KPR Institute of Engineering and Technology

Learn Beyond

(Autonomous, Affiliated to Anna University)

CURRICULUM AND SYLLABI

REGULATIONS – 2025

Department of

Electronics and Communication Engineering

CONTROLLED COPY

Learn Beyond

I. Vision and Mission of the Institute

Vision

To become a premier institute of academic excellence by imparting technical, intellectual and professional skills to students for meeting the diverse needs of industry, society, the nation and the world at large

Mission

- Commitment to offer value-based education and enhancement of practical skills
- Continuous assessment of teaching and learning processes through scholarly activities
- Enriching research and innovation activities in collaboration with industry and institutes of repute
- Ensuring the academic processes to uphold culture, ethics and social responsibilities

II. Vision and Mission of the Department

Vision

To be a centre of excellence for education, research and development in the field of Electronics and Communication Engineering to meet the growing needs of the society

Mission

The mission of the department is to

- Develop competencies in emerging technologies through skill based education collaborating with industries of repute
- Provide conducive environment for research and innovation to cater to the needs of the society
- Inculcate professionalism, ethical values and lifelong learning

III. Program Educational Objectives (PEOs)

The Program Educational Objectives (PEOs) of the ELECTRONICS AND COMMUNICATION ENGINEERING (EC) represent major accomplishments that the graduates are expected to achieve after three to five years of graduation.

PEO1: Apply principles of Electronics and Communication Engineering to provide solutions to the emerging problems in the society

PEO2: Embrace technological challenges through skill upgradation or higher education or research

PEO3: Exhibit leadership qualities with professional and ethical values

IV. Program Outcomes (POs)

Graduates of the ELECTRONICS AND COMMUNICATION ENGINEERING will be able to

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions (WK8)

Centre for Academic Courses

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment (WK1, WK5, and WK7)

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/ multi-disciplinary teams

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8)

Knowledge and Attitude Profile (WK)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences

WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline

WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline

WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline

WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area

WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline

WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues

WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes

V. Program Specific Outcomes (PSOs)

Graduates of the ELECTRONICS AND COMMUNICATION ENGINEERING will be able to

PSO1: Design and develop intelligent systems using embedded controllers, Internet of Things and network security protocols

PSO2: Design, fabricate and test modern antennas for communication systems

VI. PEO / PO Mapping

Learn Beyond

Kpr Institute of Engineering and Technology
Centre for Academic Courses
Coimbatore

Following three levels of correlation should be used:

1: Low

2: Medium

3: High

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
PEO 1	3	3	3	3	3	2	2	2	2	2	2	3	3
PEO 2	3	3	3	3	3	2	1	2	1	2	2	3	3
PEO 3	-	-	-	-	-	-	3	3	3	3	3	1	1

VII. Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Sem	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
I	English Proficiency I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Calculus and Differential Equations	✓	✓	-	✓	✓	-	-	-	-	-	-	-	-
	Engineering Physics	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-
	Applied Chemistry for Electronics Engineers	✓	✓	✓	✓	-	-	-	✓	✓	-	✓	-	-
	Problem Solving using C Programming	✓	✓	✓	✓	✓	-	-	-	-	-	✓	-	-
	Digital Technologies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
	Electronics Engineering Studio	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	✓	-
	Chinese for Engineers - I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	French for Engineers - I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Japanese for Engineers - I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Hindi for Engineers - I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	German for Engineers - I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Induction Program - Universal Human Values I	-	-	-	-	-	✓	✓	✓	-	-	✓	-	-
	Heritage of Tamils	-	-	-	-	-	-	✓	✓	-	✓	-	-	-
	Design Thinking	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	-	-
	Biology for Engineers	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-
	Computer Fundamentals and Coding Essentials	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-
II	English Proficiency II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Linear Alegebra and Complex Variables	✓	✓	-	✓	✓	-	-	-	-	-	✓	-	-
	Materials Science for Electronics Engineering	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓
	Environmental Science and Sustainability	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓	-	-
	Computational Problem Solving using Python	✓	✓	✓	✓	✓	-	-	-	-	-	✓	-	-
	Basics of Mechanical Engineering	✓	✓	-	-	✓	✓	-	✓	✓	-	-	-	-
	Basics of Electrical Engineering	✓	✓	-	-	-	-	-	-	-	-	✓	-	-
	Basics of Civil Engineering	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-

Centre for Academic Courses

Sem	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
	Engineering Graphics	✓	✓	-	-	✓	-	✓	✓	✓	-	✓	-	-
	Circuit Analysis	✓	✓	✓	-	-	-	-	-	-	-	-	-	-
	Electronic Devices and Circuits	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	✓	-
	Chinese for Engineers - II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Hindi for Engineers - II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	French for Engineers - II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Japanese for Engineers - II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	German for Engineers - II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Universal Human Values II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Tamils and Technology	-	-	-	-	-	-	✓	✓	-	✓	-	-	-
	Design Thinking	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	-	-
	Biology for Engineers	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-
	Computer Fundamentals and Coding Essentials	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-
III	Probability and Statistics	✓	✓	-	-	✓	-	-	-	-	-	-	-	-
	Signals and Systems	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-
	Analog Electronics	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	-
	Digital System Design	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	-
	Linear Integrated Circuits	✓	✓	✓	-	-	-	-	✓	✓	-	✓	✓	-
	Data Structures and Algorithms	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-
	Analog Electronics Laboratory	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-
	Digital System Design Laboratory	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	-
	Essence of Indian Traditional Knowledge	-	✓	-	✓	-	-	✓	-	-	-	-	-	-
	Professional Skill Development - I	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
IV	Analog and Digital Communication	✓	✓	✓	-	-	-	-	-	-	-	✓	-	✓
	Electromagnetic Fields and Transmission Lines	✓	✓	✓	-	-	-	-	-	-	-	✓	-	✓
	Microprocessors and Microcontrollers	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	✓	-
	Object Oriented Programming Using Java	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-
	Digital Signal Processing	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	-	-
	Analog and Digital Communication Laboratory	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	-	✓
	Object Oriented Programming Using Java Laboratory	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-
	Indian Constitution	-	-	-	-	-	✓	✓	✓	-	-	-	-	-
	Professional Skill Development - II	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-

