	3	-
1 - Low, 2 - Medium, 3 - High													

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

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

## Text Books:

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

## Reference Books :

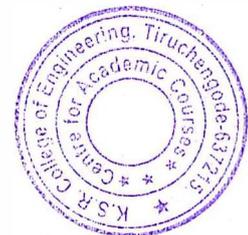
1	கீழடி-வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல்துறைவெளியீடு)
2	பொருளை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
3	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
4	Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published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

## Mapping of COs with POs and PSOs

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

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

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

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

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

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24MAI19	MATRICES AND CALCULUS	Category	L	T	P	SL	C
		BSC	45	0	30*	45	4
<b>SEMESTER I - B.E / B.TECH ( Common to All Branches )</b>							
<b>PREREQUISITE:</b> The Students should have a basic understanding of calculus, matrices, and differential equations to effectively follow the concepts in this course.							
<b>OBJECTIVES:</b> Build a strong foundation in eigen values, eigen vectors, quadratic forms, and higher-order linear differential equations. Develop skills in differential and vector calculus to analyze curves, optimize multivariable functions, and interpret vector fields.							
<b>UNIT - I</b>	<b>LINEAR ALGEBRA</b>	<b>(9)</b>					
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (Excluding proof) – Cayley Hamilton theorem (excluding proof) – Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation.							
<b>UNIT - II</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS</b>	<b>(9)</b>					
Linear differential equations of second and higher order with constant coefficients – Differential equations with variable coefficients – Legendre’s linear differential equations – Method of variation of parameters.							
<b>UNIT - III</b>	<b>DIFFERENTIAL CALCULUS</b>	<b>(9)</b>					
Curvature - Radius of curvature (Cartesian co-ordinates only) – Centre of curvature and Circle of curvature – Involutives and Evolutes (Parabola, Ellipse, Hyperbola and Rectangular hyperbola ).							
<b>UNIT - IV</b>	<b>FUNCTIONS OF SEVERAL VARIABLES</b>	<b>(9)</b>					
Partial derivatives – Taylor’s series expansion – Jacobians - Maxima and Minima for functions of two variables – Method of Lagrangian multipliers.							
<b>UNIT - V</b>	<b>VECTOR CALCULUS</b>	<b>(9)</b>					
Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoid vector fields – Green’s theorem in plane, Gauss divergence theorem and Stoke’s theorem (Cube, Cuboid and Rectangular Paralleopiped only).							
<b>List of Experiments( R Software):</b>							
<ol style="list-style-type: none"> <li>1. Calculate the characteristic equation and eigen values.</li> <li>2. Find the eigenvector and diagonalization of a given matrix.</li> <li>3. Solving ODE with constant coefficients.</li> <li>4. Detect the solution of ODE with variable coefficients.</li> <li>5. Identify the radius of curvature.</li> <li>6. Reckon the Taylor’s series for functions of two variables.</li> <li>7. Estimate the divergence and curl.</li> </ol>							
* Alternative weeks : Tutorial and Laboratory							
<b>L = 45 , * P = 15 &amp; *T = 15, SL = 45, TOTAL: 120 PERIODS</b>							



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K.S.R. College of Engineering



**COURSE OUTCOMES:**

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

COs	Course Outcome	Cognitive Level
CO1	Apply eigen values, eigen vectors, and the Cayley-Hamilton theorem to solve matrix problems and diagonalize quadratic forms into canonical form.	Apply
CO2	Apply methods to solve second and higher-order linear differential equations with constant and variable coefficients.	Apply
CO3	Apply concepts of differential calculus to find curvature, center of curvature, and evolutes of standard Cartesian conic sections.	Apply
CO4	Apply partial derivatives, Jacobians, and lagrangian multipliers to determine local extremum of multivariable functions.	Apply
CO5	Apply vector differential operators to the vector fields and verify Green's, Gauss divergence, and Stokes' theorems for geometries.	Apply

**TEXT BOOKS:**

1. Ravish R Singh and Mukul Bhatt, "Engineering Mathematics – I", Mc-Graw Hill Publications, New Delhi, 2<sup>nd</sup> Edition, 2020.

2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40<sup>th</sup> Edition, 2020.

**REFERENCES:**

1. Bali N. P and Manish Goyal, "Engineering Mathematics", Laxmi Publications Pvt Ltd., 7<sup>th</sup> Edition, 2020.

2. Dass H.K, "Advance Engineering Mathematics", S. Chand and company, 11<sup>th</sup> Edition, 2014.

3. Jain R.K. and Iyengar S.R.K, "Advanced Engineering Mathematics", Narosa Publications, 8<sup>th</sup> Edition, 2012.

4. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, New Delhi, 10<sup>th</sup> Edition 2016.

5. <https://archive.nptel.ac.in/courses/111/108/111108157/>

**Mapping of COs with POs and PSOs**

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

1-low, 2-medium, 3-high

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

S.No.	Name of the Equipments	Quantity
1.	A computer with Intel (R) Core (TM) i3 – 2130 CPU @ 3.40GHZ processor and 4 GB RAM – DDR3.	30 Nos.
2.	R software ( Open source )	30 Nos.



B.E. - Electronics and 24PHI07	Communication Engineering <b>ENGINEERING PHYSICS</b>	<b>Category</b>	L	Regulations	2024	SL	C
		BSc	45	-	30	45	4

(Common to AIDS, BME,CSE,CSE(IoT),CS,ECE,EEE &IT)

**PREREQUISITE:** The students must have knowledge about basic concepts of light sources, dual nature of radiation, conductivity of metals, semiconducting materials, different types of magnetic materials, super conducting materials and their applications.

**OBJECTIVES:** To provide a comprehensive understanding of the fundamental principles, mechanisms, applications of lasers, fiber optics, quantum physics, semiconductors, magnetic materials and superconductors in modern Science and technology.

**UNIT – I LASER AND FIBRE OPTICS (9)**

**Lasers:** Principles of spontaneous emission and stimulated emission - Einstein's co-efficient A & B- population inversion – CO<sub>2</sub> laser – semiconductor diode laser – homo – junction & hetero – junction (qualitative analysis only) – applications.

**Fibre Optics:** propagation of light in optical fibre– numerical aperture and acceptance angle – types of optical fibre (materials, refractive index profile and modes of propagation) – applications -fibre optic sensors: pressure and displacement sensors.

**UNIT – II QUANTUM MECHANICS (9)**

Introduction – black body radiation– Planck's theory (derivation) – deduction of Wien's displacement law and Rayleigh – Jean's Law from Planck's theory– Compton effect (derivation) – de-Broglie concept of matter waves – physical significance of a wave function – Schrödinger wave equations (Time dependent & time independent) – particle in a box (one dimensional).

**UNIT – III CONDUCTING MATERIALS (9)**

Classical free electron theory – expression for electrical conductivity – thermal conductivity – Wiedemann-Franz law – drawbacks of classical free electron theory – quantum theory – Fermi energy – Fermi-Dirac distribution function – density of states and carrier concentration of metals.

**UNIT – IV SEMICONDUCTING MATERIALS (9)**

Introduction – Intrinsic semiconductor: carrier concentration in an intrinsic semiconductor– Fermi level of an intrinsic semiconductor– variation of Fermi energy level with temperature – Extrinsic semiconductors: carrier concentration in n– type and p-type semiconductors (qualitative analysis only)– Fermi level of extrinsic semiconductors– variation of Fermi energy level with temperature and carrier concentration in an extrinsic semiconductors – Hall effect – determination of Hall co-efficient for n – and p – type semiconductors– applications.

**UNIT – V MAGNETIC AND SUPERCONDUCTING MATERIALS (9)**

**Magnetic Materials:** Introduction – origin of magnetic moment – dia, para and ferromagnetic materials– domain theory of ferro-magnetism – Hysteresis – soft and hard magnetic materials.

**Superconducting Materials:** Introduction to superconductivity – properties and types of superconductor – application of superconductors: magnetic levitation– SQUIDS– cryotron.

**List of exercises/experiments:**

1. Determine the thickness of the given thin paper using Air wedge method.
2. Find the acceptance angle and numerical aperture of a given optical fibre.
3. Evaluate the wavelength of semiconductor laser.
4. Estimate the particle size of the lycopodium powder using semiconductor laser
5. Enumerate the thermal conductivity of a bad conductor by Lee's disc method.
6. Compute the band gap of an intrinsic semiconductor.
7. Calculate the width of the CD groove with a help of semiconductor laser.
8. Assess the Hysteresis loss of magnetic materials using B-H curve.



*[Handwritten Signature]*

**D. R.V.M. RANGARAJAN**  
CHAIRMAN

**Lecture: 45, Laboratory: 30, SL:45, TOTAL: 120 PERIODS**

**Course Outcomes:**

B.E. - Electronics and Communication Engineering

Regulations 2024

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

COs	Course Outcome	Cognitive level
CO1	Elucidate laser principles, types, light propagation and the applications of optical fibers.	Understand
CO2	Apply quantum theory for Planck's theory, Compton Effect and Schrödinger's equation of matter waves.	Apply
CO3	Calculate electrical conductivity and Fermi energy by considering quantum free electron theory.	Apply
CO4	Infer charge carrier behavior in intrinsic, extrinsic semiconductors and Hall effect.	Understand
CO5	Describe principles, classifications, applications of magnetic materials and superconductors.	Understand

**Text Books :**

1. M.N. Avadhanulu and P.G. Kshirsagar, "A text book of Engineering Physics", S. Chand and Company, New Delhi, 11<sup>th</sup> Edition, 2018.
2. R.K. Gaur & S.L. Gupta, "Engineering Physics", Dhanpat Rai Publication, New Delhi, 7<sup>th</sup> Edition, 2014.

**Reference Books :**

1. R. Murugesan and Kiruthiga Sivaprasath, "Modern Physics", S. Chand & Company, New Delhi, 17<sup>th</sup> Edition, 2014.
2. V. Rajendran, "Engineering Physics", Tata McGraw-Hill, New Delhi, 1<sup>st</sup> Edition, 2011.
3. S.O. Pillai, "Solid State Physics", New Age Publication, Chennai, 10<sup>th</sup> Edition, 2023.
4. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill, New Delhi, 7<sup>th</sup> Edition, 2015.

**Mapping of COs with POs and PSOs**

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

1-low, 2-medium, 3-high

  
BoS chairman

**Chairman (BoS)**

24PHI07 - ENGINEERING PHYSICS  
I Year B.E (AIDS, BME, CSE, CSE (IOT), CS, ECE, EEE & B.Tech IT)  
Requirements for a batch of 30 students  
Regulation (2024)

S.No.	Description of Equipment	Quantity required
1.	Air wedge apparatus. (with traveling microscope and accessories)	5 Nos
2.	Acceptance angle and numerical aperture of an optical fibre. (with accessories)	5 Nos
3.	Wavelength of semiconductor laser beam. ( with accessories)	5 Nos
4.	Particle size of Lycopodium powder. (with accessories)	5 Nos
5.	Lee's disc apparatus. (with accessories)	5 Nos
6.	Band gap apparatus. (with accessories)	5 Nos
7.	Width of the groove of CD using laser. (with accessories)	5 Nos
8.	B-H curve apparatus. (with accessories)	5 Nos

