K.S.Rangasamy College of Technology

(Autonomous)

Curriculum & Syllabus

of

B.E. Electronics Engineering

(VLSI Design and Technology)

(For the batch admitted in 2023 – 2024)

R 2022

Accredited by NAACwith 'A++' Grade, Approved by AICTE, Affiliated to Anna University, Chennai.

KSR Kalvi Nagar, Tiruchengode – 637 215.
Namakkal District, Tamil Nadu, India.

Passed in BoS Meeting held on 18/11/2023
Approved in Academic Council Meeting held on 23/12/2023

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Department of ECE
K.S.Rangasamy College of Technology
Tiruchengode - 637 215.

Department ofB.E. Electronics Engineering
(VLSI Design and Technology)

Vision:

- To emerge as a distinguished center of academic excellence, offering exceptional education in Electronics Engineering, with a distinct focus on VLSI design and advanced research.

Mission:

- To nurture and develop professionals and technology leaders who uphold the highest standards of professional ethics in the realm of Electronics Engineering, with a focused specialization in VLSI design.
- To address the evolving needs of society by pushing the boundaries of disciplinary and multidisciplinary research in the field of Electronics Engineering, with our specialized focus on VLSI design.

PEOs:

- To empower graduates with the skills and knowledge necessary to achieve successful technical and professional career growth.
- To equip graduates with a profound understanding of the scientific, mathematical, and engineering fundamentals relevant to Electronics Engineering, with a specialized focus on VLSI design.
- To develop graduates who possess a commitment to lifelong learning, demonstrate creativity and innovation, and exhibit ethical and professional behavior, all while addressing the evolving needs of society.

PSOs :

Engineering Graduates will be able

- To develop graduates who are capable of solving complex engineering problems by applying their engineering knowledge in the fields of AI (Artificial Intelligence), IoT (Internet of Things), Signal Processing, VLSI design and related fields.
- To develop graduates who possess the capability to design system components and develop products that meet the specific needs of the industry and society in the field of Electronics Engineering, with a specialized focus on VLSI design.
- To develop graduates who possess essential interpersonal skills and attitudes required for ethical leadership and effective teamwork, including effective listening and communication, presentation skills, team building, and assertiveness.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **Design /development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations

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PO6: **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PEOs WITH POs

Programme Educational Objectives	Programme Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO 1	3	3	3	3	3	2	2	3	3	3	2	3
PEO 2	3	3	3	3	3	3	3	3	3	3	3	3
PEO 3	2	2	2	2	2	3	2	3	3	3	2	3

Contributions: 1- low, 2- medium, 3- high

MAPPING: Electronics Engineering (VLSI Design and Technology) (UG)

YEAR	SEM	COURSE CODE	COURSE NAME	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
I	I	60 EN 001	Professional English I								2	3	3	2	3
		60 MA 001	Matrices and Calculus	3	3	2.8	2.4	2.4							3
		60 PH 003	Physics for Electrical Engineering	3	2.8	2.8	2.6	2.4	2.6	2.4	1.75	2	1.6	2	2.4
		60 CS 001	C Programming	3	3	3		3				2	2		2
		60 ME 005	Foundation of Mechanical Engineering	3	3	3	3	3	2	2	2				3
		60 MY 001	Environmental Studies and Climate Change	2.8	2.8	3	2.8	2.75	2.6	3	3	2.2	2.2	1.8	2.8
		60 GE 001	Heritage of Tamils / தமிழர்மரபு							3	3		2		3
		60 CS 0P1	C Programming Laboratory	3	3	3		3				2	2		2
		60 ME 0P1	Fabrication and Reverse Engineering Laboratory	3	2.6	2.8	1.6	3	2	2	2.2	3	2	1.6	3
	II	60 EN 002	Professional English II								2	3	3	2	3
		60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	3	3	2.6	2.4	2.6							2
		60 CH 003	Chemistry for Electronic Engineering	3	3	2.8	2.8	2.6	2.8	2.8	2.2	3	2.6	3	3
		60 ME 002	Engineering Graphics	3	2.6	3	3	3	1	1	1		3	1.4	3
		60 EV 201	Electronic Devices	3	3	2.6	2.6	2.6			3	3	3		3
		60 GE 002	Tamils and Technology / தமிழரும்தொழில்நுட்பமும்							3	3		2		3
		60 CP 0P2	Engineering Physics and Chemistry Laboratory	3	2.8	3	2.8	2.2	2.6	2.8	2.4	2	2.2	2.2	2.4
		60 EV 2P1	Electronic Devices Laboratory	3	3	3	3	2.6	3	3		2.4	3		3
		60 CG 0P1	Career Skill Development – I								2	3	3	2	3

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YEAR	SEM	COURSE CODE	COURSE NAME	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12
II	III	60 MA 009	Linear Algebra and Numerical Methods	3	3	3	3	2							2
		60 CS 002	Data Structures and Algorithms	3	3	2	2.6	2	2	2	2.4	2.6	2		2
		60 EV 301	Electronic Circuits	3	2.8	2.6	2.2	3			3	3	3		3
		60 EV 302	Circuit Analysis	3	3	3	3	2.6							2
		60 EV 303	Digital System Design	2.8	2.8	3	2.4	2.8			3	3	3		
		60 MY 002	Universal Human Values						3	3	3	2.8	3	2	3
		60 EV 3P1	Analog and Digital Electronics Laboratory	3	3	2	2.7	2	2	2	3	2.6	2		2
		60 CS 0P2	Data Structures and Algorithms Laboratory	3	3	2	3	2	2	2	3	3	2		2
		60 CG 0P2	Career Skill Development – II								2	3	3	2	3
	IV	60 CG 0P6	Internship												
		60 MA 016	Probability and Inferential Statistics	3	3	3	3	2							2
		60 EV 401	Signals and Systems	3	3	2.8	2.8	2			3	3	3		3
		60 EV 402	Linear Integrated Circuits	2.6	2.8	3	3	3			3	3	3		3
		60 EV 403	Electromagnetic Waves	3	3	3	2.8		3	3					
		60 EV 404	Computer Architecture and Microcontrollers	3	3	2.8	3				3	3	3		3
		60 EV L1*	Open Elective I												
		60 EV 4P1	Linear Integrated Circuits and Electromagnetics Laboratory	3	3	3	3	3	2.8		3	3	3		3
		60 EV 4P2	Microcontrollers Laboratory	3	3	3	2.8	3			3	3	3		3
		60 CG 0P3	Career Skill Development – III	2.6	2.6	2.6	2.8		2.4				2	3	3
		60 CG 0P6	Internship												

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K.S. RANGASAMY COLLEGE OF TECHNOLOGY

Credit Distribution for B.E Electronics Engineering (VLSI Design and Technology) Programme – 2023 –2024 Batch

S.No.	Category	Credits Per Semester								Total Credits	Percentage %
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	2	2	-	-	-	-	-	-	**04**	**2.50**
2.	BS	7	9	4	4	-	-	-	-	**24**	**14.80**
3.	ES	10	4	3	-	-	-	-	-	**17**	**10.50**
4.	PC	-	5	14	16	22	14	12	-	**83**	**51.23**
5.	PE	-	-	-	-	3	6	3	3	**15**	**9.25**
6.	OE	-	-	-	3	-	3	3	-	**9**	**5.55**
7.	CG	-	-	-	-	-	-	2	8	**10**	**6.17**
8.	MC	-	-	-	-	-	-	-	-	**-**	**-**
9.	AC	-	-	-	-	-	-	-	-	**-**	**-**
10.	GE	-	-	-	-	-	-	-	-	**-**	**-**
Total		**19**	**20**	**21**	**23**	**25**	**23**	**20**	**11**	**162**	**100**

HS - HUMANITIES AND SOCIAL SCIENCES
BS - BASIC SCIENCE COURSES
ES - ENGINEERING SCIENCE COURSES
PC - PROFESSIONAL CORE COURSES
PE - PROFESSIONAL ELECTIVE COURSES
OE - OPEN ELECTIVES
CG - CAREER GUIDANCE COURSES
MC - MANDATORY COURSES
AC - AUDIT COURSES
GE - GENERAL ELECTIVE COURSES

- Open Electives are courses offered by different departments that do not have any prerequisites and could be of interest to students of any branch.

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HUMANITIES AND SOCIAL SCIENCES (HS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 EN 001	Professional English I	HS	3	1	1	0	2	Basic knowledge of reading and writing in English
2.	60 EN 002	Professional English II	HS	3	1	1	0	2	Basic knowledge of reading and writing in English and should have completed Professional English I.
3.	60 AB 001	National Cadet Corps (Air wing)	HS	4	2	0	2	3	NIL
4.	60 AB 002	National Cadet Corps (Army Wing)	HS	4	2	0	2	3	NIL

BASIC SCIENCE (BS)

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 MA 001	Matrices and Calculus	BS	4	3	1	0	4	NIL
2.	60 PH 003	Physics for Electrical Engineering	BS	3	3	0	0	3	NIL
3.	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	BS	4	3	1	0	4	NIL
4.	60 CH 003	Chemistry for Electronic Engineering	BS	3	3	0	0	3	NIL
5.	60 CP 0P2	Engineering Physics and Chemistry Laboratory	BS	4	0	0	4	2	NIL
6.	60 MA 009	Linear Algebra and Numerical Methods	BS	4	3	1	0	4	NIL
7.	60 MA 016	Probability and Inferential Statistics	BS	4	3	1	0	4	NIL

ENGINEERING SCIENCES (ES)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS 001	C Programming	ES	3	3	0	0	3	NIL
2.	60 ME 005	Foundation of Mechanical Engineering	ES	3	3	0	0	3	NIL
3.	60 CS 0P1	C Programming Laboratory	ES	4	0	0	4	2	NIL
4.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2	NIL
5.	60 ME 002	Engineering Graphics	ES	6	2	0	4	4	NIL

PROFESSIONAL CORE (PC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 EV 201	Electronic Devices	PC	3	3	0	0	3	NIL

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2.	60 EV 2P1	Electronic Devices Laboratory	PC	4	0	0	4	2	NIL
3.	60 EV301	Electronic Circuits	PC	3	3	0	0	3	Electronic Devices
4.	60 EV302	Circuit Analysis	PC	5	3	0	2	4	NIL
5.	60 EV303	Digital System Design	PC	3	2	1	0	3	NIL
6.	60 EV 3P1	Analog and Digital Electronics Laboratory	PC	4	0	0	4	2	Electronic Devices Laboratory
7.	60 EV 401	Signals and Systems	PC	3	2	1	0	3	Integrals, Partial Differential Equations and Laplace transform.
8.	60 EV 402	Linear Integrated Circuits	PC	3	3	0	0	3	Electronic Circuits
9.	60 EV 403	Electromagnetic Waves	PC	3	2	1	0	3	NIL
10.	60 EV 404	Computer Architecture and Microcontrollers	PC	3	3	0	0	3	Digital System Design
11.	60 EV 4P1	Linear Integrated Circuits and Electromagnetics Laboratory	PC	4	0	0	4	2	Electronic Circuits
12.	60 EV 4P2	Microcontrollers Laboratory	PC	4	0	0	4	2	Digital System Design
13.	60 EV 501	Control Systems Engineering	PC	3	2	1	0	3	Integrals and Partial Differential Equations
14.	60 EV 502	CMOS VLSI Design	PC	3	3	0	0	3	Digital System Design
15.	60 EV 503	Digital Signal Processing	PC	4	3	1	0	4	Signals and Systems
16.	60 EV 504	Artificial Intelligence	PC	5	3	0	2	4	Neural Networks
17.	60 EV 505	Analog and Digital Communication	PC	5	3	0	2	4	Signals and Systems
18.	60 EV 5P1	VLSI Laboratory	PC	4	0	0	4	2	Digital System Design
19.	60 EV 5P2	Digital Signal Processing Laboratory	PC	4	0	0	4	2	Digital Signal Processing
20.	60 EV 601	Embedded Systems	PC	3	3	0	0	3	Microprocessors and Microcontrollers
21.	60 EV 602	VLSI for wireless communication	PC	3	3	0	0	3	Analog and Digital Communication
22.	60 EV 603	Testing of VLSI Circuits	PC	3	3	0	0	3	Digital System Design
23.	60 EV 604	Verification Methodologies and Bus Architectures	PC	5	3	0	2	4	Testing of VLSI Circuits
24.	60 EV 6P1	VLSI Verification and Testing Laboratory	PC	4	0	0	4	2	Testing of VLSI Circuits
25.	60 EV 6P2	Embedded Systems Laboratory	PC	4	0	0	4	2	Microprocessors and Microcontrollers
26.	60 EV 6P3	Mini Project	PC	2	0	0	2	1	Nil
27.	60 EV 701	Introduction to Microfabrication	PC	3	3	0	0	3	CMOS VLSI Design
28.	60 EV 702	ASIC Design	PC	3	3	0	2	4	CMOS VLSI Design
29.	60 EV 703	Electronic Packaging	PC	3	3	0	0	3	CMOS VLSI Design
30.	60 EV 7P1	Microfabrication Laboratory	PC	4	0	0	4	2	CMOS VLSI Design

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PROFESSIONAL ELECTIVES (PE)
SEMESTER V, ELECTIVE I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 EV E11	Solid state Electronic Devices	PE	3	3	0	0	3
2.	60 EV E12	Analog VLSI Design	PE	3	3	0	0	3
3.	60 EV E13	Advanced Digital design	PE	3	3	0	0	3
4.	60 EV E14	HDL programming	PE	3	3	0	0	3
5.	60 EV E15	FPGA Design	PE	3	3	0	0	3
6.	60 EV E16	Foundations of data science	PE	3	3	0	0	3

SEMESTER VI, ELECTIVE II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 EV E21	Semiconductor Equipment Design and Technology	PE	3	3	0	0	3
2.	60 EV E22	System Verilog	PE	3	3	0	0	3
3.	60 EV E23	Advanced Embedded Computing	PE	3	3	0	0	3
4.	60 EV E24	VLSI Technology	PE	3	3	0	0	3
5.	60 EV E25	Physical design of VLSI	PE	3	3	0	0	3
6.	60 EV E26	Digital image Processing	PE	3	3	0	0	3

SEMESTER VI, ELECTIVE III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 EV E31	Low Power VLSI Design	PE	4	2	0	2	3
2.	60 EV E32	VLSI Signal Processing	PE	4	2	0	2	3
3.	60 EV E33	Scripting languages for VLSI design automation	PE	4	2	0	2	3
4.	60 EV E34	System On Chip	PE	4	2	0	2	3
5.	60 EV E35	Mixed Signal Design	PE	4	2	0	2	3
6.	60 EV E36	Machine Learning Techniques	PE	4	2	0	2	3

SEMESTER VII, ELECTIVE IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 EV E41	Nano Technology	PE	3	3	0	0	3
2.	60 EV E42	Analog IC Design	PE	3	3	0	0	3
3.	60 EV E43	Memory Design and Testing	PE	3	3	0	0	3
4.	60 EV E44	Network on Chip	PE	3	3	0	0	3
5.	60 EV E45	IP based VLSI Design	PE	3	3	0	0	3
6.	60 EV E46	Computer Vision: Algorithms and Applications	PE	3	3	0	0	3

SEMESTER VIII, ELECTIVE V

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 EV E51	TRL Design and Synthesis	PE	3	3	0	0	3
2.	60 EV E52	Algorithms for VLSI Design Automation	PE	3	3	0	0	3
3.	60 EV E53	DSP structures for VLSI	PE	3	3	0	0	3
4.	60 EV E54	RFIC Design	PE	3	3	0	0	3
5.	60 EV E55	Micro Electro Mechanical Systems	PE	3	3	0	0	3
6.	60 EV E56	Deep Learning	PE	3	3	0	0	3

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SEMESTER VII & SEMESTER VIII, AUDIT COURSES (AC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 AC 001	Research Methodology– I	AC	1	1	0	0	0
2.	60 AC 002	Research Methodology– II	AC	1	1	0	0	0

MANDATORY COURSES (MC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 MY 001	Environmental Studies and Climate Change	MC	2	2	0	0	0
2.	60 MY 002	Universal Human Values	MC	4	3	0	0	3
3.	60 MY003	Startup and Entrepreneurship	MC	2	2	0	0	0

GENERAL ELECTIVE COURSES (GE)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 GE 001	Heritage of Tamils / தமிழர்மரபு	GE	1	1	0	0	1
2.	60 GE 002	Tamils and Technology / தமிழரும்தொழில்நுட்பமும்	GE	1	1	0	0	1

OPEN ELECTIVES I / II / III (OE)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 EV L01	Machine Learning in VLSI	OE	3	3	0	0	3
2.	60 EV E15	FPGA Design	OE	3	3	0	0	3
3.	60 EV E55	Micro Electro Mechanical Systems	OE	3	3	0	0	3

CAREER ENHANCEMENT COURSES (CG)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 CG 0P1	Career Skill Development – I	CGC	2	0	0	2	1
2.	60 CG 0P2	Career Skill Development – II	CGC	2	0	0	2	1
3.	60 CG 0P3	Career Skill Development – III	CGC	2	0	0	2	1
4.	60 CG 0P4	Career Skill Development – IV	CGC	2	0	0	2	1
5.	60 CG 0P5	Comprehension Test	CGC	2	0	0	2	1
6.	60 EV 7P2	Project work - Phase I	CGC	4	0	0	4	2
7.	60 EV 8P1	Project work - Phase II	CGC	16	0	0	16	8
8.	60 CG 0P6	Internship	CGC	0	0	0	0	1/2/3

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY,TIRUCHENGODE -637215
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COURSES OF STUDY
(For the candidates admitted from 2023-2024 onwards)
SEMESTER I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
		Induction Programme	-	-	-	-	-	-
THEORY								
1.	60 EN 001	Professional English I	HS	3	1	0	2	2
2.	60 MA 001	Matrices and Calculus	BS	4	3	1	0	4
3.	60 PH 003	Physics for Electrical Engineering	BS	3	3	0	0	3
4.	60 CS 001	C Programming	ES	3	3	0	0	3
5.	60 ME 005	Foundation of Mechanical Engineering	ES	3	3	0	0	3
6.	60 MY 001	Environmental Studies and Climate Change	MC	2	2	0	0	0
7.	60 GE 001	Heritage of Tamils / தமிழர்மரபு	GE	1	1	0	0	1[&]
PRACTICALS								
8.	60 CS 0P1	C Programming Laboratory	ES	4	0	0	4	2
9.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2
		Total		**27**	**16**	**1**	**10**	**19**

I to VII semester
NCC[%] - Course can be waived with 3 credits in VII semester or offered as extra credits
NSS/NSO/YRC/RRC/Fine Arts[%] 3 credits is not accounted for CGPA
Career Skill Development (CSD)* - additional credit is offered not accounted for CGPA.
I to VIII semester
Internship[$] 3 additional credits not accounted for CGPA is offered based on the Internship duration

Heritage of Tamils[&] additional 1 credit is offered and not account for CGPA.

SEMESTER II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EN 002	Professional English II	HS	3	1	0	2	2
2.	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	BS	4	3	1	0	4
3.	60 CH 003	Chemistry for Electronic Engineering	BS	3	3	0	0	3
4.	60 ME 002	Engineering Graphics	ES	6	2	0	4	4
5.	60 EV 201	Electronic Devices	PC	3	3	0	0	3
6.	60 GE 002	Tamils and Technology / தமிழரும்தொழில்நுட்பமும்	GE	1	1	0	0	1[&]
PRACTICALS								

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7.	60 CP 0P2	Engineering Physics and Chemistry Laboratory	BS	4	0	0	4	2
8.	60 EV 2P1	Electronic Devices Laboratory	PC	4	0	0	4	2
9.	60 CG 0P1	Career Skill Development – I	CG	2	0	0	2	1*
			Total	**30**	**13**	**1**	**16**	**20**

- Tamils and Technology[&] additional1 credit is offered and not account for CGPA.

SEMESTER III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 009	Linear Algebra and Numerical Methods	BS	4	3	1	0	4
2.	60 CS 002	Data Structures and Algorithms	ES	3	3	0	0	3
3.	60 EV 301	Electronic Circuits	PC	3	3	0	0	3
4.	60 EV 302	Circuit Analysis	PC	5	3	0	2	4
5.	60 EV 303	Digital System Design	PC	3	2	1	0	3
6.	60 MY 002	Universal Human Values	MC	3	3	0	0	3[#]
PRACTICALS								
7.	60 EV 3P1	Analog and Digital Electronics Laboratory	PC	4	0	0	4	2
8.	60 CS 0P2	Data Structures and Algorithms Laboratory	PC	4	0	0	4	2
9.	60 CG 0P2	Career Skill Development – II	CG	2	0	0	2	1*
10.	60 CG 0P6	Internship	CG	0	0	0	0	1/2 /3[$]
			Total	**31**	**17**	**2**	**12**	**21**

- UHV[#] additional 3 credit is offered and not accounted for CGPA

SEMESTER IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 016	Probability and Inferential Statistics	BS	4	3	1	0	4
2.	60 EV 401	Signals and Systems	PC	3	2	1	0	3
3.	60 EV 402	Linear Integrated Circuits	PC	3	3	0	0	3
4.	60 EV 403	Electromagnetic Waves	PC	3	2	1	0	3
5.	60 EV 404	Computer Architecture and Microcontrollers	PC	3	3	0	0	3
6.	60 EV L1*	Open Elective I	OE	3	3	0	0	3
PRACTICALS								
7.	60 EV 4P1	Linear Integrated Circuits and Electromagnetics Laboratory	PC	4	0	0	4	2
8.	60 EV 4P2	Microcontrollers Laboratory	PC	4	0	0	4	2
9.	60 CG 0P3	Career Skill Development – III	CG	2	0	0	2	1*
10.	60 CG 0P6	Internship	CG	0	0	0	0	1/2 /3[$]

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			Total	**31**	**16**	**3**	**10**	**23**

SEMESTER V

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EV 501	Control Systems Engineering	PC	3	2	1	0	3
2.	60 EV 502	CMOS VLSI Design	PC	3	3	0	0	3
3.	60 EV 503	Digital Signal Processing	PC	4	3	1	0	4
4.	60 EV 504	Artificial Intelligence	PC	5	3	0	2	4
5.	60 EV 505	Analog and Digital Communication	PC	5	3	0	2	4
6.	60 EV E1*	Elective I	PE	3	3	0	0	3
7.	60 MY 003	Startup and Entrepreneurship	MC	2	2	0	0	0
PRACTICALS								
8.	60 EV 5P1	VLSI Laboratory	PC	4	0	0	4	2
9.	60 EV 5P2	Digital Signal Processing Laboratory	PC	4	0	0	4	2
10.	60 CG 0P4	Career Skill Development – IV	CG	2	0	0	2	1*
11.	60 CG 0P6	Internship	CG	0	0	0	0	1/2 /3&
			Total	**33**	**19**	**2**	**14**	**25**

SEMESTER VI

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EV 601	Embedded Systems	PC	3	3	0	0	3
2.	60 EV 602	Testing of VLSI Circuits	PC	3	3	0	0	3
3.	60 EV 603	Verification Methodologies and Bus Architectures	PC	5	3	0	2	4
4.	60 EV 2*	Elective II	PE	3	3	0	0	3
5.	60 EV E3*	Elective III	PE	4	2	0	2	3
6.	60 EV L2*	Open Elective II	OE	3	3	0	0	3
PRACTICALS								
7.	60 EV 6P1	VLSI Verification and Testing Laboratory	PC	4	0	0	4	2
8.	60 EV 6P2	Embedded Systems Laboratory	PC	4	0	0	4	2
9.	60 CG 0P5	Comprehension Test	CG	2	0	0	2	1*
10.	60 EV 6P3	Mini Project	PC	2	0	0	2	1&
11.	60 CG 0P6	Internship	CG	0	0	0	0	1/2 /3$
			Total	**33**	**17**	**0**	**16**	**23**

Comprehension Test* - one additional credit is offered and not accounted for CGPA calculation.
Miniproject& - 1 additional credit is offered and not accounted for CGPA calculation

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SEMESTER VII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EV 701	Introduction to Microfabrication	PC	3	3	0	0	3
2.	60 EV 702	ASIC Design	PC	5	3	0	2	4
3.	60 EV 703	Electronic Packaging	PC	3	3	0	0	3
4.	60 EV4*	Elective IV	PE	3	3	0	0	3
5.	60 EV L3*	Open Elective III	OE	3	3	0	0	3
6.	60 AB 00*	NCC\NSS\NSO\YRC\RRC\Yoga\Fine Arts	HS	4	2	0	2	3%
7.	60 AC 001	Research Methodology– I	AC	1	1	0	0	0
PRACTICALS								
8.	60 EV 7P1	Microfabrication Laboratory	PC	4	0	0	4	2
9.	60 EV 7P2	Project Work - I	CG	4	0	0	4	2
10.	60 CG 0P6	Internship	CG	0	0	0	0	1/2 /3$
			Total	**33**	**18**	**0**	**12**	**20**

NCC% - Course can be waived with 3 credits in VII semester or offered as extra 3 credits.
NSS/NSO/YRC/RRC/Fine Arts% 3 extra credits not accounted for CGPA

SEMESTER VIII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EV E5*	Elective V	PE	3	3	0	0	3
2.	60 AC 002	Research Methodology– II	AC	1	1	0	0	0
PRACTICALS								
3.	60 EV 8P1	Project Work - II	CG	16	0	0	16	8
4.	60 CG 0P6	Internship	CG	0	0	0	0	1/2 /3$
			Total	**20**	**4**	**0**	**16**	**11**

TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 162

Note: HS- Humanities and Social Sciences including Management Courses, BS- Basic Science Courses, ES- Engineering Science Courses, PE-Professional Core Courses, PE-Professional Elective Courses, GE- General Elective Courses, OE- Open Elective Courses, CG -Career Enhancement Course, MC- Mandatory Courses

L:Lecture
T:Tutorial
P:Practical

Note:
1 Hour Lecture is equivalent to 1 credit
2 Hours Tutorialisequivalentto 1credit
2 HoursPracticalisequivalentto1credit

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
(An Autonomous Institution affiliated to Anna University)

B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS
(For the candidates admitted from 2022-2023 onwards)

FIRSTSEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1.	60 EN 001	Professional English I	2	40	60	100	45	100
2.	60 MA 001	Matrices and Calculus	2	40	60	100	45	100
3.	60 PH 003	Physics for Electrical Engineering	2	40	60	100	45	100
4.	60 CS 001	C Programming	2	40	60	100	45	100
5.	60 ME 005	Foundation of Mechanical Engineering	2	40	60	100	45	100
6.	60 MY 001	Environmental Studies and Climate Change	2	100	00	100	00	100
7.	60 GE 001	Heritage of Tamils / தமிழர்மரபு	1	100	00	100	00	100
PRACTICAL								
8.	60 CS 0P1	C Programming Laboratory	3	60	40	100	45	100
9.	60 ME 0P1	Fabrication and Reverse EngineeringLaboratory	3	60	40	100	45	100

SECOND SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1.	60 EN 002	Professional English II	2	40	60	100	45	100
2.	60 MA 003	Integrals, Partial Differential	2	40	60	100	45	100

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		Equations and Laplace Transform						
3.	60 CH 003	Chemistry For Electronic Engineering	2	40	60	100	45	100
4.	60 ME 002	Engineering Graphics	2	40	60	100	45	100
5.	60 EV 201	Electronic Devices	2	40	60	100	45	100
6.	60 GE 002	Tamils and Technology / தமிழரும்தொழில் நுட்பமும்	1	100	-	100	-	100
PRACTICAL								
7.	60 CP 0P2	Engineering Physics and Chemistry Laboratory	3	60	40	100	45	100
8.	60 EV 2P1	Electronic Devices Laboratory	3	60	40	100	45	100
9.	60 CG 0P1	Career Skill Development – I	1	100	00	100	00	100

THIRD SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1.	60 MA 009	Linear Algebra and Numerical Methods	2	40	60	100	45	100
2.	60 CS 002	Data Structures and Algorithms	2	40	60	100	45	100
3.	60 EV 301	Electronic Circuits	2	40	60	100	45	100
4.	60 EV 303	Digital System Design	2	40	60	100	45	100
5.	60 MY 002	Universal Human Values	2	100	00	100	00	100
THEORY CUM PRACTICAL								
6.	60 E 302	Circuit Analysis	2	50	50	100	45	100
PRACTICAL								
7.	60 EV 3P1	Analog and Digital Electronics Laboratory	3	60	40	100	45	100
8.	60 CS 0P2	Data Structures and Algorithms Laboratory	3	60	40	100	45	100
9.	60 CG 0P2	Career Skill Development – II	1	100	00	100	00	100
10.	60 CG 0P6	Internship	-	100	-	100	-	100

FOURTH SEMESTER

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S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1.	60 MA 016	Probability and Inferential Statistics	2	40	60	100	45	100
2.	60 EV 402	Linear Integrated Circuits	2	40	60	100	45	100
3.	60 EV 403	Electromagnetic Waves	2	40	60	100	45	100
4.	60 EV 401	Signals and Systems	2	40	60	100	45	100
5.	60 EV 404	Computer Architecture and Microcontrollers	2	40	60	100	45	100
PRACTICAL								
6.	60 EV 4P1	Linear Integrated Circuits and Electromagnetics Laboratory	3	60	40	100	45	100
7.	60 EV 4P2	Microcontrollers Laboratory	3	60	40	100	45	100
8.	60 CG 0P3	Career Skill Development – III	1	100	00	100	00	100
9.	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will puta process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks fort he award ofter minal examination marks.