Learn Beyond

Kumaraguru Institute of Engineering and Technology
Centre for Academic Courses
Coimbatore

ELECTRONICS AND COMMUNICATION ENGINEERING

Regulations 2025

For the students admitted from 2025 onwards

CHOICE BASED CREDIT SYSTEM

CURRICULUM FOR I - VIII SEMESTERS

SEMESTER I

No	Course Code	Title	Category	Type	L	T	P	J	C
1	U25ENG01	English Proficiency I	HSMC	L	-	-	2	-	1
2	U25MA101	Calculus and Differential Equations	BSC	TwL	2	-	2	-	3
3	U25PH101	Engineering Physics	BSC	TwL	2	-	2	-	3
4	U25CY102	Applied Chemistry for Electronics Engineers	BSC	TwL	2	-	2	-	3
5	U25CSG01	Problem Solving using C Programming	ESC	TwL	2	-	2	-	3
6	U25CSG03	Digital Technologies	ESC	T	1	-	-	-	1
7	U25EC101	Electronics Engineering Studio	PCC	TwL	1	-	4	-	3
8	U25LEG01 U25LEG02 U25LEG03 U25LEG04 U25LEG09	German for Engineers - I Japanese for Engineers - I French for Engineers - I Hindi for Engineers - I Chinese for Engineers - I	HSMC	TwL	1	-	2	-	2
Total									**19**
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
9	U25MCC01	Induction Program - Universal Human Values I	MCC	MCC	2	1	-	-	3
10	U25MCC02	Heritage of Tamils	MCC	Tamil Courses	1	-	-	-	1
11	U25MCC03 U25MCC04 U25MCC05	Design Thinking Computer Fundamentals and Coding Essentials @ Biology for Engineers $	MCC	MCC	1	-	2	-	2
Total									**6**

$ - For Non-Biology Students, @ - For Biology Students

SEMESTER II

No	Course Code	Title	Category	Type	L	T	P	J	C
1	U25ENG02	English Proficiency II	HSMC	L	-	-	2	-	1
2	U25MA203	Linear Alegebra and Complex Variables	BSC	TwL	2	-	2	-	3
3	U25PH206	Materials Science for Electronics Engineering	BSC	TwP	2	-	-	2	3
4	U25CY201	Environmental Science and Sustainability	BSC	TwL	1	-	2	-	2
5	U25CSG05	Computational Problem Solving using Python	ESC	TwL	2	-	2	-	3
6	U25CEG01 U25EEG01 U25MEG02	Basics of Civil Engineering Basics of Electrical Engineering Basics of Mechanical Engineering	ESC	TwL	1	-	2	-	2
7	U25MEG03	Engineering Graphics	ESC	L	-	-	4	-	2

Centre for Academic Courses
Learn Beyond

No	Course Code	Title	Category	Type	L	T	P	J	C
8	U25EC201	Circuit Analysis	PCC	T	3	-	-	-	3
9	U25EC202	Electronic Devices and Circuits	PCC	TwL	2	-	2	-	3
10	U25LEG05 U25LEG06 U25LEG07 U25LEG08 U25LEG10	German for Engineers - II Japanese for Engineers - II French for Engineers - II Hindi for Engineers - II Chinese for Engineers - II	HSMC	TwL	1	-	2	-	2
Total									24
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
11	U25MCC06	Universal Human Values II	MCC	MCC	2	1	-	-	3
12	U25MCC07	Tamils and Technology	MCC	Tamil Courses	1	-	-	-	1
13	U25MCC03 U25MCC04 U25MCC05	Design Thinking Computer Fundamentals and Coding Essentials @ Biology for Engineers $	MCC	MCC	1	-	2	-	2
Total									6

$ - For Non-Biology Students, @ - For Biology Students

SEMESTER III

No	Course Code	Title	Category	Type	L	T	P	J	C
1	U25MA302	Probability and Statistics	BSC	TwL	2	-	2	-	3
2	U25EC301	Signals and Systems	PCC	T	3	-	-	-	3
3	U25EC302	Analog Electronics	PCC	T	3	-	-	-	3
4	U25ECG02	Digital System Design	PCC	T	3	-	-	-	3
5	U25EC303	Linear Integrated Circuits	PCC	TwL	2	-	2	-	3
6	U25ADG02	Data Structures and Algorithms	PCC	TwL	3	-	2	-	4
7	U25EC304	Analog Electronics Laboratory	PCC	L	-	-	2	2	2
8	U25ECG03	Digital System Design Laboratory	PCC	L	-	-	2	-	1
Total									22
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
9	U25MNC02	Essence of Indian Traditional Knowledge	MNC	MNC	1	-	-	-	-
10	U25MCC08	Professional Skill Development - I	MCC	MCC	-	-	-	-	1
Total									1