BoS chairman

**Chairman (BoS)**





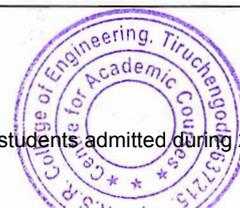
24ITI16	PROGRAMMING FOR PROBLEM SOLVING	Category	L	T	P	SL	C
		ESC	15	0	90	15	4
<b>(COMMON TO AI&amp;DS,BME,CSE,CS,ECE,EEE,IOT &amp; IT)</b>							
<b>PREREQUISITE:</b> A basic grasp of computer concepts is essential. Familiarity with logical thinking and simple algorithm design is recommended.							
<b>OBJECTIVES:</b> To enable students to understand the fundamentals of C programming and develop problem-solving skills. The course focuses on writing structured programs using control statements, functions, arrays, pointers, structures and file operations.							
<b>UNIT - I</b>	<b>C PROGRAMMING BASICS</b>	<b>(21)</b>					
Structure of C program -- C Character set - Identifiers and Keywords - Data Types – Declarations- Expressions - Statements and Symbolic constants. Operators: Arithmetic Operators - Unary operators - Relational and Logical Operators - Assignment operators - Conditional operators. Unformatted and formatted Input/output functions - pre-processor directives and storage classes. <span style="float: right;"><b>(Theory-3)</b></span>							
<b>List of Exercise:</b>							
<ol style="list-style-type: none"> <li>1. Display Student Details Using Formatted I/O.</li> <li>2. Arithmetic Operations on Two Numbers.</li> <li>3. Check Whether a Number is Positive, Negative or Zero.</li> <li>4. Find the Greatest of Three Numbers.</li> <li>5. Grade Calculation Using Conditional Operator.</li> <li>6. Temperature Conversion between Celsius and Fahrenheit.</li> <li>7. Determine Whether a Number is Odd or Even.</li> <li>8. Character Classification: Letter, Digit or Symbol.</li> <li>9. Demonstrate Use of Storage Classes in C.</li> <li>10. Macro Definition and Preprocessor Directive Example. <span style="float: right;"><b>(Laboratory-18)</b></span></li> </ol>							
<b>UNIT - II</b>	<b>CONTROL STATEMENTS, ARRAYS AND STRING</b>	<b>(21)</b>					
Conditional statements - Unconditional statements - branching and looping statements - Arrays - Initialization - Declaration - One dimensional and Two dimensional arrays. String: String operations - String Arrays. Simple programs – sorting - searching - matrix operations. <span style="float: right;"><b>(Theory-3)</b></span>							
<b>List of Exercise:</b>							
<ol style="list-style-type: none"> <li>1. Check Whether a Number is Prime Using Looping Statements.</li> <li>2. Generate Fibonacci Series Using Conditional and Looping Constructs.</li> <li>3. Find Factorial of a Number Using while and for Loops.</li> <li>4. Sum and Average of Elements in a One Dimensional Array.</li> <li>5. Find the Largest and Smallest Elements in an Array.</li> <li>6. Sort Array Elements in Ascending Order (Bubble Sort).</li> <li>7. Search for an Element in an Array Using Linear Search.</li> <li>8. Matrix Addition and Subtraction Using Two Dimensional Arrays.</li> <li>9. Perform Matrix Multiplication Using Nested Loops.</li> <li>10. String Manipulation: Concatenate, Reverse and Find Length of a String. <span style="float: right;"><b>(Laboratory-18)</b></span></li> </ol>							

S. Gopinath  
Chairman (BUS)



UNIT - III	FUNCTIONS AND POINTERS	(21)
<p>Functions: Library functions and user defined functions - Function prototypes and function definitions - Call by value - Call by reference - Recursion – Pointer: Definition - Initialization - Pointers arithmetic - Pointers and arrays - Pointers and Functions - Dynamic memory Allocation - Example Programs. <b>(Theory-3)</b></p> <p><b>List of Exercise:</b></p> <ol style="list-style-type: none"> <li>1. Create and Use User Defined Functions for Basic Arithmetic Operations.</li> <li>2. Demonstrate Call by Value and Call by Reference Using Swap Function.</li> <li>3. Find Factorial of a Number Using Recursion.</li> <li>4. Generate Fibonacci Series Using Recursive Function.</li> <li>5. Count Vowels and Consonants in a String Using User Defined Function.</li> <li>6. Demonstrate Pointer Arithmetic with Arrays.</li> <li>7. Pass Arrays to Functions Using Pointers.</li> <li>8. Access and Modify Array Elements Using Pointers.</li> <li>9. Allocate and Free Memory Using malloc, calloc and free.</li> <li>10. Create a Program Using Function Pointer for Menu Driven Operations. <b>(Laboratory-18)</b></li> </ol>		
UNIT - IV	STRUCTURES AND UNIONS	(21)
<p>Need for structure data type - structure definition - Structure declaration - Structure within a structure - Passing structures to functions - Array of structures - Pointers to structures - Union - Programs using structures and Unions. <b>(Theory-3)</b></p> <p><b>List of Exercise:</b></p> <ol style="list-style-type: none"> <li>1. Define and Display Student Details Using Structure.</li> <li>2. Calculate and Display Employee Salary Using Structure.</li> <li>3. Store and Display Book Details Using Array of Structures.</li> <li>4. Pass Structure Variables to Functions for Processing Student Marks.</li> <li>5. Nested Structure Example: Store and Display Address Information.</li> <li>6. Use Pointer to Structure to Access and Modify Data.</li> <li>7. Create a Program to Sort Student Records Using Array of Structures.</li> <li>8. Compare Two Dates Using Structures.</li> <li>9. Demonstrate the Use of Union to Store Multiple Data Types.</li> <li>10. Create a Program Using Structure to Perform Complex Number Addition. <b>(Laboratory-18)</b></li> </ol>		
UNIT - V	FILE MANIPULATIONS	(21)
<p>Files: File operations- Binary files and text files - Types of File Processing - Sequential access - Random Access File - Command line arguments. Case Studies: GEMINI Operating System. <b>(Theory-3)</b></p> <p><b>List of Exercise:</b></p> <ol style="list-style-type: none"> <li>1. Write and Read Data from a Text File.</li> <li>2. Append New Records to an Existing Text File.</li> <li>3. Count the Number of Characters, Words, and Lines in a File.</li> <li>4. Copy Contents from One File to Another.</li> <li>5. Store and Retrieve Student Records Using Binary Files.</li> <li>6. Search a Specific Record in a Binary File (Random Access).</li> <li>7. Update a Record in a Binary File Using File Pointers.</li> <li>8. Delete a Specific Record from a File Using Temporary File Technique.</li> <li>9. Display File Content Using Command Line Arguments.</li> <li>10. Merge Two Text Files into a Single File Using File Operations. <b>(Laboratory-18)</b></li> </ol>		
<b>L= 15, T=0, P=90, SL=15, TOTAL: 120 PERIODS</b>		

S. Gopikrishna  
Chairman (BOS)



**COURSE OUTCOMES:**

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

COs	Course Outcome	Cognitive Level
CO1	Explain the use of console input and output functions in C programs.	Understand
CO2	Construct C programs using arrays, decision making and looping statements to solve basic problems.	Apply
CO3	Differentiate between call by value and call by reference while using functions and pointers in C.	Analyze
CO4	Implement real time applications using structures and unions to manage and organize complex data.	Apply
CO5	Assess the effectiveness of different file handling methods for managing data in real time applications.	Evaluate

**TEXT BOOKS:**

1. Deitel and Deitel, "C How to Program", Pearson Education, 9<sup>th</sup> Edition, March 2024.
2. Yashavant P. Kanetkar, "Let Us C", BPB Publications, 20<sup>th</sup> Edition, 2024.

**REFERENCES:**

1. Kernighan B.W and Ritchie D.M, "The C Programming language", Second Edition, Pearson Education, 2006.
2. Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
4. E. Balagurusamy, "Programming in ANSI C", seventh edition, Tata McGraw Hill, 2016.
5. Ashok N. Kamathane, 'Computer Programming, Pearson Education, India, Third Edition, 2015.

**Mapping of COs with POs and PSOs**

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

1-low, 2-medium, 3-high

S. G. G. X  
Chairman (BOC)





24MEP16	ENGINEERING GRAPHICS LABORATORY	Category	L	T	P	SL	C
		ESC	15	0	30	15	2

(Common to BME, CSE, CSE(CS), AI&DS, CSE(IoT), IT, ECE, EEE)

#### PREREQUISITE

Engineering Graphics Laboratory requires a good understanding of geometry. This includes knowledge of shapes, angles, dimensions, and spatial reasoning. The ability to visualize and interpret three-dimensional objects from two-dimensional drawings is crucial.

#### OBJECTIVES:

Instruct the utility of drafting & modeling packages in orthographic and isometric drawings and train the usage of 2D and 3D modeling

#### List of Exercise/Experiments:

1. Study of drawing tools, commands and coordinate systems in 2D software.
2. Cycloid and Conic curves.
3. Orthographic projections of pictorial views.
4. Orthographic views of straight lines.
5. Orthographic views of planes.
6. Orthographic views of simple solids.
7. The sectional view and the true shape of simple solids.
8. Development of lateral surfaces of simple solids.
9. Isometric projection of simple solids.
10. Drafting the 2D multi-view drawings from 3D model.

#### LIST OF EQUIPMENT (for a batch of 30 Students)

S.No.	Name of the Equipment	Quantity
1.	Intel i3 Processor, 8 GB RAM with 2 GB Graphics Card	30 Nos
2.	Licensed software for drafting and modeling	30 Nos

L:15 P:30 SL:15 TOTAL: 60 PERIODS

#### COURSE OUTCOMES:

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

COs	Course Outcome	Exp. No.	Cognitive Level
CO1	Explain the fundamentals of engineering drawing and AutoCAD tool.	1	Understand
CO2	Construct projections of points, lines, and planes, then develop a virtual drawing using AutoCAD tool.	2,3 & 4	Apply
CO3	Apply projection principles to convert pictorial views into orthographic drawings	5,6	Apply
CO4	Model the Solid Projections and Sectioning of the solids by the AutoCAD tool.	7,8	Apply
CO5	Develop isometric drawings of simple objects reading the orthographic projections of those objects.	9,10	Apply

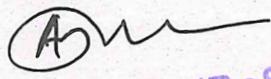
**REFERENCES:**

1. Bhatt. N. D., Engineering Drawing, Charotar Publishing House, Fifty Third Edition, 2014.
2. Basant Agarwal and Agarwal. C. M., Engineering Drawing, Tata McGraw Hill Publishing Company Limited, 2018.

**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	-	-	-	-	-	-	-	-
CO2	3	3	2	-	3	-	-	-	-	-	-	-	-
CO3	3	3	2	-	3	-	-	-	-	-	-	-	-
CO4	3	3	2	-	3	-	-	-	-	-	-	-	-
CO5	3	3	2	-	3	-	-	-	-	-	-	-	-

1-low, 2-medium, 3-high

  
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24GEP16	ENGINEERING EXPERIENCE LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1
<b>(Common to BME, CSE, CSE(CS), CSD, CSE(IoT), ECE, EEE, IT)</b>							
<b>PREREQUISITE:</b>							
A solid foundation in basic electrical components such as switches, wires, fuses, and light bulbs, including the roles of line, neutral, and ground wires. Basic understanding of physics and core principles of electrical and mechanical engineering.							
<b>OBJECTIVE:</b>							
To develop practical skills in basic electrical wiring, electronic interfacing with Arduino and IoT, and fundamental mechanical tools and systems.							
<b>LIST OF EXPERIMENTS</b>							
<b>GROUP - A (ELECTRICAL)</b>							
<ol style="list-style-type: none"> <li>1. Fluorescent lamp wiring.</li> <li>2. Stair-case wiring.</li> <li>3. Residential house wiring using switches, fuse, indicator and lamp.</li> <li>4. Measurement of Energy in single phase system.</li> </ol>							
<b>GROUP - B (ELECTRONICS)</b>							
<ol style="list-style-type: none"> <li>1. Study of Electronic Components, Instruments, Internet of Things (IoT) and Arduino IDE.</li> <li>2. Controlling the Light Emitting Diode (LED) with a push button using Arduino.</li> <li>3. Interfacing of a Sensor (Ultrasonic, Rain, Voltage, Current &amp; PIR) with Arduino Uno.</li> <li>4. Controlling of LED through Wi-Fi using ESP8266.</li> </ol>							
<b>GROUP - C (MECHANICAL)</b>							
<ol style="list-style-type: none"> <li>1. Study of plumbing line sketches for water supply and carpentry tools.</li> <li>2. Study of welding tools and centrifugal pump.</li> </ol>							
<b>COURSE OUTCOMES:</b>							
<b>At the end of the course, the students will be able to:</b>							
COs	Course Outcome	Bloom's Taxonomy Level					
CO1	Construct different types of wiring used in residential houses.	Apply					
CO2	Measure the energy in single-phase system.	Apply					
CO3	Demonstrate different electronic components, instruments, IoT and Arduino IDE.	Apply					
CO4	Construct the control circuit with the help of Arduino and sensors.	Apply					
CO5	Describe the plumbing, carpentry, welding components and centrifugal pump works for engineering practices and applications.	Understand					

  
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**REFERENCES:**

1. Gupta J.P., "A Course in Electrical Installation Estimating and Costing", S.K. Kataria and Sons, Delhi, Reprint 2013 Edition, 2013.
2. Mike Cheich, "Arduino Book for Beginners", Programming Electronics Academy, 2021.