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60 EN 001	PROFESSIONAL ENGLISH I

Category	L	T	P	Credit
HS	1	0	2	2

Objective

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Pre-requisite

Basic knowledge of reading and writing in English.

Course Outcomes

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

CO1	Listen and comprehend complex academic texts	Understand
CO2	Read and infer the denotative and connotative meanings of technical texts	Analyze
CO3	Write definitions, descriptions, narrations, and essays on various topics	Apply
CO4	Speak fluently and accurately in formal and informal communicative contexts	Apply
CO5	Express their opinions effectively in both oral and written medium of communication	Analyze

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Apply (Ap)	20	20	40
Analyse (An)	30	30	50
Create (Cr)	0	0	0
Total	60	60	100

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 EN 001 - Professional English I								
Common to All Branches								
Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	1	0	2	30	2	40	60	100

Introduction to Fundamentals of Communication* **Listening:** General information-specific details-conversation: introduction to classmates – audio / video (formal & informal). **Speaking:** Self Introduction; Introducing a friend; conversation - politeness strategies. **Reading:** Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. **Writing:** Writing letters – informal and formal – basics and format orientation **Language Focus:** Present Tenses; word formation (affixes); synonyms, antonyms and contranyms, and phrasal verbs; abbreviations & acronyms (as used in technical contexts).	**[6]**
Narration and Summation* **Listening:** Podcast, anecdotes / stories / event narration; documentaries and interviews with celebrities. **Speaking:** Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews. **Reading:** Biographies, travelogues, newspaper reports, excerpts from literature, and travel & technical blogs. **Writing:** Paragraph writing, short report on an event (field trip etc.). **Language Focus:** Past tenses and prepositions; One-word substitution.	[6]
Description of a process / product* **Listening:** Listen to a product and process descriptions; advertisements about products or services **Speaking:** Picture description; giving instruction to use the product; presenting a product. **Reading:** Advertisements, gadget reviews and user manuals. **Writing:** Definitions; instructions; and product /process description. **Language Focus:** Imperatives; comparative adjectives; future tenses. Homonyms; and Homophones, discourse markers (connectives & sequence words)	[6]
Classification and Recommendations* **Listening:** TED Talks; scientific lectures; and educational videos. **Speaking:** Small Talk; Mini presentations **Reading:** Newspaper articles and Journal reports **Writing:** Note-making / Note-taking; recommendations; Transferring information from non-verbal (chart, graph etc, to verbal mode) **Language Focus:** Articles; Pronouns -Possessive & Relative pronouns; ; subject-verb agreement; collocations	[6]
Expression* **Listening:** Debates/ discussions; different viewpoints on an issue; and panel discussions. **Speaking:** Group discussions, debates & role plays. **Reading:** Editorials; and opinion blogs. **Writing:** Essay Writing (Descriptive or narrative). **Language Focus:** Punctuation; Compound Nouns; simple, compound & complex sentences. cause& effect expressions.	[6]
Total hours	**30**

Text book(s):

1. 'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2. Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020

Reference(s):

1. Paul Emmerson and Nick Hamilton, 'Five Minute Activities for Business English', Cambridge University Press, New York, 2005
2. Arthur Brookes and Peter Grundy,' Beginning to Write: Writing Activities for Elementary and Intermediate Learners', Cambridge University Press, New York, 2003
3. Michael McCarthy and Felicity O Dell, 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.York, 2012
4. Lakshmi Narayanan, 'A Course Book on Technical English'Scitech Publications (India) Pvt. Ltd. 2020

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*** SDG- 04- Quality Education**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Introduction to Fundamentals of Communication**	
1.1	Listening for general information and Specific details	1
1.2	Self-introduction	1
1.3	Narrating personal experiences	1
1.4	Reading relevant to technical contexts and emails	1
1.5	Writing letters – informal	1
1.6	Writing letters – formal	1
1.7	Present Tenses	1
1.8	synonyms, antonyms and contranyms, and affixes	1
1.9	phrasal verbs; abbreviations & acronyms	1
2	**Narration and Summation**	
2.1	Listening to podcasts, documentaries and interviews with celebrities	1
2.2	Narrating personal experiences	1
2.3	Summarizing of documentaries	1
2.4	Reading travelogues, and excerpts from literature	1
2.5	Paragraph writing	1
2.6	Short report on an event (field trip etc.).	1
2.7	Past tenses	1
2.8	Prepositions	1
2.9	One-word substitution	1
3	**Description of a process / product**	
3.1	Listen to a product and process descriptions	1
3.2	Picture description	1
3.3	Giving instruction to use the product	1
3.4	Reading Advertisements, gadget reviews and user manuals	1
3.5	Writing Definitions and instructions	1
3.6	Future Tenses	1
3.7	Homonyms and Homophones	1
3.8	Imperatives	1
3.9	comparative adjectives, and discourse markers	1
4	**Classification and Recommendations**	
4.1	Listening to TED Talksand educational videos	2
4.2	Listening to scientific lectures	1
4.3	Small Talk and mini presentations	2
4.4	Reading newspaper articles and journal reports	2
4.5	Note-making / Note-taking	1
4.6	Recommendations	1
4.7	Transferring information from non-verbal	1
4.8	Articles and Pronouns	2
4.9	Subject-verb agreement and collocations	
5	**Expression**	

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5.1	Listening to debates and panel discussions	1
5.2	Group discussions	2
5.3	Role plays	1
5.4	Reading editorials and opinion blogs	1
5.5	Essay Writing (Descriptive or narrative)	1
5.6	Punctuation and cause & effect expressions.	1
5.7	Compound Nouns	1
5.8	Simple, compound & complex sentences	1
	Total	**60**

Course Designers

1. Dr.A.Palaniappan -palaniappan@ksrct.ac.in

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60MA001	MATRICES AND CALCULUS	Category	L	T	P	Credit
		BS	3	1	0	4

Objective

- To familiarize the basic concepts in Cayley-Hamilton theorem and orthogonal transformation.
- To get exposed to the fundamentals of differentiation.
- To acquire skills to understand the concepts involved in Jacobians and maxima and minima.
- To solve various linear differential equations and method of variation of parameters.
- To learn various techniques and methods in solving definite and indefinite integrals.

Pre-requisite

NIL

Course Outcomes

Onthesuccessful completion ofthecourse,Studentswill beable to

CO1	Apply the concepts of Cayley-hamilton theorem and orthogonal transformation to the matrix.	Remember Understand Apply
CO2	Apply the concepts of differentiation in solving various Engineering problems.	Remember Understand Apply
CO3	Obtain Jacobians and maxima and minima of functions of two variables.	Remember Understand Apply
CO4	Employ various methods in solving differential equations.	Remember Understand Apply
CO5	Apply different techniques to evaluate definite and indefinite integrals.	Remember Understand Apply

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3							2		3
CO2	3	3	2	2	3							2		3
CO3	3	3	3	2	3							2		3
CO4	3	3	3	3	3							2		3
CO5	3	3	3	2	3							2		3
3 - Strong;2 - Medium;1 - Some														

Assessment Pattern

Bloom'sCategory	ContinuousAssessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	20	20
Apply (Ap)	40	40	70	70
Analyze (An)	0	0	0	0
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

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K.S.Rangasamy College of Technology – Autonomous (R 2022)								
60 MA 001 - Matrices and Calculus								
Common to MECH, ECE, EE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT, AI&DS, AI&ML								
Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	1	0	60	4	40	60	

Matrices

Characteristic equation - Eigen values and Eigen vectors of a real matrix - Properties of Eigen values and Eigen vectors - Cayley-Hamilton theorem - Orthogonal transformation of a symmetric matrix to diagonal form - Reduction of quadratic form to canonical form by an Orthogonal transformation - Nature of quadratic form - Applications: Stretching of an elastic membrane. [9]

Differentiation

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Successive Differentiation - Leibnitz's theorem - **Applications: Maxima and Minima of functions of one variable*.** [9]

Functions of Several Variables

Partial differentiation - Homogeneous functions and Euler's theorem - Jacobians - Taylor's series for functions of two variables - **Applications: Maxima and minima of functions of two variables - Constrained maxima and minima: Lagrange's Method of Undetermined Multipliers*.** [9]

Differential Equations

Linear differential equations of second and higher order with constant coefficients - R.H.S is of the form $e^{\alpha x}$, $sin\,\alpha x$, $cos\,\alpha x$, x^n, $n > 0$ - Differential equations with variable coefficients: Cauchy's and Legendre's form of linear equations - Method of variation of parameters. [9]

Integration

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass.

List of MATLAB Programs: [9]

1. Introduction to MATLAB.
2. Matrix Operations - Addition, Multiplication, Transpose, Inverse and Rank.
3. Solution of system of linear equations.
4. Compute of Eigen values and Eigen vectors of a Matrix.
5. Solve first and second order ordinary differential equations.
6. Compute Maxima and Minima of a function of one variable.

Total Hours: 45 + 15 (Tutorial)

TextBook(s):

1. Grewal B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi, 2017.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", 10thEdition, John Wiley and Sons (Asia) Limited,

Reference(s):

1. Dass H.K, "Higher Engineering Mathematics", 3rd (Revised) Edition, S.Chand& Company Ltd, New Delhi, 2014.
2. Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019.
3. Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand& Company Ltd, New Delhi, 2017.
4. Bali N P and Manish Goyal," A text book of Engineering Mathematics",10thEdition, Laxmi Publications (P) Ltd, 2016.

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***SDG: 4 – Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	Number of Hours
1	**Matrices**	
1.1	Characteristic equation	1
1.2	Eigen values and Eigen vectors of a real matrix	1
1.3	Properties of Eigen values and Eigen vectors	1
1.4	Cayley-Hamilton theorem	1
1.5	Tutorial	2
1.6	Orthogonal transformation of a symmetric matrix to diagonal form	1
1.7	Reduction of quadratic form to canonical form by Orthogonal transformation	1
1.8	Nature of quadratic form	1
1.9	Stretching of an elastic membrane	1
1.10	Tutorial	2
2	**Differentiation**	
2.1	Representation of functions	1
2.2	Limit of a function and Continuity	1
2.3	Differentiation rules (sum, product, quotient, chain rules)	2
2.4	Successive differentiation	1
2.5	Tutorial	2
2.6	Leibnitz's theorem	1
2.7	Maxima and minima of functions of one variable	2
2.8	Tutorial	2
3	**Functions of Several Variables**	
3.1	Partial differentiation	1
3.2	Homogeneous functions and Euler's theorem	1
3.3	Jacobians	2
3.4	Tutorial	2
3.5	Taylor's series for functions of two variables	1
3.6	Maxima and minima of functions of two variables	1
3.7	Lagrange's Method of Undetermined Multipliers	2
3.8	Tutorial	2
4	**Differential Equations**	
4.1	Linear differential equations of second and higher order with constant co-efficient	1
4.2	R.H.S is of the form $e^{\alpha x}$, $\sin \alpha x$, $\cos \alpha x$, $x^n, n > 0$	2
4.3	Tutorial	2
4.4	Differential equations with variable coefficients: Cauchy's form of linear equations	2
4.5	Differential equations with variable coefficients: Legendre's form of linear equations	2

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4.6	Method of variation of parameters	1
4.7	Tutorial	2
5	**Integration**	
5.1	Definite and Indefinite integrals	1
5.2	Substitution rule	1
5.3	Techniques of Integration: Integration by parts	1
5.4	Integration of rational functions by partial fraction	1
5.5	Tutorial	2
5.6	Integration of irrational functions	1
5.7	Improper integrals	1
5.8	Hydrostatic force.	1
5.9	Pressure, moments and centres of mass.	1
5.10	Tutorial	2
	Total	60

Course Designers

1. Dr.C.Chandran - cchandran@ksrct.ac.in
2. Mr.G.Mohan - mohang@ksrct.ac.in

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Syllabus

60 PH 003	PHYSICS FOR ELECTRICAL ENGINEERING (ECE, EE &EEE)

Category	L	T	P	Credit
BS	3	0	0	3

Objective

- To make the students to understand the basics of crystallography, crystal growth and its importance in semiconductor devices
- To enable the students in understanding the importance of quantum physics and its applications.
- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
- To understand the dielectric properties of materials including magnetic materials, applications of dielectrics and magnetic materials
- To introduce advanced materials and nano technology for various modern engineering applications

Pre-requisite

Nil

Course Outcomes

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

CO1	Recognize the basics of crystallography, different crystal growth techniques and its applications	Understand
CO2	Utilize the fundamentals of quantum mechanics and apply to one dimensional motion of particles	Understand
CO3	Acquire knowledge on basics of semiconductor physics and its applications in various devices	Apply
CO4	Impart the knowledge on magnetic and dielectric properties of materials and their applications	Apply &Analyse
CO5	Interpret the properties of new engineering materials and nano materials for potential applications	Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	30
Understand	20	20	30
Apply	30	30	30
Analyse	0	0	10
Evaluate	0	0	0
Create	0	0	0

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K.S.Rangasamy College of Technology – Autonomous R 2022								
60 PH 003- Physics for Electrical Engineering								
Common to EEE, ECE, EE								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
I	3	0	0	45	3	40	60	100

CRYSTAL STRUCTURE OF SOLIDS* Lattice - Unit cell – crystal systems and Bravais lattice - Miller indices - d spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number - Packing factor for HCP structure – Production of single crystal silicon by melt growth techniques (Bridgman and Czochralski) - Basic Properties of Silicon Wafers - wafer orientation – wafer cleaning – pattern alignment - imperfections in crystals.	[9]
QUANTUM MECHANICS* Black body radiation – Dual nature of light - de-Broglie hypothesis – Properties of matter waves - Time-dependent and time independent Schrodinger equation for wave function - Applications: Particle in a box (one dimensional and three dimensional) – Physical significance of wave function-Uncertainty principle – Applications - Electron microscope - Scanning electron microscope.	[9]
SEMICONDUCTING MATERIALS Properties-Elemental and Compound Semiconductors - Carrier Concentration in intrinsic and Extrinsic semiconductors- Experimental determinations of resistivity of semiconductor by four probe method - Hall Coefficient-Experimental Determination of Hall Coefficient- Semiconductor devices – P-N Junction diode, **Solar Cell, LED**.**	[9]
MAGNETIC AND DIELECTRIC MATERIALS* Magnetic Materials: Origin of magnetic moment - Bohr magnetron - Classification of magnetic materials -Domain theory - Hysteresis - soft and hard magnetic materials - Applications - Giant Magneto Resistance (GMR). Dielectric Materials: Polarization - Electronic, ionic, orientational and space charge - Frequency and Temperature dependence of polarization- Breakdown mechanisms - Applications of dielectrics in Capacitor and Transformer.	[9]
ADVANCED MATERIALS AND NANOTECHNOLOGY* Advanced Materials: Metallic glasses – preparation, properties and applications - Shape memory alloys (SMA) - characteristics, properties of NiTi alloy applications. Nano Technology: Properties- Top-down process: Ball Milling method – Bottom-up process: Vapour Phase Deposition - Carbon Nano Tube (CNT): Properties, preparation by electric arc method- Application -Single electron phenomena and Single electron transistor (SET)	[9]
Total hours	**45**

Text book(s):

1.	M. N. Avadhanulu, P. G. Kshirsagar, TVS Arun Murthy “A Text Book of Engineering Physics”, S Chand Publications, New Delhi, 2022.
2.	H. K. Malik, A. K. Singh “Engineering Physics” ,McGraw Hill Education Private Limited, New Delhi. 2021.
3.	D. R. Joshi, “Engineering Physics” ,McGraw Hill Education Private Limited, New Delhi. 2010.

Reference(s):

1.	S.O. Pillai, “A Textbook Of Engineering Physics” ,New Age International (P) Limited, New Delhi, 2014.
2.	B. B. Laud,“ Lasers and Non-Linear Optics”, New Age International Publications, New Delhi, 2015.
3.	Palanisamy, P.K., “Physics of Materials”, Scitech Publications, Chennai. 2012.

*** SDG:4- Quality Education**

**** SDG:7 - Sustainable and modern energy for all**

Course Contents and Lecture Schedule

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S.No.	Topic	No.of hours
1.0	**CRYSTALSTRUCTUREOFSOLIDS**	
1.1	Lattice - Unit cell – crystal systems and Bravais lattice	1
1.2	Miller indices - d spacing in cubic lattice	1
1.3	Calculation of number of atomsper unit cell	1
1.4	Atomic radius - Coordination number -Packing factor for HCP structure	1
1.5	Production of single crystal silicon by melt growth techniques	1
1.6	(Bridgman and Czochralski)	1
1.7	Basic Properties of Silicon Wafers	1
1.8	Wafer orientation–wafer cleaning	
1.9	Pattern alignment-imperfection sincrystals	
2.0	**QUANTUMMECHANICS**	
2.1	Black body radiation	1
2.2	Dual nature of light - de-Broglie hypothesis	1
2.3	Properties of matter waves	1
2.4	Time-dependent and timeindependent Schrodinger equation for wave function	1
2.5	Applications: Particle in a box (one dimensional and three dimensional)	1
2.6	Physical significance of wave function-Uncertainty principle	1
2.7	Applications of Schrodinger equation	1
2.8	Electronmicroscope	1
2.9	Scanning electron microscope	1
3.0	**SEMICONDUCTINGMATERIALS**	
3.1	Properties of semiconductor	1
3.2	Elemental and Compound Semiconductors	1
3.3	Carrier Concentration in intrinsic and Extrinsic semiconductors	1
3.4	Experimental determinations of resistivity of semiconductor	1
3.5	Four probe method	1
3.6	Hall Coefficient	1
3.7	Experimental Determination of Hall Coefficient	1
3.8	Semiconductor devices–P-NJunction diode	1
3.9	SolarCell,LED	1
4.0	**MAGNETIC ANDDIELECTRICMATERIALS**	
4.1	Origin of magnetic moment-Bohrmagnetron	1
4.2	Classification of magnetic materials	1
4.3	Domain theory-Hysteresis-soft and hard magnetic materials	1
4.4	Applications-Giant Magneto Resistance (*GMR*)	1
4.5	Electronic Polarization, Ionic Polarization	1
4.6	Orientational and space charge polarization	1
4.7	Frequency and Temperature dependence of polarization	1
4.8	Break down mechanisms	1
4.9	Applications of dielectrics in Capacitor and Transformer	1

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5.0	**ADVANCEDMATERIALSANDNANOTECHNOLOGY**	
5.1	Metallic glasses – preparation, properties and applications	1
5.2	Shape memory alloys (SMA)	1
5.3	Characteristics,properties of NiTi alloy applications	1
5.4	Properties- Top-down process: Ball Milling method	1
5.5	Bottom-up process: Vapour Phase Deposition	1
5.6	Carbon NanoTube(CNT):Properties	1
5.7	Preparationbyelectricarcmethod	1
5.8	CNT-Application	1
5.9	Single electron phenomena and Single electron transistor (SET)	1

Course Designers

1. Dr. V. Vasudevan
2. Mr.S. Vanchinathan
3. Dr. M. Malarvizhi

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60 CS 001	C PROGRAMMING

Category	L	T	P	Credit
ES	3	0	0	3

Objective

- To learn most fundamental element of the C language and to examine the execution of branching, looping statements,
- To examine the concepts of arrays, its characteristics and types and strings.
- To understand the concept of functions, pointers and the techniques of putting them to use
- To apply the knowledge of structures and unions to solve basic problems in C language
- To enhance the knowledge in file handling functions for storage and retrieval of data

Pre-requisite

NIL

Course Outcomes

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

CO1	Construct the fundamental building blocks of structured Programming in C	Apply
CO2	Implement the different operations on arrays and strings	Apply
CO3	Develop simple real world applications utilizing functions, recursion and pointers.	Apply
CO4	Demonstrate the concepts of structures ,unions ,user defined data types and preprocessor	Apply
CO5	Interpret the file concepts using proper standard library functions for a given application	Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination(Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS 001 – C Programming								
Common to All Branches								
Semester	**Hours/Week**			**Total hrs**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
I	**3**	**0**	**0**	**45**	**3**	**40**	**60**	**100**

Basics of C, I/O, Branching and Loops* Structure of a C Program – Data types – Keywords - Variables – Type Qualifiers - Constants – Operators– expressions and precedence- Console I/O– Unformatted and Formatted Console I/O - Conditional Branching and Loops-Writing and evaluation of conditionals and consequent branching	[9]
Arrays and Strings* Arrays: One Dimensional Arrays - Two Dimensional Arrays – Matrix Manipulation - Character arrays – Strings: String Manipulation with and without String Handling Functions.	[7]
Functions and Pointers* Functions: Scope of a Function – Library Functions and User defined functions - Function Prototypes – Call by value and Call by reference – Function Categorization- Arguments to main function—Recursion and application - Passing Arrays to Functions– Storage class Specifiers. Introduction to Pointer Variables - The Pointer Operators - Pointer Expressions - Pointers and Arrays - Generating a Pointer to an Array - Indexing Pointers– Function and pointers - Dynamic memory allocation.	[11]
Structures, Unions, Enumerations, Typedef and Preprocessors* Structures - Introduction to Structures and Initialization - Arrays of Structures- Arrays and Structures, Nested Structures - Passing Structures to Functions - Structure Pointers - Unions – Bit Fields - Enumerations - typedef –The preprocessor and commands.	[9]
File Handling* File: Streams –Reading and Writing Characters - Reading and Writing Strings - File System functions – File Manipulation-Sequential access - Random Access Files – Command Line arguments.	[9]
Total Hours	**45**

TextBook(s):

1.	Herbert Schildt, “The Complete Reference C”, Fourth Edition, Tata McGraw Hill Edition, 2010.
2.	Byron Gottfried, “Programming with C”, Third Edition, McGraw Hill Education, 2014.

Reference(s):

1.	E.Balagurusamy, “Programming in ANSI C”, Seventh Edition, Tata McGraw Hill Edition, New Delhi, 2016.
2.	Brian W. Kernighan and Dennis M. Ritchie, “C Programming Language”, Prentice-Hall.
3.	ReemaThareja, “Computer Fundamentals and Programming in C”, Second Edition, Oxford Higher Education, 2016.
4.	K N King, “C Programming: A Modern Approach”, Second Edition, W.W.Norton, New York, 2008.

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Course Contents and Lecture Schedule

Module No.	Topic	No.of Hours
1	**Basics of C, I/O, Branching and Loops**	
1.1	Structure of a C Program, Keywords	1
1.2	Data types, Type Qualifiers	1
1.3	Variables and Constants	1
1.4	Operators–expressions and precedence	1
1.5	Console I/O– Unformatted and Formatted Console I/O	1
1.6	Conditional Branching	1
1.7	Iteration and loops	2
1.8	Writing and evaluation of conditionals and consequent branching	1
2	**Arrays and Strings**	
2.1	One Dimensional Array	1
2.2	Two-Dimensional Array and Matrix Manipulation	1
2.3	Character arrays and Strings Basics	1
2.4	String Manipulation without String Handling Functions	2
2.5	String Manipulation with String Handling Functions	2
3	**Functions and Pointers**	
3.1	Scope of a Function – Library Functions, User defined functions and Function Prototypes	1
3.2	Function Call by value and Function Call by reference, Function Categorization	2
3.3	Arguments to main function	1
3.4	Recursion and application	1
3.5	Passing Arrays to Functions	1
3.6	Storage class Specifiers	1
3.7	Introduction to Pointer Variables - The Pointer Operators - Pointer Expressions	1
3.8	Pointers and Arrays - Generating a Pointer to an Array - Indexing Pointers	1
3.9	Function and pointers	1
3.10	Dynamic memory allocation	1
4	**Structures, Unions, Enumerations, Typedef and Preprocessors**	
4.1	Introduction to Structures and Initialization	1
4.2	Arrays and Structures, Arrays of Structures	1
4.3	Structures within Structures, Passing Structures to Functions	2
4.4	Structure Pointers	1
4.5	Unions and Bit Fields.	1
4.6	Enumerations - typedef	1
4.7	Preprocessor commands	2
5	**File Handling**	
5.1	File Streams –Reading and Writing Characters - Reading and Writing Strings	2
5.2	File System functions and File Manipulation	2
5.3	Sequential access	2
5.4	Random Access Files	2
5.5	Command Line arguments and files	1
	Total Hours	**45**

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Course Designers

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60 ME 005	FOUNDATION OF MECHANICAL ENGINEERING

Category	L	T	P	Credit
ES	3	0	0	3

Objective

- To learn a process for analysis of static objects, concepts of force and motion of particles.
- To acquire knowledge on thermodynamics process, laws and entropy.
- To impart the concept of heat transfer mechanism through simple and composite geometries
- To learn the concept of refrigeration & Air-conditioning with its application.
- To identify the different sources of energy and to know the working principle of power plants.