SEMESTER IV

No	Course Code	Title	Category	Type	L	T	P	J	C
1	U25EC401	Analog and Digital Communication	PCC	T	3	-	-	-	3
2	U25EC402	Electromagnetic Fields and Transmission Lines	PCC	T	3	-	-	-	3
3	U25ECG04	Microprocessors and Microcontrollers	PCC	TwL	3	-	2	-	4
4	U25CSG11	Object Oriented Programming Using Java	PCC	T	3	-	-	-	3

No	Course Code	Title	Category	Type	L	T	P	J	C
5	U25EC403	Digital Signal Processing	PCC	TwL	3	-	2	-	4
6	U25EC404	Analog and Digital Communication Laboratory	PCC	L	-	-	2	-	1
7	U25CSG13	Object Oriented Programming Using Java Laboratory	PCC	L	-	-	2	-	1
8	-	Open Elective I	OEC	T	3	-	-	-	3
					2	-	2	-	
Total									**22**
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
9	U25MNC03	Indian Constitution	MNC	MNC	1	-	-	-	-
10	U25MCC09	Professional Skill Development - II	MCC	MCC	-	-	-	-	1
Total									**1**

T - Theory, **L** - Laboratory, **TwL** - Theory with Laboratory, **TwP** - Theory with Project

KPR Institute of Engineering and Technology
Centre for Academic Courses
Coimbatore

Learn Beyond

SEMESTER I

U25ENG01	English Proficiency I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		0	0	2	0	1

COURSE OBJECTIVES:

- Comprehend technical vocabulary
- Apply reading strategies to understand academic and professional texts

COURSE OUTCOMES:

CO 1: Comprehend technical and professional documents using vocabulary and strategies — **Remember**

CO 2: Evaluate the understanding from technical reports and case studies — **Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	2	3	-	2	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	2	-	-

LIST OF EXPERIMENTS

1. Contextual lexicon – Discourse markers – Strategies for reading – Read aloud: stress and intonation – Interpretive Reading and narrative analysis – Critical reading of abstracts and conclusions from research articles / magazines / blogs
2. Newspaper: Opinions, Editorials and Columns – Short Story: The Bet – Anton Chekhov – Science Fiction: Never Let Me Go – Kazuo Ishiguro
3. Reading Standard Operating Procedures (SOPs) – Manuals – Case Studies (Field Work) Evaluation – Sustainability Practices in Industry: A Case Study – Biographies of Popular Engineers and Inventors – Success Stories of Start-ups and Entrepreneurs

CONTACT PERIODS:

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

TEXTBOOKS:

1. Meenakshi Raman and Sangeeta Sharma, "Technical Communication: Principles and Practice", 3rd Edition, Oxford University Press, 2015
2. Debra Daise and CharlNorloff, "Q Skills for Success: Q: Skills for Success: Reading and Writing, Level 4", 3rd Edition, Oxford University Press, 2019

REFERENCES:

1. Sudharshana N P and Savitha C, "English for Technical Communication", 1st edition, Cambridge University Press, 2016
2. Thomas L. Means, "English and Communication for Colleges", 4th Edition, Cengage India Private Limited, 2017

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I

U25MA101	Calculus and Differential Equations (Common to AD, AM, BM, CB, CS, EC, EE, IT, SC)	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To develop a strong foundation in multivariable calculus, vector calculus, and differential equations for application in engineering problems
- To equip students with the skills needed to solve optimization, integration, and differential equations problems relevant to real – world engineering scenarios
- To foster the ability to apply advanced mathematical techniques for analyzing and modeling physical systems in various engineering fields

COURSE OUTCOMES:

CO 1:	Understand and apply the concepts of multivariable calculus, including partial derivatives, total derivatives, and the Taylor series for multiple variables, to solve engineering problems	**Understand**
CO 2:	Solve optimization problems using methods like Lagrange multipliers and find the extrema of multivariable functions	**Apply**
CO 3:	Compute and interpret double and triple integrals, including change of order and change of variables, and apply them to calculate areas and volumes in engineering contexts	**Understand**
CO 4:	Apply vector calculus concepts such as gradient, divergence, curl, and directional derivatives to analyze physical systems and engineering problems	**Apply**
CO 5:	Solve ordinary and partial differential equations, including those with constant and variable coefficients, and apply these solutions to engineering scenarios	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	-	-	-	-	-	-	-	-	-	-	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	-	-
CO 3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 4	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 5	3	2	-	2	1	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: MULTIVARIABLE CALCULUS **6 + 6**

Functions of several variables – Partial derivatives and total derivative – Taylor series for two variables – Extrema of multivariable functions – Lagrange multipliers method

UNIT II: MULTIPLE INTEGRALS AND APPLICATIONS **6 + 6**

Double and triple integrals – Change of order and change of variables – Applications in computing area and volume

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: VECTOR CALCULUS **6 + 6**

Vector functions, differentiation of vectors – Gradient, divergence and curl – Directional derivatives – Line, surface, and volume integrals (introductory concepts)