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

**LIST OF EQUIPMENT (For a Batch of 30 Students)**

S.No.	Name of the Equipment	Qty.
1.	Single-phase house wiring setup	2 Nos.
2.	Staircase wiring setup	2 Nos.
3.	Fluorescent lamp wiring setup	2 Nos.
4.	Energy Meter	5 Nos.
5.	Electrical Measuring Instruments	10 Nos.
6.	Ultrasonic Sensor	5 Nos.
7.	Rain Sensor	5 Nos.
8.	Voltage Sensor	5 Nos.
9.	Current Sensor	5 Nos.
10.	PIR Sensor	5 Nos.
11.	ESP8266 & Cable	15 Nos.
12.	Arduino UNO & Cable	15 Nos.
13.	DHT 11	5 Nos.
14.	Temperature sensor	5 Nos.
15.	Red LED	15 Nos.
16.	2-leg push Button	15 Nos.
17.	4-leg push Button	15 Nos.
18.	Personal Computer	15 Nos.

  
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24SDP19	SOFT SKILLS DEVELOPMENT – I		Category	L	T	P	SL	C
			EEC	0	0	30	0	1
<b>(Common to All Branches)</b>								
<b>OBJECTIVES:</b>								
To introduce students to the fundamental concepts of aptitude, emphasizing its relevance in academic pursuits and career advancement. It also focuses on developing proficiency in verbal reasoning, which enhances the students' problem-solving abilities and critical thinking skills.								
<b>UNIT - I</b>	<b>NUMBER SYSTEM</b>						<b>(6)</b>	
Introduction to Number System and its Classification – Divisibility Rules and Problems – Remainder Theorem – HCF & LCM and its properties.								
<b>UNIT - II</b>	<b>NUMBERS</b>						<b>(6)</b>	
Introduction to Digits, Place value, Face value and Fractions – BODMAS Rule and Simplifications – Unit Digit, Squares and Cubes.								
<b>UNIT - III</b>	<b>AVERAGES</b>						<b>(6)</b>	
Introduction to Averages, Sum of Observations and Number of Observation – Average of Consecutive Numbers – Weighted Average – Change in Average – Averages in Real-life Scenarios.								
<b>UNIT - IV</b>	<b>LOGICAL REASONING</b>						<b>(6)</b>	
Analogies – Alphabet Series and Number Series – Directions and Distance.								
<b>UNIT - V</b>	<b>VERBAL ABILITY</b>						<b>(6)</b>	
Reading Comprehension – Synonyms and Antonyms – Sentence Formation – Paragraph Formation.								
<b>TOTAL: 30 PERIODS</b>								
<b>COURSE OUTCOMES:</b>								
<b>At the end of the course, the students will be able to:</b>								
COs	Course Outcome						Cognitive Level	
CO1	Explain the classification of number systems, apply divisibility rules to identify number properties, and understand the concepts of HCF and LCM.						Understand	
CO2	Solve problems using face and place value, fractions, BODMAS and number properties.						Apply	
CO3	Apply concepts of averages, to analyse and solve real-life and quantitative aptitude problems effectively.						Apply	
CO4	Resolve problems with series & direction based logical reasoning.						Apply	
CO5	Interpret passages to demonstrate reading comprehension, and explain the structure of correct sentence and paragraph formation.						Understand	

  
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**TEXT BOOKS:**

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

**REFERENCES:**

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. Wren & Martin, High School English Grammar & Composition.
4. <https://prepinsta.com/>.
5. <https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm>.
6. <https://www.youtube.com/@FeelFreetoLearn/playlists>.

**Mapping of COs with POs and PSOs**

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

  
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24ECT21	DESIGN THINKING		Category	L	T	P	SL	C
			PCC	30	0	0	30	2
(COMMON TO BME, EEE & ECE)								
PRE-REQUISITE: Nil								
<b>OBJECTIVE:</b> To equip learners with a structured, human-centered approach to problem-solving using the principles and stages of Design Thinking, including empathy, problem definition, ideation, prototyping, and effective communication.								
<b>UNIT - I</b>	<b>FUNDAMENTALS OF DESIGN THINKING</b>						<b>(6)</b>	
What is Design Thinking? - When to use Design Thinking? - How to do it? - Who are involved in this? – Design Thinking™– Personal Visualization, The Wheel of Life & Balancing Priorities – Appreciating ‘Design’ – The 3 Laws of Design Thinking.								
<b>UNIT - II</b>	<b>STEP 1: THE ‘FEEL’ STAGE</b>						<b>(6)</b>	
What is this stage about? – What role does a Design Thinker play in this stage? Tools – What is the purpose in this stage? – Persona – Journey Mapping – Stakeholder Mapping & CATWOE Analysis - Cartographic Perspective (L0) – Empathy Map – Case Study: Understanding the Stakeholders.								
<b>UNIT - III</b>	<b>STEP 2: THE ‘DEFINE’ STAGE</b>						<b>(6)</b>	
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Five-Whys – Anti-Pattern – Paraphrasing the Problem – Challenge Mapping – LORD: Definitive skill set for a Design Thinker – Case Study: Relooking at the Problem.								
<b>UNIT - IV</b>	<b>STEP 3: THE ‘DIVERGENCE’ &amp; ‘CONVERGENCE’ STAGE</b>						<b>(6)</b>	
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Brainstorming – Metaphor – Random Association Technique – End-State Visualization - 10gm-100gm-1000gm – Prototyping – Wire framing for digital products – Case Study: Prototyping and Communicating for Effective Outcome.								
<b>UNIT - V</b>	<b>STEP 5: THE ‘COMMUNICATION’ STAGE</b>						<b>(6)</b>	
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – The 4Cs Framework – Naming – Packaging – Story boarding – Presentation – Distribution.								
<b>TOTAL (L:30, SL:30): 60 PERIODS</b>								
<b>COURSE OUTCOMES:</b> <b>At the end of the course, the students will be able to:</b>								
COs	Course Outcome						Cognitive Level	
CO1	Demonstrate an understanding of Design Thinking concepts and principles by explaining their relevance in real-world contexts.						Understand	
CO2	Articulate the significance of a Design Mindset and its impact on creative problem-solving.						Understand	
CO3	Apply Design Thinking methods effectively at each stage of the problem-solving process.						Apply	

*C. Guha*  
Chairman (BoS)



CO4	Identify and implement the phases of Design Thinking to address complex challenges systematically.											Apply	
CO5	Use a variety of Design Thinking tools to develop innovative solutions and refine ideas through iteration.											Apply	
<b>TEXT BOOKS:</b>													
<ol style="list-style-type: none"> <li>1. UnMukt – The Science &amp; Art of Design Thinking, Arun Jain</li> <li>2. Don Norman ,The Design of Everyday Things, MIT Press, 2013</li> <li>3. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and inspires innovation, Harper Collins Publishers Ltd, New York, First Edition, 2009.</li> </ol>													
<b>REFERENCES:</b>													
<ol style="list-style-type: none"> <li>1. Chrisitan Mueller-Roterberg, Handbook of Design Thinking – Tips &amp; Tools for how to design thinking, kindle Direct Publishing, First Edition, 2018.</li> <li>2. Johnny Schneider, Understanding Design Thinking, Lean and Agile, O’Reilly Media, California, First Edition, 2017</li> <li>3. Roger Martin, The Design of Business, Why Design Thinking is the next competitive advantage, Harvard Business Press, United States, First Edition, 2009.</li> <li>4. Idris Mootee, Design Thinking for Strategic Innovation, John Wiley &amp; Sons Inc, New Jersey, First Edition, 2013.</li> </ol>													
<b>Mapping of COs with POs and PSOs</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	2	2	2	2	3	2	3	3	-	-
CO2	3	3	2	2	2	2	2	3	2	3	3	-	-
CO3	3	3	3	3	3	2	2	3	2	3	3	-	-
CO4	3	3	3	3	3	2	2	3	2	3	3	-	-
CO5	3	3	3	3	3	2	2	3	2	3	3	-	-
1-low, 2-medium, 3-high													

*C. Guntf*  
Chairman (BoS)



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

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

  
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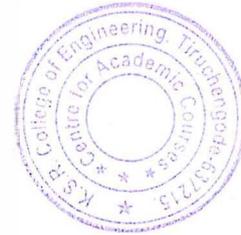


Text Books :	
1	தமிழகவரலாறு- மக்களும் பண்பாடும்- கேகேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2	கணிணித்தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
Reference Books :	
1	சீழடி- வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல் துறை வெளியீடு)
2	பொருதை - ஆற்றங்கரை நாகரிகம் ( தொல்லியல்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

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

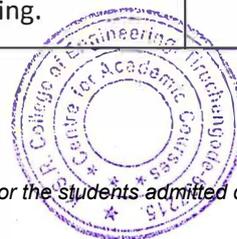
*Arumugam*

Chairman (BoS)



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

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Chairman (BoS)



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

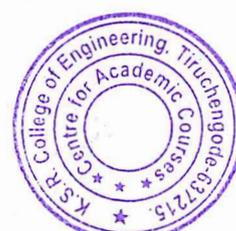
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1: Slight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

  
Chairman (BoS)



24ECT22	CIRCUIT THEORY	Category	L	T	P	SL	C
		PCC	45	15	0	60	4
<b>PREREQUISITE:</b> NIL							
<b>OBJECTIVE:</b> This course aims to build the ability to apply Ohm's Law, KVL, KCL and network theorems for analyzing both simple and complex DC circuits. It also focuses on developing skills to evaluate steady-state and transient responses of RL, RC, RLC circuits and analysis of two-port networks.							
<b>UNIT - I</b>	<b>DC NETWORK ANALYSIS</b>	<b>(9+3=12)</b>					
Analysis of series and parallel networks - Voltage and Current Division - Networks Reduction - Nodal and Mesh Analysis for Linear Resistive Networks - Network Topology – Duals - Dual Networks.							
<b>UNIT - II</b>	<b>NETWORK THEOREMS</b>	<b>(9+3=12)</b>					
Superposition Theorem - Thevenin's Theorem - Norton's Theorem - Maximum Power Transfer Theorem - Reciprocity Theorem - Star - Delta Transformation.							
<b>UNIT - III</b>	<b>SINUSOIDAL STEADY STATE ANALYSIS</b>	<b>(9+3=12)</b>					
Sinusoidal Steady State analysis - Characteristics of Sinusoids - AC Network Power Analysis; Instantaneous Power, Average Power, Apparent Power and Power Factor - Phase Relationship for R, L, and C - Analysis of Simple Series and Parallel AC Networks with Phasor Diagram.							
<b>UNIT - IV</b>	<b>TRANSIENTS AND RESONANCE IN RLC NETWORKS</b>	<b>(9+3=12)</b>					
Transient Response of RL, RC and RLC Networks for DC Input and Sinusoidal Inputs - Series and Parallel Resonance - Frequency Response - Quality Factor – Bandwidth - Half Power Frequencies.							
<b>UNIT - V</b>	<b>TWO PORT AND COUPLED NETWORKS</b>	<b>(9+3=12)</b>					
Network parameters: Impedance, admittance transmission parameters and conversion formulae - Magnetically Coupled Networks: Self-Inductance, Mutual Inductance, Co-efficient of Coupling - Single and Double Tuned Networks - Analysis and Applications.							
<b>Total (L:45, T:15, SL:60 ): 120 PERIODS</b>							
<b>COURSE OUTCOMES:</b> <b>At the end of the course, the students will be able to</b>							
COs	Course Outcome	Cognitive Level					
CO1	Apply foundational electrical laws to calculate current, voltage and power in both simple and complex electric circuits.	Apply					
CO2	Apply network theorems to simplify complex circuits and calculate electrical parameters such as current, voltage, and power.	Apply					
CO3	Analyze the steady-state behavior of RL, RC, and RLC circuits in AC systems using phasor diagrams.	Analyze					
CO4	Analyze the transient response of RL, RC, and RLC circuits when subjected to both DC and AC inputs.	Analyze					
CO5	Measure and evaluate the electrical parameters of two-port networks and magnetically coupled circuits.	Apply					

*C. Guntur*  
Chairman (BoS)



**TEXT BOOKS:**

- 1 Mahmood Nahri, Joseph A.Edminister, Electric Circuits, Schaum's Series, Tata McGraw-Hill, New Delhi, Seventh Edition 2017.
- 2 Charles K. Alexander & Mathew N.O.Sadiku, Fundamentals of Electric Networks, McGraw- Hill New Delhi, Seventh Edition, 2013.