Pre-requisite

NIL.

Course Outcomes

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

CO1	Apply basic knowledge on statics and dynamics of particles.	Understand, Apply &Analyse
CO2	State the laws of thermodynamics and applied to thermodynamic system.	Understand, Apply &Analyse
CO3	Apply the principles of heat transfer modes in solving heat transfer problems	Understand, Apply &Analyse
CO4	Demonstrate the principle of operation of refrigeration and air-conditioning systems.	Understand & Apply
CO5	Discuss on renewable sources of energy and method of power generation.	Understand & Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Semester Examination (Marks)
	1	2	
Remember	10	10	30
Understand	20	20	30
Apply	30	30	30
Analyse	0	0	10
Evaluate	0	0	0
Create	0	0	0

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R 2022								
60 ME 005– FOUNDATION OF MECHANICAL ENGINEERING								
B.E. Electronics Engineering(VLSI Design and Technology)								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
II	3	0	0	45	3	40	60	100

Basics of Statics and Dynamics of Particles Introduction -Units and Dimensions-Laws of Mechanics–Principle of transmissibility-Lame's theorem, Parallelogram and triangular Law of forces. Displacement, Velocity, acceleration and their relationship– Relative motion.	[9]
Thermodynamics – Laws and Entropy Basic concepts – Thermodynamic systems – Laws of Thermodynamics: Zeroth law of Thermodynamics, First law of thermodynamics - Second law of Thermodynamics – cyclic heat engine, heat pump, Carnot cycle. Entropy.	[9]
Heat Transfer Introduction – Modes of Heat Transfer: Conduction, Convection and Radiation – Laws of Conduction - Types of Convection– Laws of Radiation – Radiation Shields - Fourier law of heat conduction in simple and composite wall geometrics, types of boundary and initial conditions – Fins: types – fin efficiency.	[9]
Refrigeration and Air-Conditioning** Introduction – Terminology of Refrigeration and Air conditioning systems – working principle of vapour compression and absorption system – Layout of typical domestic refrigerator. Window, Split and Central air conditioners.	[9]
Sources of Energy* and Power Plants*** Introduction – Energy- Classification of Energy Sources - Conventional Energy Sources: Working principle of Thermal, Gas, Diesel, Hydro-electric and Nuclear power plants. Non - Conventional Energy Sources: working principle of Solar, Wind, Tidal and Geothermal power plants.	[9]
Total hours	**45**

Text book(s):	
1.	Pravin Kumar, 'Basic Mechanical Engineering', Pearson India Education Services Pvt. Ltd, 2nd Edition, Chennai, 2018.
2.	Rajasekaran, S., Sankarasubramanian, G., Fundamentals of Engineering Mechanics, Vikas Publishing House Pvt. Ltd., 3rd Edition, 2017.
Reference(s):	
1.	YunusA.Cengel, 'Heat Transfer: A Practical Approach', Mcgraw-Hill, 2nd edition, 2002.
2.	Arora.C.P., 'Refrigeration and Airconditioning', Tata McGraw Hill Education Pvt. Ltd., 3rd Edition, New Delhi, 2008.
3.	Arora, S. C., Domkundwar.S., 'A Course in Power Plant Engineering', Dhanpatrai& Co., New Delhi, 2014.
4.	Jayakumar, V. and Kumar, M, 'Engineering Mechanics', PHI Learning Private Ltd, New Delhi, 2012.

*** SDG 7 – Affordable and Clean Energy**

****SDG 9 – Industry Innovation and Infrastructure**

*****SDG 12 – Responsible Consumption and Production**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours

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1.0	**BASICS OF STATICS AND DYNAMICS OF PARTICLES**	
1.1	Introduction -Units and Dimensions	1
1.2	Laws of Mechanics–Principle of transmissibility	1
1.3	Lame's theorem	1
1.4	Parallelogram Law of forces	1
1.5	Triangular Law of forces	1
1.6	Displacement, Velocity, acceleration and their relationship	2
1.7	Relative motion	2
2.0	**THERMODYNAMICS – LAWS AND ENTROPY**	
2.1	Basic concepts – Thermodynamic systems	2
2.2	Laws of Thermo dynamics: Zeroth law of Thermodynamics, First law of thermodynamics	2
2.3	Laws of Thermodynamics: Second law of Thermodynamics	1
2.4	Cyclic heat engine and Heat pump	2
2.5	Carnot cycle and Entropy	2
3.0	**HEAT TRANSFER**	
3.1	Introduction to heat transfer	1
3.2	Modes of Heat Transfer: Conduction, Convection and Radiation	1
3.3	Laws of Conduction - Types of Convection– Laws of Radiation	1
3.4	Radiation Shields	1
3.5	Fourier law of heat conduction in simple wall	1
3.6	Fourier law of heat conduction in composite wall	1
3.7	Types of boundary and initial conditions	1
3.8	Fins: types and efficiency	2
4.0	**REFRIGERATION AND AIR-CONDITIONING**	
4.1	Introduction to Refrigeration and Air-Conditioning and its Terminology	2
4.2	Working principle of vapour compression	1
4.3	Working principle of absorption system	1
4.4	Layout of typical domestic refrigerator	2
4.5	Window and Split air conditioners.	2
4.6	Central air conditioners	1
5.0	**SOURCES OF ENERGY AND POWER PLANTS**	
5.1	Introduction to energy resources and Classification	1
5.2	Working principle of Thermal and Gas power plants	2
5.3	Working principle of Diesel and Hydro-electric power plants	2
5.4	Nuclear power plants	1
5.5	Working principle of Solar and Wind power plants	2
5.6	Tidal and Geothermal power plants.	1
	Total	45

Course Designers

1. Dr.A.Murugesan – murugesana@ksrct.ac.in
2. Mr.M.Gnanaseakran – gnanasekaran@ksrct.ac.in
3. Mr.M.Moorthi – moorthi@ksrct.ac.in

Passed in BoS Meeting held on 18/11/2023
Approved in Academic Council Meeting held on 23/12/2023

CHAIRMAN BOARD OF STUDIES
Department of ECE
K.S.Rangasamy College of Technology
Tiruchengode - 637 215.

60 MY 001	ENVIRONMENTAL STUDIES AND CLIMATE CHANGE (Common to all)

Category	L	T	P	Credit
MC	2	0	0	0

Objective

- To understand the importance of ecosystem and biodiversity.
- To analyze the impacts of pollution, control and legislation.
- To enlighten awareness and recognize the social responsibility in environmental issues.
- To enlighten the waste management

Pre-requisite

Nil

Course Outcomes

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

CO1	Understand the impacts of pollution on climate change	Understand
CO2	Enhance the awareness the methods of waste management.	Apply
CO3	Examine the value of sustainable future	Evaluate
CO4	Evaluate the clean and green development for environmental problem	Evaluate
CO5	Analyze the role of Geo-science in environmental management	Analyze

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	10
Understand	20	20	20
Apply	30	30	30
Analyze	30	30	30
Evaluate	-	-	-
Create	-	-	-

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R 2022								
60 MY 001 - Environmental Studies and Climate Change								
Common to all branches								
Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	2	0	0	20	0	100	-	100

Pollution and its impact on climate change* Pollution: Sources and impacts of air pollution – green house effect- global warming- climate change - ozone layer depletion - acid rain. Carbon Footprint - Climate change on various sectors – Agriculture, forestry and ecosystem – climate change mitigation and adaptation. Action plan on climate change. IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes. *Activity*: Study of carbon emission nearby place or industry.	[4]
Integrated Waste Management** Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan – Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste - risk management: Collection, segregation, treatment and disposal methods. Waste water treatment- ASP *Activity*: Analysis and design of waste management systems, prepare a model / project -wealth from waste	[4]
Sustainable development practices[$] Sustainable development goals (SDGs) **–** Green computing- Carbon trading - Green building – Eco- friendly plastic – Alternate energy: Hydrogen – Bio-fuels – Solar energy – Wind – Hydroelectric power. Water scarcity- Watershed management, ground water recharge and rainwater harvesting. *Activity*: Select a topic and analyze the value of sustainable development.	[4]
Environment and Agriculture [$$]: Organic farming – bio-pesticides- composting, bio composting, vermi-composting, roof gardening and irrigation. Waste land reclamation. Climate resilient agriculture. Green auditing *Activity*: Prepare a green auditing report on energy, water etc.	[4]
Geo-science in natural resource management Data base software in environment information, Digital image processing applications in forecasting. GPS, Remote Sensing and Geographical Information System (GIS), World wide web (www), Environmental information system (ENVIS). *Activity*: Prepare the report using IT tool.	[4]
Total hours	**20**

Text book(s):	
1.	AnubhaKaushik , C P Kaushik. Perspectives In Environmental Studies, New Age International publishers; Sixth edition (1 January 2018)
Reference(s):	
1.	G.Tyler Miller Environmental Science 14th Edition Cengage Publications, Delhi, 2013
2.	Gilbert M.Masters and Wendell P. Ela,"Environmental Engineering And Science", Phi Learning Private Limited, 3rd Edition,2015
3.	ErachBharucha. Textbook of Environmental Studies for Undergraduate Courses, Universities Press, 2000

§§ SDG: 3 – Good Health and Well-being
****SDG: 4 – Clean Water and Sanitation**
§SDG: 6 - Affordable and Clean Energy
***SDG: 13 – Climate Action**

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Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Pollution and its impact on climate change**	
1.1	Pollution: Sources and impacts of air pollution – green house effect- Global warming- climate change - ozone layer depletion - acid rain	2
1.2	Climate change on various sectors: Agriculture, forestry and ecosystem. – climate change mitigation and adaptation	1
1.3	Action plan on climate change - IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes	1
2	**Integrated Waste Management**	
2.1	Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan	1
2.2	Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste	1
2.3	Risk management: Collection, segregation, treatment and disposal methods.	1
2.4	Waste water treatment- ASP	1
3	**Sustainable development practices**	
3.1	Sustainable development goals (SDGs) **–** Green computing- Carbon trading - Green building – Eco- friendly plastic	1
3.2	Alternate energy: Hydrogen – Bio-fuels – Solar energy – Wind – Hydroelectric power	2
3.3	Water scarcity- Watershed management, ground water recharge and rainwater harvesting	1
4	**Environment and Agriculture**	
4.1	Organic farming – bio-pesticides	1
4.2	Composting, bio composting, vermi-composting	1
4.3	Roof gardening and irrigation	1
4.4	Waste land reclamation. Climate resilient agriculture, Green auditing	1
5	**Geo-science in natural resource management**	
5.1	Data base software in environment information, Digital image processing applications in forecasting	2
5.2	GPS, Remote Sensing and Geographical Information System (GIS)	1
5.3	World wide web (www), Environmental information system (ENVIS)	1
	Total	20

Course Designers

1. Dr.T.A.SUKANTHA
2. Dr.S.MEENACHI
3. Mr.K.TAMILARASU

Passed in BoS Meeting held on 18/11/2023
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60 GE 001	**Heritage of Tamils** (Common to all Branches)

Category	L	T	P	Credit
GE	1	0	0	1

Objectives:

- To learn the extensive literature of classical Tamil.
- To review the fine arts heritage of Tamil culture.
- To realize the contribution of Tamils in Indian freedom struggle.

Pre-requisite:

Nil

Course Outcomes:

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

CO1	Recognize the extensive literature of Tamil and its classical nature.	Understand
CO2	Apprehend the heritage of sculpture, painting and musical instruments of ancient people.	Understand
CO3	Review on folk and martial arts of Tamil people.	Understand
CO4	Insight thinai concepts, trade and victory of Chozha dynasty.	Understand
CO5	Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.	Understand

Mapping with Programme Outcomes

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

3- Strong; 2-Medium; 1-Low

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Syllabus

K. S. Rangasamy College of Technology – Autonomous R2022								
60 GE 001 – Heritage of Tamils								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	1	0	0	15	1	100	-	100

Language and Literature* 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.	3
Heritage - Rock Art Paintings to Modern Art – Sculpture* 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.	3
Folk and Martial Arts* Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.	3
Thinai Concept of Tamils* 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.	3
Contribution of Tamils to Indian National Movement and Indian Culture* 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.	3
Total Hours	**15**

Text Book(s):

1.	தமிழகவரலாறு - மக்களும்பண்பாடும்கே. கே . பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).
2.	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3.	கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு).
4.	பொருநை - ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

*SDG:4- Quality Education

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60 GE 001	**தமிழர்மரபு** (அனைத்துதுறைகளுக்கும்பொதுவானது)	Category	L	T	P	Credit
		GE	1	0	0	1

பாடத்தின்நோக்கங்கள்:

- தமிழ்மொழியின்இலக்கணச்செறிவைக்கற்றுணர்தல்.
- தமிழர்பண்பாட்டின்நுண்கலைகள்பற்றியஒருமீள்பார்வை.
- இந்தியசுதந்திரப்போராட்டத்தில்தமிழர்களின்பங்களிப்பைஉணருதல்.

முன்கூட்டியதுறைசார்அறிவு:

தேவைஇல்லை

பாடம்கற்றதின்விளைவுகள்:

பாடத்தைவெற்றிகரமாகக்கற்றுமுடித்தபின்பு, மாணவர்களால்முடியும்விளைவுகள்

CO1	தமிழ்மொழியின்செந்தண்மைமற்றும்இலக்கியம்குறித்ததெரிதல்.	புரிதல்
CO2	தமிழர்களின்சிற்பக்கலை, ஓவியக்கலைமற்றும்இசைக்கருவிகள்குறித்ததெளிவு.	புரிதல்
CO3	தமிழர்களின்நாட்டுப்புறக்கலைகள்மற்றும்வீரவிளையாட்டுகள்குறித்ததெளிவு.	புரிதல்
CO4	தமிழர்களின்திணைக்கோட்பாடுகள், சங்ககாலவணிகம்மற்றும்சோழர்களின்வெற்றிகள்குறித்ததகவல்கள்.	புரிதல்
CO5	இந்தியதேசியஇயக்கம், சுயமரியாதையைஇயக்கம்மற்றும்சித்தமருத்துவம்பற்றியபுரிதல்.	புரிதல்

Mapping with Programme Outcomes

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

3- Strong; 2-Medium; 1-Low

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Department of ECE
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Syllabus

K. S. Rangasamy College of Technology – Autonomous R2022								
60 GE 001 – *தமிழர்மரபு*								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	1	0	0	15	1	100	-	100

***மொழி மற்றும் இலக்கியம்*:** *இந்தியமொழிக்குடும்பங்கள் – திராவிடமொழிகள்–தமிழ்ஒருசெம்மொழி– தமிழ்செவ்விலக்கியங்கள் - சங்கஇலக்கியத்தின்சமயச்சார்பற்றதன்மை – சங்கஇலக்கியத்தில்பகிர்தல்அறம் – திருக்குறளில்மேலாண்மைக்கருத்துக்கள் - தமிழ்க்காப்பியங்கள் - தமிழகத்தில்சமணபௌத்தசமயங்களின்தாக்கம் – பக்திஇலக்கியம், ஆழ்வார்கள்மற்றும்நாயன்மார்கள் - சிற்றிலக்கியங்கள் -தமிழில்நவீனஇலக்கியத்தின்வளர்ச்சி – தமிழ்இலக்கியவளர்ச்சியில்பாரதியார்மற்றும்பாரதிதாசன்ஆகியோரின்பங்களிப்பு.*	3
***மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக்கலை*:** *நடுகல்முதல்நவீனசிற்பங்கள்வரை – ஐம்பொன்சிலைகள் – பழங்குடியினர்மற்றும்அவர்கள்தயாரிக்கும்கைவினைப்பொருட்கள், பொம்மைகள் - தேர்செய்யும்கலை – சுடுமண்சிற்பங்கள் – நாட்டுப்புறத்தெய்வங்கள் – குமரிமுனையில்திருவள்ளுவர்சிலை – இசைக்கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின்சமூகபொருளாதாரவாழ்வில்கோவில்களின்பங்கு.*	3
***நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுகள்*:** *தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின்விளையாட்டுகள்.*	3
***தமிழர்களின் திணைக்கோட்பாடுகள்*:** *தமிழகத்தின்தாவரங்களும், விலங்குகளும் – தொல்காப்பியம்மற்றும்சங்கஇலக்கியத்தில்அகம்மற்றும்புறக்கோட்பாடுகள் - தமிழர்கள்போற்றியஅறக்கோட்பாடு - சங்ககாலத்தில்தமிழகத்தில்எழுத்தறிவும், கல்வியும் - சங்ககாலநகரங்களும்துறைமுகங்களும் - சங்ககாலத்தில்ஏற்றுமதிமற்றும்இறக்குமதி – கடல்கடந்தநாடுகளில்சோழர்களின்வெற்றி.*	3
***இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு*:** *இந்தியவிடுதலைப்போரில்தமிழர்களின்பங்கு – இந்தியாவின்பிறப்பகுதிகளில்தமிழ்ப்பண்பாட்டின்தாக்கம் - சுயமரியாதைஇயக்கம் – இந்தியமருத்துவத்தில், சித்தமருத்துவத்தின்பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப்புத்தகங்களின்அச்சுவரலாறு.*	3
Total Hours	**15**

Text Book(s):

1.	*தமிழகவரலாறு - மக்களும்பண்பாடும்கே. கே . பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).*
2.	*கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).*
3.	*கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு).*
4.	*பொருநை - ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு).*
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

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60 CS 0P1	C PROGRAMMING LABORATORY

Category	L	T	P	Credit
ES	0	0	4	2

Objective

- To enable the students to apply the concepts of C to solve simple problems
- To use selection and iterative statements in C programs
- To apply the knowledge of library functions in C programming
- To implement the concepts of arrays, functions, structures and pointers in C
- To implement the file handling operations through C

Pre-requisite

NIL

Course Outcomes

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

CO1	Read, display basic information and use selection and iterative statements.	Apply
CO2	Demonstrate C program to manage collection of related data.	Apply
CO3	Design and Implement different ways of passing arguments to functions, Recursion and implement pointers concepts.	Apply
CO4	Develop a C program to manage collection of different data using structures, Union, user-defined data types and preprocessor directives.	Apply
CO5	Demonstrate C program to store and retrieve data using file concepts.	Apply

Mapping with Programme Outcomes

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

List of Experiments

1. Implementation of Simple computational problems using various formulas*.
2. Implementation of Problems involving Selection statements*.
3. Implementation of Iterative problems e.g., sum of series*.
4. Implementation of 1D Array manipulation*.
5. Implementation of 2D Array manipulation*.
6. Implementation of String operations*.
7. Implementation of Simple functions and different ways of passing arguments to functions and Recursive Functions*.
8. Implementation of Pointers*
9. Implementation of structures and Union*.
10. Implementation of Bit Fields, Typedef and Enumeration*.
11. Implementation of Preprocessor directives*.
12. Implementation of File operations*.

*** SDG:4- Quality Education**

Course Designers

1. Dr.P.Kaladevi - kaladevi@ksrct.ac.in

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60 ME 0P1	Fabrication and Reverse Engineering Laboratory (Common to All branches)	Category	L	T	P	Credit
		ES	0	0	4	2

Objectives

- To acquire skills in operating hand tools and instruments.
- To provide hands-on training on Carpentry, Sheet metal, Fitting and Welding.
- To provide hands-on training on household wiring and electronic circuits.
- To offer real time activity on plumbing connections in domestic applications.
- To provide hands-on activities on dismantling, and assembling the Home Appliance, Center lathe operations, computer's internal components and peripherals.

Pre-requisite

-Nil-

Course Outcomes

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

CO1	Perform power tools operations.	Apply
CO2	Make a wooden model using carpentry Process	Apply
CO3	Make a model using sheet metal, filing and joining a MS Plate	Apply
CO4	Repair and Maintenances of water lines for home applications	Apply
CO5	Trouble shoots the electrical and electronic circuits, Electrical Machines and realizes the reputation of house wiring, home Appliance, computer internal components and peripherals.	Apply

Mapping with Programme outcomes

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

Syllabus

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Performs of Power Tools
Drilling in different Walls and Materials Fitting of Hand shower mount, Shirt hanger, Towel hanger and Pipe with clamps.

Carpentry Process
Design and Development of Wooden Model using the Carpentry Process T / Cross Joint / different joints

Sheet Metal and Filling Process
Design and Development of Metal Model - Make a Tray Components using Sheet Metal Process and Mating of Square joint in MS Plate using the Filling Process

Welding Process
Fabrication of Models with MS Plate using Arc Welding- Lap Joint, Butt Joint, T Joint

Plumbing Process
Repair and Maintenances of Pipe Fitting for Home Applications Study of plumbing tools, assembly of G.I. pipes/ PVC and pipe fittings, cutting of threads in G.I. Pipes by thread cutting dies.

Residential house wiring
Design and Excusion of Residential house wiring With and Without UPS- 1 BHK - 2 BHK. Design and fabrication of domestic LED lamps - Circuit designing (calculation of components)

Electronic Circuit wiring
PCB fabrication – Soldering - Assembling of Audio Amplifiers- Connecting USB/Bluetooth MP3 player board - Connecting Volume controllers - Connecting bass & treble filter boards - Connecting Surround and sub-woofer filter board

Assembling and dismantling of Electronics Machines
Iron box, Induction stove, Water heater, Mixer, Table fan, Ceiling fan

Study Exercises
Demonstration of Centre Lathe operations Facing, Turning, and drilling and its components.
Assemble and dismantle of Vacuum Cleaner / Refrigerator and its components

Computer Hardware Study Exercises
Identify internal components of computer - Assemble and dismantle desktop computer systems

List of Experiments

1. Fitting of Wall mounting Parts using Power Tools

a) Drilling in different Walls and Materials

b) Fitting of Hand shower mount, Shirt hanger, Towel hanger and Pipe with Clamps.

2. Making of Wooden model using the Carpentry Process

a) T / Cross Joint

b) Mortise and Tenon Joint / different joints

3. Making of Metal Model

a) Making of Components using Sheet Metal Process

b) Mating of Components using the Filling Process

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4. Fabrication of Welded model

5. Repair and Maintenance of Pipe Fitting for Home Applications

a) Assembly of GI pipes/PVC and Pipe Fitting

b) Cutting of Threads in GI pipes by thread Cutting Dies

6. Assembling and dismantling of

a) Iron box

b) Induction stove

c) Water heater

d) Mixer

e) Table fan

f) Ceiling fan

7. Design and Execution of Residential house wiring

a) 1 BHK

b) 2 BHK

8. Design and Execution of Residential house wiring with UPS.

a) 1 BHK

b) 2 BHK

9. Design and fabrication of domestic LED lamps

a) Circuit designing (calculation of components)

b) PCB fabrication

c) Soldering

10. Assembling of Audio Amplifiers

a) Connecting USB/Bluetooth MP3 player board

b) Connecting Volume controllers

c) Connecting bass & treble filter boards

d) Connecting Surround and sub-woofer filter board

Study Exercises

1. Demonstration of Centre Lathe and its operations like Facing, Turning, and drilling.
2. Dismantle and Assemble of Vacuum Cleaner / Refrigerator.
3. Study of components of computer. Dismantle and assemble of desktop computer systems

Course Designers

1. Mr.SSakthivel - sakthivel_s@ksrct.ac.in
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3. Mr. K.Raguvaran – raguvaran@ksrct.ac.in

***SDG 9 – Industry Innovation and Infrastructure**

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60 EN 002	PROFESSIONAL ENGLISH II

Category	L	T	P	Credit
HS	1	0	2	2

Objective

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Prerequisite

Basic knowledge of reading and writing in English and should have completed Professional English I.

Course Outcomes

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

CO1	Compare and contrast products and ideas in technical texts.	Analyze
CO2	Identify cause and effects in events, industrial processes through technical texts	Analyze
CO3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	Analyze
CO4	Report events and the processes of technical and industrial nature.	Apply
CO5	Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search.	Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom'sCategory	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Apply (Ap)	20	20	40
Analyse (An)	30	30	50
Create (Cr)	0	0	0
Total	60	60	100

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R 2022								
60 EN 002 –PROFESSIONAL ENGLISH II								
Common to All Branches								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
II	1	0	2	30	2	40	60	100

Making Comparisons* **Listening:** Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organiser (choosing a product or service by comparison) **Speaking:** Marketing a product, persuasive speech techniques. **Reading:** Reading advertisements, user manuals and brochures. **Writing:** Professional emails, Email etiquette - compare and contrast essay. **Language Focus:** mixed tenses, prepositional phrases, same words used in different contexts and discourse markers	**[6]**
Expressing Causal Relations in Speaking and Writing* **Listening:** Listening to longer technical talks and completing– gap filling exercises. Listening technical information from podcasts – Listening to process/event descriptions to identify cause & effects. **Speaking:** Describing and discussing the reasons of accidents or disasters based on news reports. **Reading:** longer technical texts– cause and effect essays, and letters / emails of complaint, **Writing:** Writing responses to complaints **Language Focus:** Active Passive Voice transformations, Infinitive and Gerunds – Word Formation (Noun-Verb-Adj-Adv), Adverbs.	[6]
Problem Solving* **Listening:** Listening to / watching movie scenes/ documentaries depicting a technical problem and suggesting solutions. **Speaking:** Group Discussion (based on case studies), - techniques and Strategies. **Reading:** Case Studies, excerpts from literary texts, news reports etc. **Writing:** Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay **Language Focus:** Error correction; If conditional sentences - Compound Words, Sentence Completion.	[6]
Reporting of Events and Research* **Listening:** Listening Comprehension based on new report and documentaries – **Speaking:** Interviewing, presenting oral reports, Mini presentations on select topics. **Reading:** Newspaper articles. **Writing:** Recommendations, Transcoding, Accident Report, Precis writing and Summarising, and Plagiarism **Language Focus:** Reported Speech – Modals - Conjunctions- use of Prepositions	[6]
The Ability to put Ideas or Information Coherently* **Listening:** Listening to TED Talks, Presentations, Formal job interviews, (analysis of the interview performance). **Speaking:** Participating in role plays, virtual interviews, making presentations with visual aids **Reading:** excerpts of interview with professionals **Writing:** Job / Internship application – Cover letter & Résumé **Language Focus:** Numerical Adjectives, question types: Wh/ Yes or No/ and Tags; Relative Clauses - Idioms.	[6]
Total hours	**30**

Text book(s):

1.	*'English for Engineers & Technologists'* Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, *'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book'*, Penguin Random House India, 2020

Reference(s):

1.	Raman. Meenakshi, Sharma. Sangeeta,*'Professional English'*. Oxford university press.New Delhi. 2019
2.	Arthur Brookes and Peter Grundy,' *Beginning to Write: Writing Activities for Elementary and Intermediate Learners',* Cambridge University Press, New York, 2003
3.	Prof. R.C. Sharma & Krishna Mohan, *'Business Correspondence and Report Writing'*, TataMcGraw Hill & Co. Ltd., New Delhi, 2001
4.	V.N. Arora and Laxmi Chandra, *'Improve Your Writing'*, Oxford University Press, New Delhi, 2001

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*SDG- 04- Quality Education

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Making Comparisons**	
1.1	Evaluative Listening	1
1.2	Product Descriptions and filling a graphic organiser	1
1.3	Marketing a product by using persuasive techniques	2
1.4	Reading advertisements, user manuals and brochures	1
1.5	Writing professional emails	1
1.6	Compare and contrast essay	1
1.7	mixed tenses and prepositional phrases	1
1.8	Same words used in different contexts	1
2	**Expressing Causal Relations in Speaking and Writing**	
2.1	Listening to longer technical talks	1
2.2	Listening to process/event descriptions	1
2.3	Describing and discussing the reasons of accidents or disasters	1
2.4	Reading longer technical texts– cause and effect essays	1
2.5	Writing responses to complaints	1
2.6	Active Passive Voice transformations	2
2.7	Infinitive and Gerunds	1
2.8	Word Formation (Noun-Verb-Adj-Adv), Adverbs.	1
3	**Problem Solving**	
3.1	Listening to documentaries and suggesting solutions	1
3.2	Group Discussion (based on case studies)	2
3.3	Reading Case Studies, excerpts from literary texts and news reports	1
3.4	Letter to the Editor	1
3.5	Checklists	1
3.6	Problem solution and argumentative essays	1
3.7	Error correction and Sentence Completion	1
3.8	If conditional sentences	1
4	**Reporting of Events and Research**	
4.1	Listening Comprehension	1
4.2	Interviewing and presenting oral reports	1
4.3	Mini presentations on select topics	1
4.4	Reading newspaper articles	1
4.5	Recommendations	1
4.6	Transcoding	1
4.7	Precis writing, Summarising and Plagiarism	1
4.8	Reported Speech, Modals	1
4.9	Conjunctions	1
5	**The Ability to put Ideas or Information Coherently**	
5.1	Listening to Formal job interviews	1

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5.2	Role plays	2
5.3	Virtual interviews	1
5.4	Reading Company profiles	1
5.5	Writing Statement of Purpose (SoPs)	1
5.6	Writing Résumé	1
5.7	Numerical Adjectives and Relative Clauses - Idioms	1
5.8	question types: Wh/ Yes or No/ and Tags	1
	Total	**45**

Course Designers

1. Dr.A.Palaniappan -palaniappan@ksrct.ac.in

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60 MA 003	INTEGRALS, PARTIAL DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM

Category	L	T	P	Credit
BS	3	1	0	4

Objective

- To provide exposure in handling situations involving multiple integrals.
- To familiarize the basic concepts in Vector calculus.
- To get exposed to the fundamentals in analytic functions.
- To develop the mathematical skills in solving partial differential equations.
- To facilitate the concepts in Laplace transform techniques.