UNIT IV: ORDINARY DIFFERENTIAL EQUATIONS **6 + 6**

Second and higher order linear differential equations with constant coefficients – Variable coefficients – Euler Cauchy equation – Legendre's equation - Applications

UNIT V: PARTIAL DIFFERENTIAL EQUATIONS **6 + 6**

Formation of partial differential equations – Singular integrals – Lagrange's linear equation – Solution methods for second order homogeneous equations with constant coefficients

LIST OF EXPERIMENTS

1. Multivariable Calculus – Plot single – variable functions – Identify extrema using first and second derivative tests
2. Multivariable Optimization – Compute and visualize partial derivatives – Find local maxima/minima using contour plots
3. Area and Volume by Integration – Numerically compute double/triple integrals – Visualize regions of integration
4. Solving and Visualizing Ordinary Differential Equations – Euler's method – Runge-Kutta method
5. Solving Partial Differential Equations and Visualizing Solutions – Form and solve basic PDEs – Visualize solutions in 2D and 3D

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th edition, Wiley India Pvt Ltd, New Delhi, 2018
2. George B Thomas, D. Weir and J.Hass, Thomas Calculus, 13th edition, Pearson Education India, 2018

REFERENCES:

1. Grewal,B.S. Higher Engineering Mathematics, 44th Edition, Khanna Publishers, 2017
2. Douglas C. Montgomery, Applied Statistics and Probability for Engineers, 7th Edition, Wiley, 2019
3. Robert L. Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, Cengage, 2012

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I

		Category: BSC				
U25PH101	Engineering Physics (Common to all programmes)	L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To understand the fundamental mechanical and thermal properties of solids and fluids for real-world engineering applications
- To explore advanced concepts in ultrasonic waves and their applications in imaging, testing, and sensing technologies
- To gain insights into semiconductor physics and photonics for their role in modern electronic and optical systems

COURSE OUTCOMES:

CO 1:	Explain the modulus of elasticity and stress-strain behavior of materials to infer the elastic properties of materials	Understand
CO 2:	Examine the heat transfer in thermal systems and properties of fluids	Analyze
CO 3:	Apply the principles of ultrasonics in testing, imaging, and communication technologies	Apply
CO 4:	Estimate charge carrier transport in semiconductors and the performance of devices such as Hall effect sensors and Schottky diodes	Apply
CO 5:	Organise the principles of laser and fiber optics for industrial and medical applications	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	-	-	-
CO 2	3	3	2	2	-	-	-	-	-	-	-	-	-
CO 3	3	2	1	1	-	-	-	-	-	-	-	-	-
CO 4	3	2	1	1	-	-	-	-	-	-	-	-	-
CO 5	3	2	1	1	-	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: MECHANICAL PROPERTIES OF SOLIDS 6 + 6

Modulus of Elasticity – Stress-strain diagram – Poisson's ratio – Elastic and plastic deformation – Stress-strain behaviour in metals, polymers and ceramics – Bending Moment – Cantilever – Applications (GIRDERS, MEMS)

UNIT II: FUNDAMENTALS OF HEAT TRANSFER AND FLUIDS 6 + 6

Heat transfer – Thermal expansion – Heat conductivity – Lee's Disc method – Surface tension –Viscosity – Coefficient of viscosity using Poiseuille's flow experiment – Solar water heater – Microwave oven – Heat exchangers – Radiators – Cooling towers

UNIT III: ULTRASONICS AND ITS APPLICATIONS 6 + 6

Properties of Ultrasonic waves – Production of ultrasonic waves – Piezoelectric Oscillator – Magnetostriction Oscillator – Velocity measurement of Ultrasonic waves – SONAR – Non-Destructive Testing – Ultrasound imaging in medicine – Ultrasonic scanning methods

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

UNIT IV: SEMICONDUCTOR PHYSICS **6 + 6**

Properties – Direct and Indirect bandgap-semiconductor – Intrinsic and extrinsic Semiconductors – Carrier concentration in n-type semiconductor – P-type semiconductor – Carrier Transport in Semiconductor – Hall effect – Ohmic contacts – Schottky diode

UNIT V: PHOTONICS **6 + 6**

Interaction of Radiation with Matter – Laser Characteristics – Population Inversion – CO2 laser – Semiconductor Diode Laser – Laser applications – Total Internal Reflection – Structure and working principle of Optical fibre – Fiber optic Endoscopy – Fiber optic sensors

LIST OF EXPERIMENTS

1. Determine the moduli of elasticity of the given beams and evaluate them for different structural applications. (High/ Medium/Low modulus)
2. Evaluate the shear moduli of the different materials and rank them for suitable applications with reference to their strength
3. Select the most effective thermal insulation material from mica, cardboard, and glass for optimal heat protection
4. Determine the Viscosity of Liquids Using Poiseuille's Method and Identify the Fastest-Flowing Liquid
5. Measure the speed of ultrasound in liquids and calculate their compressibility for different hydraulic purposes
6. Categorize the specified semiconducting materials according to their energy bandgap values
7. Determine a semiconducting material's Hall coefficient and identify its type
8. Determination of wavelength of given laser and the particle size of the given samples using diffraction method
9. Use an optical fiber to measure its light-gathering capacity and calculate the propagation angle
10. Calculate the surface tension of different liquids and examine how surfactants affect it
11. Determination of wavelength of various spectral lines by using spectrometer and grating
12. Determination of velocity of light passing through glass medium using spectrometer