**REFERENCES:**

- 1 W.H.Hayt, J.E.Kemmarly, S.M.Durbin, Engineering Circuit Analysis, McGraw- Hill, New Delhi, Eighth Edition, 2013.
- 2 David A. Bell, Electric Circuits, Oxford University press, UK, Seventh Edition 2009.
- 3 A.Sudhakar and S.P.Shyam Mohan, Circuits and Network Analysis and Synthesis, Tata McGraw Hill, Fifth Edition 2017.
- 4 Chakrabati A, Circuits Theory Analysis and synthesis, Dhanpath Rai& Sons, New Delhi, Sixth Edition 2018.

**Mapping of COs with POs and PSOs**

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

1-low, 2-medium, 3-high

*C. Gurup*  
Chairman (BOS)



24MAI29	PROBABILITY AND STATISTICS	Category	L	T	P	SL	C
		BSC	45	0	30*	45	4
<b>SEMESTER II - B.E / B.TECH ( Common to All Branches )</b>							
<b>PREREQUISITE:</b> A basic understanding of algebra, calculus, and introductory statistics is required to grasp the concepts of probability, hypothesis testing, and statistical methods used in engineering and quality control.							
<b>OBJECTIVES:</b> To build a foundational understanding of probability and random variables, enable the application of two-dimensional random variables in engineering contexts, develop the ability to perform hypothesis testing for both small and large samples, introduce the principles of experimental design in agricultural studies, and provide knowledge of statistical quality control techniques.							
<b>UNIT - I</b>	<b>ONE DIMENSIONAL RANDOM VARIABLES</b>						<b>(9)</b>
One dimensional Random Variable - Discrete and continuous random Variables -Expectations - Moment generating functions and their properties - Binomial, Poisson, Uniform and Normal distributions.							
<b>UNIT - II</b>	<b>TWO - DIMENSIONAL RANDOM VARIABLES</b>						<b>(9)</b>
Joint distributions – Marginal and conditional distributions – Covariance – Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation - Regression Analysis.							
<b>UNIT - III</b>	<b>TESTING OF HYPOTHESIS</b>						<b>(9)</b>
One sample and two sample test for means of large samples (Z- test), One sample and two sample test for means of small samples (t-test), Chi-square - Independent of Attributes - F test for equality of variances.							
<b>UNIT - IV</b>	<b>DESIGN OF EXPERIMENTS</b>						<b>(9)</b>
Analysis of variance - One way and two way classifications - Completely Randomized Design - Randomized Block Design - Latin Square Design.							
<b>UNIT - V</b>	<b>STATISTICAL QUALITY CONTROL</b>						<b>(9)</b>
Control charts for measurements $\bar{X}$ and R charts – Control charts for C and P charts.							
<b>List of Experiments (R Software):</b>							
<ol style="list-style-type: none"> <li>1. Determine the probability by using binomial distribution.</li> <li>2. Find the probability with the help of normal distribution.</li> <li>3. Determine the correlation co-efficient between X and Y.</li> <li>4. Examine the small samples using F distribution.</li> <li>5. Inspect the data using Latin Square Design (LSD).</li> <li>6. Find the <math>\bar{X}</math> Charts.</li> <li>7. Compute the R Charts.</li> </ol>							
* Alternative weeks : Tutorial and Laboratory							
<b>L = 45 , * P = 15 &amp; *T = 15, SL = 45, TOTAL: 120 PERIODS</b>							

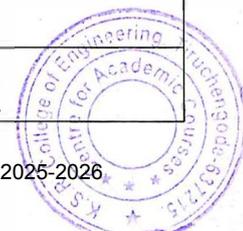
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COURSE OUTCOMES: At the end of the course, the students will be able to:													
COs	Course Outcome												Cognitive Level
CO1	Apply the concepts of one dimensional random variables to compute expectations and analyze the standard distributions.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

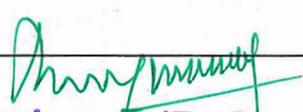
#### LIST OF EQUIPMENTS (For a Batch of 30 Students)

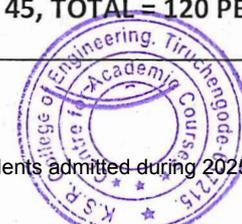
S.No.	Name of the Equipments	Quantity
1.	A computer with Intel (R) Core (TM) i3 – 2130 CPU @ 3.40GHZ processor and 4 GB RAM – DDR3.	30 Nos.
2.	R software ( Open source )	30 Nos.





24CH106	CHEMISTRY FOR ENGINEERS	Category	L	T	P	SL	C
		BSC	45	0	30	45	4
<b>(Common to AI&amp;DS, BME, CSE, CSE(CS), CSE(CSD), CSE(IoT), ECE, EEE and IT)</b>							
<b>PREREQUISITE</b>							
The students must have knowledge about the basic concepts of water parameters, electro chemistry, organic reactions and their applications.							
<b>OBJECTIVES:</b>							
To equip the learners to apply the chemical principles and their applications in the engineering fields.							
<b>UNIT - I</b>	<b>WATER TREATMENT</b>						<b>(9)</b>
Hardness – types, units – estimation of hardness by EDTA method; Boiler feed water – requirements, disadvantages of using hard water in boilers – scale and sludge – priming and foaming – caustic embrittlement – boiler corrosion. Softening methods – internal conditioning – calgon, phosphate – external conditioning – zeolite process and ion exchange process; Desalination – reverse osmosis. Domestic water treatment (Sterilisation process Only).							
<b>UNIT - II</b>	<b>ELECTROCHEMISTRY AND CORROSION</b>						<b>(9)</b>
Introduction – electrode potential – Nernst equation – EMF series and its significance; E – Vehicles - Need - Types – Advantages and Disadvantages; Corrosion – causes, consequences – classification – chemical corrosion – electro chemical corrosion – mechanism; Galvanic & differential aeration corrosion – factors influencing corrosion – corrosion control (Sacrificial anode and Impressed Current Cathodic protection method).							
<b>UNIT - III</b>	<b>ENERGY STORAGE DEVICES</b>						<b>(9)</b>
Batteries – primary battery – Dry cell, secondary batteries – lead-acid and lithium-ion batteries. Fuel cells – H <sub>2</sub> -O <sub>2</sub> fuel cell, solar cells – principle, applications and advantages; Nuclear energy: Light water Nuclear power plant - breeder reactor.							
<b>UNIT - IV</b>	<b>POLYMER CHEMISTRY</b>						<b>(9)</b>
Polymer – definition – degree of polymerization – functionality. Polymerization – addition, condensation and co-polymerization – free radical mechanism of addition polymerization; Preparation properties & uses of PVC, Nylon – 6,6 & Teflon. Plastics – classification – thermosetting and thermoplastics. Fabrication of polymers – compression and Injection moulding.							
<b>UNIT - V</b>	<b>NANO CHEMISTRY AND COMPOSITES</b>						<b>(9)</b>
Introduction – basics of nanochemistry – distinction between nanoparticles, molecules and bulk materials - synthesis of nanomaterials [CVD, laser evaporation, pyrolysis] - applications of nanomaterials. Composite – Introduction: Definition and need for composite – Types of composites: Properties and application of FRP and MMC.							
<b>List of Exercise/Experiments:</b>							
1. Estimation of total, permanent and temporary hardness of water sample By EDTA method							
2. Estimation of chloride content in water by Argentometric method [Mohr's Method]							
3. Conductometric titration of strong acid with strong base (HCl Vs NaOH)							
4. Estimation of dissolved oxygen in water (Winkler's Method)							
5. Conductometric titration of mixture of acids (HCl & CH <sub>3</sub> COOH) with strong base							
6. Estimation of Fe <sup>2+</sup> ion by potentiometric titration							
7. Estimation of HCl by p <sup>H</sup> - Metry							
8. Conductometric precipitation titration using BaCl <sub>2</sub> -Na <sub>2</sub> SO <sub>4</sub>							
<b>L = 45, P = 30, SL = 45, TOTAL = 120 PERIODS</b>							

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

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

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

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24CSI29	PYTHON PROGRAMMING	Category	L	T	P	SL	C
		ESC	15	0	90	15	4
<b>(Common to All Branches)</b>							
<b>PREREQUISITE:</b> A basic understanding of programming principles such as variables and loops, paired with good problem- solving abilities, is required. Logical thinking and analytical skills are critical for effective programming.							
<b>OBJECTIVES:</b> To equip learners with essential Python skills in programming logic, data handling, object-oriented design, file operations, database management, web development with Django, and GUI creation using Tkinter.							
<b>UNIT – I</b>	<b>FUNDAMENTALS OF PYTHON</b>	<b>(3+18)</b>					
Introduction to Python – Variables and Data types – I/O function – Operators – Control structures – Functions – Types of arguments – Anonymous functions: Lambda.							
<b>List of Experiments:</b>							
<ol style="list-style-type: none"> <li>Write a program to calculate the total of all even numbers between 1 and 150 and print the sum of all even numbers.</li> <li>Build a leaderboard for a coding competition platform. To highlight consistent performers, find the second highest unique score from the submitted scores. Write a Python program to accept a list of scores and display the second largest unique score.</li> <li>Create a puzzle game where levels unlock with special Armstrong numbers to check if the player's input is an Armstrong number and display an appropriate message based on the result.</li> <li>Write a Python program to generate patterns like pyramids or triangles based on user input and display the pattern clearly according to the number of rows entered.</li> <li>Create a function in python that accepts any number of integers and returns their sum using variable length arguments.</li> <li>Write a recursive program to find the GCD of two given numbers. The program should return the greatest number that divides both without leaving a remainder.</li> <li>Write a program to find the factorial of a given number using a function. The function should return the product of all positive integers up to that number.</li> <li>Write a Python program to generate the Fibonacci series up to n terms using a function. and display the complete series for the given number of terms.</li> <li>Implement a Python program to accept two dates in DD-MM-YYYY format as input. Manually calculate and display the difference in years, months and days between the two dates without using built in modules.</li> <li>Create a program to accept two integers as the start and end of a range from the user, find and print all prime numbers within this range and print the total count of prime numbers found.</li> <li>Write a program to find the sum of digits of a given number using a while loop. The program should repeatedly extract and add each digit until the number becomes zero.</li> <li>Implement a function that accepts employee information and prints the details in the specific format.</li> </ol>							