Prerequisite

NIL.

Course Outcomes

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

CO1	Evaluate double and triple integrals.	Remember, Apply, Evaluate
CO2	Analyze the basic concepts of vector calculus.	Remember, Analyze, Evaluate
CO3	Construct the Analytic functions and evaluate the complex integrals.	Remember, Understand, Apply
CO4	Compute the solutions of partial differential equations using different methods.	Remember, Apply
CO5	Apply Laplace transform techniques for solving differential equations.	Remember, Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	0	10	10	10
Apply (Ap)	20	40	40	40
Analyze (An)	10	0	20	20
Evaluate (Ev)	20	0	20	20
Create (Cr)	0	0	0	0
Total	60	60	100	100

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R 2022								
60 MA 003– INTEGRALS, PARTIAL DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM								
Common to Mech,ECE,EE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
II	3	1	0	60	4	40	60	100

MULTIPLE INTEGRALS Double integration – Cartesian and polar co-ordinates – Change of order of integration – Area as double integral – Triple integration in Cartesian co-ordinates – Change of variables - Cartesian to polar co-ordinates and Cartesian to Cylindrical co-ordinates.	[9]
VECTOR CALCULUS* Introduction - Gradient of a scalar point function –Directional derivative – Angle of intersection of two surfaces – Divergence and curl (excluding vector identities) – Solenoidal and irrotational vectors – Application: Green's theorem in the plane – Gauss divergence theorem -Stokes' theorem (statement only) .	[9]
ANALYTIC FUNCTIONS AND INTEGRALS Analytic function – Necessary and Sufficient conditions (statement only)-Properties – Harmonic function – Construction of an analytic function – Cauchy's Integral theorem (statement only) – Cauchy's integral formula – Classification of singularities – Application: Cauchy's residue theorem.	[9]
PARTIAL DIFFERENTIAL EQUATIONS* Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – Non- Linear partial differential equations of first order – Lagrange's linear equations – Application: Homogeneous Linear partial differential equations with constant coefficients.	[9]
LAPLACE TRANSFORM Conditions for existence – Transforms of elementary functions – Basic properties - Derivatives and integrals of transforms - Initial and final value theorem – Transform of periodic functions. Inverse Laplace transform – Convolution theorem (excluding proof) – Application: Solution of second order ordinary differential equations with constant co-efficients.	[9]
Hands on: 1. Evaluating double and triple integrals. 2. Area as double integral. 3. Volume as triple integral. 4. Plotting and visualizing single variable functions. 5. Plotting and visualizing functions of two and three variables. 6. Evaluating Gradient, divergence and curl. 7. Evaluating Laplace & Inverse Laplace transforms. 8. Applying Laplace transform techniques to solve differential equations	
Total hours:45+15(Tutorial)	**60**

Text book(s):	
1.	Grewal B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi, 2017.
2.	Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019.
Reference(s):	
1.	Kreyszig Erwin, "Advanced Engineering Mathematics", 10th Edition, John Wiley and Sons (Asia) Limited,New Delhi, 2016.
2.	Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand&Company Ltd, New Delhi, 2017.
3.	Bali N P and Manish Goyal," A text book of Engineering Mathematics",10th Edition,Laxmi Publications(P) Ltd, 2016.
4.	Dr.P.Agrawal, Dr.D.N.Pandey, "Integral Equations, Calculus of Variations and its Applications", NPTEL online video courses.

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Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**MULTIPLE INTEGRALS**	
1.1	Double integration	1
1.2	Cartesian and polar coordinates	1
1.3	Change of order of integration	1
1.4	Area as double integral	1
1.5	Tutorial	2
1.6	Triple integration in Cartesian coordinates	1
1.7	Change of variables	1
1.8	Cartesian to polar coordinates	1
1.9	Cartesian to Cylindrical coordinates	1
1.10	Tutorial	2
2	**VECTOR CALCULUS**	
2.1	Introduction : Gradient of a scalar point function	1
2.2	Directional derivative	1
2.3	Angle of intersection of two surfaces	1
2.4	Divergence and curl (excluding vector identities)	1
2.5	Tutorial	2
2.6	Solenoidal and irrotational vectors	1
2.7	Application : Green's theorem in the plane	1
2.8	Gauss divergence theorem	1
2.9	Stokes' theorem (statement only)	1
2.10	Tutorial	2
3	**ANALYTIC FUNCTIONS AND INTEGRALS**	
3.1	Analytic function	1
3.2	Necessary and Sufficient conditions (statement only)	1
3.3	Properties	1
3.4	Harmonic function	1
3.5	Tutorial	2
3.6	Construction of an analytic function	1
3.7	Cauchy's Integral theorem (statement only), Cauchy's integral formula	1
3.8	Classification of singularities	1
3.9	Applications: Cauchy's residue theorem.	1
3.10	Tutorial	2
4	**PARTIAL DIFFERENTIAL EQUATIONS**	
4.1	Formation of partial differential equations by eliminating arbitrary constants	1
4.2	Formation of partial differential equations by eliminating arbitrary functions	2
4.3	Tutorial	2
4.4	Non- linear partial differential equations of first order	2
4.5	Lagrange's linear equations	1

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4.6	Application:Homogeneous Linear partial differential equations with constant coefficients.	2
4.7	Tutorial	2
5	**LAPLACE TRANSFORM**	
5.1	Conditions for existence	1
5.2	Transforms of elementary functions	1
5.3	Basic properties	1
5.5	Derivatives and integrals of transforms, Initial and final value theorem	1
5.6	Tutorial	1
5.7	Transform of periodic functions	2
5.8	Inverse Laplace transform	1
5.9	Convolution theorem (excluding proof)	1
5.10	Application:Solution of second order ordinary differential equation with constant co-efficient.	1
5.11	Tutorial	2
	Total	60

Course Designers

1. Dr. C. Chandran – cchandran@ksrct.ac.in
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60 CH 003	CHEMISTRY FOR ELECTRONIC ENGINEERING (Common to EEE ,ECE& EE)

Category	L	T	P	Credit
BS	3	0	0	3

Objective

- To help the learners to analyze the hardness of water and its removal
- To analyze the concepts and functions of electrochemistry
- To endow an overview of energy storage devices
- To understand the basics and application of chemical sensors
- To rationalize the types of electronic materials

Pre-requisite

NIL

Course Outcomes

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

CO1	Identify the different types of water softening methods	Apply
CO2	Analyse the significance of electro chemistry in engineering	Analyse
CO3	Recognize the types of energy storage devices and its principle	Understand
CO4	Interpret the principles of sensors for various applications.	Understand, Analyse, Apply
CO5	Understand the advantages of advanced electronic materials	Understand

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	2	
Remember	10	10	20
Understand	20	20	40
Apply	20	20	20
Analyze	10	10	20
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R 2022								
60 CH 003 – Chemistry For Electronic Engineering								
Common to EEE,ECE& EE								
Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	40	60	100

WATER TECHNOLOGY* Introduction – Commercial and industrial uses of water – hardness – types – estimation of hardness by EDTA method- Internal conditioning (colloidal, phosphate, 54algon and carbonate conditioning methods) – external conditioning (Zeolite process, demineralization process) – Desalination methods (Reverse Osmosis and Electro dialysis). Flash evaporation	[7]
ELECTROCHEMISTRY* Electrode potential – Nernst Equation – derivation and problems – reversible and irreversible cells – Types of Electrodes and its applications – reference electrodes – pH, conductometric and Potentiometric titrations – Principles of electro plating and electro less plating- fabrication process of Printed Circuit Board.	[9]
ENERGY STORAGE DEVICES** Batteries – Types of Batteries. Fabrication and Working of Alkaline Battery – Lead-Acid Battery-Ni-Cd-Lithium Ion Batteries – Fuel Cells: Hydrogen-Oxygen fuel cell – microbial fuel cell (MFC). Organic Solar Cells-working principle and applications organic transistors- construction-working principle and applications in electronic Industries.	[9]
CHEMICAL SENSORS*** Sensors – Chemical Sensors – Characteristics – Elements and Characterization – Potentiometric Sensors - Amperometric Sensors – Sensors Based on Electrochemical Methods – Electrochemical Biosensors – Optical Biosensors : Enzyme Sensors – Bio affinity Sensors - DNA Sensors. Chemical Sensors as Detectors and Indicators: Indicators for Titration Processes – Separation Methods. Nano technology in chemical sensors.	[10]
ELECTRONIC MATERIALS Liquid crystal polymers – Organic Light Emitting Diode (OLED) – [polythiopene] – working and applications – Conductive polymers and Semi conducting polymers: principle and applications- organic: Organic dielectric material [Polystyrene, PMMA]. Smart screen materials: Inorganic Rare earth metals [yttrium, lanthanum, cerium] – Conductive components: Indium tin oxide [properties and applications] – touch screen [resistive and capacitive] – magnetic storage [Iron oxide, cobalt alloy] – optical storage [photo chromic materials] – solid storage.	[10]
Total hours	**45**

Text book(s):

1. O.G. Palanna “Engineering Chemistry” Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2017.
2. Jain. P.C. and Monica Jain, “Engineering Chemistry”, Dhanpatrai publishing co. New Delhi, 14th edition, 2015.

Reference(s):

1. Pletcher D and Walsh F C, “Industrial Electrochemistry”, Chapman and Hall, 2nd Edition, New York, 1990
2. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.
3. ShikhaAgarwal, “Engineering Chemistry-Fundamentals and Applications”, Cambridge University Press, Delhi, 2nd Edition, 2019.
4. Hagen Klauk, “Organic Electronics: Materials, Manufacturing and Applications”, Wiley-VCH, 2006.

***SDG: 6 – Clean Water and Sanitation**
****SDG: 7 - Affordable and Clean Energy**
*****SDG: 15 – Life on land**

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Course Contents and Lecture Schedule

S.No.	Topic	No.of hours
1.0	**WATER TECHNOLOGY**	
1.1	Introduction – Commercial and Industrial uses of water	**1**
1.2	Hardness – types	**1**
1.3	Estimation of Hardness of ater by EDTA method	**1**
1.4	Internal conditioning (Colloidal, Phosphate, Calgon and Carbonate)	**1**
1.5	External conditioning (Zoelite process & Demineralization process)	**1**
1.6	Desalination methods (Reverse Osmosis and Electrodialysis)	**1**
1.7	Flash Evaporation	**1**
2.0	**ELECTROCHEMISTRY**	
2.1	Electrode potential – Nernst Equation – derivation and problems	**2**
2.2	Reversible and irreversible cells	**1**
2.3	Types of Electrodes and its applications	**1**
2.4	Reference electrodes - pH	**1**
2.5	Conductometric and Potentiometric titrations	**1**
2.6	Principles of electro plating and electro less plating-	**2**
2.7	Fabrication process of Printed Circuit Board.	**1**
3.0	**ENERGY STORAGE DEVICES**	
3.1	Batteries – Types of Batteries.	**2**
3.2	Fabrication and Working of Alkaline Battery	**1**
3.3	Lead-Acid Battery	**1**
3.4	Ni-Cd-Lithium Ion Batteries	**1**
3.5	Fuel Cells: Hydrogen-Oxygen fuel cell	**1**
3.6	Microbial fuel cell (MFC).	**1**
3.7	Organic Solar Cells-working principle and applications organic transistors	**1**
3.8	Construction-working principle and applications in electronic Industries.	**1**
4.0	**CHEMICAL SENSORS**	
4.1	Sensors – Chemical Sensors – Characteristics	**1**
4.2	Elements and Characterization	**1**
4.3	Potentiometric Sensors, Amperometric Sensors	**1**
4.4	Sensors Based on Electrochemical Methods	**1**
4.5	Electrochemical Biosensors	**1**
4.6	Optical Biosensors: Enzyme Sensors – Bio affinity Sensors	**1**
4.7	DNA Sensors. Chemical Sensors as Detectors and Indicators	**1**
4.8	Indicators for Titration Processes	**1**
4.9	Separation Methods. Nano technology in chemical sensors.	**2**
5.0	**ELECTRONIC MATERIALS**	
5.1	Liquid crystal polymers – Organic Light Emitting Diode (OLED) – [polythiopene] – working and applications	**2**
5.2	Conductive polymers and Semi conducting polymers: principle and applications	**2**
5.3	organic: Organic dielectric material [Polystyrene, PMMA].	**1**

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5.4	Smart screen materials: Inorganic Rare earth metals [yttrium, lanthanum, cerium]	**2**
5.5	Conductive components: Indium tin oxide [properties and applications] – touch screen [resistive and capacitive]	**1**
5.6	magnetic storage [Iron oxide, cobalt alloy]	**1**
5.7	optical storage [photo chromic materials] – solid storage.	**1**

Course Designers

1. Dr.T.A.SUKANTHA
2. Dr.B.SRIVIDHYA
3. Dr.K.PRABHA
4. Dr.S.MEENACHI
5. Mr.K.TAMILARASU
6. Ms.D.KIRTHIGA

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60 ME 002	ENGINEERING GRAPHICS

Category	L	T	P	Credit
ES	2	0	4	4

Objective

- To acquire various concepts of dimensioning, conventions and standards.
- To impart the graphic skills for converting pictorial views of solids in to orthographic views.
- To learn the concept in projection of solids, section of solids and development of different types of surfaces.
- To learn the concept of isometric projection.
- To learn the geometry and topology of engineered components

Pre-requisite

NIL

Course Outcomes

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

CO1	Demonstrate the Impact of computer technologies on graphical communication	Remember/ Understand/ Apply
CO2	Convert the pictorial views in to orthographic views using drafting software	Remember/ Understand/ Apply
CO3	Draw the projection of simple solids, true shape of sections and development of surfaces	Remember/ Understand/ Apply
CO4	Construct the isometric projections of objects using drafting software.	Remember/ Understand/ Apply
CO5	Interpret a design project illustrating engineering graphical skills.	Remember/ Understand/ Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	20	20	30
Apply	30	30	50
Analyse	0	0	0
Evaluate	0	0	0
Create	0	0	0
Total	60	60	100

Syllabus

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K.S.Rangasamy College of Technology – Autonomous R 2022								
60 ME 002- Engineering Graphics								
Common to All Branches								
Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	2	0	4	90	4	50	50	100

Introduction to Computer Aided Drafting (CAD) software* {6+12} Theory of CAD software – Menu System, Tool bars (Standard, Object Properties, Draw, Modify and Dimension) – Drawing Area (Background, Crosshairs, Coordinate System) – Dialog boxes and windows – Shortcut menus (Button Bars) – The Command Line and Status Bar – Different methods of zoom – Select and erase objects.	[18]
Orthographic Projection* [6+12] Theory of projection – Terminology and Methods of projection – first angle and third angle projection – Conversion of pictorial views into orthographic views	[18]
Projection of Solids and Sections of Solids* [6+12] Projections of simple solids: prism, pyramid, cylinder and cone (Axis parallel to one plane and perpendicular to other, axis inclined to one plane and parallel to other). Sections of simple solids: prism, pyramid, cylinder and cone in simple positions (cutting plane is inclined to one of the principal planes and perpendicular to the other) – True shape of sections **Development of Surfaces*** Principle of development-Methods of development: Parallel line development-Cube, Prism and Cylinder. Radial line development – Pyramid and cone	[18]
Isometric Projection* [6+12] Principles of Isometric projection – Isometric scale, Isometric views, Conventions – Isometric views of lines, Planes, Simple and compound Solids – Conversion of Orthographic views in to Isometric view	[18]
Application of Engineering Graphics* [6+12] Geometry and topology of engineered components: Creation of engineering models and their presentation in standard 2D blueprint form, 3D wire-frame and shaded solids – Geometric dimensioning and Tolerance – Use of solid modeling software for creating associative models – Floor plans: windows, doors, and fixtures such as water closet (WC), bath sink, shower, etc. – Applying colour coding according to building drawing practice – Drawing sectional elevation showing foundation to ceiling – Introduction to Building Information Modelling (BIM).	[18]
Total hours	**90**

Text book(s):

1. Bhatt N.D., 'Engineering Drawing', Charotar Publishing House Pvt. Ltd., 53rd Edition, Gujarat, 2019
2. Venugopal K., 'Engineering Graphics', New Age International (P) Limited, 2014.

Reference(s):

1. Shah M.B., Rana B.C., and V.K.Jadon., 'Engineering Drawing', Pearson Education, 2011.
2. Natarajan K.V., 'A Text Book of Engineering Graphics', Dhanalakshmi Publishers, Chennai, 2014.
3. Agrawal B. &Agrawal C. M., 'Engineering Graphics', TMH Publication, 2012.
4. Narayana, K.L. & P Kannaiah, 'Text book on Engineering Drawing', Scitech Publishers, 2008.

***SDG 9 – Industry Innovation and Infrastructure**

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Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Introduction to Computer Aided Drafting (CAD) software**	
1.1	Theory of CAD software	1
1.2	Menu System, Tool bars (Standard, Object Properties, Draw, Modify and Dimension)	2
1.3	Drawing Area (Background, Crosshairs, Coordinate System)	3
1.4	Dialog boxes and windows – Shortcut menus	3
1.5	The Command Line and Status Bar	1
1.6	Different methods of zoom – Select and erase objects.	2
2	**Orthographic Projection**	
2.1	Introduction to orthographic projections	2
2.2	Planes of projection,	2
2.3	Projection of points	1
2.4	Projection of lines inclined to both planes.	2
2.5	Projection of planes	2
2.6	Projection of planes Inclined to both planes	1
2.7	Conversions of pictorial views to orthographic views.	3
2.8	Practice class for pictorial views to orthographic views.	2
2.9	Practice class for pictorial views to orthographic views.	1
3	**Projection of Solids**	
3.1	Projections of simple solids: prism	2
3.2	Projections of simple solids: cylinder	3
3.3	Projections of simple solids: pyramid	2
3.4	Projections of simple solids: Cone	2
3.5	Practice class for Projection of Solids	2
3.6	Axis of solid inclined to both HP and VP	5
3,7	Section of solids for Prism,	2
3,8	Section of solids for Cylinder,	2
3,9	Section of solids for Pyramid,	2
3,10	Section of solids for Cone	2
3,11	Auxiliary Views – Draw the sectional orthographic views of geometrical solids.	3
3.12	Draw the sectional orthographic views of objects from industry.	3
3,13	Development of surfaces of Right solids Prism,	2
3.14	Development of surfaces of Right solids Pyramid	2
3.15	Development of surfaces of Right solids Cylinder and Cone	2
4	**Isometric Projection and Introduction to AutoCAD**	
4.1	Principles of isometric projection	1
4.2	Isometric scale	2
4.3	Isometric projections of simple solids: Prism,	2
4.4	Isometric projections of simple solids: Pyramid,	2

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4.5	Isometric projections of simple solids: Cylinder	1
4.6	Isometric projections of simple solids: Cone	2
4.7	Isometric projections of frustum	2
4.8	Isometric projections of truncated solids	2
4.9	Combination of two solid objects in simple vertical positions.	3
5	**Application of Engineering Graphics**	
5.1	Geometry and topology of engineered components:	2
5.2	Creation of engineering models and their presentation in standard 2D blueprint form,	3
5.3	3D wire-frame and shaded solids – Geometric dimensioning and Tolerance – Use of solid modeling software for creating associative models	3
5.4	Floor plans: windows, doors, and fixtures such as water closet (WC), bath sink, shower, etc.	3
5.5	Applying colour coding according to building drawing practice	2
5.6	Drawing sectional elevation showing foundation to ceiling	2
5.7	Introduction to Building Information Modelling (BIM).	2

Course Designers

1. Dr.K.Mohan-mohank@ksrct.ac.in

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60 EV 201	ELECTRONIC DEVICES (Common to ECE& EE)

Category	L	T	P	Credit
PC	3	0	0	3

Objective

- To understand the physics of junction diodes and tolearn to implement them in various applications
- To learn different configurations of BJT and FET and applications of MOSFET
- To identify the use of various transducers and sensors.
- To study the construction and operation of various opto devices
- To familiarize the operation of power devices and convertors

Pre-requisite

NIL.

Course Outcomes

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

CO1	Learn the operation and characteristics of diodes	Remember, Understand, Apply
CO2	Discuss the operation of different configurations of transistors	Remember, Understand, Apply
CO3	Identify the type of transducers and sensors used for various application	Remember, Understand
CO4	Explain the operation of various opto devices	Remember, Understand
CO5	Learn the role of power electronics devices and convertors in real life applications	Remember, Understand

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	50
Understand	40	50	40
Apply	10	0	10
Analyse	0	0	0
Evaluate	0	0	0
Create	0	0	0
Total	60	60	100

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R 2022								
60 EV 201– ELECTRONIC DEVICES (Common to ECE& EE)								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
II	3	0	0	45	3	40	60	100

DIODES* PN junction diode- Current Voltage Characteristics and Analysis, Diode Logic Gates, Modelling the Diode Forward Characteristics- Graphical analysis, Small signal model, Zener diode, Varactor diode and Diode applications.	[9]
TRANSISTORS* Construction and Operation of a Transistor, Input and Output Characteristics of a Transistor in CE configuration, operation of CB and CC configurations, Construction and Characteristics of n channel JFET, Basic MOSFET operation, Characteristics of depletion type MOSFET and enhancement type MOSFET and **MOSFET applications****	[9]
TRANSDUCERS AND SENSORS* Classification of Transducers, Transducers Actuating Mechanisms, Resistance Transducers, Variable Inductance Transducers, Capacitive Transducers, Piezoelectric Transducers, Hall Effect Transducers, Noise introduced by transducers and their reduction. Smart sensors, fiber optic sensors, MEMS, Ultrasonic Sensors and their typical applications	[9]
OPTO DEVICES* Introduction, Photo emitters, **LASER, LED, Photoconductive Cell, Opto coupler**, **Solid state relays (light operated relay) and optical fibre*** **	[9]
POWER DEVICES AND CONVERTORS* Construction and operation of switching devices –**SCR, MOSFET and IGBT**** – Static characteristics of SCR – Switching mode regulators: **Buck regulator, Boost regulator, Buck-Boost Regulators, Chopper*** **	[9]
Hands on: 1. Simulation of VI characteristics of PN junction diode 2. Simulation of input- output characteristics of BJT 3. Simulation of I-V characteristics of MOSFET	
Total hours	**45**

Text book(s):	
1.	Anil K. Maini, Varsha Agrawal, 'Electronics Devices and Circuits', Wiley India Pvt.Ltd, 2nd edition, 2019.
2.	Patranabis. D, "Sensors and Transducers", Prentice Hall of India, 1999
3.	Mohammad H Rashid, Power Electronics, Circuits, Devices and Applications, 3rd/4th Edition, Pearson Education Inc, 2014, ISBN: 978-93-325-1844-5
Reference(s):	
1.	Robert L. Boylestad, Louis Nashelsky, 'Electronic Devices and circuit theory', Pearson Education, 11th Edition, 2017
2.	M.D Singh and K B Khanchandani, Power Electronics, 2nd Edition, Tata Mc-Graw Hill, 2009
3.	L. Umanand, Power Electronics, Essentials and Applications, John Wiley India Pvt. Ltd, 2009
4.	Dr. P. S. Bimbhra, —Power Electronicsll, Khanna Publishers, Delhi, 2012

Assignment 1 Covers Module 1 & 2:

- Problems on PN junction diode, Relation between α &β of the BJT, parameters of JFET.
- Simulation on diode logic gates and diode applications like two way clipper, voltage tripler, Zener diode as voltage regulator using Multisim.

Assignment 2 Covers Module 3,4 & 5:

- Problems on Resistive, Capacitive, Inductive and Hall Effect transducers, LED and optical fibre.
- Simulate MOSFET model and describe the switching application of MOSFET with its IV characteristics using Simulink.