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. M.N. Avadhanulu, P.G. Kshirsagar, and T.V.S. Arun Murthy, "A Textbook of Engineering Physics", 11th edition, S. Chand Publishing, New Delhi, 2022
2. R.K. Gaur and S.L. Gupta, "Engineering Physics", 8th edition, Dhanpat Rai Publications, New Delhi, 2017

REFERENCES:

1. Harald Ibach and Hans Luth, "Solid State Physics: An Introduction", 4th edition, Springer Publications, 2020
2. Charles Kittel, revised by David Pines (Editor) "Introduction to Solid State Physics", 9th edition, Wiley & Sons, US, 2020
3. H.K. Malik and A.K. Singh "Engineering Physics" Publisher: McGraw Hill Education India 2022
4. https://onlinecourses.nptel.ac.in/noc20cy17/preview

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

SEMESTER I

		Category: BSC				
U25CY102	Applied Chemistry for Electronics Engineers (Common to BM, EC, EE, MI)	L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To explain the properties, classifications and engineering applications of polymeric materials
- To describe corrosion mechanisms and evaluate electrochemical principles relevant to energy conversion and storage technologies
- To investigate the materials and working principles underlying display technologies, photonic devices, sensors, and wafer fabrication processes

COURSE OUTCOMES:

CO 1:	Execute polymer synthesis, molecular weight determination using viscometry, and the structure–functional behavior of polymers in electronic applications.(Apply)	**Apply**
CO 2:	Utilize appropriate corrosion prevention and coating strategies for engineering materials based on corrosion analysis.	**Apply**
CO 3:	Implement appropriate energy storage devices and colorimetric analysis based on photochemical principles	**Apply**
CO 4:	Execute sensor principles in pH-metric and conductometric titrations for solution analysis and in materials used for display and smart sensing devices.	**Apply**
CO 5:	Employ wafer fabrication techniques for manufacturing micro- and nanoelectronic devices and for extracting copper from PCB boards.	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	-	-	-	1	1	-	1	-	-
CO 2	3	2	1	1	-	-	-	1	1	-	1	-	-
CO 3	3	2	1	1	-	-	-	1	1	-	1	-	-
CO 4	3	2	1	1	-	-	-	1	1	-	1	-	-
CO 5	3	2	1	1	-	-	-	1	1	-	1	-	-

SYLLABUS:

UNIT I: POLYMERIC MATERIALS **6 + 6**

Polymers – classification and properties, Polymer compounding: (Compression, Injection, Extrusion) – Conductive Polymers – (PANI, PEDOT) Synthesis, Properties, Mechanism and applications, Photochromic polymers: Azobenzenes, Diarylethenes – Mechanism of photo-switching, Electroluminescent polymers – Fabrication of light-emitting electrochemical cells and application, Biopolymers – PLA – Synthesis and applications – Packaging materials for integrated circuits – Purpose, key components and types

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

UNIT II: CORROSION SCIENCE

6 + 6

Types of corrosion – dry,wet – Electrochemical theory – Electrochemical series - Factors influencing corrosion and control methods – Cathodic protection – Corrosion inhibitors – anodic, cathodic, mixed – Metallic coatings – Electroplating – Tinning, Phosphating, Carburizing, Nitriding, Protective Coatings – Advanced surface treatments and protective coatings – powder and antifouling coatings – Self-healing and corrosion-sensing paints

UNIT III: ENERGY CONVERSION AND STORAGE

6 + 6

Batteries – Classification, Fabrication & working – Li-polymer, $LiFePO_4$ – Fuel Cells (Proton Exchange Membrane, Solid Oxide Fuel Cell, Microbial Fuel Cells) and Green Hydrogen Technologies – Laws of Photochemistry – Jablonski Diagram, Solar Cells – Dye-Sensitized Solar Cells, Supercapacitors – Electrostatic double layer, Pseudocapacitors, Hybrid Supercapacitors

UNIT IV: MATERIALS FOR DISPLAY AND SENSING DEVICES

6 + 6

Liquid Crystal Displays, OLED, QLED – structure, properties and mechanism – Emerging Display Materials – Perovskite emitters – Phase-Change Memory (PCM) materials – Sensors – Electrochemical sensor, Conductometric, Potentiometric, pH metric titrations – principle, working and applications

UNIT V: WAFER TECHNOLOGY

6 + 6

Semiconductors (GaAs, SiGe), Insulators and High Resistive Materials (Porcelain, Bakelite, Transformer oil, Epoxy, SF_6) – Wafer Manufacturing and Purification – Czochralski and Float Zone methods and applications – Photolithography and Microfabrication – Epitaxial Growth and its Significance – Smart Materials and Nano-enabled Devices – MEMS & NEMS

LIST OF EXPERIMENTS

1. Synthesis of Polyaniline (PANI) and Bakelite
2. Determination of molecular weight and degree of polymerisation of a given polymer using an Ostwald viscometer
3. Determination of rate of corrosion of mild steel by weight loss method
4. Potentiometric estimation of Fe present in corrosion medium
5. Estimate the concentration of copper (Cu^{2+}) or nickel (Ni^{2+}) in a given solution using colorimetric analysis based on Beer-Lambert's law
6. Evaluate the strength of the given HCl by pH metry
7. Determination of the amount of HCl present in the given solution by conductometric titration
8. Recover copper from waste printed circuit boards (PCBs) using chemical methods and estimate the amount of copper recovered using appropriate analytical techniques