UNIT – II	HANDLING STRINGS AND EXCEPTIONS	(3+18)
Strings – List – Tuples – Dictionaries – Sets – Exception Handling – Modules and Packages.		
<b>List of Experiments:</b>		
<ol style="list-style-type: none"> <li>1. Write a program to find the length of a given string without using any built-in functions. Use a loop to count each character until the end of the string.</li> <li>2. Write a program to check if two input strings are anagram or not.</li> <li>3. Develop a Python program to sort integers in a list and display the sorted list in ascending and descending order.</li> <li>4. Write a program to reverse a list without using the built-in reverse() method. Use a loop or slicing to rearrange the elements in reverse order.</li> <li>5. Create a program to find Maximum, Minimum, and Sum of Elements in a List without using built in functions.</li> <li>6. Create a python program to find the most frequent element in a list and print the count.</li> <li>7. Write a Python program that stores student information using a dictionary and perform Add, Modify and Remove student details.</li> <li>8. Write a program to sort a list of strings in ascending order based on their vowel count.</li> <li>9. Implement a Python program to perform basic set operations: union, intersection, difference and symmetric difference and print the result.</li> <li>10. Create a dictionary with course names as keys and the student names as values the student's names should be stored in a set. Write a Python program to identify student names who are enrolled in more than one course, display the list of such students.</li> <li>11. Write a Python program to simulate basic banking operations such as deposit and withdrawal for a customer account. Implement balance checks during withdrawal and define a user defined exception called InsufficientFundsError that is raised when a withdrawal amount exceeds the saving account balance.</li> <li>12. Create a Python package structure to manage car brand information using modules and sub-packages</li> </ol>		
UNIT – III	OBJECT ORIENTED PROGRAMMING CONCEPTS	(3+18)
Object Oriented Programming basics – Inheritance – Polymorphism – Operator Overloading – Method Overriding – Name Mangling – Duck Typing.		
<b>List of Experiments:</b>		
<ol style="list-style-type: none"> <li>1. Implement a class known as BankAccount with methods called deposit() and withdraw() create a sub class called SavingsAccount and CurrentAccount that overrides the withdraw() method to prevent withdrawals with AccountBalance falls below one hundred.</li> <li>2. Create a Python class named Complex to represent complex numbers with real and imaginary parts as attributes. Overload the + operator to add two complex number objects and display the result in the form a + bi using a custom __str__() method.</li> <li>3. Create a class Employee with attributes like emp_id, name, basic_pay, hra, and da. Write a method to calculate gross salary and display employee details. Create objects for multiple employees and generate their payroll.</li> </ol>		



4. Implement a class Time with attributes hour, minute, and second. Overload the + operator to add two Time objects with proper carry-over of seconds and minutes. Display the resulting time in hh:mm:ss format.
5. Create a class Vehicle with attributes brand and model. Derive a class Car that includes fuel\_type. Display full details using an object of Car.
6. Create a class Calculator with multiple add() methods one for adding two integers, one for adding three integers and one for adding two floats. Demonstrate polymorphism by calling different versions of the add() method.
7. Create a base class Device, with Phone and Camera inheriting from Device and Smartphone inheriting from both Phone and Camera.
8. Create a Vehicle class with a constructor for make, model, and year and an abstract method displayDetails(). Derive Car and Truck classes, each with overloaded constructors and overridden displayDetails() methods. Demonstrate polymorphism by storing Car and Truck objects in a Vehicle list and calling displayDetails() polymorphically. Use super() to resolve method calls and print the method resolution order (MRO) for Smartphone.
9. Design a Python program using hierarchical inheritance with a base class Account containing account number, holder name and balance. Create SavingsAccount and CurrentAccount. Override withdraw() in both classes and demonstrate account-specific operations.
10. Design a Python class Employee with private fields \_\_salary and \_\_bonus. Add a method to calculate and return total earnings. Access and print the private variables using name mangling.
11. Create two classes Drone and Bird, each having a method fly(). Write a function start\_journey(obj) that takes any object and calls its fly() method. Demonstrate duck typing by calling this function with both Drone and Bird objects.
12. Create a classes Mobile and SmartWatch, both with a notify() method. Write a send\_alert(device) function that uses duck typing to call notify(). Demonstrate by calling the function with both class objects.

**UNIT- IV****FILES AND DATABASES****(3+18)**

File I/O operations – Directory Operations – Reading and Writing in Structured Files – CSV and JSON – Data manipulation using SQLite.

**List of Experiments:**

1. Write a Python program to read a text file and count the number of lines, words, and characters and display the counts after reading the file.
2. Write a program to rename and delete files in a specific directory using Python. Use built-in file handling functions for the operations.
3. Read a CSV file and display its contents in a tabular format using Python. Use proper formatting to enhance readability.
4. Create a CSV file with product details (ID, name, price). Write a program to append new product entries to it and update its contents.
5. Write a program to sort data from a CSV file based on a specified column (e.g., marks or salary). Read, sort, and display the updated data.
6. Read a JSON file containing employee data. Display names of employees with salary greater than 50,000.
7. Load collections of dictionaries from a JSON file using Python. Print each dictionary entry one by one.



8. Convert a JSON file to a CSV file using Python. Ensure each JSON object becomes a row in the CSV.
9. Create a SQLite table "Students" with fields: ID, Name, Marks. Insert and retrieve sample student records using Python.
10. Create a SQLite table "Books" with fields: BookID, Title, Author, Price and Year. Insert data, accept author name from user, and display matching books.
11. Write a Python program to perform aggregate functions like MAX, MIN, and SUM on marks or salary. Use SQLite queries to get the results and display them.
12. Export data from a SQLite table to a CSV file using Python. Read table contents and write them to a new CSV file.

<b>UNIT – V</b>	<b>WEBPROGRAMINGAND GUI USING PYTHON</b>	<b>(3+18)</b>
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Frameworks: Introduction to Django – Django CRUD – UI design: Tkinter – Events – CGI: Introduction to CGI Programming, GET and POST Methods.

#### List of Experiments:

1. Implement a basic Django project and run the development server.
2. Create a Django app with a model Book and implement Create, Read, Update and Delete operations using generic views.
3. Design a GUI login form using Tkinter with fields for username and password. Add a login button that verifies if both fields are filled. Display a success or error message based on the input validation.
4. Implement a calculator using Tkinter with buttons for digits and operations.
5. Create a GUI application using Tkinter to design a simple color picker.
6. Create a calendar of a month in a year using Tkinter module.
7. Implement a basic text editor using Tkinter with Open, Save, and Clear functions.
8. Implement a mouse click events to select and apply a color to the window background. Display the selected color name or code on the screen.
9. Implement a CGI program that accepts user input using HTML form and displays it using POST method.
10. Develop a Python CGI script that takes a user's input for email and phone number, validates the input, and displays an error message if the email or phone number is invalid.
11. Implement a Python CGI script to handle user sessions. The script should track a user's login status and display different content based on whether the user is logged in or not.
12. Create a feedback form using CGI where submitted data is stored and displayed on another page.

**L:15, T:0, P:90, SL:15, TOTAL: 120 PERIODS**

#### COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Apply Python syntax to write code, using data types, operators, loops and conditionals.	Apply
CO2	Implement string manipulation, data structures, and exception handling to build robust applications.	Apply
CO3	Construct object-oriented programs by applying inheritance, polymorphism, and encapsulation to develop modular and reusable code.	Apply
CO4	Demonstrate the use of file I/O operations and database management techniques to effectively manage and manipulate data in Python.	Apply
CO5	Develop web applications and graphical user interfaces using Python frameworks and libraries	Apply

**TEXT BOOKS:**

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

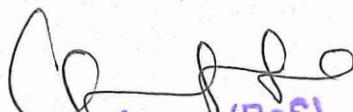
**REFERENCES:**

1. Robert Oliver, "Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications", Clyde Bank Media LLC,1st Edition, 2023
2. Allen B. Downey, "Think Python", O'Reilly Media, 2nd Edition, 2016.
3. David Beazley, Brian K. Jones, "Python Cookbook", O'Reilly Media, 3rd Edition, 2013
4. Mark Lutz, "Python Pocket Reference", O'Reilly Media,5th Edition, 2014
5. www.python.org
6. [https://onlinecourses.swayam2.ac.in/cec22\\_cs20/preview](https://onlinecourses.swayam2.ac.in/cec22_cs20/preview)

**Mapping of COs with POs and PSOs**

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

1-low, 2-medium, 3-high

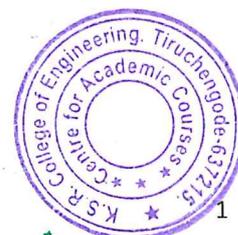


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24ENP29	PROFESSIONAL COMMUNICATION LABORATORY	Category	L	T	P	SL	C	
		HSMC	0	0	30	0	1	
<b>(Common to All Branches)</b>								
<b>OBJECTIVE:</b> To enhance learners' proficiency in listening, speaking, reading, and writing through structured activities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

*Shreyas*  
Chairman (BoS)



**List of Experiments:**

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

**COURSE OUTCOMES:**

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

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

**TEXT BOOKS:**

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

**REFERENCES:**

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

**Mapping of COs with POs and PSOs**

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

1-Low, 2-Medium, 3-High

*Murugesan*  
Chairman (BoS)



2

## Lab Requirement for a batch of 30 Students

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

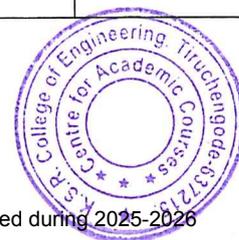
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24SDP29	SOFT SKILLS DEVELOPMENT – II	Category	L	T	P	SL	C
		EEC	0	0	30	0	1
<b>(Common to All Branches)</b>							
<b>OBJECTIVES:</b> To introduce students to the basics of aptitude, helping them understand its core concepts and real-world applications. A key focus is placed on developing proficiency in verbal reasoning, which supports improved problem-solving and analytical thinking. Additionally, the course works toward building a strong foundation in English grammar to enhance language accuracy and communication skills.							
<b>UNIT - I</b>	<b>PERCENTAGE</b>						(6)
Concept of Percentage – Successive Percentage – Increasing and Decreasing Percentage – Population – Depreciation.							
<b>UNIT - II</b>	<b>PROFIT AND LOSS</b>						(6)
Concepts of Cost Price, Selling Price, Profit and Loss – Profit Percentage – Loss Percentage – Problems on Dishonest Seller.							
<b>UNIT - III</b>	<b>RATIO PROPORTIONS AND PARTNERSHIP</b>						(6)
Introduction and Ratio Calculation – Mean Proportion – Share Calculation Based on Ratio – Ages – Partnership.							
<b>UNIT - IV</b>	<b>LOGICAL REASONING</b>						(6)
Coding and Decoding – Blood Relations – Ranking and Ordering.							
<b>UNIT - V</b>	<b>VERBAL ABILITY</b>						(6)
Sentence Improvement – Ordering of Sentence – Cloze Test – Spellings.							
<b>TOTAL: 30 PERIODS</b>							
<b>COURSE OUTCOMES:</b> <b>At the end of the course, the students will be able to:</b>							
COs	Course Outcome	Cognitive Level					
CO1	Apply percentage concepts to solve problems on growth, depreciation, and population change effectively.	Apply					
CO2	Apply concepts of profit, loss, and pricing to analyse transactions, including cases of dishonest selling.	Apply					
CO3	Demonstrate proficiency in applying ratio, proportion, and partnership principles	Apply					
CO4	Solve the problems on coding-decoding, blood relations, and ranking using logical reasoning techniques	Apply					
CO5	Improve the sentence structure, logical sequencing, contextual understanding, and spelling accuracy for effective communication.	Understand					

  
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**TEXT BOOKS:**

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

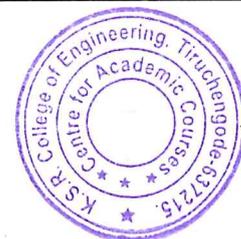
**REFERENCES:**

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. Wren & Martin, High School English Grammar & Composition.
4. <https://prepinsta.com/>.
5. <https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm>.
6. <https://www.youtube.com/@FeelFreetoLearn/playlists>.