***SDG:4- Quality Education**

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****SDG:8- Desent work and economic growth**

*****SDG:9 –Industry innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Diodes**	
1.1	PN junction diode	1
1.2	Current Voltage Characteristics and Analysis	1
1.3	Diode Logic Gates	1
1.4	Modelling the Diode Forward Characteristics	1
1.5	Graphical analysis, Small signal model	1
1.6	Zener diode	1
1.7	Varactor diode	1
1.8	Diode applications	2
2	**Transistors**	
2.1	Construction and Operation of a Transistor	1
2.2	Input and Output Characteristics of a Transistor in CE configuration	1
2.3	Operation of CB and CC configurations	1
2.4	Construction and Characteristics of n channel JFET	1
2.5	Basic MOSFET operation	1
2.6	Characteristics of depletion type MOSFET	1
2.7	Characteristics of enhancement type MOSFET	1
2.8	MOSFET applications	2
3	**Transducers and Sensors**	
3.1	Classification of Transducers	1
3.2	Transducers Actuating Mechanisms	1
3.3	Resistance Transducers, Variable Inductance Transducers	1
3.4	Capacitive Transducers, Piezoelectric Transducers	1
3.5	Hall Effect Transducers	1
3.6	Noise introduced by transducers and their reduction	1
3.7	Smart sensors, fiber optic sensors, MEMS	1
3.8	Ultrasonic Sensors	1
3.9	Applications	
4	**Optodevices**	
4.1	Introduction	1
4.2	Photo emitters	1
4.3	LASER.	1
4.4	LED	1
4.5	Photoconductive Cell	1
4.6	Opto coupler	1
4.7	Solid state relays (light operated relay)	1
4.8	Optical fibre	2
5	**Power devices and convertors**	
5.1	Construction and operation of switching devices – SCR	2

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5.2	MOSFET.	1
5.3	IGBT	1
5.4	Static characteristics of SCR	1
5.5	Switching mode regulators: Buck regulator	1
5.6	Boost regulator	1
5.7	Buck-Boost Regulators	1
5.8	Chopper	1

Course Designers

1. Mrs.S.S.Thamilselvi–sstamilselvi@ksrct.ac.in

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60 GE 002	**Tamils and Technology** (Common to all Branches)

Category	L	T	P	Credit
GE	1	0	0	1

Objectives:

- To learn weaving, ceramic and construction technology of Tamils.
- To understand the agriculture, irrigation and manufacturing technology of Tamils.
- To realize the development of scientific Tamil and Tamil computing.

Pre-requisite:

Nil

Course Outcomes:

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

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

Mapping with Programme Outcomes

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

3- Strong; 2-Medium; 1-Low

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Syllabus

K. S. Rangasamy College of Technology – Autonomous R2022								
60 GE 002 – Tamils and Technology (Common to all Branches)								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	1	0	0	15	1	100	-	100

WEAVING AND CERAMIC TECHNOLOGY* Weaving Industry during Sangam Age – Ceramic Technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.	3
DESIGN AND CONSTRUCTION TECHNOLOGY* Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type Study (Madurai Meenakshi Temple)- ThirumalaiNayakar Mahal – Chetti Nadu Houses , Indo – Saracenic architecture at Madras during British Period.	3
MANUFACTURING TECHNOLOGY* 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.	3
AGRICULTURE AND IRRIGATION TECHNOLOGY* Dam,Tank,Ponds, Sluice,Significance of KumizhiThoompu of CholaPeriod,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.	3
SCIENTIFIC TAMIL & TAMIL COMPUTING* 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.	3
Total Hours	**15**

Text Book(s):

1.	தமிழகவரலாறு – மக்களும்பண்பாடும்கே. கே . பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).
2.	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3.	கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு).
4.	பொருநை – ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi– 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

*SDG4-Quality Education

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60 GE 002	தமிழரும்தொழில்நுட்பமும் (அனைத்துதுறைகளுக்கும்பொதுவானது)

Category	L	T	P	Credit
GE	1	0	0	1

பாடத்தின்நோக்கங்கள்:

- *தமிழர்களின் சங்ககால நெசவு, பனைவனைதல் மற்றும் கட்டிட தொழில்நுட்பம் குறித்து அறிதல்.*
- *தமிழர்களின் சங்ககால வேளாண்மை, நீர்ப்பாசனம் மற்றும் உற்பத்தி முறைகள் குறித்தகற்றல்.*
- *நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிதல்.*

முன்கூட்டிய துறைசார் அறிவு:

தேவை இல்லை

பாடம் கற்ற தின்விளைவுகள்:

பாடத்தை வெற்றிகரமாகற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்

CO1	*சங்ககாலத்தமிழர்களின் நெசவுமற்றும் பானைவனைதல் தொழில்நுட்பம் குறித்த கற்றுணர்தல்*	*புரிதல்*
CO2	*சங்ககாலத்தமிழர்களின் கட்டிட தொழில்நுட்பம் கட்டுமானப் பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்த அறிவு.*	*புரிதல்*
CO3	*சங்ககாலத்தமிழர்களின் உலோகத்தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு.*	*புரிதல்*
CO4	*சங்ககாலத்தமிழர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் குறித்த தெளிவு.*	*புரிதல்*
CO5	*நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிந்து கொள்ளலும் மற்றும் பயன்படுத்துதலும்.*	*பகுப்பாய்வு*

Mapping with Programme Outcomes

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

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Syllabus

K. S. Rangasamy College of Technology – Autonomous (R2022)								
60 GE 002 – *தமிழரும்தொழில்நுட்பமும்*								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	1	0	0	15	1	100	-	100

நெசவு மற்றும் பானைத் தொழில்நுட்பம்: சங்ககாலத்தில்நெசவுத்தொழில்–பானைத்தொழில்நுட்பம்–கருப்புசிவப்புபாண்டங்கள் - பாண்டங்களில்கீறல்குறியீடுகள்.	3
வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: சங்ககாலத்தில்வடிவமைப்புமற்றும்கட்டுமானங்கள்&சங்ககாலத்தில்வீட்டுப்பொருட்களில்வடிவமைப்பு–சங்ககாலத்தில்கட்டுமானப்பொருட்களும்நடுகல்லும்–சிலப்பதிகாரத்தில்மேடைஅமைப்புபற்றியவிவரங்கள் – மாமல்லபுரச்சிற்பங்களும், கோவில்களும்–சோழர்காலத்துப்பெருங்கோயில்கள்மற்றும்பிறவழிபாட்டுத்தலங்கல்–நாயக்கர்காலக்கோயில்கள் – மாதிரிகட்டமைப்புகள்பற்றிஅறிதல், மதுரைமீனாட்சிஅம்மன்ஆலயம்மற்றும்திருமலைநாயக்கர்மஹால்–செட்டிநாட்டுவீடுகள்–பிரிட்டிஷ்காலத்தில்சென்னையில்இந்தோ–சாரோசெனிக்கட்டிடக்கலை.	3
உற்பத்தித்தொழில்நுட்பம்: **கப்பல்கட்டும்கலை – உலோகவியல்–இரும்புத்தொழிற்சாலை–இரும்பைஉருக்குதல்,எஃகு–வரலாற்றுச்சான்றுகளாகசெம்பு**மற்றும்தங்கநாணயங்கள்–நாணயங்கள்அச்சடித்தல்–மணிஉருவாக்கும்தொழிற்சாலைகள்–கல்மணிகள் , கண்ணாடிமணிகள்–சுடுமண்மணிகள்–சங்குமணிகள்–எலும்புத்துண்டுகள்–தொல்லியல்சான்றுகள் – சிலப்பதிகாரத்தில்மணிகளின்வகைகள்.	3
வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம்: அணை, ஏரி, குளங்கள், மதகு–சோழர்காலக்குமுழித்தூம்பின்முக்கியத்துவம்–கால்நடைபராமரிப்பு–கால்நடைகளுக்கானவடிவமைக்கப்பட்டகிணறுகள் – வேளாண்மைமற்றும்வேளாண்மைசார்ந்தசெயல்பாடுகள்–கடல்சார்அறிவு–மீன்வளம்–முத்துமற்றும்முத்துக்குளித்தல்–பெருங்கடல்குறித்தபண்டையஅறிவு–அறிவுசார்சமூகம்.	3
அறிவியல் தமிழ் மற்றும் கணித்தமிழ் அறிவியல்தமிழின்வளர்ச்சி–கணித்தமிழ்வளர்ச்சி–தமிழ்நூல்களைமின்பதிப்புசெய்தல்–தமிழ்மென்பொருட்கள்உருவாக்கம்–தமிழ்இணையக்கல்விக்கழகம்–தமிழ்மின்நூலகம்–இணையத்தில்தமிழ்அகராதிகள்–சொற்குவைத்திட்டம்.	3
Total Hours	**15**

Text Book(s):

1.	தமிழகவரலாறு - மக்களும்பண்பாடும்கே. கே . பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).
2.	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3.	கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு).
4.	பொருநை–ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi– 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

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60 AB 001	NCC STUDIES (AIR WING) – I	Category	L	T	P	Credit
		HS	2	0	2	3

Objective

- To designed especially for NCC Cadets to educate basic military knowledge
- To develop character, camaraderie,discipline, secular outlook
- To inculcate spirit of adventure, sportsman spirit
- To teach selfless service amongst cadets by working inteams
- To learning military subjects including we apontraining and motivate them to join in tri-services

Pre-requisite

Nil

Course Outcomes

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

CO1	Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion	Remember
CO2	Demonstrate the sense of discipline with smartness and have basic knowledge of weapons and their use and handling	Remember
CO3	Illustrate various forces and moments acting on aircraft	Understand
CO4	Outline the concepts of aircraft engine and rocket propulsion	Understand
CO5	Design, build and fly chuck gliders/model airplanes and display static models	Create

Mapping with Programme Outcomes

Cos/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3	3	3	3	3					3
CO2					3										3
CO3	3	2	1	1											3
CO4	3	2	1	1											3
CO5	3	2	1	1											3
1- low, 2- medium, 3- high															

Assessment Pattern

Bloom'sCategory	Continuous Assessment (Marks)			End Sem Examination (Marks)
	DST(20)	AM(20)	SBM(10)	
Remember	10	00	00	40
Understand	10	00	10	60
Apply	00	00	00	00
Analyse	00	00	00	00
Evaluate	00	00	00	00
Create	00	20	00	00
Total	20	20	10	100

DST - Drill SquareTest AM - Aero Modeling SBM - Swachh Bharat Mission

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 AB 001 - NCC STUDIES (AIR WING) – I								
Common to ALL Branches								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	2	0	2	45	3	50	50	100

Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

NCC Organisation and National Integration* NCC Organization — History of NCC- NCC Organization- NCC Training- NCC Uniform — Promotion of NCC cadets — Aim and advantages of NCC Training- NCC badges of Rank- Honors‟ and Awards – Incentives for NCC cadets by central and state govt. History and Organization of IAF- Indo-PakWar-1971-Operation Safed Sagar .National Integration-Unity in diversity- Contribution of youth in nation building-National integration council – Images and Slogans on National Integration.	[9]
Drill and Weapon Training* Basic physical Training- Various exercises for fitness(with Demonstration)- Food- Hygiene and Cleanliness.Drill-Words of commands- Position and commands- Sizing and forming- Saluting-Marching-Turning on the march and wheeling- Saluting on the march-Sidepace, Pace forward and to the rear-Marking time-Drill with arms-Ceremonial drill-Guard mounting.(WITH DEMONSTRATION)	[9]
Principles of Flight* Laws of motion-Forces acting on aircraft- Bernoulli‟s theorem-Staling-Primary control surfaces-Secondary control surfaces-Aircraft recognition.	[9]
Aero Engines* Introduction of Aero engine-Types of engine- Piston engine- Jet engines-Turboprop engines-Basic Flight Instruments-Modern trends.	[9]
Aero Modeling* History of Aero modeling-Materials used in Aeromodeling-Types of Aeromodels – Static Models-Gliders-Control line models-Radio Control Models-Building and Flying of Aeromodels.	[9]
Total Hours	45

Text Books:	
1.	“National Cadet Corps- A Concise hand book of NCC Cadets”, Ramesh Publishing House, NewDelhi,2014.
Reference(s):	
1.	“Cadets Handbook–Common Subjects SD/SW”,published by DGNCC,New Delhi.
2.	“Cadets Handbook-Specialized Subjects SD/SW”,published by DGNCC,NewDelhi.
3.	“NCCOTA Precise”, published by DGNCC, NewDelhi.

*SDG4-Quality Education

ASSESSMENT PATTERN -THEORY					
Test / Bloom’s Category*	**Knowledge (K1)%**	**Apply (K2)%**	**Analyzing(K3)%**	**Creating(K4)%**	**Total %**
CAT1	-	-	-	-	-
CAT2	-	-	-	-	-
CAT3	-	-	-	-	-
ESE	The examination and award of marks will be done by the Ministry of Defence, Government of India which includes all K1 to K4 knowledge levels. The maximum marks for the End Semester Examination is 500 marks. It will be converted to100 marks.				

Course Designers

1. Flt Lt V.R.SADASIVAM- sadasivam@ksrct.ac.in

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60 AB 002	National Cadet Corps- ARMY WING	Category	L	T	P	Credit
		HS	2	0	2	3

Objective

- Develop character, camaraderie
- Inculcate discipline, secular outlook
- Enrich the spirit of adventure, sportsman spirit
- Ideals of selfless service amongst cadets by working in teams
- Improve qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

Pre-requisite

NIL

Course Outcomes

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

CO1	Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion.	Understand
CO2	Demonstrate Health Exercises, the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders.	Apply
CO3	Basic knowledge of weapons and their use and handling.	Understand
CO4	Aware about social evils and shall inculcate sense of whistle blowing against such evils and ways to eradicate such evils	Analyse
CO5	Acquaint, expose & provide knowledge about Army/Navy/ Air force and to acquire information about expansion of Armed Forces, service subjects and important battles	Apply

Mapping with Programme Outcomes

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

1- low, 2- medium, 3- high

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	20	10	20
Apply	20	20	20
Analyse	10	10	20
Evaluate	0	10	20
Create	0	0	0
Total	60	60	100

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 AB 002 – National Cadet Corps (Army Wing)								
Common to all Branches								
Semester	Hours/Week			Total hrs	Credit	MaximumMarks		
	L	T	P		C	CA	ES	Total
II	2	0	2	60	3	50	50	100

NCC Organization & National Integration* NCC Organization – History of NCC- NCC Organization- NCC Training- NCC Uniform – Promotion of NCC cadets – Aim and advantages of NCC Training- NCC badges of Rank- Honors' and Awards – Incentives for NCC cadets by central and state govt. National Integration - Unity in diversity- contribution of youth in nation building- national integration council- Images and Slogans on National Integration	[12]
Basic Physical Training & Drill* Basic physical Training – various exercises for fitness(with Demonstration)-Food – Hygiene and Cleanliness. Drill- Words of commands- position and commands- sizing and forming- saluting- marching- turning on the march and wheeling- saluting on the march- side pace, pace forward and to the rear- marking time- Drill with arms- ceremonial drill- guard mounting.(WITH DEMONSTRATION).	[16]
Weapon Training* Main Parts of a Rifle- Characteristics of .303 rifle- Characteristics of .22 rifle- loading and unloading – position and holding safety precautions – range procedure- MPI and Elevation- Group and Snap shooting- Long/Short range firing(WITH PRACTICE SESSION) - Characteristics of 5.56mm rifle- Characteristics of 7.62mm SLR- LMG- carbine machine gun – pistol.	[12]
Social Awareness and Community Development* Aims of Social service-Various Means and ways of social services- family planning – HIV and AIDS- Cancer its causes and preventive measures- NGO and their activities- Drug trafficking- Rural development programmes - MGNREGA-SGSYJGSY-NSAP-PMGSY-Terrorism and counter terrorism- Corruption – female foeticide -dowry – child abuse-RTI Act- RTE Act- Protection of children from sexual offences act- civic sense and responsibility	[12]
Specialized Subject (ARMY)* Basic structure of Armed Forces- Military History – War heroes- battles of Indo-Pak war- ParamVir Chakra- Career in the Defence forces- Service tests and interviews.	[08]
Total Hours	**60**

TextBook(s):	
1.	National Cadet Corps- A Concise handbook of NCC Cadets by Ramesh Publishing House, New Delhi, 2014
2.	Cadets Handbook- Specialized Subjects SD/SW published by DG NCC, New Delhi ,2014
Reference(s):	
1.	"Cadets Handbook – Common Subjects SD/SW" by DG NCC, New Delhi,2019
2.	"Cadets Handbook – Specialised Subjects SD/SW" by DG NCC, New Delhi,2017

***Quality Education**

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**NCC Organization & National Integration**	
1.1	NCC Organization	1
1.2	History of NCC and NCC Organization	1
1.3	NCC Training and NCC Uniform	1
1.4	Promotion of NCC cadet, Aim and advantages of NCC Training	1
1.5	NCC badges of Rank, Honors' and Awards, Incentives for NCC cadets by central	2

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	and state govt	
1.6	National Integration, Unity in diversity	1
1.7	Contribution of youth in nation building	2
1.8	National integration council	1
1.9	Images and Slogans on National Integration	2
2	**Basic Physical Training & Drill**	
2.1	Basic physical Training – various exercises for fitness (with Demonstration)-	3
2.2	Food – Hygiene and Cleanliness .	1
2.3	Drill- Words of commands- position and commands- sizing and forming-	3
2.4	saluting- marching- turning on the march and wheeling-	3
2.5	saluting on the march- side pace, pace forward and to the rear- marking time-	3
2.6	Drill with arms- ceremonial drill- guard mounting.(WITH DEMONSTRATION)	3
3	**Weapon Training Main Parts of a Rifle**	
3.1	Characteristics of .303 rifle	1
3.2	Characteristics of .22 rifle	2
3.3	Loading and unloading, position and holding safety precautions	2
3.4	Range procedure, MPI and Elevation-	2
3.5	Group and Snap shooting Long/Short range firing (WITH PRACTICE SESSION)	3
3.6	Characteristics of 5.56mm rifle	1
3.7	Characteristics of 7.62mm	1
4	**Social Awareness and Community Development**	
4.1	Aims of Social service, Various Means and ways of social services	1
4.2	Family planning , HIV and AIDS	1
4.3	Cancer its causes and preventive measures	1
4.4	NGO and their activities, Drug trafficking	1
4.5	Rural development programmes	1
4.6	MGNREGA, SGSY, JGSY, NSAP, PMGSY	2
4.7	Terrorism and counter terrorism, Corruption	1
4.8	female foeticide, dowry, child abuse	1
4.9	RTI Act, RTE Act	1
4.10	Protection of children from sexual offences act	1
4.11	Civic sense and responsibility	1
5	**Specialized Subject (ARMY)**	
5.1	Basic structure of Armed Forces	1
5.2	Military History, War heroes	1
5.3	battles of Indo - Pak war	1
5.4	Param Vir Chakra,	1
5.5	Career in the Defence forces	2
5.6	Service tests and interviews.	2
	Total	60

Course Designer

1. Mr.E.Chandra Kumar -chandrakumar@ksrct.ac.in

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60 CP 0P2	ENGINEERING PHYSICS AND CHEMISTRY LABORATORY (CSE, IT, EEE, ECE, EE)

Category	L	T	P	Credit
BS	0	0	4	2

Objectives

- To infer the practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To demonstrate an ability to make physical measurements and understand the limits of precision in measurements
- To analyze the behavior and characteristics of various materials for its optimum utilization
- Test the knowledge of theoretical concepts and develop the experimental skills of the learners
- To facilitate data interpretation and expose the learners to various industrial and environmental applications

Pre-requisite

Nil

Course Outcomes

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

CO1	Analyze the properties of semiconducting materials for its potential applications	Analyze
CO2	Realize the interference and diffraction phenomena by Air wedge and laser experiments	Apply
CO3	Recognize the magnetic properties by experimental verification	Apply
CO4	Apply different techniques of qualitative and quantitative chemical analysis to generate experimental skills and apply these skills to various analyses	Apply
CO5	Explain and analyze instrumental techniques for chemical analysis	Analyze

Mapping with Programme Outcomes

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

PHYSICS LABORATORY (CSE, IT, EEE, ECE)

List of Experiments

1. Determination of Hall coefficient of a given semiconductor and its charge carrier density
2. V-I Characteristics of Zener diode and Solar cell
3. Air wedge - Determination of thickness of a thin sheet/wire
4. a) Laser- Determination of the wave length of the laser using grating
   b) Optical fibre -Determination of numerical aperture and acceptance angle
5. Magnetic field along the axis of current carrying coil – Stewart and Gee.

Course Designers

Dr. V. Vasudevan
Mr.S. Vanchinathan
Dr. M. Malarvizhi

*** SDG: 4- Quality Education**

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CHEMISTRY LABORATORY (CSE, IT, EEE, ECE)

List of Experiments

1. Estimation of HCl by pH meter.
2. Estimation of mixture of acids by conductivity meter.
3. Determination of ferrous ion by Potentiometric titration.
4. Determination of corrosion by weight loss method.
5. Estimation of ferrous ion by spectrophotometer.

Case studies/Activity report

1. Activity using chemdraw software.
2. Activity report on cheminformatic structure.
3. Case study on ion selective electrodes.
4. Assembling of cell or battery.

Course Designers

Dr.T.A.Sukantha
Dr.B.Srividhya
Dr.K.Prabha
Dr.S.Meenachi

* SDG 6: Improve Clean Water and Sanitation
* SDG 9: Industry, Innovation, and Infrastructure
* SDG 8: Decent Work and Economic Growth

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60 EV 2P1	ELECTRONIC DEVICES LABORATORY (Common to ECE& EE)

Category	L	T	P	Credit
PC	0	0	4	2

Course Objectives

- To analyse the operation of the circuits with diodes in series and parallel combinations
- To design and implement various circuits using diodes
- To design and implement various circuits using BJT& FET
- To analyse the characteristics of various Optical devices
- To implement the application circuits using Power devices

Pre-requisite

Nil

Course Outcomes

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

CO1	Analyse the circuits with diodes in series and parallel	Analyse
CO2	Implement the application circuits using diodes	Apply
CO3	Implement the application circuits using BJT& FET	Apply
CO4	Analyse the characteristics of optical devices	Apply &Analyse
CO5	Implement the application circuits using power devices	Apply

Mapping wih Programme Outcomes

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

.

LIST OF EXPERIMENTS

Students have to design application circuits using analog electronic components/MOKU GO Kit/ multisim software

1. *Diode circuit analysis
2. *Application circuits using Diodes***
3. *Application circuits using BJT & FET
4. *Analyse the characteristics of Optical devices
5. *Application circuits using Power devices**

***SDG:4- Quality Education**

**** SDG:8- Desent work and economic growth**

*****SDG:9 –Industry innovation and infrastucture**

Course Designer

Mrs.S.S.Thamilselvi - sstamilselvi@ksrct.ac.in

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60 CG 0P1	Career Skill Development – I

Category	L	T	P	Credit
CG	0	0	2	1

Objective

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Pre-requisite

Basic knowledge of reading and writing in English.

Course Outcomes

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

CO1	Listen and comprehend complex academic texts	Understand
CO2	Read and infer the denotative and connotative meanings of technical texts	Analyze
CO3	Write definitions, descriptions, narrations, and essays on various topics	Apply
CO4	Speak fluently and accurately in formal and informal communicative contexts	Apply
CO5	Appraise the verbal ability skills in the career development and professional contexts	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	POS3
CO1								2	3	3	2	3			
CO2								2	3	3	2	3		2	
CO3								2	3	3	2	3		2	
CO4								2	3	3	2	3	2		
CO5								2	3	3	2	3	2	2	3

1- low, 2- medium, 3- high

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CG 0P1 - Career Skill Development - I								
Common to All Branches								
Semester	**Hours/Week**			**Total hrs**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
II	0	0	2	25	1	100	00	100

Listening* Listening for general information-specific details - audio / video (formal & informal) - Listen to podcasts/ TED talks/ anecdotes / stories / event narration / documentaries and interviews with celebrities - Listen to a product and process descriptions, advertisements about products or services.	[5]
Speaking* Self Introduction; Introducing a friend; conversation - politeness strategies - Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews - Picture description; giving instruction to use the product; presenting a product - Small Talk; Mini presentations - Group discussions, debates & role plays.	[5]
Reading* Loud reading vs Silent reading, Skimming & Scanning of passages, reading brochures (technical context), social media messages relevant to technical contexts and emails - Biographies, travelogues, newspaper reports and travel & technical blogs - Advertisements, gadget reviews and user manuals - Newspaper articles and Journal reports - Editorials; and opinion blogs	[5]
Writing* Writing letters – informal and formal – basics and format orientation - paragraph texting, short report on an event (field trip etc.) - Definitions; instructions; and product /process description - Note-making / Note-taking; recommendations; transferring information from non-verbal (charts, graphs to verbal mode) - Essay texting	[5]
Verbal Ability I* Reading Comprehension (MCQs) – Cloze Test - Sequencing of sentences – Summarizing and paraphrase – Error Detection – Spelling Test – Sentence Improvement - Preposition	[5]
Total Hours	**25**

Reference(s):

1.	'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020
3.	Michael McCarthy and Felicity O Dell, 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.York, 2012
4.	Lakshmi Narayanan, 'A Course Book on Technical English'Scitech Publications (India) Pvt. Ltd. 2020

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Listening**	
1.1	Listening for general information and Specific details	1
1.2	Listening to podcasts, documentaries and interviews with celebrities	1
1.3	Narrating personal experiences	1
1.4	Reading relevant to technical contexts and emails	1
1.5	Listen to a product and process descriptions	1

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2	**Speaking**	
2.1	Self-introduction	1
2.2	Summarizing of documentaries& Picture Narration	1
2.3	Small Talk; Mini presentations	1
2.4	Group discussions, debates & role plays.	1
2.5	Group discussions	1
3	**Reading**	
3.1	Loud reading vs Silent reading, Skimming & Scanning of passages	1
3.2	Reading social media messages relevant to technical contexts	1
3.3	Reading newspaper reports and travel & technical blogs	1
3.4	Reading advertisements, gadget reviews and user manuals	1
3.5	Reading newspaper articles and journal reports	1
4	**Writing**	
4.1	Writing letters – informal and formal	1
4.2	Paragraph Texting	1
4.3	Definitions and instructions	1
4.4	Note-making / Note-taking	1
4.5	Essay texting	1
5	**Verbal Ability**	
5.1	Reading Comprehension (MCQs) and Cloze Test	1
5.2	Sequencing of sentences	1
5.3	Paraphrasing and Summarizing	1
5.4	Error Detection and Spelling Test	1
5.5	Prepositions	1
	Total	**25**

Course Designers

1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

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60 MA 009	LINEAR ALGEBRA AND NUMERICAL METHODS	Category	L	T	P	Credit
		BS	3	1	0	4

Objective

- To acquire knowledge about vector spaces.
- To get exposed to the basic concepts of linear transformation.
- To know the concepts of interpolation and numerical integration.
- To learn the basics concepts ofinitialvalueproblems.
- To acquire knowledge of various methods to solve partial differential equations with boundary conditions

Pre-requisite

Nil

Course Outcomes

On the successful completion ofthecourse,studentswill beable to

CO1	Apply the concept of vector spaces.	Remember, Understand, Apply
CO2	Understand the concepts of linear transformation.	Remember, Understand, Apply
CO3	Apply different techniques to find the intermediate values and to evaluate single definite integrals.	Remember, Understand, Apply
CO4	Compute the solution for initial value problems using single and multi-step methods.	Remember, Understand, Apply
CO5	Apply various methods to solve partial differential equations with boundary conditions.	Remember, Understand, Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	ContinuousAssessmentTests (Marks)		Model Test (Marks)	End Sem Examination (Marks)
	1	2		
Remember(Re)	06	06	10	08
Understand(Un)	10	08	15	18
Apply(Ap)	44	46	75	74
Analyze(An)	--	--	--	--
Evaluate(Ev)	--	--	--	--
Create(Cr)	--	--	--	--
Total	60	60	100	100