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. Wiley India Pvt. Ltd., "Engineering Chemistry", 2nd edition, Wiley India Pvt. Ltd., New Delhi, 2013
2. S.S. Dara and S.S. Umare, "A Textbook of Engineering Chemistry", 12th edition, Chand Publishing, New Delhi, 2024
3. R.V. Gadag and A. Nityananda Shetty, "Engineering Chemistry", 3rd edition, I.K. International Publishing House, New Delhi, 2014
4. Sunita Rattan, "Experiments in Applied Chemistry", 3rd edition, S.K. Kataria & Sons, New Delhi 2021

REFERENCES:

1. Fred W Billmeyer, "Textbook of Polymer Science", 4th edition, John Wiley & Sons, New York, 1999

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

2. Lieng-Huang Lee, "Conductive Polymers and Plastics: In Industrial Applications", 1st edition, Springer, New York, 1990
3. M.F. Ashby and D.R.H. Jones, "Engineering Materials 2: An Introduction to Microstructures, Processing and Design", 4th edition, Elsevier, UK, 2012
4. Kirby W Beard, "Linden's Handbook of Batteries", 5th edition, McGraw Hill, New York, 2019
5. G.A Ozin and C.A. Andre, "Nanochemistry: A Chemical Approach to Nanomaterials", 2nd edition, Royal Society of Chemistry, Cambridge, 2005

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses
KPR Institute of Engineering and Technology * Coimbatore *
Learn Beyond

SEMESTER I

U25CSG01	Problem Solving using C Programming (Common to AD, AM, BM, CB, CS, EC, EE, IT, SC)	Category: ESC				
		L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To enable students to understand the fundamentals of C programming, including problem-solving techniques, flowcharts, algorithms, and the structure of a C program
- To impart knowledge on arrays, strings, functions, and pointers to efficiently solve computational problems using modular programming
- To introduce structured data types like structures and unions and demonstrate their use in handling complex data
- To familiarize students with file handling operations and apply C programming constructs to solve real-world problems

COURSE OUTCOMES:

CO 1:	Explain fundamental programming concepts and control structures used in C for problem-solving	Understand
CO 2:	Implement and Manipulate one and two dimensional array and strings for basic processing	Apply
CO 3:	Apply function, recursion, and pointers for effecient problem solving	Apply
CO 4:	Apply structures, unionsm and storage classes to organize and manage complex data effectively in C Programs	Apply
CO 5:	Implement file handling concepts and operations, including text and binary files, error handling and command-line arguments	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 2	3	2	1	1	-	-	-	-	-	-	2	-	-
CO 3	3	2	1	1	-	-	-	-	-	-	2	-	-
CO 4	3	2	1	1	-	-	-	-	-	-	2	-	-
CO 5	3	2	1	1	1	-	-	-	-	-	2	-	-

SYLLABUS:

UNIT I: C PROGRAMMING BASICS **6 + 6**

Fundamentals of Problem Solving – Importance of logical and analytical thinking – Algorithm – Flow Chart – Pseudo code – Introduction to C programming – Structure of a C program – Compilation and linking processes – C Programming Constructs: Keywords, Identifiers, Constants – Variables – Data Types – Operators – Managing I/O operations – Conditional Statements – Looping statements

UNIT II: ARRAYS AND STRINGS **6 + 6**

Array: Declaration and Initialization – Accessing and manipulating array elements – One-dimensional array – Two-dimensional array – Strings: Declaring and initializing strings – String operations – String Arrays – Practice problems based on real-world applications

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: FUNCTIONS AND POINTERS 6 + 6

Functions: Definition – Function call – Return statement – Types of Functions – Recursion. Pointer: Declaration – Initialization – Passing arguments by value vs by reference – Pointer to pointer – Array of Pointers – Dynamic Memory Allocation: malloc(), calloc(), realloc(), free()

UNIT IV: STRUCTURES AND UNION 6 + 6

Grouping data using structures – Declaring structure variables – Accessing members using dot (.) operator – Nested Structures – Arrays of Structures – Pointer to Structure – Access members through pointers (→) operator – Memory sharing in unions – Storage classes

UNIT V: FILE HANDLING 6 + 6

Importance of File Handling – Types of files – File modes – File operations: Open, Read, Write, Close – Serialization and file operations with DAT files – Common errors in file handling – File pointers: ftell(), fseek(), rewind() – Command line arguments – Practical Exercises Using Files for Data Persistence

LIST OF EXPERIMENTS

1. Demonstrating the use of simple statements and expressions in C
2. Implementing the flow control of programs using decision and iteration constructs
3. Demonstrating the creation and manipulation of arrays in C
4. Programs using string operations
5. Illustrate function declaration, definition, and calling mechanisms
6. Hands-on practice with recursive solutions for mathematical problems
7. Hands-on practice with pointers in memory access and manipulation
8. Applications of structures and unions in organizing and processing data
9. Implementation of file operations such as open, read, write, append, and close
10. Perform arithmetic operations using values passed through command line