**Mapping of COs with POs and PSOs**

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

  
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24MAT31	RANDOM PROCESSES AND NUMERICAL ANALYSIS	Category	L	T	P	SL	C	
		BSC	45	15	0	60	4	
<b>SEMESTER III – B.E ( ECE )</b>								
<b>PREREQUISITE:</b> Basic knowledge of probability theory, signals and systems, calculus, and differential equations is required to effectively understand and apply the concepts in this course.								
<b>OBJECTIVES:</b> To gain knowledge of random processes and their properties, analyze system responses to random inputs, apply numerical techniques for mathematical problems, and solve partial differential equations using finite difference methods.								
<b>UNIT - I</b>	<b>CLASSIFICATION OF RANDOM PROCESSES</b>							<b>(12)</b>
Definition and examples - first order, second order, strictly stationary, wide-sense stationary and ergodic processes - Markov process - Binomial, Poisson and Normal processes.								
<b>UNIT - II</b>	<b>CORRELATION AND SPECTRAL DENSITIES</b>							<b>(12)</b>
Auto correlation - Cross correlation - Properties – Power spectral density – Cross spectral density - Properties – Wiener-Khintchine relation – Relationship between cross power spectrum and cross correlation function.								
<b>UNIT - III</b>	<b>LINEAR SYSTEMS WITH RANDOM INPUTS</b>							<b>(12)</b>
Linear time invariant system - System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output – white noise.								
<b>UNIT - IV</b>	<b>NUMERICAL DIFFERENTIATION AND INTEGRATION</b>							<b>(12)</b>
Numerical differentiation using Newton's forward and backward interpolation methods - Numerical integration by trapezoidal and Simpson's 1/3 <sup>rd</sup> and 3/8 <sup>th</sup> rules – double integrals.								
<b>UNIT - V</b>	<b>BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS</b>							<b>(12)</b>
Finite difference solution of one dimensional heat equation by Crank Nicholson and Bender Schmidt method - One dimensional wave equation and two dimensional Laplace and Poisson equations.								
<b>L = 45, T = 15, SL = 60, TOTAL = 120 PERIODS</b>								



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**COURSE OUTCOMES:**

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

COs	Course Outcome	Cognitive Level
CO1	Apply concepts of stationary and ergodic to analyze stochastic behavior of Markov, Binomial, Poisson and Normal processes.	Apply
CO2	Apply concepts of auto-correlation and cross-correlation to analyze power and cross spectral densities using the Wiener-Khintchine theorem.	Apply
CO3	Apply concepts of LTI systems and transfer functions to evaluate system response to random inputs using autocorrelation and cross-correlation.	Apply
CO4	Apply numerical methods for differentiation and integration to solve practical problems involving interpolation and multiple integrals.	Apply
CO5	Solve boundary value problems in differential equations using finite difference methods for heat, wave, Laplace, and Poisson equations.	Apply

**TEXT BOOKS:**

1. P. Z. Peebles, "Probability, Random Variables and Random Signal Principles", McGraw Hill Education, 4<sup>th</sup> Edition, 2002.
2. B. S. Grewal, "Numerical Methods in Engineering and Science", Khanna Publishers, 10<sup>th</sup> Edition, 2020.

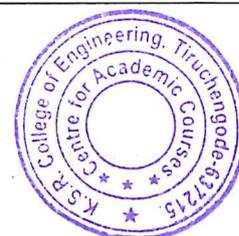
**REFERENCES:**

1. A. Singaravelu and S. Sivasubramanian, "Probability and Random Process", MA Publications, 2021
2. M. K. Jain, S. R. K. Iyengar, and R. K. Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International, 7<sup>th</sup> Edition, 2019.
3. Dr.P.Kandasamy, Dr.Thilagavathy and Dr.K.Gunavathy, Numerical Methods , S.Chand& company Ltd, Third edition, New Delhi, 2003
4. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8<sup>th</sup> Edition, 2014.

**Mapping of COs with POs and PSOs**

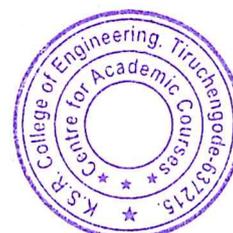
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	-	-	-	1	-	-	2	-	-
CO2	3	3	3	3	-	-	-	1	-	-	2	-	-
CO3	3	3	3	3	-	-	-	1	-	-	2	-	-
CO4	3	3	3	3	-	-	-	1	-	-	2	-	-
CO5	3	3	3	3	-	-	-	1	-	-	2	-	-

1-low, 2-medium, 3-high


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24ECT31	ELECTRON DEVICES	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>PREREQUISITE:</b> Students should be familiar in Electric Circuits							
<b>OBJECTIVE:</b> To build a strong foundation in analog electronics by gaining in-depth knowledge of the principles, operation and characteristics of various electronic devices.							
<b>UNIT - I</b>	<b>SEMICONDUCTOR DIODES</b>	<b>(9)</b>					
Types of semiconductor: Intrinsic, extrinsic semiconductor, P-type and N- type semiconductors, Fermi energy level, variation of fermi level with temperature, electrical conductivity – Drift & diffusion current – PN Junction: forward bias, reverse bias – Diode current equation – Capacitance.							
<b>UNIT - II</b>	<b>TRANSISTORS</b>	<b>(9)</b>					
NPN Operations – Configurations – Biasing methods – Bias compensation techniques – Hybrid parameter for CE amplifier – Miller's theorem – Darlington amplifier and bootstrapping emitter follower – Hybrid $\pi$ equivalent model – Low and high frequency response of CE amplifier.							
<b>UNIT - III</b>	<b>FIELD EFFECT TRANSISTOR</b>	<b>(9)</b>					
JFET types and operation of N-Channel and P-channel – MOSFET types and operation – CMOS operation, inverter voltage transfer curve and threshold voltage – Insulated Gate Bipolar Transistor.							
<b>UNIT - IV</b>	<b>RECTIFIERS AND POWER SUPPLIES</b>	<b>(9)</b>					
Analysis of half wave, full wave and bridge rectifiers with resistive load – Analysis of ripple voltage with C and L filters – Voltage regulators: Zener diode regulator, transistor series and shunt regulator – SMPS.							
<b>UNIT - V</b>	<b>SPECIAL SEMICONDUCTOR DEVICES</b>	<b>(9)</b>					
Zener diode, Tunnel diode, PIN diode, Varactor diode, LED, Photodiode, Phototransistor, Photoconductive and Photovoltaic cells. SCR, DIAC, TRIAC and UJT.							
<b>TOTAL (T:45, SL:45) = 90 PERIODS</b>							
<b>COURSE OUTCOMES:</b> At the end of the course, the learners will be able to:							
COs	Course Outcome	Cognitive Level					
CO1	Explain the working principles of intrinsic, extrinsic semiconductors and describe the operation of a PN junction Diode.	Understand					
CO2	Apply transistor biasing techniques and hybrid parameter models to analyze and design transistor amplifier circuits.	Apply					
CO3	Describe the construction, types and working principles of Field effect type transistors and interpret their static and transfer characteristics.	Understand					
CO4	Design of rectifiers with filters and regulated power supply circuits.	Apply					
CO5	Illustrate the relationship between voltage and current for special semiconductor devices.	Understand					

*C. Gurusamy*  
Chairman (BoS)



**TEXT BOOKS:**

1. Sedra / Smith, "Micro Electronic Circuits" Oxford University Press, Seventh edition, United Kingdom, 2017
2. Anil K Maini, Varsha Agarwal, "Electronic Devices & Circuits", John Wiley United States, Reprint 2012.

**REFERENCES:**

1. Robert L. Boylestad and Louis Nasheresky, "Electronic Devices and Circuit Theory", Eleventh edition, PHI, Delhi 2015
2. David A. Bell, "Solid State Pulse Circuits", Fourth edition PHI, Delhi 2012
3. Donald .A. Neamen, "Electronic Circuit Analysis and Design", Second edition, Tata McGraw Hill, Delhi 2009
4. Millman.J. and Halkias C.C, "Integrated Electronics", Tata McGraw Hill, Forty eight Reprint Delhi 2008.

**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	3	3
CO2	3	3	2	-	-	-	-	1	1	-	2	3	3
CO3	3	2	-	-	-	-	-	1	1	-	2	3	3
CO4	3	3	2	-	-	-	-	1	1	-	2	3	3
CO5	2	2	-	-	-	-	-	1	1	-	2	3	3

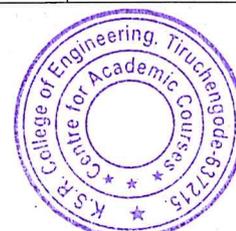
1-low, 2-medium, 3-high

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24ECT32	ELECTROMAGNETIC WAVES	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>PREREQUISITE:</b> Students should be familiar with vector calculus and coordinate systems.							
<b>OBJECTIVE:</b> To introduce the fundamental principles of electrostatics, magnetostatics and electromagnetic fields using vector calculus, enabling students to understand and apply static and time-varying fields behavior. The course also aims to develop an understanding of wave propagation in various guided media using Maxwell's equations.							
<b>UNIT - I</b>	<b>STATIC ELECTRIC FIELD</b>	<b>(9)</b>					
Introduction to vector calculus – Gradient, divergence and curl – Stokes and Divergence theorem – Coulomb's law – Electric field intensity – Electric field intensity due to line and surface charges – Electric potential – Relationship between potential and electric field – Potential due to infinite uniformly charged line – Electric dipole – Electric flux density – Gauss's law and its applications.							
<b>UNIT - II</b>	<b>STATIC MAGNETIC FIELD</b>	<b>(9)</b>					
The Biot-Savart's law – Magnetic field intensity due to a finite and infinite wire, the axis of a circular loop – Ampere's circuital law and its applications – Magnetic flux density – The Lorentz force equation for a moving charge – Force on a current carrying wire placed in a magnetic field – Torque on a loop carrying a current.							
<b>UNIT - III</b>	<b>ELECTRIC AND MAGNETIC FIELDS IN MATERIALS</b>	<b>(9)</b>					
Poisson's and Laplace's equation – Boundary conditions for electric fields – Definition of capacitance – Capacitance of parallel plate capacitor – Electrostatic energy and energy density – Electric current – Current density – Point form of Ohm's law – Continuity equation for current – Definition of inductance, Inductance of Solenoid and Toroid – Energy density in magnetic fields – Magnetic boundary conditions.							
<b>UNIT - IV</b>	<b>TIME VARYING FIELDS AND EM WAVES</b>	<b>(9)</b>					
Maxwell's first equation from Ampere's circuital law – Equation expressed in point form – Faraday's law – Maxwell's second equation from Faraday's law – Equation expressed in point form – Maxwell's equations in integral form and differential form – Poynting vector and Poynting theorem – Wave equation – Wave equation in phasor form – Plane waves in free space.							
<b>UNIT - V</b>	<b>GUIDED WAVES</b>	<b>(9)</b>					
Waves between parallel planes of perfect conductors – Field components of TM, TE and TEM waves between parallel planes and its characteristics – Waves in rectangular waveguide, TM and TE waves and its characteristics in rectangular wave guide.							
<b>TOTAL(T : 45, SL : 45) : 90 PERIODS</b>							
<b>COURSE OUTCOMES:</b> At the end of the course, the learners will be able to:							
COs	Course Outcome	Cognitive Level					
CO1	Apply vector calculus and Coulomb's law to calculate electric field intensity and potential for various charge distributions.	Apply					
CO2	Determine magnetic field intensity using Biot-Savart's and Ampere's laws and to calculate force on current-carrying conductors in static magnetic fields.	Apply					
CO3	Apply boundary conditions and field equations to calculate the boundary value problems, capacitance, inductance and energy storage in electric and magnetic fields.	Apply					

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CO4	Derive Maxwell's equations, Poynting theorem and wave equations and explain their importance of propagation in time-varying EM fields.	Understand
CO5	Apply Maxwell's equations to analyze TE, TM and TEM wave behavior in parallel planes and rectangular waveguides.	Apply

**TEXT BOOKS:**

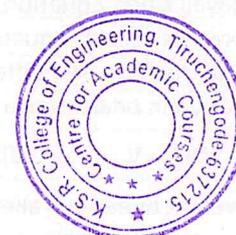
- 1 W H.Hayt & J A Buck, "Engineering Electromagnetics", TATA McGraw-Hill, Ninth edition, 2020.
- 2 Matthew N.O.Sadiku, "Elements of Engineering Electromagnetics", Oxford University Press, Seventh edition, 2021.

**REFERENCES:**

- 1 G S N Raju, "Electromagnetic Field Theory and Transmission Lines", Pearson Education, First edition, 2013.
- 2 E.C. Jordan & K.G. Balmain, "Electromagnetic Waves and Radiating Systems", Prentice Hall, Second edition, 2000.
- 3 Narayana Rao.N. "Elements of Engineering Electromagnetics", Pearson Education, Sixth edition, 2021.
- 4 David K.Cheng, "Field and Wave Electromagnetics", Pearson Edition, Second edition, 2013.