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K.S.RangasamyCollegeofTechnology–Autonomous R2022								
60 MA 009 – Linear Algebra and Numerical Methods								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	Hours/Week			Totalhrs	Credit	MaximumMarks		
	L	T	P		C	CA	ES	Total
III	3	1	0	60	4	40	60	100

Vector Space** Vector space – Subspace – Null space – Row and Column space - Linear combinations – Linear independence and linear dependence – Basis and dimension.	[9]
Linear Transformation and Inner Product Spaces* Linear transformation - Matrix representation of a linear transformation - Inner product - Norm – Gram-Schmidt orthogonalization process.	[9]
InterpolationandNumericalIntegration** Lagrange's and Newton's divided difference interpolation (unequal intervals) - Newton's forward and backward interpolation (equal intervals) - Two point and three point Gaussian quadrature – Trapezoidal, Simpson's 1/3 and 3/8 rule (single integral).	[9]
Numerical Solution of Ordinary Differential Equations** Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order equations - Multi step methods: Milne's predictor and corrector method - Adam's predictor and corrector method.	[9]
Numerical Solution of Partial Differential Equations*** Classifications of partial differential equations of second order - Finite difference method - Laplace's equations - Liebmann's process - Poisson's equation - Hyperbolic equation	[9]
Hands on: 1. Find a basis and dimension for the vector subspace. 2. Matrix representation of a linear transformation 3. Simpson 1/3 method for definite integral 4. Runge – Kutta method for solving first order equations. 5. Solution of one dimensional wave equation.	
TotalHours:45+15(Tutorial)	**60**

Text Book(s):	
1.	David C. Lay, 'Linear Algebra and its Applications', Pearson Education, 6th Edition, 2022.
2	B.S.Grewal and Grewal J.S., "Numerical Methods in Engineering and Science", 10th Edition, Khanna Publishers, New Delhi, 2015.
Reference(s):	
1.	Howard Anton and Chris Rorres, 'Elementary Linear Algebra', John Wiley & Sons, 11th Edition, 2014.
2.	Gilbert Strang, 'Linear Algebra and Its Applications', Brooks/Cole/Cengage, 4th Edition, 2006.
3.	C.F. Gerald and P.O. Wheatley, 'Applied Numerical Analysis', Pearson Education (Asia), 7th Edition, 2007.
4.	P Kandasamy, KThilagavathy and K Gunavathi, 'Numerical Methods', S.Chand& Company Ltd, 3rd Edition, 2013

***SDG:4- Quality Education**

****SDG:9- Industry, Innovation, and Infrastructure**

*****SDG:7- Affordable and Clean Energy**

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours

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1	**Vector Spaces**	
1.1	Vector space	2
1.2	Subspace	1
1.3	Null space, Row and Column space	1
1.4	Tutorial	2
1.5	Linear combinations	1
1.6	Linear independence	1
1.7	linear dependence	1
1.8	Basis and dimension.	1
1.9	Tutorial	2
2	**Linear Transformation and Inner Product Spaces**	
2.1	Linear transformation	2
2.2	Matrix representation of a linear transformation	1
2.3	Inner product	1
2.4	Problems	1
2.5	Tutorial	2
2.6	Gram-Schmidt orthogonalization process	2
2.7	Problems	1
2.8	Tutorial	2
3	**InterpolationandNumericalIntegration**	
3.1	Lagrange's interpolation	1
3.2	Newton's divided difference Methods	1
3.3	Newton's forward and backward difference Methods.	2
3.4	Two point and three point Gaussian quadratures	2
3.5	Trapezoidal rule	1
3.6	Tutorial	2
3.7	Simpson's1/3 and 3/8 rules	1
3.8	Tutorial	2
4	**Numerical Solution of Ordinary Differential Equations**	
4.1	Taylor series method	1
4.2	Euler and modified Euler methods	1
4.3	Fourth order Runge – Kutta method	2
4.4	Tutorial	2
4.5	Milne's predictor and corrector methods.	1
4.6	Problems	1
4.7	Adam's predictor and corrector methods.	1
4.8	Problems	1
4.9	Tutorial	2
5	**Numerical Solution of Partial Differential Equations**	
5.1	Classifications of partial differential equations of second order	1
5.2	Finite difference method	1
5.3	Laplace's equations	2

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5.4	Liebmann's process	1
5.5	Tutorial	2
5.6	Poisson's equation	1
5.7	Hyperbolic equation.	1
5.8	Problems	1
5.9	Tutorial	2
	Total	60

Course Designers

1. Mr. D.Senthil Raja -senthilrajad@ksrct.ac.in
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60 CS 002	DATA STRUCTURES AND ALGORITHMS

Category	L	T	P	Credit
ES	3	0	0	3

Objective

- To study the asymptotic performance of algorithms and choose the appropriate data structure for a specified application
- To design and implement abstract datatypes such as Linked List, Stack, Queue and Trees
- To Learn and implement the Hashing techniques
- To design a Priority Queue ADT and its applications
- To demonstrate various Sorting, Searching and Graph algorithms

Pre-requisite

Basic knowledge of mathematics and programming language in C

Course Outcomes

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

CO1	Analyze the asymptotic performance of algorithms and apply linear data structures to solve real time applications	Apply, Analyze
CO2	Experiment with trees and its operations	Apply
CO3	Apply algorithm for solving problems like Sorting and Searching	Apply
CO4	Implement Priority Queue with its operations and Hashing Techniques	Apply
CO5	Explain Shortest Path algorithms, Minimum Spanning Tree algorithms, Biconnectivity and algorithmic design paradigms	Apply, Analyze

Mapping with Programme Outcomes

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

3- Strong;2-Medium;1-Some

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination (Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	30	30	40
Analyse	10	10	20
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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K.S. Rangasamy College of Technology–Autonomous R 2022								
60 CS 002 – DATA STRUCTURES AND ALGORITHMS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	40	60	100

Lists, Stacks and Queues Abstraction - Abstract data types - Data Representation - Elementary data types - Mathematical preliminaries: big-Oh notation - Efficiency of algorithms - Notion of time and space complexity - performance measures for data structures - **The List ADT – The Stack ADT – The Queue ADT***.	[12]
Trees Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – B–Trees – B+ Trees.	[9]
Sorting and Searching Preliminaries – Insertion Sort – Shell Sort – Heap Sort – Merge Sort – Quick Sort – External Sorting – Searching: Sequential Search - Binary Search – Hashed List Searches.	[7]
Hashing and Priority Queues (Heaps) **Hashing – Hash Function – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing***– Priority Queues (Heaps) – Model – Simple Implementations –Binary Heap–Applications of Priority Queues – d-Heaps.	[7]
Graphs Definitions – **Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm, Kruskal's Algorithm – Applications of Depth-First Search*** – Undirected Graphs – Biconnectivity. **Algorithm Design Paradigms** - greedy, divide and conquer, dynamic programming, backtracking	[10]
Total Hours	45

Text Book(s):

1. M.A.Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education Asia, 2008.
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", 3rd Edition, Tenth Impression, Pearson Education Asia, 2017

Reference(s):

1. Rajesh K.Sukla, "Data Structure using C & C++", Wiley India, 2012.
2. A.Tannenbaum, "Data Structure using C", Pearson Education, 2003.
3. Goodrich and Tamassia, "Data Structures and Algorithms in C++", Second Edition, John Wiley and Sons, 2011
4. Reema Thareja, "Data Structures using C", Second Edition, Oxford Higher Education, 2014.

***SDG4 - Quality Education**

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours
1	**Lists, Stacks and Queues**	
1.1	Abstract Data Type (ADT), Mathematical preliminaries: big-Oh notation	1
1.2	Efficiency of algorithms, Notion of time and space complexity - performance measures for data structures	1
1.3	List ADT	4
1.4	Stack ADT	3

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1.5	Queue ADT	3
2	**Trees**	
2.1	Preliminaries	1
2.2	Binary Trees	1
2.3	The Search Tree ADT	1
2.4	Binary Search Trees	1
2.5	AVL Trees	1
2.6	Tree Traversals	1
2.7	B-Trees	2
2.8	B+ Trees	1
3	**Sorting and Searching**	
3.1	Preliminaries, Insertion Sort	1
3.2	Shell Sort, Heap sort	1
3.3	Merge Sort, Quick sort	1
3.4	External Sorting	1
3.5	Sequential Searching	1
3.6	Binary Searching	1
3.7	Hashed List Searches	1
4	**Hashing and Priority Queues (Heaps)**	
4.1	Hashing, Hash Function	1
4.2	Separate Chaining, Open Addressing	1
4.3	Rehashing, Extendible Hashing	1
4.4	Priority Queues (Heaps)	1
4.5	Simple Implementations, Binary Heap	1
4.6	Applications of Priority Queues	1
4.7	d –Heaps	1
5	**Graphs**	
5.1	Graph Definitions - Topological Sort	1
5.2	Shortest-Path Algorithms - Unweighted Shortest Paths	1
5.3	Dijkstra's Algorithm	1
5.4	Minimum Spanning Tree	1
5.5	Prim's Algorithm	1
5.6	Kruskal's Algorithm	1
5.7	Applications of Depth-First Search	1
5.8	Undirected Graphs	1
5.9	Biconnectivity	1
5.10	Algorithm Design Paradigms	1
	Total Hours	**45**

Course Designers

1. Ms.K.Poongodi - poongodik@ksrct.ac.in

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CHAIRMAN BOARD OF STUDIES
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60 EV 301	ELECTRONIC CIRCUITS (Common to ECE& EE)

Category	L	T	P	Credit
PC	3	0	0	3

Objective

- To understand the operation of different transistor amplifiers
- To design and analyze the feedback amplifiers and oscillators
- To understand the operation of power amplifiers and differential amplifier
- To acquire the basic knowledge of operational amplifier
- To implement application circuits using OP-AMP.

Prerequisite

Electron Devices

Course Outcomes

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

CO1	Explain the operation of different transistor amplifier circuits	Remember, Understand,
CO2	Describe and analyse the characteristics of negative feedback amplifiers and oscillators	Remember, Understand, Apply, Analyse
CO3	Describe the concepts and characteristics of power amplifiers and design differential amplifier	Remember, Understand, Apply
CO4	Understand the basic concepts of op-amp	Remember, Understand
CO5	Design and analyse the various application of op-amp	Remember, Understand, Apply, Analyse

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Exam (Marks	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	20	20
Understand (Un)	35	40	60	60
Apply (Ap)	10	10	10	10
Analyze (An)	5	0	10	10
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

Syllabus

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 EV 301 - ELECTRONIC CIRCUITS (Common to ECE& EE)								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		**C**	**CA**	**ES**	**Total**
III	3	0	0	45	3	40	60	100

TRANSISTOR AMPLIFIERS* Introduction to biasing schemes for BJT and FET- Overview of single stage BJT amplifiers: Common emitter, common base, common collector- Hybrid-pi model -Miller effect - Frequency response of single stage MOSFET amplifier- Cascade and Cascode amplifiers.	[9]
FEEDBACK AMPLIFIERS AND OSCILLATORS* Different topologies: Voltage series, Voltage shunt, Current series and Current shunt, Effect on gain and frequency response, stability considerations and frequency compensation- Basic concept of oscillators, RC and LC sinusoidal oscillators	[9]
POWER AMPLIFIER & DIFFERENTIAL AMPLIFIER* Different modes of operation of amplifiers and their power efficiency: Class A, Class B, Class AB and Class C, **Push-pull amplifiers and applications **** Differential amplifier: Basic structure and principle of operation - calculation of differential gain, common mode gain, CMRR and ICMR, Design of differential amplifier for a given specification.	[9]
BASICS OF OPERATIONAL AMPLIFIERS* Ideal op-amp characteristics, General operational amplifier stages and internal circuit diagrams of IC 741, DC characteristics, AC characteristics, Frequency response of op-amp, Slew rate.	[9]
APPLICATIONS OF OPERATIONAL AMPLIFIERS* Basic applications of op-amp – Inverting and Non-inverting Amplifiers, Voltage Follower, Scale changer, Summer, Subtractor, Basic comparator, **Precision rectifier, Clipper and clamper, Peak detector, V/I & I/V converters, Switched capacitor circuits**: Basic concept, Practical configurations, **Application in amplifier****.	[9]
Hands on 1. Design and simulation of self- bias circuit of BJT 2. Design and simulation of CS amplifier using FET **3.** Design and simulation of inverting and non- inverting amplifier	
Total Hours	45

Text book (s) :	
1	David A. Bell, 'Electronic Devices and Circuits ',5th Edition, Oxford University press, 2018.
2	Robert L. Boylestad, Louis Nashelsky, 'Electronic Devices and circuit theory', Pearson Education, 11thEdition, 2017.
3.	D.RoyChoudry ,Shail Jain , 'Linear integrated Circuits', 5th Edition, New Age International Pvt Ltd, 2018.
Reference(s) :	
1	Anil K. Maini, VarshaAgrawal, 'Electronics Devices and Circuits', Wiley India Pvt.Ltd, 2nd edition, 2019.
2	S.Salivahanan, N.Sureshkumar, 'Electronic Devices and circuits', 4 th Edition, McGraw-Hill, 2017.
3	Ramakant A., Gayakwad, 'Op – Amps and Linear Integrated Circuits', 4th Edition, Prentice Hall, 2017

Assignment 1 – Covers Module 1 & 2

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- Simulation of biasing circuits, common emitter amplifier for the given specifications.
- Simulation of feedback amplifiers with and without feedback and compare the measured gain.
- Problems in RC and LC oscillators.

Assignment 2 – Covers Module 3, 4 & 5

- Problems in differential amplifier.
- Comparison of op-amp 741 with another op-amp to analyze the features.
- Simulation of inverting amplifier, non-inverting amplifier, voltage follower, level shifter and comparator circuit using op-amp.

***SDG:4- Quality Education**
****SDG:9 –Industry innovation and infrastructure**

Course Contents and Lecture Schedule

Module no	topic	No.of Hours
1	**TRANSISTOR BIASING**	
1.1	Introduction to biasing schemes for BJT	1
1.2	FET	1
1.3	Overview of single stage BJT amplifiers	1
1.4	Common emitter amplifier	1
1.5	Common base, common collector	1
1.6	Hybrid-pi model, Miller effect	1
1.7	Frequency response of single stage MOSFET amplifier	1
1.8	Cascade amplifier	1
1.9	Cascode amplifier	1
2	**FEEDBACK AMPLIFIERS AND OSCILLATORS**	
2.1	Different topologies: Voltage series	1
2.2	Voltage shunt	1
2.3	Current series	1
2.4	Current shunt	1
2.5	Effect on gain and frequency response, stability considerations and frequency compensation	1
2.6	Basic concept of oscillators	1
2.7	RC oscillators	1
2.8	LC sinusoidal oscillators	2
3	**POWER AMPLIFIER & DIFFERENTIAL AMPLIFIER**	
3.1	Different modes of operation of amplifiers	1
3.2	Their power efficiency: Class A, Class B,	1
3.3	Class AB and Class C	1
3.4	Push-pull amplifiers and applications	1
3.5	Differential amplifier: Basic structure and principle of operation	1
3.6	Calculation of differential gain, common mode gain, CMRR and ICMR.	1

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3.7	Design of differential amplifier for a given specification	1
4	**BASICS OF OPERATIONAL AMPLIFIERS**	
4.1	Ideal op-amp characteristics	2
4.2	General operational amplifier stages	1
4.3	internal circuit diagrams of IC 741	1
4.4	DC characteristics	1
4.5	AC characteristics	2
4.6	Frequency response of op-amp	1
4.7	Slew rate	1
5	**APPLICATIONS OF OPERATIONAL AMPLIFIERS**	
5.1	Basic applications of op-amp – Inverting and Non-inverting Amplifiers	1
5.2	Voltage Follower, Scale changer	1
5.3	Summer, Subtractor	1
5.4	Basic comparator, Precision rectifier	1
5.5	Clipper and clamper	1
5.6	Peak detector	1
5.7	V/I & I/V converters	1
5.8	Switched capacitor circuits: Basic concept, Practical configurations	1
5.9	Application in amplifier	1

Course Designers

1.Mrs.S.S.Thamilselvi - sstamilselvi@ksrct.ac.in

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60 EV 302	CIRCUIT ANALYSIS (Common to ECE& EE)

Category	L	T	P	Credit
PC	3	0	2	4

Objectives

- To learn the basic concepts and behaviour of DC circuits
- To understand the various network theorems and two port network parameters
- To learn the basic concepts and behaviour of AC circuits
- To understand the transient and steady state response of the circuits subjected to DC excitations and AC with sinusoidal excitations.
- To learn the concept of coupling in circuits and the frequency response of resonant circuits

Pre-requisite

NIL

Course Outcomes

Onthesuccessful completion ofthecourse,studentswill beable to

CO1	Apply the basic laws to analyses the electric circuits using circuit analysis techniques.	Remember, Understand Apply
CO2	Apply network theorems and Analyze the two port network behavior.	Remember,Apply, Analyze.
CO3	Analyze the steady state response of AC circuits with phasor diagram	Remember,Understand, Apply.
CO4	Apply Laplace Transform for steady state and transient analysis of RC, RL, and RLC networks	Remember, Apply, Analyze.
CO5	Analyses the frequency response of electric circuits under resonance and coupled circuits	Remember,Understand, Apply,Analyze

Mapping with Programme Outcomes

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

3- Strong;2-Medium;1-Some

Assessment Pattern

Bloom'sCategory	ContinuousAssessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	30	20	60	60
Analyze (An)	10	20	20	20
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

Syllabus

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K.S.Rangasamy College of Technology – Autonomous (R 2022)

60 EV 302 - CIRCUIT ANALYSIS(Common to ECE& EE)

B.E. Electronics Engineering (VLSI Design and Technology)

Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	2	75	4	50	50	100

DC CIRCUIT ANALYSIS* Laws: Ohms Law, Kirchhoff's Current Law, Kirchhoff's voltage law, Connections: Sources, Resistors, Inductors and Capacitors in Series and Parallel, star and delta transformations, voltage, current source conversions. voltage and current division rules, Nodal analysis and Mesh analysis in DC Circuits.	[9]
NETWORK THEOREMS AND TWO PORT NETWORK* Theorems- Superposition, Thevenin's, Norton's, and Maximum power Transfer theorems. Network parameters - Impedance, admittance, transmission and Conversion formulae.	[9]
SINUSOIDAL STEADY STATE ANALYSIS * Sinusoidal Steady – State analysis, Characteristics of Sinusoids, The Phasor, Phasor relationship for R, L, and C, impedance and Admittance, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, apparent Power and Power Factor, Complex Power, star and Delta Connections	[9]
TRANSIENTS* Transient analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms evaluation of initial conditions for DC & AC inputs, State equations for networks.	[9]
RESONANCE AND COUPLED CIRCUITS* Behavior of series and parallel resonant circuits, frequency response, quality factor and bandwidth. Magnetically Coupled Circuits, mutual Inductance, Coefficient of Coupling, Dot rule- analysis of coupled circuits.	[9]

Hands on:

1. Measurements of current and voltage and power of a specific branch in a circuit
2. Verification of Mesh and Nodal Analysis
3. AC circuit various power calculation
4. Verification of Theorems – Thevenien, Notrons, Superposition theorem
5. Check the transient response of RL, RC and RLC circuits.

Total Hours: 45 + 30(Practical) 75

TextBook(s):

1. Sudhakar A and Shyammohan S, 'Circuits & Network Analysis and Synthesis', 4th Edition, McGraw Hill, 2021
2. Singh R R, 'Network Analysis and Synthesis', 2nd Edition, McGraw Hill Education Pvt Limited, 2021.

Reference(s):

1. Mahmood Nahvi and Joseph Edminister, 'Electric Circuits', 6th Edition, Schaum's Outline series, Tata McGraw-Hill, 2014.
2. William H Hayt& Jack E Kemmerly, 'Engineering Circuit Analysis', 8th Edition, McGraw Hill Education, 2013.
3. Franklin F. Kuo, 'Network Analysis and Synthesis', 5th Edition, Wiley International, 2012. 4 John D Ryder, 'Networks, Lines and Fields', 2nd Edition, Pearson Education, 2015.

***SDG 4: Quality Education**

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Course Contents and Lecture Schedule

Module no.	Topic	Number of Hours
1	**DC CIRCUIT ANALYSIS**	
1.1	Basic Components of electric Circuits: Charge, current, Voltage and Power	1
1.2	Voltage and Current Sources. Laws: Ohms Law, Kirchhoff's Current Law, Kirchhoff's voltage law,	1
1.3	Voltage and current division rule	1
1.4	Connections: Series and Parallel Connected Sources, Resistors,	1
1.5	Inductor and Capacitor in Series and Parallel connection	1
1.6	Star and Delta transformation,	1
1.7	Voltage, Current sources conversion.	1
1.8	Nodal analysis	1
1.9	Mesh analysis	1
2	**NETWORK THEOREMS AND TWO PORT NETWORK**	
2.1	Superposition Theorem	1
2.2	Thevenin's Theorem	1
2.3	Norton's Theorem	1
2.4	Maximum power Transfer theorems.	1
2.5	Impedance parameter	1
2.6	Admittance parameter	1
2.7	Transmission parameter	1
2.8	hybrid parameter	1
2.9	Conversion formula between two port parameters	1
3	**SINUSOIDAL STEADY STATE ANALYSIS**	
3.1	Sinusoidal Steady – State analysis, Characteristics of Sinusoids	1
3.2	The Phasor relationship for R, L and C	1
3.3	Impedance and Admittance Diagram	1
3.4	Phasor Diagrams	1
3.5	AC Circuit Power Analysis	1
3.6	Instantaneous Power, Average Power, apparent Power and Power Factor, Complex Power	1
3.7	Problems on various Power	1
3.8	Why Connection	1
3.9	Delta Connection	1
4	**TRANSIENTS**	
4.1	Transient analysis of RC without initial conditions	1
4.2	Transient analysis of RL without initial conditions	1
4.3	Transient analysis of RLC networks without initial conditions	2
4.4	Transient analysis of RC with initial conditions	1
4.5	Transient analysis of RL with initial conditions	1
4.6	Transient analysis of RLC networks with initial conditions	2
4.7	State equations for networks.	1
5	**RESONANCE AND COUPLED CIRCUITS**	

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5.1	Behavior of series resonant circuits, frequency response,	1
5.2	Quality factor and bandwidth of series resonance	1
5.3	Behavior of parallel resonant circuits, frequency response	1
5.4	Quality factor and bandwidth of parallel resonance circuit	1
5.5	Magnetically Coupled Circuits, mutual Inductance, Coefficient of Coupling,	1
5.6	Dot rule- analysis of coupled circuits.	1
5.7	Introduction to filters, classification	1
5.8	T' Filter network and its equation	1
5.9	'π' Filter network and its equation	1
	Total (45+15(Tutorial))	60

Course Designers

1. **Mr S.Jayamani**

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60 EV 303	DIGITAL SYSTEM DESIGN (Common to ECE& EE)

Category	L	T	P	Credit
PC	2	1	0	3

Objective

- To introduce number systems and codes, basic postulates of Boolean algebra and show the correlation between Boolean expressions.
- To design and analyse combinational circuits
- To study the concept of sequential circuits.
- To introduce the concept of HDL
- Reinforce theory and techniques taught in the classroom through experiments and projects in laboratory

Pre-requisite

Nil

Course Outcomes

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

CO1	Explain the fundamentals of numbering system and apply Boolean algebra to design digital systems	Remember, Understand Apply, Evaluate
CO2	Design and analyze combinational circuits and semiconductor memories	Remember, Understand, Apply Analyse
CO3	Design and analyze synchronous sequential logic circuits	Remember, Understand Analyse
CO4	Analyse the asynchronous sequential circuits.	Understand Analyse, Evaluate
CO5	Design and verify the digital circuits using HDL.	Remember, Apply, Evaluate

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Modal exam (marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	20	10	30	20
Analyze (An)	10	10	20	30
Evaluate (Ev)	10	10	20	20
Create (Cr)	0	10	10	10
Total	60	60	100	100

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Syllabus

K.S.Rangasamy College of Technology– Autonomous R 2022								
60 EV 303 - Digital System Design(Common to ECE& EE)								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	2	1	0	45	3	40	60	100

Digital Fundamentals* Review of Number Systems- representation-conversions–– Boolean postulates and laws – De-Morgan's Theorem - Logic Gates- Minimization of Boolean expressions – Sum of Products (SOP) – Product of Sums (POS)- Canonical forms –– Karnaugh map Minimization –Implementation of Boolean expressions using universal gates.	[9]
Combinational Circuits* Combinational logic circuits-adders, subtractors, decoders, encoders, multiplexers, demultiplexers, Code convertor, Realization of Boolean expressions-using multiplexers. Memories –ROM types, RAM types, PLDs **Hands on:**Simulation of combinational circuit	[9]
Sequential Circuits* Flip flops SR, JK, T, D and Master slave – Characteristic table and equation – Flip flop conversion, Application table – Edge triggering – Level Triggering –Ripple counters – Synchronous counters –Modulo – n counter– **Design of Synchronous FSM – Analysis of clocked sequential circuits***: state equation – State table – State diagram – State reduction & assignment – Register : shift registers – Universal shift register– Shift counters **Hands on:** Simulation of sequential circuit	[9]
Asynchronous Sequential Circuits Analysis procedure – Transition table – Flow table – Race conditions –Design of fundamental mode circuits – Primitive flow table – Reduction of state and flow table – Race free state assignment – Hazards – overview and comparison of logic families	[9]
Introduction To HDL **Design flow of VLSI, Different modelling styles in Verilog HDL, Structural, Dataflow and behavioural modelling of combinational and sequential logic circuits****	[9]
Total Hours: 30 + 15 (Tutorial)	**45**

TextBook(s):	
1.	M. Morris Mano, Michael D. Ciletti, 'Digital Design', 5th Edition, Pearson Education, New Delhi, 2016.
2.	Samir Palnitkar, 'Verilog HDL – A Guide to Digital Design and Synthesis', 2nd Edition, Pearson Education, 2016.
Reference(s):	
1.	Anand Kumar, 'Fundamentals of Digital Circuits', 4th Edition, Prentice Hall, 2016.
2.	Donald P.Leach and Albert Paul Malvino, GoutamSaha, 'Digital Principles and Applications', 8th Edition, Tata
3.	S. Salivahanan and S. Arivazhagan, 'Digital Circuits and Design',5thEdition, Oxford University press, 2018.
4.	John F.Wakerly, 'Digital Design: principles and practices', 5th Edition, Pearson Education, 2018.

***SDG:4 -Quality Education**

****SDG:8 -Decent work and economic growth**

*****SDG:9-Industry,innovation and infrastructure**

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Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Digital Fundamentals**	
1.1	Review of Number Systems	1
1.2	conversions	1
1.3	Boolean postulates and laws	1
1.4	De-Morgan's Theorem	1
1.5	Logic Gates	1
1.6	Minimization of Boolean expressions	1
1.7	Sum of Products (SOP) – Product of Sums (POS)	1
1.8	Canonical forms- Karnaugh map Minimization	1
1.9	Implementation of Boolean expressions using universal gates.	1
2	**Combinational Circuits**	
2.1	Combinational logic circuits	
2.2	Adders, subtractors,	1
2.3	Decoders, encoders	1
2.4	Multiplexers, demultiplexers	2
2.5	Code convertor,	2
2.6	Realization of Boolean expressions-using multiplexers	1
2.7	Memories –ROM types ,RAM types, PLDs	2
3	**Sequential Circuits**	
3.1	Flip flops SR, JK, T, D and Master slave	1
3.2	Characteristic table and equation	1
3.3	Flip flop conversion, Application table	1
3.4	Edge triggering – Level Triggering	1
3.5	Ripple counters – Synchronous counters	1
3.6	Modulo – n counter- Design of Synchronous FSM	1
3.7	Analysis of clocked sequential circuits: state equation – State table – State diagram –	1
3.8	State reduction & assignment	1
3.9	Register : shift registers – Universal shift register– Shift counters	1
4	**Asynchronous Sequential Circuits**	
4.1	Analysis procedure	1
4.2	Transition table – Flow table	1
4.3	Race conditions	1
4.4	Design of fundamental mode circuits	1
4.5	Primitive flow table	1
4.6	Reduction of state and flow table	1
4.7	Race free state assignment	1
4.8	Hazards	1
4.9	overview and comparison of logic families	1

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5	**Introduction To HDL**	
5.1	Design flow of VLSI,	1
5.2	Different modelling styles in Verilog HDL, s	2
5.3	Structural, Dataflow and behavioural modelling of combinational and sequential logic circuit	6
	Total	45

Course Designers

1. Dr.S.Malarkhodi–malarkhodi@ksrct.ac.in

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60 MY 002	UNIVERSAL HUMAN VALUES

Category	L	T	P	Credit
MC	3	0	0	3

Objective

- To identify the essential complementarily between 'values' and 'skills'
- To ensure core aspirations of all human beings.
- To acquire ethical human conduct, trustful and mutually fulfilling human behaviour
- To enrich interaction with Nature
- To achieve holistic perspective towards life and profession

Pre-requisite

NIL

Course Outcomes

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

CO1	Understand the significance of value inputs in formal education and start applying them in their life and profession	Understand
CO2	Evaluate coexistence of the “I” with the body.	Analyze
CO3	Identify and evaluate the role of harmony in family, society and universal order.	Analyze
CO4	Classify and associate the holistic perception of harmony at all levels of existence and Nature	Analyze
CO5	Develop appropriate human conduct and management patterns to create harmony in professional and personal lives.	Create

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom’s Category	Continuous Assessment Tests (Marks)			End Semester Examination (Marks)
	1	2	Model	
Remember (Re)	10	10	20	No End Semester Examination
Understand (Un)	10	10	20	
Apply (Ap)	20	20	30	
Analyze (An)	20	20	30	
Evaluate (Ev)	0	0	0	
Create (Cr)	0	0	0	

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 MY 002 - UNIVERSAL HUMAN VALUES								
Common to all Branches								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	100	00	100

Introduction to value Education* Understanding value Education-Self exploration as the process for value education-Continuous Happiness and prosperity-the basic human aspirations-right understanding-relationship and physical facility –happiness and prosperity - current scenario – **method to fulfill the basic human aspirations****	[9]
Harmony in the Human Being* Understanding Human being as the Co-Existence of the self and the Body-Distinguishing between the needs of the self and the body-the body as an instrument of the self-**understanding harmony in the self-harmony of the self with the body** –** programme to ensure self-regulation and health	[9]
Harmony in the Family and Society* Harmony in the Family –the basic unit of human interaction-values in human- to - human relationship –'Trust' the foundation value in relationship –'Respect'- as the right evaluation-understanding harmony in the society –vision for the universal human order.	[9]
Harmony in the Nature/Existence* Understanding harmony in the Nature-Interconnectedness, self-regulation and mutual fulfillment among the four orders of nature – realizing existence as co-existence at all levels –the holistic perception of harmony in existence.	[9]
Implications of the Holistic Understanding* Natural Acceptance of human values- definitiveness of human conduct- a basis for humanistic education, humanistic constitution and universal human order- competence in professional ethics –holistic technologies, production systems and management models-typical case studies – strategies for transition towards value base life and profession	[9]
Total Hours	**45**

Text Book(s):	
1.	A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2.	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2
Reference(s):	
1.	Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2.	Human Values, A.N. Tripathi, New Age International. Publishers, New Delhi, 2004.

*SDG:3 – Good Health and Well-Being

**SDG:5 – Quality Education

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Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**INTRODUCTION TO VALUE EDUCATION**	
1.1	Discussion on Present Education System and Skill Based Education	1
1.2	Understanding Value Education	1
1.3	Self exploration as the process for value education	1
1.4	Basic Human Aspirations - Continuous Happiness and Prosperity	1
1.5	Basic requirements to fulfill Human Aspirations - Right understanding, Relationship and Physical facility	1
1.6	Transformation from Animal Consciousness to Human Consciousness	1
1.7	Sources of Happiness and Prosperity – Harmony and Disharmony	1
1.8	Current Scenario and Role of Education	1
1.9	Outcome of Human Education and Method to fulfill the basic human aspirations	1
2	**HARMONY IN THE HUMAN BEING**	
2.1	Understanding Human being - As Co-Existence of the self and the Body - The Needs of the Self and the Body	1
2.2	Understanding Human being - As Co-Existence of the self and the Body - The Activities and Response of the Self and the Body	2
2.3	The body as an instrument of the self	1
2.4	Understanding harmony in the self	1
2.5	Harmony of the self with the body	2
2.6	Programme to ensure self-regulation and health	1
2.7	My Participation (Value) regarding Self and my Body - Correct Appraisal of our Physical needs	1
3	**HARMONY IN THE FAMILY AND SOCIETY**	
3.1	Harmony in the Family - Understanding Values in Human Relationships	1
3.2	Family as the basic Unit of Human Interaction	1
3.3	Values in human Relationships	1
3.4	Trust - the foundation value in relationship	1
3.5	Respect as the right evaluation, the Basis for Respect, Assumed Bases for Respect today	1
3.6	Harmony from Family to World Family: Undivided Society	1
3.7	Extending Relationship from family to society , Identification of the Comprehensive Human Goal	1
3.8	Programs needed to achieve the Comprehensive Human Goal: The Five Dimensions of Human Endeavour	1
3.9	Harmony from Family Order to World Family Order – Universal Human Order	1
4	**HARMONY IN THE NATURE / EXISTENCE**	
4.1	The Four Orders in Nature	1
4.2	Participation of Human Being in Entire Nature	1
4.3	Natural Characteristics - Tendency of Human Living with Animal Consciousness / The Holistic Perception of Harmony in Existence	1
4.4	Present day Problems	1
4.5	Recyclability and self-regulation in Nature	1
4.6	Relationship of Mutual Fulfillment	1
4.7	An Introduction to space, Co-existence of Units in Space	1
4.8	Harmony in Existence – Understanding Existence as Co- Existence	1

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4.9	Natural Characteristic of Human Living with Human Consciousness	1
5	**IMPLICATIONS OF THE HOLISTIC UNDERSTANDING**	
5.1	Natural Acceptance of human values	1
5.2	Definitiveness of Ethical Human Conduct - Development of Human Consciousness	1
5.3	Identification of Comprehensive Human Goal	1
5.4	Basis for Humanistic Education and Humanistic Constitution	1
5.5	Ensuring Competence in professional Ethics	1
5.6	Issues in Professional Ethics-The Current Scenario	1
5.7	Holistic Technologies and Production Systems and management models -Typical Case Studies	2
5.8	Strategies for transition towards value based life and profession	1
	Total	45

Course Designers

1. Dr.G.Vennila -vennila@ksrct.ac.in
2. Dr.K.Raja - rajak@ksrct.ac.in

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60 EV 3P1	ANALOG AND DIGITAL ELECTRONICS LABORATORY (Common to ECE& EE)

Category	L	T	P	Credit
PC	0	0	4	2

Objective

- To illustrate the working of transistor biasing circuits
- To understand and analyze the operation of single stage and multistage amplifiers
- To understand and analyze the applications of op-amp
- To design and implement combinational and sequential circuits for practical applications
- To simulate combinational and sequential circuits using HDL

Pre-requisite

Electronic Devices Laboratory

Course Outcomes

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

CO1	Construct different biasing circuits for BJT & MOSFET	Apply &Analyse
CO2	Design, implement and obtain the frequency response of single stage and multistage amplifiers.	Apply&Analyse
CO3	Construct an application circuit using op-amp	Apply
CO4	Design and implement application circuit using combinational and sequential logic circuits	Apply &Analyse
CO5	Design and simulate combinational and sequential logic circuits using HDL	Apply &Analyse

Mapping with Programme Outcomes

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

List of Experiments

Students have to design application circuits using analog electronic components / MOKU GO Kit / multisim software

Analog experiments*

1. Design and simulation of BJT & MOSFET biasing circuits
2. Design and implementation of MOS amplifier circuits**
3. Analysis of frequency response of feedback amplifiers/ multistage amplifier
4. Design and implementation of application circuits using op-amp**

Digital experiments*

5. Design and implementation of combinational circuits using logic gates**
6. Design and implementation of synchronous sequential circuits**
7. Design and implementation of asynchronous sequential circuits**
8. Design and implementation of FSM (Finite State Machine)**
9. Design and simulation of combinational / synchronous & asynchronous sequential circuits using HDL**

***SDG:4- Quality Education**

****SDG:9 –Industry innovation and infrastucture**

Course Designers

1. Mrs.S.S.Thamilselvi - sstamilselvi@ksrct.ac.in

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60 CS 0P2	DATA STRUCTURES AND ALGORITHMS LABORATORY	Category	L	T	P	Credit
		ES	0	0	4	2

Objective

- To design and implement simple linear and nonlinear data structures
- To strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To program for storing data as tree structure and implementation of various traversal techniques
- To implement sorting and searching techniques
- To gain knowledge of graph applications

Pre-requisite

Programming knowledge in C language

Course Outcomes

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

CO1	Demonstrate the implementation of Linear Data structures and its applications	Apply
CO2	Investigate Balanced Parenthesis and Postfix expressions with the help of Stack ADT	Apply
CO3	Implement Non-Linear Data Structure	Apply
CO4	Implement sorting and searching techniques	Apply
CO5	Implement Shortest Path and Minimum Spanning Tree Algorithm	Apply

Mapping with Programme Outcomes

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

List of Experiments

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1. **Implementation of List Abstract Data Type (ADT)***
2. **Implementation of Stack ADT***
3. **Implementation of Queue ADT***
4. Implementation of stack applications:
   (a) Program for ‘Balanced Parenthesis’
   (b) Program for ‘Evaluating Postfix Expressions’
5. Implementation Search Tree ADT
6. Implementation of Internal Sorting
7. Develop a program for external sorting
8. Develop a program for various Searching Techniques
9. **Implementation of Shortest Path Algorithm***
10. **Implementation of Minimum Spanning Tree Algorithm***

***SDG:4- Quality Education**

CourseDesigners

1. K.Poongodi - poongodik@ksrct.ac.in

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60 CG 0P2	CAREER SKILL DEVELOPMENT II

Category	L	T	P	Credit
CG	0	0	2	1

Objective

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Pre-requisite

Basic knowledge of reading and writing in English.

Course Outcomes

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

CO1	Compare and contrast products and ideas in technical texts.	Analyze
CO2	Identify cause and effects in events, industrial processes through technical texts	Analyze
CO3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	Analyze
CO4	Report events and the processes of technical and industrial nature.	Apply
CO5	Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search.	Apply

Mapping with Programme Outcomes

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

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 CG 0P2 - Career Skill Development II								
Common to All Branches								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	0	2	30	1	100	00	100

Listening* Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organiser (choosing a product or service by comparison) - Listening to longer technical talks and completing– gap filling exercises. Listening technical information from podcasts – Listening to process/event descriptions to identify cause & effects, documentaries depicting a technical problem and suggesting solutions - Listening to TED Talks	[6]
Speaking* Marketing a product, persuasive speech techniques - Describing and discussing the reasons of accidents or disasters based on news reports, Group Discussion (based on case studies), presenting oral reports, Mini presentations on select topics with visual aids, participating in role plays, virtual interviews	[6]
Reading* Reading advertisements, user manuals and brochures - longer technical texts– cause and effect essays, and letters / emails of complaint - Case Studies, excerpts from literary texts, news reports etc. - Company profiles, Statement of Purpose (SoPs)	[6]
Writing* Professional emails, Email etiquette - compare and contrast essay - Writing responses to complaints Precis writing, Summarizing and Plagiarism- Job / Internship application – Cover letter & Résumé	[6]
Verbal Ability II* Reading Comprehension (Inferential fillups) – Spotting Errors – Verbal Analogies – Theme Detection – Change of Voice – Change of Speech – One word substitution	[6]
Total Hours	**30**

Reference(s):

1.	'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020
3.	Raman. Meenakshi, Sharma. Sangeeta, 'Professional English'. Oxford University Press. New Delhi. 2019
4.	Arthur Brookes and Peter Grundy,' Beginning to Write: Writing Activities for Elementary and Intermediate Learners', Cambridge University Press, New York, 2003

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Listening**	
1.1	Evaluative Listening: Advertisements, Product Descriptions	1
1.2	Listening to longer technical talks and completing– gap filling exercises.	1
1.3	Listening technical information from podcasts	1
1.4	Listening to process/event descriptions to identify cause & effects and documentaries depicting a technical problem and suggesting solutions	1
1.5	Listening to TED Talks	1
2	**Speaking**	
2.1	Marketing a product, persuasive speech techniques	1

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2.2	Describing and discussing the reasons of accidents or disasters based on news reports,	1
2.3	Group Discussion (based on case studies)	1
2.4	Presenting oral reports, Mini presentations on select topics with visual aids	1
2.5	participating in role plays and virtual interviews	1
3	**Reading**	
3.1	Reading advertisements, user manuals and brochures	1
3.2	Reading - longer technical texts– cause and effect essays, and letters / emails of complaint	1
3.3	Case Studies, excerpts from literary texts, news reports etc.	1
3.4	Company profiles	1
3.5	Statement of Purpose (SoPs)	1
4	**Writing**	
4.1	Professional emails, Email etiquette	1
4.2	Compare and contrast essay	1
4.3	Writing responses to complaints	1
4.4	Precis writing, Summarizing and Plagiarism	1
4.5	Job / Internship application – Cover letter & Résumé	1
5	**Verbal Ability II**	
5.1	Reading Comprehension (Inferential fillups) and Theme Detection	1
5.2	Spotting Errors	1
5.3	Verbal Analogies	1
5.4	Change of Voice and Change of Speech	1
5.5	One word substitution	1
	Total	**25**

Course Designer

1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

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60 MA 016	PROBABILITY AND INFERENTIAL STATISTICS

Category	L	T	P	Credit
BS	3	2	0	4

Objective

- To learn the basic concepts of probability.
- To get exposed to some standard distributions.
- To familiarize the concepts of correlation and regression
- To familiarize various methods in hypothesis testing.
- To get exposed to various statistical methods for time series.

Pre-requisite

Nil

Course Outcomes

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

CO1	Understand the basics of probability.	Remember, Understand, Apply
CO2	Understand the concepts of standard distributions.	Remember, Understand, Apply
CO3	Calculate coefficient of correlation and regression.	Remember, Understand, Apply
CO4	Apply Student's t test, F test and Chi-square test for testing the statistical hypothesis.	Remember, Understand, Apply
CO5	Apply suitable methods for measuring trend values.	Remember, Understand, Apply

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Test (Marks)	End Sem Examination (Marks)
	1	2		
Remember(Re)	06	06	10	08
Understand(Un)	10	08	15	18
Apply(Ap)	44	46	75	74
Analyze(An)	0	0	0	0
Evaluate(Ev)	0	0	0	0
Create(Cr)	0	0	0	0
Total	60	60	100	100

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 MA 016 - Probability and Inferential Statistics								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	1	0	60	4	40	60	100

Probability and Random Variables* Axioms of probability – Conditional probability –Baye's theorem–Random variable – Expectation – Probability mass function – Probability density function – Moment generating function.	**[9]**
Standard Distributions Discrete Distributions: Binomial, **Poisson*** ** and Geometric distributions – Continuous Distributions: Uniform, Exponential and Normal distributions – Properties.	**[9]**
Two Dimensional Random Variables* Joint distributions - Marginal and conditional distributions – Covariance – Correlation and Regression - Rank Correlation.	**[9]**
Testing of Hypothesis** Type I and Type II errors – Test of significance of small samples : Student's 't' test – Single mean – Difference of means – F- test – Chi-square test– Goodness of fit – Independence of attributes.	**[9]**
Time Series* Components of a time series - Method of least square - Parabolic trend - Exponential trend - Method of seasonal variations – Ratio to trend method - Link relative method.	**[9]**
Hands on: 1. Calculate the mean and variance for discrete distributions. 2. Fit the Normal distribution. 3. Calculate the correlation coefficient and lines of regression. 4. Applied Chi-square test to real data set. 5. Fit a curve to the given data using method of least squares.	
TotalHours:45+15(Tutorial)	**60**

TextBook(s):

1.	Richard A Johnson, "Miller & Freund's Probability and Statistics for Engineers", 9th Edition, Pearson Education Limited, New Delhi, 2018.
2	P N Arora and S Arora, 'Statistics for Management', 5th Edition, Sultan Chand & Sons, New Delhi, 2015.

Reference(s):

1.	Sheldon Ross, "A first course in Probability", 10th Edition, Pearson Education, New Delhi, 2019.
2.	T.Veerarajan, 'Probability, Statistics and Random process', Tata McGraw-Hill Education, 4th Edition, 2015.
3.	Gupta S.P, "Statistical Methods", 45th Edition, Sultan Chand & sons, New Delhi, 2017.
4.	D C Montgomery, Cheryl L.Jennings and Murat Kulahci "Introduction to Time Series Analysis and Forecasting", 2nd Edition, John Wiley and Sons, 2015.
5.	V.K.Kapoor and S.C.Gupta, "Fundamentals of Mathematical Statistics", Sultan Chand & sons, 12th Edition, New Delhi, 2020.

***SDG:4- Quality Education**
****SDG:9- Industry, Innovation, and Infrastructure**
*****SDG:2- Zero Hunger**

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Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Probability and Random Variables**	
1.1	Axioms of probability	1
1.2	Conditional probability	1
1.3	Baye's theorem	2
1.4	Tutorial	2
1.5	Random variable ,Expectation	1
1.6	Probability mass function	1
1.7	Probability density function	1
1.8	. Moments generating function .	1
1.9	Tutorial	2
2	**Standard Distributions**	
2.1	Discrete Distributions- Binomial distribution	2
2.2	Poisson distribution	1
2.3	Geometric distribution	1
2.4	Tutorial	2
2.5	Continuous Distributions - Uniform distribution	1
2.6	Exponentialdistribution	1
2.7	Normal distribution	2
2.8	Properties	1
2.9	Tutorial	2
3	**Two Dimensional Random Variables**	
3.1	Joint distributions	1
3.2	Marginal distribution	1
3.3	conditional distribution	1
3.4	Tutorial	2
3.5	Covariance	1
3.6	Correlation	1
3.7	Regression	2
3.8	Rank correlation	1
3.9	Tutorial	2
4	**Testing of Hypothesis**	
4.1	Type I and Type II errors	1
4.2	Test of significance of small samples -Student's 't' test	1
4.3	Single mean	1
4.4	Difference of means.	2
4.5	Tutorial	2
4.6	F- test	1
4.7	Chi-square test – Goodness of fit	1
4.8	Independence of attributes.	1
4.9	Tutorial	2
5	**Time Series**	

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5.1	Components of a time series	1
5.2	Method of least square	1
5.3	Parabolic trend	2
5.4	Exponential trend	1
5.5	Tutorial	2
5.6	Method of seasonal variations	1
5.7	Ratio to trend method	1
5.8	Link relative method	1
5.9	Tutorial	2
	Total	60

Course Designers

1 Mrs. D.Padmavathi -padmavathi@ksrct.ac.in

2. Mr. D.Senthil Raja -senthilrajad@ksrct.ac.in

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60 EV 401	SIGNALS AND SYSTEMS (Common to ECE& EE)

Category	L	T	P	Credit
PC	2	1	0	3

Objectives

- To understand the basic properties of signals & systems and analysis of LTI systems
- To understand the sampling and reconstruction of CT signals.
- To analyse continuous time and discrete time signals and systems in the Fourier series and Fourier transform.
- To analyse discrete time signals and systems using z-transform.
- To study about DFT and FFT algorithms

Pre-requisite

Integrals, Partial Differential Equations and Laplace transform.

Course Outcomes

Onthesuccessful completion ofthecourse,studentswill beable to

CO1	Describe the classification of signals and systems with their properties and analyse LTI systems.	Remember, Understand Apply,
CO2	Understand the concepts of sampling and reconstruction of CT signals.	Remember, Understand Apply, Analyze
CO3	Analyse continuous-time and discrete-time signals and systems using Fourier series and Fourier transform	Remember, Understand, Apply.
CO4	Analyse discrete-time signals and systems using z-transform	Remember, Understand, Apply
CO5	Computation of DFT and FFT algorithms	Remember, Understand, Apply

Mapping with Programme Outcomes

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

3 - Strong;2 - Medium;1 – Some

Assessment Pattern

Bloom'sCategory	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	30	30	70	70
Analyze (An)	10	10	10	10
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

Syllabus

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 EV 401 - SIGNALS AND SYSTEMS (Common to ECE& EE)								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	Hours/Week			Totalhrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	2	1	0	45	3	40	60	100

INTRODUCTION TO SIGNALS AND SYSTEMS* Basic Continuous-time (CT) & Discrete-Time (DT) signals-Classification of CT & DT Signals – Basic CT and DT signals -Signal operations –Classification-Properties of CT & DT systems - Analysis of LTI systems: ConvolutionSum-Convolution Integral—Properties. **Handson:** Signal generation &operations and verification of system properties	[9]
SAMPLING* **R**epresentation of CT signals by samples—Sampling theorem-Impulse train sampling-Effects of under sampling-Reconstruction of CT signal from samples using interpolation. **Handson:** Sampling and Reconstruction.	[9]
FOURIER ANALYSIS OF CONTINUOUS TIME AND DISCRETE TIME SIGNALS AND SYSTEMS* Representation of periodic signals by Continuous Time Fourier Series (CTFS) and Discrete Time Fourier Series (DTFS) -Representation of CT aperiodic and periodic signals by Continuous Time Fourier Transform-Representation of DT aperiodic and periodic signals by DiscreteTime Fourier Transform—Properties- Frequency response of systems characterized by differential equations and difference equations. **Handson:** Analysis and Synthesis of CT and DT signals and systems using Fourier Transform	[9]
Z TRANSFORM ANALYSIS OF DISCRETE TIM ESIGNALS ANDS YSTEMS* Z transform - two sided and one sided Z transform - Properties of Z transform - Properties of ROC — InverseZ transform, Analysis of LTI systems using z transform- Stability and causality in z-domain -Solution of difference equations - frequency response and impulse response. **Handson:** Analysis o fDT systems using z-transform.	[9]
DFT AND FFT ALGORITHMS* Introduction – Frequency Domain Sampling: Discrete Fourier Transform (DFT) – Properties of DFT – Efficient computation of the DFT: FFT algorithms – Radix 2 FFT algorithms: Decimation in Time and Decimation in Frequency **Handson:** Verification of properties of DFT	[9]
Total Hours-30+15(Tutorial): 45	

TextBook(s):	
1.	Alan V.Oppenheim, Alan S.Willsky with S.Hamid Nawab, 'Signals & Systems', 2nd Edition, Pearson Education, 2013.
2	B P Lathi, 'Signal processing and Linear systems', Oxford University Press, 2010.
Reference(s):	
1.	John G.Proakis and Dimitris G.Manolakis, 'Digital Signal Processing, Principles, Algorithms and Applications', 4th Edition, Prentice Hall, 2013.
2.	M.J.Roberts, 'Signals and Systems Analysis using Transform method and MATLAB', 3rd Edition, Tata McGraw-Hill, 2018.
3.	Simon Haykin and Barry Van Veen, 'Signals and Systems', 2nd Edition, John Wiley & Sons, 2012

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Course Contents and Lecture Schedule

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S.No.	Topic	Numberof Hours
INTRODUCTION TO SIGNALS AND SYSTEMS		
1.1	Basic Continuous-time(CT) & Discrete-Time(DT) signals	1
1.2	Classification of CT Signals & DTSignals	1
1.3	Basic CT and DT signals-Signal operations,Classification	1
1.4	Properties of CT & DTsystems	1
1.5	Analysis of LTI systems:Convolution Sum	1
1.6	Convolution Integral & Properties	1
1.7	Tutorial	2
1.8	Handson	1
SAMPLING		
2.1	**R**epresentation of CT signals by samples-Sampling theorem	2
2.2	Impulse train sampling	2
2.3	Effects ofunder sampling	1
2.4	Reconstruction of CT signal from samples using interpolation	1
2.5	Tutorial	2
2.6	Handson	1
FOURIER ANALYSIS OF CONTINUOUS TIME and DISCRETE TIME SIGNALS AND SYSTEMS		
3.1	Representation of periodic signals by ContinuousTimeFourier Series (CTFS)	1
3.2	Representation of periodic signals by Discrete Time Fourier Series (DTFS)	1
3.3	Representation of CT aperiodicand periodic signals by Continuous Time Fourier Transform	1
3.4	Representation of DT aperiodic and periodic signals by Discrete Time Fourier Transform & Properties	1
3.5	Frequency response of systems characterized by differential equations.	1
3.6	Frequency response of systems characterized by difference equations	1
3.7	Tutorial	2
3.8	Hands on	1
Z TRANSFORM ANALYSIS OF DISCRETE TIME SIGNALS AND SYSTEMS		
4.1	Z transform-two sided and one sided Z transform	1
4.2	Propertiesof Z transform and Properties of ROC	1
4.3	Inverse Z transform	1
4.4	Analysis of LTI systems using z transform	1
4.5	Stability and causality in z-domain	1
4.6	Solution of difference equations-frequency response and impulse response	1
4.7	Tutorial	2
4.8	Handson	1
DFT AND FFT ALGORITHMS		
5.1	Frequency Domain Sampling	1
5.2	Discrete Fourier Transform(DFT)	1
5.3	Properties of DFT	1
5.4	Efficient computation of the DFT:FFT algorithms	1

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5.5	Radix-2 FFT algorithms: Decimationin Time and Decimation in Frequency	2
5.6	Tutorial	2
5.7	Handson	1
	Total Hours:30+15(Tutorial)	45

Course Designers

1. Dr.P.Babu
2. Ms.C.Saraswathy

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60 EV 402	LINEAR INTEGRATED CIRCUITS

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- To study the circuit configuration of linear integrated circuits.
- To introduce practical applications of linear integrated circuits.
- To introduce the concept of analog multiplier and Phase Locked Loop with applications.
- To study the application of ADC and DAC in real time systems.
- To introduce special function ICs and its construction.