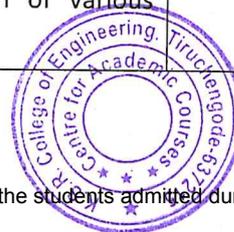
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	1	1	-	2	3	2
CO2	3	3	2	-	-	-	-	1	1	-	2	3	2
CO3	3	3	2	-	-	-	-	1	1	-	2	3	2
CO4	3	2	-	-	-	-	-	1	1	-	2	3	2
CO5	3	3	2	-	-	-	-	1	1	-	2	3	2

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24ECT33	MICROPROCESSORS AND MICROCONTROLLERS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>PREREQUISITE:</b> Fundamental knowledge in number systems and digital electronics							
<b>OBJECTIVE:</b> To provide a comprehensive understanding of microprocessor (8085/8086) and microcontroller (8051) architectures, instruction sets and interfacing techniques.							
<b>UNIT - I</b>	<b>MICROPROCESSOR ARCHITECTURE AND PROGRAMMING</b>	<b>(9)</b>					
Introduction to 8085 Microprocessor- 8086 Microprocessor: Hardware architecture – Signals - Addressing modes - Maximum and minimum mode configurations - Assembler directives - Instruction set - Timing diagram – Interrupts - Assembly language programming.							
<b>UNIT - II</b>	<b>8051 MICROCONTROLLER ARCHITECTURE</b>	<b>(9)</b>					
8051 Microcontroller: Hardware architecture - Special function register - I/O ports and circuits - Memory organization - External memory-Interfacing 8051 with external memory- Timers and counters- Serial data input/output - Interrupts operation - Addressing modes - Instruction set.							
<b>UNIT - III</b>	<b>8051 MICROCONTROLLER PROGRAMMING</b>	<b>(9)</b>					
Assembly Language Programming: Timer/Counter Programming - Programming 8051 Timers - Counter Programming - Serial Communication: Basics of serial Communication - 8051interfacing to RS232-Serial Communication Programming - Interrupts Programming: Programming Timer interrupts - Programming External Hardware Interrupts - Programming Serial Communication Interrupt.							
<b>UNIT - IV</b>	<b>MICROPROCESSOR PERIPHERAL INTERFACING</b>	<b>(9)</b>					
8086 Interfacing: Need of Interfacing - Memory Interfacing - Programmable Peripheral Interface (8255) - Serial Communication Interface (8251) - Keyboard and Display Controller (8279) - DMA Controller (8257) - Programmable Interrupt Controller (8259) - Programmable interval Timer (8253, 8254).							
<b>UNIT - V</b>	<b>MICROCONTROLLER PERIPHERAL INTERFACING</b>	<b>(9)</b>					
8051 Interfacing: DC motor - Stepper motor - Sensors - Keyboard - Seven segment display- ADC- DAC - LCD. Case study Traffic light control.							
<b>TOTAL (T:45, SL:45) : 90 PERIODS</b>							
<b>COURSE OUTCOMES:</b> <b>At the end of the course, the learners will be able to:</b>							
COs	Course Outcome	Cognitive Level					
CO1	Explain the architecture of 8086 microprocessor and solve the assembly language programming using 8086 microprocessor.	Apply					
CO2	Describe the architecture and instruction set of 8051 microcontroller to perform the ALP using 8051 microcontroller.	Understand					
CO3	Write an assembly language programme for timer, counter and serial communication for 8051 microcontroller.	Apply					
CO4	Explain the need for interfacing and describe the operation of various peripheral devices with the 8086 microprocessor.	Understand					

*C. Guha*  
Chairman (BoS)



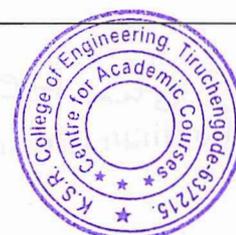
CO5	Apply the concepts of peripheral interfacing to connect devices with the 8051 microcontroller.											Apply	
<b>TEXT BOOKS:</b>													
1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085", Fifth Edition, Prentice Hall, 2002.													
2. Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" TMH, Third Edition, 2012.													
<b>REFERENCES:</b>													
1 Krishna Kant, "Microprocessors and microcontrollers architecture, programming and system design using 8085, 8086, 8051 and 8096", PHI, Second Edition, 2014.													
2 Kenneth Ayala, "The 8051 Microcontroller", Thomson Delmar Learning, Third Edition, 2007.													
3 Kenneth J. Ayala, "The 8086 Microprocessor: programming & interfacing the PC", Delmar Publishers, First Edition, 2007.													
4 A K Ray, K M Bhurchandi, "Advanced Microprocessors and Peripherals", TMH, Third Edition, 2012.													
<b>Mapping of COs with POs and PSOs</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	1	-	-	-	-	1	1	-	2	3	3
CO2	3	2	-	-	-	-	-	1	1	-	2	3	3
CO3	3	3	1	-	-	-	-	1	1	-	2	3	3
CO4	3	2	-	-	-	-	-	1	1	-	2	3	3
CO5	3	3	1	-	-	-	-	1	1	-	2	3	3

*C. Gnanapavan*  
Chairman (BoS)



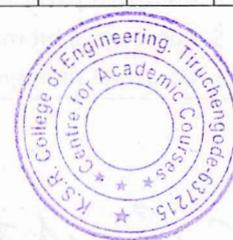
24ECI31	DIGITAL ELECTRONICS	Category	L	T	P	SL	C	
		PCC	45	0	30	45	4	
<b>PREREQUISITE:</b> Students should have basic knowledge on binary numbers, logic gates, algebra and discrete mathematics.								
<b>OBJECTIVE:</b> To equip the students with fundamental knowledge in Boolean logic, combinational and sequential circuit design, and implementation using gates, PLDs, and HDL. The course also aims to develop practical skills in designing, simulating, and constructing digital systems through hands-on experiments and HDL modeling.								
<b>UNIT - I</b>	<b>MINIMIZATION TECHNIQUES AND LOGIC GATES</b>							<b>(9)</b>
<b>Boolean Algebra:</b> Boolean postulates and laws - De-Morgan's theorem - Principle of duality - <b>Boolean expression:</b> Sum of Products, Product of Sums - <b>Minimization of boolean expression:</b> Algebraic method, Karnaugh map method, Don't care conditions, Quine - McCluskey method. <b>Logic gates:</b> AND, OR, NOT, NAND, NOR, Exclusive - OR and Exclusive-NOR - Implementation of logic functions using basic gates, NAND and NOR implementations – Characteristics of TTL and CMOS digital logic families.								
<b>UNIT - II</b>	<b>COMBINATIONAL CIRCUITS</b>							<b>(9)</b>
Introduction - Design procedure - Half adder - Full adder - Half subtractor - Full subtractor - Parallel binary adder, Parallel binary subtractor - Fast adder: Carry look ahead adder - Serial adder/subtractor - BCD adder, Magnitude Comparator - Code converters - Parity generator - Parity checker - Decoders - Encoders - Multiplexers - Demultiplexers - <b>Hardware Description Language</b> : Introduction to VHDL- VHDL model for combinational circuits.								
<b>UNIT - III</b>	<b>MEMORY AND PROGRAMMABLE LOGIC DEVICES</b>							<b>(9)</b>
Classification of memories – ROM,PROM, EPROM, EEPROM, EAPROM, RAM - Static RAM cell - Bipolar RAM cell - MOSFET RAM cell - Dynamic RAM cell <b>Programmable Logic Devices:</b> Programmable Logic Array - Programmable Array Logic - Implementation of combinational logic circuits using ROM, PLA and PAL- Field Programmable Gate Arrays.								
<b>UNIT - IV</b>	<b>SYNCHRONOUS SEQUENTIAL LOGIC</b>							<b>(9)</b>
<b>Latches and Flip-flops:</b> SR, JK, D, T and Master-Slave - Characteristic table and equation - Application Table – Edge triggering - Level Triggering - Realization of one flip flop using other flip-flops. <b>Synchronous Sequential Logic:</b> General model, classification, analysis and design of synchronous sequential circuit. <b>Counters:</b> Asynchronous and synchronous Up, Down and Up/Down counter - Design of counter - Shift registers - Types - Ring counter and Johnson counter.								
<b>UNIT - V</b>	<b>ASYNCHRONOUS SEQUENTIAL LOGIC</b>							<b>(9)</b>
Introduction - classification - Analysis and design of fundamental mode and pulse mode asynchronous sequential circuits - Incompletely specified state machines - Problems in asynchronous sequential circuit. <b>Hazards:</b> Types of hazard, design of hazard free switching circuits- VHDL model for sequential circuits.								
<b>List of Experiments:</b> 1. Realize basic gates using universal gates 2. Construct simple arithmetic circuits- adder and subtractor 3. Construct binary to gray and gray to binary code converters using logic gates 4. Construct parity generator and parity checker circuits 5. Construct 2-bit magnitude comparator 6. Construct multiplexer, demultiplexer, encoder and decoder using logic gates								

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7. Construct and verify the functionality of ripple counter and synchronous counter													
8. Implement SISO, PIPO shift registers using flip-flops													
9. Simulate combinational logic circuits using HDL													
10. Simulate sequential logic circuits using HDL													
11. Design a Digital System (Any Hardware/ Simulation circuit)													
<b>TOTAL(T:45, P:30, SL:45) : 120 PERIODS</b>													
<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the learners will be able to:</b>													
COs	Course Outcome											Exp. No	Cognitive Level
CO1	Apply Boolean algebra and minimization methods to simplify logic expressions and implement logic circuits using basic and universal gates.											1	Apply
CO2	Design combinational logic circuits such as adders, subtractors, multiplexers and code converters using a systematic procedure and implement using VHDL.											2,3,4,5,6,9,11	Apply
CO3	Classify and compare different memory technologies and programmable logic devices; implement combinational logic functions using ROM, PLA, and PAL.											11	Apply
CO4	Analyze and design synchronous sequential circuits such as, counters and shift registers.											7,8,10,11	Analyze
CO5	Analyze and design asynchronous sequential circuits and simulate their behavior using Hardware Description Language (HDL).											10,11	Analyze
<b>TEXT BOOKS:</b>													
1	M.Morris Mano, Digital Design with an Introduction to the Verilog HDL, VHDL and System Verilog Pearson Education, Sixth Edition, 2018.												
2	John F. Wakerly, Digital Design Principles and Practices, Pearson Education, Fourth Edition, 2008.												
<b>REFERENCES:</b>													
1	Donald P. Leach, Albert Paul Malvino and Goutam Saha, Digital Principles and Applications, McGraw Hill Education, Eight Edition, 2015.												
2	John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning, Ninth Edition Reprint, 2012.												
3	Donald D. Givone, Digital Principles and Design, Tata McGraw, Twenty first Reprint 2012.												
4	Stephen Brown, Zvonko Vranesic, Fundamentals of Digital Logic with VHDL Design, TMH, Third Edition 2012.												
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	3	3	2
CO2	3	3	2	-	2	-	-	2	1	-	3	3	2
CO3	3	3	2	-	2	-	-	2	1	-	3	3	2
CO4	3	3	3	2	2	-	-	2	1	-	3	3	2
CO5	3	3	3	2	3	-	-	2	1	-	3	3	2

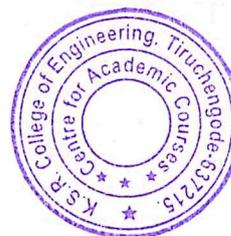
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## LIST OF EQUIPMENT (For a batch of 30 students)

Sl.No.	Name of the Equipment	Qty
1	Digital IC Tester	2
2	Digital IC Trainer Kit	15
3	Dual/Single Mode Power Supply	15
4	Digital Multimeter	5
5	Computer with HDL Simulation Software	5
6	IC7400	50
7	IC7404	50
8	IC7402	50
9	IC7408	50
10	IC7411	50
11	IC7432	50
12	IC7483	50
13	IC7485	50
14	IC7486	50
15	IC7474	50
16	IC7476	50
17	IC7447	50
18	Bread Board	20
19	Wires	Sufficient Quantity