Pre-requisite

Electronic Circuits

Course Outcomes

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

CO1	Explain the circuit configuration of linear integrated circuits.	Remember, Understand
CO2	Design linear and non-linear circuits using op-amps	Remember, Understand Apply, Analyze.
CO3	Explain the operation and applications of analog multiplier and PLL	Remember, Understand
CO4	Design ADC and DAC circuits using op – amps	Remember, Understand Apply, Analyze.
CO5	Explain the working principle of special function ICs	Remember, Understand, Analyze

Mapping with Programme Outcomes

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

3 - Strong; 2 - Medium; 1 – Some

Assessment Pattern

Bloom'sCategory	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	20	20	45	45
Apply (Ap)	15	20	25	25
Analyze (An)	15	10	20	20
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

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Syllabus

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60 EV 402 - LINEAR INTEGRATED CIRCUITS								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

CIRCUIT CONFIGURATION FOR LINEAR ICS* Current sources, Analysis of difference amplifiers with active loads, supply and temperature independent biasing, Band gap references, Monolithic IC operational amplifiers, specifications, frequency compensation, slew rate and methods of improving slew rate. interpretation of TL082	[9]
LINEAR AND NON-LINEAR APPLICATIONS OF OPAMP* Linear and Nonlinear Circuits using operational amplifiers and their analysis, Differentiator, Integrator, Instrumentation amplifier, Sine wave Oscillators, Low pass, High pass and band pass filters, Multivibrator and Schmitt trigger, Triangle wave generator, Log and Antilog amplifiers.	[9]
ANALOG MULTIPLIER AND PLL* Analysis of four quadrants and variable Transconductance multipliers, Analog multiplier MPY634 features, Voltage controlled oscillator, Closed loop analysis of PLL, AM, PM and FSK modulators and demodulators.	[9]
ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTORS * Sample and Hold circuit -Digital to Analog converters - Binary weighted and R-2R Ladder types - Analog to digital converters – Flash - Counter ramp, successive approximation, single, dual slope - DAC/ADC performance characteristics and comparison.	[9]
SPECIAL FUNCTION ICS **555 Timers, Voltage regulators - linear and switched mode types, switched capacitor filter, SMPS, Frequency to Voltage converters, Power amplifiers and Isolation Amplifiers, sources for noises, Op Amp noise analysis and Low noise OP-Amps**.**	[9]
Hands on using Matlab: 1. Design and Simulation of Differential amplifier 2. Design and Simulation of Differentiator 3. AD/DA converters	
Total Hours:	**45**

Text Book(s):	
1.	D.RoyChoudry , Shail Jain , ‘Linear integrated Circuits’, 5th Edition, New Age International Pvt Ltd, 2018.
2	Ramakant A., Gayakwad, ‘Op – Amps and Linear Integrated Circuits’, 4th Edition, Prentice Hall, 2017.
Reference(s):	
1.	Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", Mc Graw Hill Education, 2014
2.	Sergio Franco., ‘Design with Operational Amplifiers and Analog Integrated Circuits’, 4th Edition, Tata McGraw-Hill, 2014.
3.	S.Salivahanan& V.S. KanchanaBhaskaran, ‘Linear Integrated Circuits’, 3rd Edition, TMH, 2018
4.	Gray and Meyer, ‘Analysis and Design of Analog Integrated Circuits’, 5th Edition, Wiley International, 2010

Assignment Activity:

Assignment 1- Covers module 1 & 2: Questions Related to Hands-on and Case Study & presentation on different types of opamps

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- Design RC Phase shift oscillator, Clipper & clamper using Opamp 741.
- Discuss and analyse the following parameters of ALM2403-Q1 IC & Compare with LM741, Features, ii) Applications.

Assignment 2-Covers module 3 &4: Questions related to Hands-on and Case study & presentation on different types of ADC/DAC:

- Design monostable multivibrator using 555 timer and 8-bit SAR Analog to digital converter.
- Discuss and analyse the following parameters of ADC0804 8-Bit Analog to Digital A/D Converter IC DIP-20 Package IC i) Features, ii) Specifications

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****SDG:9 – Industry, Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	Number ofHours
	CIRCUIT CONFIGURATION FOR LINEAR ICS:	
1.1	Current sources	2
1.2	Analysis of difference amplifiers with active loads	2
1.3	Supply and temperature independent biasing	1
1.4	Monolithic IC operational amplifiers, specifications	1
1.5	Frequency compensation	1
1.6	Slew rate and methods of improving slew rate.	1
1.7	Interpretation of TL082 datasheet	1
	APPLICATION OF OPERATIONAL AMPLIFIERS	
2.2	Differentiator, Integrator	1
2.3	Instrumentation amplifier	1
2.4	Sine wave Oscillators	2
2.5	Low pass, High pass and band pass filters	1
2.6	Schmitt trigger	1
2.7	Multivibrator, Triangle wave generator	1
2.8	Log and Antilog amplifiers.	1
	ANALOG MULTIPLIER AND PLL	
3.1	Analysis of four quadrants and variable Transconductance multipliers	2
3.2	Analog multiplier MPY634 features	1
3.3	Voltage controlled oscillator	1
3.4	Closed loop analysis of PLL	2
3.5	AM, PM modulators and demodulators	2
3.6	FSK modulators and demodulators	1
	ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTORS	
4.1	Digital to Analog converters - Binary weighted	1

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4.2	Digital to Analog converters - R-2R Ladder types	1
4.3	Sample and Hold circuit	2
4.4	Continuous - Counter ramp type ADC	1
4.5	successive approximation	1
4.6	single, dual slope	2
4.7	DAC/ADC performance characteristics and comparison.	1
	SPECIAL FUNCTION ICS	
5.1	555 Timers	2
5.2	Voltage regulators - linear and switched mode types	1
5.3	Voltage regulators -switched capacitor filter	1
5.4	SMPS	1
5.5	Frequency to Voltage converters	1
5.6	Power amplifiers and Isolation Amplifiers	1
5.7	Op Amp noise analysis	1
5.8	Low noise OP-Amps	1
	Total	45

Course Designers

1. MrD.Poornakumar - poornakumard@ksrct.ac.in

60 EV 403	**ELECTROMAGNETIC WAVES (Common to ECE& EE)**

Category	L	T	P	Credit
PC	2	1	0	3

Objectives

- To introduce the concept of vector analysis
- To develop an understanding of electromagnetic laws and its application in boundaries
- To study maxwell's equation, plane wave propagation in free space
- To introduce the concept of signal propagation through transmission lines and high frequency lines
- To illustrate the propagation of TE, TM and TEM rectangular, circular waveguides and cavity resonators

Pre-requisite

NIL

CourseOutcomes

Onthesuccessful completion ofthecourse,studentswill beable to

CO1	Describe the vector quantities and apply vector integration and differentiation in different coordinate systems	Remember, Understand Apply,
CO2	Apply the laws of electromagnetic to evaluate the boundary conditions for electric and magnetic fields and describe the propagation of plane electromagnetic waves	Remember, Apply, Analyze.
CO3	Apply Faraday's law to find the electromotive force and Calculate displacement current using Maxwell's equation for time varying magnetic field	Remember, Understand, Apply.
CO4	Evaluate the characteristics and wave propagation in high frequency transmission lines	Remember, Apply, Analyze.

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CO5	Describe rectangular and circular waveguides and understand the propagation of electromagnetic waves	Remember, Understand, Apply, Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2									3	2	
CO2	3	3	3	3									3	3	
CO3	3	3	3	3									3	3	
CO4	3	3	3	3		3	3						3	3	
CO5	3	3	3	3									3	2	
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom'sCategory	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	30	20	60	60
Analyze (An)	10	20	20	20
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

Syllabus

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60 EV 403 - ELECTROMAGNETIC WAVES (Common to ECE& EE)

B.E. Electronics Engineering (VLSI Design and Technology)

Semester	Hours/Week			Total Hours	Credit	MaximumMarks		
	L	T	P		C	CA	ES	Total
IV	2	1	0	45	3	40	60	100

VECTOR ANALYSIS * [9]

Vectors analysis: Vector algebra, vector calculus - divergence, gradient, curl, Laplacian; Coordinate systems - Cartesian, cylindrical and spherical

Hands on: 1. Generate Electromagnetic Wave

2. Find the electrostatic potential in an air-filled annular quadrilateral frame

ELECTROMAGNETICS * [9]

Coulomb's law, Gauss's law, electric scalar potential, Laplace and Poisson's equations, conduction and polarization, boundary conditions, Biot-Savart law, Ampere's law

Hands on: Solve a 2-D magnetostatic model for a ferromagnetic frame with an H-shaped cavity

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ELECTRODYNAMICS* Maxwell's equations, Faraday's induction, displacement current, Plane wave propagation in free space and in materials; Poynting vector, reflection and transmission of plane waves at media boundary	[9]
TRANSMISSION LINES* Transmission-line general solution - loading. Impedance transformation and matching. Smith Chart, Quarter-wave and half-wave transformers. Single stub matching	[9]
WAVEGUIDES* Classification of guided wave solutions-TE, TM and TEM waves. Rectangular and circular waveguides. Excitation of waveguides. Rectangular and circular cavity resonators	[9]
Total Hours: 30 + 15 (Tutorial)	45

TextBook(s):

1.	Matthew N.O.Sadiku , 'Elements of Electromagnetics', 7th Edition , Oxford University Press , 2018.
2.	E.C. Jordan & K.G. Balmain, 'Electromagnetic waves & Radiating Systems', 2nd Edition, Prentice Hall, 2013

Reference(s):

1.	William H.Hayt, John A.Buck , 'Engineering Electromagnetics', 8th Edition, McGraw Hill Education, 2017.
2.	John. D. Ryder, 'Network Lines and Fields', 2nd Edition, Pearson Education India, 2015.
3.	David K.Cheng, 'Field and Wave Electromagnetics', 2nd Edition, Pearson Education, 2015.
4.	Umesh Sinha, 'Transmission Lines and Networks', Satya Prakashan Publishing Company, New Delhi, 2010.

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Course Contents and Lecture Schedule

S.No.	Topic	Number of Hours
	VECTOR ANALYSIS	
1.1	Electromagnetic waves – Introduction	1
1.2	Vectors, Position & distance vector, component of vectors	1
1.3	Cartesian and cylindrical coordinate systems	1
1.4	Spherical coordinates-constant coordinate surface	1
1.5	Vector calculus-differential length, Area, Volume	1
1.6	Line, surface & volume integrals – Del operator	1
1.7	Gradient of scalar-Divergence of a vector	1
1.8	Divergence theorem-curl of a vector	1
1.9	Stokes theorem- Laplacian of scalar and vector field	1
	ELECTROMAGNETICS	
2.1	Coulomb's law	1
2.2	Gauss's law	1
2.3	Electric scalar potential	1
2.4	Laplace and Poisson's equations	1
2.5	Conduction and polarization	2

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2.6	Boundary conditions	1
2.7	Biot-Savart law	1
2.8	Ampere's law	1
ELECTRODYNAMICS		
3.1	Maxwell's equations	2
3.2	Faraday's induction	1
3.3	Displacement current	1
3.4	Plane wave propagation in free space and in materials	2
3.5	Poynting vector	1
3.6	Reflection of plane waves at media boundary	1
3.7	Transmission of plane waves at media boundary	1
TRANSMISSION LINES		
4.1	Transmission line – V & I equation of transmission line	2
4.2	Propagation constant & characteristic impedance	1
4.3	Reflection coefficient & VSWR	1
4.4	Impedance transformation and matching	1
4.5	Smith Chart	1
4.6	Admittance Smith Chart, Applications of Smith Chart	1
4.7	Quarter-wave and half-wave transformers	1
4.8	Single stub matching	1
WAVEGUIDES		
5.1	Classification of waveguides	1
5.2	TM waves in rectangular waveguides	1
5.3	TE waves in rectangular waveguides	1
5.4	Characteristics of TE, TM waves	1
5.5	Cut-off wavelength, phase velocity and impossibility of TEM waves	1
5.6	TM and TE waves in circular waveguides	1
5.7	Excitation of waveguides	1
5.8	Rectangular cavity resonators	1
5.9	Circular cavity resonators	1
	Total (45+15(Tutorial))	60

Course Designers

1. Mr Saravanan S - saravanan.s@ksrct.ac.in

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60 EV 404	Computer Architecture and Microcontrollers

Category	L	T	P	Credit
BS	3	0	0	3

Objective

- To learn in detail the different types of control and the concept of pipelining,
- Learn the hierarchical memory system including cache memories and virtual memory.
- To introduce the architecture, programming of 8051 micro controller
- Interfacing an peripheral device with the 8051 microcontroller
- To explore the applications using microcontroller 8051

Pre-requisite

NIL

Course Outcomes

Onthesuccessful completion ofthecourse,Studentswill beable to

CO1	Acquire the knowledge of fundamentals of different types of control and the concept of pipelining	Remember,Understand, Apply
CO2	Explain the operation of different I/O systems and Memory devices	Remember,Understand,Apply,Analyze
CO3	Describe the operation of 8051 microcontroller and develop the assembly language program using 8051 microcontroller.	Remember,Understand, Apply
CO4	Do interfacing design of peripherals like Timers and Standard interfaces	Remember,Understand,Apply,Analyze
CO5	Develop the 8051 microcontroller based system for various applications	Remember,Understand,Apply.Analyze

Mapping with Programme Outcomes

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

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	30	20	60	60
Analyze (An)	10	20	20	20
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

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K.S. Rangasamy College of Technology – Autonomous R 2022								
60 EV 404 - Computer Architecture and Microcontrollers								
B.E. Electronics Engineering (VLSI Design and Technology)								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Computer organization and architecture Architecture, Structure and Function. Computer components, function, and bus interconnection. Instruction sets characteristics and functions, addressing modes, stack operation, RISC-CISC, and Pipelining principles.	[9]
Computer memory systems Memory access characteristics, memory hierarchy, Cache memory Improving Cache performance. Virtual memory – Overlay, Memory management, Address translation. Input/Output Organization – Introduction, Synchronous vs. asynchronous I/O, Programmed I/O, Interrupt driven I/O, Direct Memory Access.	[9]
8051 Architecture Microcontrollers and Embedded Processors. Architecture – Block diagram of 8051,Working registers, SFRs, Clock and RESET circuits, Stack and Stack Pointer, Program Counter, I/O ports, Memory Structures, Data and Program Memory, Timing diagrams and Execution Cycles. 8051 Instruction set, Addressing Modes, Instruction timings, Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction.	[9]
Instruction Set and Programming Assembly language programs, C language programs. Programming on Timer, interrupt and serial data transfer. Assemblers and compilers. Programming and debugging tools. Standard interfaces - RS232, RS485, USB, SPI and I2C.	[9]
Programming and Interfacing of 8051 Interfacing of sensors, DAC, ADC, PWM, Keypad,Seven segments LED display. DC motor, LED, Stepper motor and LCD interfacing	[9]
Total Hours:	45

TextBook(s):	
1.	Muhammed Ali Mazidi& Janice GilliMazidi, R.D. Kinley, The 8051 microcontrollers
2.	Subrata Ghoshal, Computer Architecture and Organization: From 8085 to Core2Duo and beyond, Pearson, 2011.
Reference(s):	
1.	Mano M M, Computer System Architecture, 3rd Ed, Prentice Hall of India.
2.	Computer organization and design: The Hardware/Software interface/David A.
3.	Computer Organisation V. Carl Hamacher, Zvonko G. Vranesic, SafwatG.Zaky.
4.	John P Hayes, Computer Architecture and Organization, McGraw Hill.

Assignment 1 – Covers Module 1 & 2 Questions related to the problems and simulation / Hands on

1. Arithmetic operation for 8085 processor.

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2. Embedded C program for configuring the Ports and Peripheral interface with 8051.

Assignment 2 - Mini Project

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

Module no	topic	No.of Hours	Mode of content Delivery
1	**Computer organization and architecture**		
1.1	Architecture, Structure and Function	1	Power Point
1.2	Computer components, function	1	Power Point
1.3	bus interconnection	1	Flipped Class
1.4	Instruction sets	1	Power Point
1.5	characteristics and functions	1	Self-learning
1.6	addressing modes	1	Black Board
1.7	stack operation	1	Power Point
1.8	RISC-CISC	1	seminar
1.9	Pipelining principles	1	Power Point Presentation
2	**Computer memory systems**		
2.1	Memory access characteristics	1	Power Point Presentation
2.2	memory hierarchy	1	Power Point Presentation
2.3	Cache memory Improving Cache performance	1	Self-learning
2.4	Virtual memory – Overlay	1	Power Point Presentation
2.5	Memory management	1	Flipped Class
2.6	Address translation. Input/Output Organization	1	Power Point Presentation
2.7	Introduction, Synchronous vs. asynchronous I/O, Programmed I/O	1	Power Point Presentation
2.8	Interrupt driven I/O	1	Power Point Presentation
2.9	Direct Memory Access	1	Power Point Presentation
3	**8051 Architecture**		
3.1	Microcontrollers and Embedded Processors	1	Power Point Presentation

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3.2	Architecture – Block diagram of 8051, Clock and RESET circuits	1	Power Point Presentation
3.3	Working registers, SFRs	1	Power Point Presentation
3.4	Stack and Stack Pointer, Program Counter, I/O ports	1	Power Point Presentation
3.5	Memory Structures, Data and Program Memory	1	Black Board
3.6	Timing diagrams and Execution Cycles	1	Block Board
3.7	8051 Instruction set	1	Power Point Presentation
3.8	Addressing Modes	1	seminar
3.9	Instruction timings, Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction.	1	Group Problem Solving
4	**Instruction Set and Programming**		
4.1	Assembly language programs	1	Power Point
4.2	C language programs. Programming on Timer	1	Black Board
4.3	Programming on interrupt	1	Power Point
4.4	Programming on serial data transfer	1	Power Point Presentation
4.5	Assemblers and compilers	1	Flipped class
4.6	Programming and debugging tools	1	Simulation
4.7	Standard interfaces - RS232, RS485	1	Self-learning
4.8	Standard interfaces- USB, SPI	1	Simulation
4.9	Standard interfaces- I2C	1	Simulation
5	**Programming and Interfacing of 8051**		
5.1	Interfacing of sensors	1	Power Point
5.2	DAC, ADC	1	Black Board
5.3	PWM	1	Power Point
5.4	Keypad	1	Power Point
5.5	LED	1	Simulation
5.6	Seven segments LED display	1	Simulation
5.7	DC motor	1	Self-learning
5.8	Stepper motor	1	Simulation
5.9	LCD interfacing	1	Simulation

Course Designers

1.M.Devaki-devaki@ksrct.ac.in

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60 EV 4P1	LINEAR INTEGRATED CIRCUITS AND ELECTROMAGNETICS LABORATORY (Common to ECE& EE)

Category	L	T	P	Credit
PC	0	0	4	2

Objective

- To design and test the various circuits using Op-amp
- To design and test the various circuits using 555 timer
- To construct and test the phase locked loop
- To construct and test different data convertor circuits
- To demonstrate the field configurations in different geometries and waveguides

Pre-requisite

Electronic Circuits

Course Outcomes

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

CO1	Design and test the various applications of op-amp	Create
CO2	Design and test the various applications of NE555 timer	Create
CO3	Design and test the various applications of PLL	Create
CO4	Design and test the different data convertors	Create
CO5	Simulate the field configurations in different geometries and waveguides	Create

Mapping with Programme Outcomes

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

3 - Strong; 2 - Medium; 1 – Some

List of Experiments

1. Application circuits using op-amp*
2. Application circuits using NE555 Timer*
3. Application circuits using PLL*
4. Application circuits using Data convertors*
5. Simulation of the variation of electric field in point charge geometry and parallel plate capacitor Geometry*
6. Simulation of Transverse electric modes in rectangular waveguide*

***SDG:4- Quality Education**

Course Designers

1. Mr D.Poornakumar - poornakumard@ksrct.ac.in
2. Mr.S.Saravanan - saravanan.s@ksrct.ac.in

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60 EV 4P2	Microcontrollers Laboratory

Category	L	T	P	Credit
PC	0	0	4	2

Objective

- To familiarize the 8051 microcontroller architectures and Instruction set
- To give an exposure of assembling language programming and interfacing of various modules
- To use IDE for programming and debugging
- To understand the techniques to interface sensors and I/O circuits and to implement applications using these processors
- To develop microprocessor or microcontroller based small application projects

Pre-requisite

NIL

Course Outcomes

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

CO1	Perform arithmetic operations using 8051 by developing assembly language programs	Apply
CO2	Do the experiment like counters and bit manipulation using logical instruction	Apply
CO3	Developing C code for accessing GPIO for interfacing seven segment display and Hex Keyboard interface to 8051	Apply
CO4	Design a system for temperature acquisition system	Apply
CO5	Design and implement 8051 microcontroller interface with DC and stepper motor.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3								3	2	
CO2	3	3	3	3	3								3	3	
CO3	3	3	3	3	3			3	3	3		3	3	3	3
CO4	3	3	3	3	3			3	3	3		3	3	3	3
CO5	3	3	3	3	3			3	3	3		3	3	3	3
3 - Strong;2 - Medium;1 – Some3															

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List of Experiments

1. Data Transfer - Block move, Exchange, Sorting, Finding largest element in an array*
2. Arithmetic Instructions - Addition/subtraction, multiplication and division, square, Cube – (16 bits Arithmetic operations – bit addressable)*
3. Counters*
4. Boolean & Logical Instructions (Bit manipulations)*
5. Write C programs to interface 8051 chip to Interfacing modules to develop single chip solutions*
6. Simple Calculator using 6 digit seven segment display and Hex Keyboard interface to 8051*
7. Alphanumeric LCD panel and Hex keypad input interface to 8051*
8. External ADC and Temperature control interface to 8051*
9. Generate different waveforms Sine, Square, Triangular, Ramp etc. using DAC interface to 8051; change the frequency and amplitude*
10. Stepper and DC motor control interface to 8051*

*__SDG:9__ - Industry Innovation and Infrastructure

Course Designers

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60 CG 0P3	CAREER SKILL DEVELOPMENT - III

Category	L	T	P	Credit
CG	0	0	2	1

Objective

- To help learners improve their logical reasoning skills at different academic and professional contexts.
- To help learners relate basic quantitative problems and solve them.
- To help learners Infer critically the statements with optimal conclusions and assumptions.
- To Solve the quantitative problems pertaining to calculations of averages, ratio and proportions, and profit and loss effectively
- To compute quantitative problems related to time and work, speed and distance, and simple and compound interest

Pre-requisite

Basic knowledge of Arithmetic and Logical Reasoning

Course Outcomes

Onthesuccessful completion ofthecourse,studentswill beable to

CO1	Deduce the topics in logical reasoning at the preliminary and intermediate level.	Analyze
CO2	Relate basic quantitative problems and solve them effectively at the preliminary level	Apply
CO3	Infer critically the statements with optimal conclusions and assumptions with the data and information given.	Analyze
CO4	Solve the quantitative problems pertaining to calculations of averages, ratio and proportions, and profit and loss effectively at the pre-intermediate level.	Apply
CO5	Compute quantitative problems related to time and work, speed and distance, and simple and compound interest at intermediate level.	Apply

Mapping with Programme Outcomes

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

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 CG 0P3 - Career Skill Development III								
Common to All Branches								
Semester	Hours/Week			Total Hrs	Credit	MaximumMarks		
	L	T	P		C	CA	ES	Total
IV	0	0	2	30	1	100	00	100

Logical Reasoning* Analogies - Alpha and numeric series - Number Series - Coding and Decoding - Blood Relations - Coded Relations - Order and Ranking – odd man out - Direction and distance	**[6]**
Quantitative Aptitude – Part 1* Number system - Squares & cubes - Divisibility - Unit digits - Remainder Theorem - HCF & LCM - Geometric and Arithmetic progression - Surds & indices	**[6]**
Critical Reasoning* Syllogism - Statements and Conclusions, Cause and Effect, Statements and Assumptions - identifying Strong Arguments and Weak Arguments – Cause and Action -Data sufficiency	**[6]**
Quantitative Aptitude – Part 2* Average - Ratio and proportion – Ages – Partnership– Percentage - Profit & loss – Discount - Mixture and Allegation	**[6]**
Quantitative Aptitude – Part 3* Time & Work - Pipes and cistern – Time, Speed & distance - Trains - Boats and Streams - Simple interest and Compound interest	**[6]**
TotalHours	**30**

Reference(s):

1.	Aggarwal, R.S. *'A Modern Approach to Verbal and Non-verbal Reasoning'*, Revised Edition 2008, Reprint 2009, S.Chand& Co Ltd., New Delhi.
2.	Abhijit Guha, *'Quantitative Aptitude'*, McGraw Hill Education, 6th edition, 2016
3.	Dinesh Khattar, 'Quantitative Aptitude For Competitive Examinations', Pearson Education 2020
4.	Anne Thomson, *'Critical Reasoning: A Practical Introduction'* Lexicon Books, 3rd edition, 2022. Warszaw

***SDG 4 – Quality Education**
***SDG 8 – Decent work and Economic growth**
***SDG 9 – Industry, innovation and Infrastructure**

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Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Logical Reasoning**	
1.1	Analogies - Alpha and numeric series	1
1.2	Number Series - Coding and Decoding	1
1.3	Blood Relations - Coded Relations	1
1.4	Order and Ranking – odd man out	1
1.5	Direction and distance	1
2	**Quantitative Aptitude – Part 1**	
2.1	Number system	1
2.2	Squares & cubes - Divisibility	1
2.3	Unit digits - Remainder Theorem	1
2.4	HCF & LCM- Geometric and Arithmetic progression	1
2.5	Surds & indices	1
3	**Critical Reasoning**	
3.1	Syllogism	1
3.2	Statements and Conclusions, Cause and Effect	1
3.3	Statements and Assumptions	1
3.4	identifying Strong Arguments and Weak Arguments	1
3.5	Cause and Action -Data sufficiency	1
4	**Quantitative Aptitude – Part 2**	
4.1	Average - Ratio and proportion	1
4.2	Ages – Partnership	1
4.3	Percentage	1
4.4	Profit & loss	1
4.5	Discount - Mixture and Allegation	1
5	**Quantitative Aptitude – Part 3**	
5.1	Time & Work	1
5.2	Pipes and cistern	1
5.3	Time, Speed & distance - Trains	1
5.4	Boats and Streams	1
5.5	Simple interest and Compound interest	1
	Total	**25**

Course Designer

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