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LIST OF EQUIPMENT (Part - 2) of 30 - Institute

S.No.	Name of the Equipment	Qty
1	Digital Tester	10
2	Digital IC Trainer kit	10
3	Digital IC Trainer Power Supply	10
4	Digital Multimeter	10
5	Computer with HDL sim trainer kit	10
6	IC 4050	100
7	IC 4017	100
8	IC 4013	100
9	IC 4088	100
10	IC 4011	100
11	IC 4012	100
12	IC 4018	100
13	IC 4019	100
14	IC 4020	100
15	IC 4021	100
16	IC 4022	100
17	IC 4023	100
18	IC 4024	100
19	IC 4025	100
20	IC 4026	100
21	IC 4027	100
22	IC 4028	100
23	IC 4029	100
24	IC 4030	100
25	IC 4031	100
26	IC 4032	100
27	IC 4033	100
28	IC 4034	100
29	IC 4035	100
30	IC 4036	100
31	IC 4037	100
32	IC 4038	100
33	IC 4039	100
34	IC 4040	100
35	IC 4041	100
36	IC 4042	100
37	IC 4043	100
38	IC 4044	100
39	IC 4045	100
40	IC 4046	100
41	IC 4047	100
42	IC 4048	100
43	IC 4049	100
44	IC 4050	100
45	IC 4051	100
46	IC 4052	100
47	IC 4053	100
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49	IC 4055	100
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51	IC 4057	100
52	IC 4058	100
53	IC 4059	100
54	IC 4060	100
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57	IC 4063	100
58	IC 4064	100
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61	IC 4067	100
62	IC 4068	100
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64	IC 4070	100
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24ECP31	ELECTRON DEVICES LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
<b>PREREQUISITE:</b> Students should be familiar in Electric Circuits							
<b>OBJECTIVES:</b> To provide a solid understanding of BJT and FET amplifiers using appropriate design techniques, and to develop hands-on simulation skills using PSPICE tools for analyzing device characteristics and validating theoretical concepts.							
<b>List of Experiments:</b> <ol style="list-style-type: none"> <li>1. Verification of network theorems</li> <li>2. Characteristics of PN and Zener diodes</li> <li>3. Characteristics of CE, CB and CC configurations</li> <li>4. Characteristics of JFET</li> <li>5. Characteristics of UJT and SCR</li> <li>6. Design and construct CE amplifier using voltage divider bias with and without bypass emitter capacitance</li> <li>7. Design and construct CC amplifier using voltage divider bias</li> <li>8. Design and construct CS amplifier</li> <li>9. Power supply circuit – Half, Full wave rectifier with simple capacitor filter and shunt regulator</li> <li>10. Simulation using PSPICE tool for any four device characteristics.</li> </ol>							
<b>TOTAL (P:45) : 45 PERIODS</b>							
<b>COURSE OUTCOMES:</b> At the end of the course, the students will be able to:							
COs	Course Outcome	Exp.No	Cognitive Level				
CO1	Verify the network theorems and I-V characteristics of semiconductor devices	1,2	Apply				
CO2	Analyse the behaviour of BJT and FET amplifier configurations (CE, CB, CC, CS) with respect to gain and frequency response.	3,4,5	Analyse				
CO3	Design and construct amplifier circuits using appropriate biasing techniques with bypass capacitor	6,7,8	Apply				
CO4	Demonstrate the working of power supply circuits such as half-wave and full-wave rectifiers with capacitor filters and voltage regulators.	9	Apply				
CO5	Simulate the characteristics of diode and transistor using PSPICE tool.	10	Apply				

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

1-low, 2-medium, 3-high

#### LIST OF EQUIPMENT (For a batch of 30 students)

S.NO	Components / Equipment	Quantity
1.	Dual RPS	10
2.	Bread Board	10
3.	Diode (PN & Zenor)	10 Each
4.	Transistor ( BC 107 & BFW10)	20 Each
5.	UJT	10
6.	SCR	10
7.	Transformer	10
8.	DC Voltmeter (0 - 30) V	20
9.	DC Ammeter (0-100) mA	20
10.	Function Generator	10
11.	CRO	10
12.	Decade Resistance box	10
13.	Multimeter	10
14.	Resistors (2.2 K $\Omega$ , 10 K $\Omega$ , 1 K $\Omega$ , 470 $\Omega$ , 8.2 K $\Omega$ , 100 $\Omega$ , 10 K $\Omega$ , 5.6 K $\Omega$ , 82 K $\Omega$ , 780 $\Omega$ , 2M $\Omega$ , 250K $\Omega$ )	Each 20 Numbers
15.	Capacitors – (10 $\mu$ F, 47 $\mu$ F, 470 $\mu$ F, 1000 $\mu$ F)	10
16.	Multisim Software	10
17.	Computer	10

*C. Guntur*  
Chairman (BOS)



24ECP32	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
<b>PREREQUISITE:</b> Students should have a basic understanding of digital electronics and number systems.							
<b>OBJECTIVE:</b> To develop hands-on skills in programming and interfacing 8086 microprocessors and 8051 microcontrollers using assembly language and Keil software, and to apply them in real-time embedded system applications.							
<b>1.8086 Microprocessor Programming:</b> <ul style="list-style-type: none"> <li>i) Arithmetic Operations</li> <li>ii) Sorting and Searching</li> <li>iii) String Manipulation.</li> </ul>							
<b>2.8051 Microcontroller Programming:</b> <ul style="list-style-type: none"> <li>i) Arithmetic Operations</li> </ul>							
<b>3.Peripheral Interfacing:</b> <ul style="list-style-type: none"> <li>i) Programmable peripheral interface (8255) using 8086</li> <li>ii) Programmable interval timer (8253) using 8086.</li> <li>iii) ADC and DAC using 8086.</li> <li>iv) iv)Traffic light controller using 8086</li> <li>v) Keyboard and Display Controller (8279) using 8051</li> <li>vi) Stepper motor control using 8051.</li> </ul>							
<b>4. 8051 programming using KEIL and Proteus Software.</b>							
<b>TOTAL (P:45) : 45 PERIODS</b>							
<b>COURSE OUTCOMES:</b> At the end of the course, the students will be able to:							
COs	Course Outcome	Exp. No	Cognitive Level				
CO1	Write and execute an assembly language programs using the 8086 microprocessor to solve computational problems.	1	Apply				
CO2	Write and execute an assembly language programs using the 8051 microcontroller to solve computational problems.	2	Apply				
CO3	Interface external peripherals with the 8086 microprocessor and perform their functional operation.	3	Apply				
CO4	Interface external peripherals with the 8051 microcontroller and perform their functional operation.	3	Apply				
CO5	Design and test 8051 microcontroller programs through simulation in KEIL $\mu$ Vision.	4	Apply				
<b>REFERENCES:</b>							
<ol style="list-style-type: none"> <li>1. Krishna Kant, "Microprocessors and microcontrollers architecture, programming and system design using 8085, 8086, 8051 and 8096", PHI, Second Edition, 2014.</li> <li>2. Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" TMH, Third Edition, 2012.</li> <li>3. Kenneth J. Ayala, "The 8086 Microprocessor: programming &amp; interfacing the PC", Delmar Publishers, First Edition, 2007.</li> <li>4. Kenneth J. Ayala, "The 8051 Microcontroller", Thomson Delmar Learning, Third Edition, 2007.</li> </ol>							

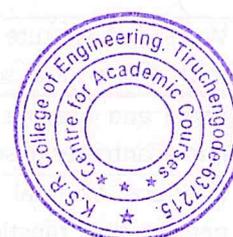


Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	2	2	-	-	2	3	3
CO2	3	3	2	-	-	-	2	2	-	-	2	3	3
CO3	3	3	2	-	-	-	2	2	-	-	2	3	3
CO4	3	3	2	-	-	-	2	2	-	-	2	3	3
CO5	3	3	2	-	3	-	2	2	-	-	2	3	3

**LIST OF EQUIPMENT (For a batch of 30 students)**

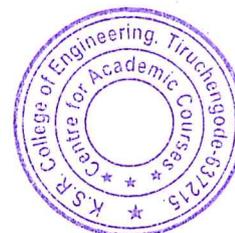
S.NO	Components / Equipment	Quantity
1.	8086 Trainer Kit	15
2.	8051 Trainer Kit	15
3.	8255 Interfacing Card	6
4.	8279 Interfacing Card	6
5.	8253 Interfacing Card	6
6.	ADC Interfacing Card	6
7.	DAC Interfacing Card	6
8.	Stepper motor Interfacing Card	6
9.	Traffic light Interface	6
10.	KEIL Software (Open source)	-
11.	Personal Computer	15

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Chairman (BoS)



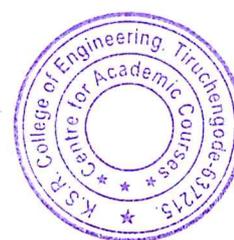
24ECP36	DESIGN STUDIO – I	Category	L	T	P	SL	C
		ESC	0	0	30	0	1
(Common to BME, CSE (IoT), ECE, EEE)							
<b>PREREQUISITE:</b>							
Basic understanding of design thinking principles, including empathy, problem identification, and user-centered design, is essential for engaging in the Design Studio.							
<b>OBJECTIVE:</b>							
To apply design thinking and system design principles to develop, prototype, and present user-centered electronic solutions through hands-on projects.							
<p><b>Identification of components</b></p> <p>Ex: 1 Resistor colour coding, Capacitors etc</p> <p>Ex: 2: Soldering Practice</p> <p><b>Realizing the functionality of components</b></p> <p>Ex: 3: Connecting LED with fixed resistor, variable resistors</p> <p>Ex: 4: LED Go- No Go using Diode</p> <p>Ex: 5: Multiple LED Circuit</p> <p>Ex: 6: Switch on LED using Transistor</p> <p>Ex: 7: Electronic LED Lantern</p> <p>Ex: 8: Light Detector</p> <p>Ex: 9: IC555 LED Flasher / Beeper</p> <p>Ex: 10: LED Blinking</p> <p>Ex: 11: Autodesk Fusion - Simulation</p> <p><b>Prototyping</b></p> <p>Ex: 11: Mini project</p> <p>(Choose the problem and apply Design Thinking Concepts - empathy, Define, Ideation, Prototype to solve the problem)</p>							
<b>TOTAL(P:30) : 30 PERIODS</b>							

*C. Guntur*  
Chairman (BoS)



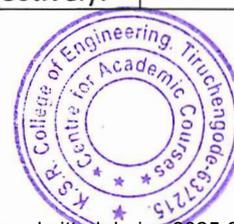
<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able :</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
<b>CO1</b>	To identify and interpret the characteristics of basic electronic components such as resistors, capacitors, diodes, LEDs, transistors, and LDRs through visual inspection and standard coding schemes.											Analyze	
<b>CO2</b>	To experience hands-on training in soldering techniques and assembling electronic circuits using discrete components on breadboards and PCBs.											Apply	
<b>CO3</b>	To understand the working principles of passive and active components by constructing basic circuits and observing their electrical behavior under different conditions.											Apply	
<b>CO4</b>	To design and implement functional circuits including switching, blinking, and multiple output systems using fundamental electronics											Create	
<b>CO5</b>	To document and effectively communicate the design process, implementation, and outcomes of a project through formal reporting and presentations.											Evaluate	
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	-	3	3	3	-	3	3	3	3	3	3	3	3
<b>CO2</b>	-	3	3	3	-	3	3	3	-	3	3	3	3
<b>CO3</b>	3	3	3	3	3	3	3	3	3	3	3	3	3
<b>CO4</b>	3	3	3	3	3	3	3	3	-	3	3	3	3
<b>CO5</b>	2	3	3	3	3	3	3	3	3	3	3	3	3
1 - Low, 2 - Medium, 3 - High													

*C. Guha*  
Chairman (BoS)



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

  
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**TEXT BOOKS:**

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

**REFERENCES:**

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

**Mapping of COs with POs and PSOs**

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



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