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. David D. Railey and Kenny A.Hunt , "Computational Thinking for Modern problem Solver", 1st Edition, CRC Press, 2014
2. Brian W. Kernighan and Dennis Ritchie, "The C Programming Language", 2nd Edition, Pearson, 2015

REFERENCES:

1. Paolo Ferragina and Fabrizio Luccio, "Computational Thinking First Algorithms", Then Code",1st Edition, Springer International Publishing, 2018
2. Reema Thareja, "Programming in C", 2nd Edition, Oxford University Press, 2016
3. Paul Deitel and Harvey Deitel, "C How to Program", 7th Edition, Pearson Publication, 2015
4. Juneja, B. L and Anita Seth, "Programming in C",1st Edition, Cengage Learning India Pvt. Ltd., 2011
5. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", 1st Edition, Oxford University Press, 2009

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER I

U25CSG03	Digital Technologies (Common to all programmes)	Category: ESC				
		L	T	P	J	C
		1	0	0	0	1

COURSE OBJECTIVES:

- To explain the foundational concepts of AI, IoT, cloud, cybersecurity, and blockchain technologies
- To apply practical knowledge of OpenAI, RPA, and digital marketing strategies effectively
- To analyse interconnected sart systems, big data, and evolving digital landscapes
- To evaluate ethical implications of AI, data privacy, and societal impact of technologies

COURSE OUTCOMES:

CO 1: Understand the foundational concepts of AI, ML, DL, and key OpenAI generative tools **Understand**

CO 2: Explain the interplay of AI, wearables, and big data in emerging technologies like the Metaverse and Edge AI **Understand**

CO 3: Describe the key components and uses of IoT, cloud computing, and cybersecurity, including common threats **Understand**

CO 4: Interpret the core principles and practical uses of blockchain, RPA, and digital marketing strategies **Understand**

CO 5: Recognize the key concepts and applications of 3D printing, digital manufacturing, AR/VR, Metaverse, and ethical considerations in AI **Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	2	1	1	1	-	-	-	-	1	-	-
CO 2	3	3	2	2	1	1	-	1	1	1	1	-	-
CO 3	3	2	3	1	2	1	-	1	2	2	1	-	-
CO 4	3	2	1	3	3	1	-	1	-	1	-	-	-
CO 5	3	2	1	1	2	1	1	1	-	1	1	-	-

SYLLABUS:

UNIT I: MODERN ARTIFICIAL INTELLIGENCE AND OPENAI TOOLS 6

An Overview of Artificial Intelligence – Introduction to Machine Learning and Deep Learning – ChatGPT – GPT 4 – OpenAI Tools: AI Text Classifier – OpenAI Tools: Point-E – Text to Image Generator – DALL-E

UNIT II: MART SYSTEMS AND ANALYTICS 6

Intelligent Wearables – AI and Metaverse – Edge AI / TinyML – Evolution of Big Data Analytics –Applications of Big Data Analytics

UNIT III: IOT, CLOUD, CYBERSECURITY ESSENTIALS 6

Internet of Things – Applications of IoT – Industrial Internet of Things or IIoT – Digital Payments –Overview of Cloud Computing – Applications of Cloud Computing – Service Models in Cloud Computing – Overview of Cybersecurity – Applications of Cybersecurity – Types of Cyber Attacks – Data Privacy and User Data Control – Deepfake

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: DIGITAL INNOVATION AND AUTOMATION 6

Evolution of Blockchain – Applications of Blockchain in Finance Industry – Impact of Blockchain on Workforce & Workplace – Getting Started with Robotic Process Automation – Applications of Robotic Process Automation in Banking & Insurance Industry – Web, Mobile Development and Marketing – 5Ds of Digital Marketing – Digital Storytelling

UNIT V: DIGITAL DESIGN AND RESPONSIBILITY 6

3D Printing Modelling – Digital Manufacturing – Augmented Reality and Virtual Reality – Pre-requisites for Augmented Reality & Virtual Reality – Metaverse – Applications of Augmented Reality – Virtual Reality in – AI Ethics – Ethical Considerations of Generative AI

CONTACT PERIODS:

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

TEXTBOOKS:

1. Faheem Syeed Masoodi, Zubair Sayeed Masoodi, Khalid Bashir Dar, "Digital and Technological Solutions: Exploring the Foundations of Digitization", 1st Edition, BPB Publications, 2024

REFERENCES:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence: A Modern Approach", 4th Edition, Pearson, 2020
2. Arshdeep Bahga, Vijay Madisetti, "Internet of Things: A Hands-On Approach" Universities Press, 2014
3. Dieter Schmalstieg, Tobias Hollerer, "Augmented Reality: Principles and Practice", Addison-Wesley, 2016
4. Daniel Drescher, "Blockchain Basics: A Non-Technical Introduction in 25 Steps" Apress, 2017
5. Xiaofei Wang, Yunchuan Sun, "Edge AI: Convergence of Edge Computing and Artificial Intelligence", Wiley, 2022
6. Mark Coeckelbergh, "AI Ethics", MIT Press, 2020
7. https://www.futureskillsprime.in/journey/digital-101-30-hours/ - Digital 101 Futureskills Prime Course by NASSCOM

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses
Learn Beyond

SEMESTER I

U25EC101	Electronics Engineering Studio	Category: PCC				
		L	T	P	J	C
		1	0	4	0	3

COURSE OBJECTIVES:

- Introduce the evolution and basics of electronics and communication
- Explore modern ECE applications across various sectors
- Develop practical skills with PCB design, embedded projects, and emerging technologies

COURSE OUTCOMES:

CO 1:	Illustrate the key historical milestones in electronics and communication engineering	**Understand**
CO 2:	Explain the evolution of communication and semiconductor technologies	**Understand**
CO 3:	Explain the role of ECE in different sectors	**Understand**
CO 4:	Design and fabricate PCBs, perform soldering, and develop simple embedded system projects	**Apply**
CO 5:	Demonstrate IoT and drone technology applications through hands-on experiments and field visits	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	-	-	-
CO 2	2	1	-	-	-	-	-	-	-	-	-	-	-
CO 3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO 4	3	2	1	1	1	-	-	2	2	-	2	2	-
CO 5	3	2	1	1	1	-	-	2	2	-	2	2	-

SYLLABUS:

UNIT I: HISTORICAL MILESTONES **5 + 20**

Key Technological Breakthroughs in Electronics Field and Semiconductor Technology – Evolution of Communication Systems – Advancements in Network Systems with reference to Bandwidth and Frequency

UNIT II: EMERGING TRENDS IN ELECTRONICS **5 + 20**

Healthcare and Biomedical Applications – Automotive and Transportation Systems – Space and Defence – Agriculture and Environmental Monitoring – Smart Cities and Infrastructure

UNIT III: EMERGING TRENDS IN COMMUNICATION SYSTEMS **5 + 20**

6G and 7G Communication Systems – Non-Terrestrial Networks – Satellite Communication Systems – LEO, MEO and GEO Satellites

LIST OF EXPERIMENTS

1. PCB Design using ECAD Software
2. PCB Fabrication Process
3. Soldering Techniques and Practice

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

4. Simple Projects Using Embedded Controller for Beginners
5. Fundamentals of Drone Technology
6. Industrial and Research Field Visits

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 60 Periods **Project:** - Periods **Total:** 75 Periods

TEXTBOOKS:

1. Albert Malvino and David J. Bates, Electronic Principles, McGraw Hill Education, 7th edition, 2017

REFERENCES:

1. George Kennedy and Bernard Davis, Electronic Communications Systems, McGraw Hill Education, 4th Edition,2000
2. V.K. Mehta and Rohit Mehta, Principles of Electronics, S Chand & Company Limited, 2022

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I

U25LEG01	German for Engineers - I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- Gain basic proficiency in listening, speaking, reading, and writing - understanding everyday conversations, speaking in survival situations, reading short texts, and writing simple sentences
- Acquire essential knowledge of German grammatical structures to support communication and comprehension
- Gain introductory insights into German cultural norms, practices, and everyday life

COURSE OUTCOMES:

CO 1:	Acquire familiarity in the German alphabet & basic vocabulary	Understand
CO 2:	Listen and identify individual sounds of German	Understand
CO 3:	Use basic sounds and words while speaking	Apply
CO 4:	Read and understand simple advertisements, brochures and invitations	Understand
CO 5:	Use basic grammar and appropriate vocabulary in completing language tasks	Remember

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: INTRODUCTION TO GERMAN LANGUAGE AND SOUNDS **6 + 3**

Alphabet and pronunciation (phonetics and name spelling) – Basic greetings and farewells – Asking for and giving personal information – Countries – Languages – Professions – Numbers (0–100) – Cultural focus: German-speaking countries

UNIT II: GRAMMAR FOUNDATIONS AND SENTENCE BUILDING **6 + 3**

Formal vs. informal register: Sie vs. du – Personal pronouns: ich - du -Sie - er - sie - es – Verb conjugation in Präsens (regular and irregular) – Verbs: sein - haben (to be - to have) – Questions: wo -wer - wie - was - etc – Yes/No questions (Ja-/Nein-Fragen) – Cultural focus: Formal vs. informal speech

UNIT III: DAILY LIFE AND ROUTINES **6 + 3**

Describing daily activities and routines – Talking about time – Days – Routine verbs and nouns – Grammar: Separable verbs (aufstehen - mitkommen) – Modal verbs (intro): können - müssen – Negation: nicht - kein – Cultural focus: Typical German daily schedules

Head of the Department,
Electronics & Communication Engineering,
KR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: GRAMMAR – CASES AND STRUCTURE **6 + 3**

Accusative case: articles and pronouns – Dative case: definite and indefinite articles – Grammar focus: Prepositions with dative (in, auf, bei, mit, zu) – Cultural focus: Office hours and punctuality in German culture

UNIT V: NAVIGATION AND PUBLIC INTERACTION **6 + 3**

Asking for/giving directions – Describing locations and surroundings – Places in the city: Supermarkt, Bahnhof – Post – Kino – Reading and understanding public signs – Maps – Timetables – Grammar: Imperative (basic usage for giving directions) – Cultural focus: Public transportation – City services in German-speaking countries

LIST OF EXPERIMENTS

1. Prepare a family tree chart
2. Record a self-intro video
3. Describe your college
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Buscha- A & Szita, S-Begegnungen Deutsch als Fremdsprache A1+: Integriertes Kurs- und Arbeitsbuch- 1st Edition, 2021
2. Brüseke, R., "Grammatik leicht A1," 1st Edition-2019

REFERENCES:

1. Netzwerk Deutsch als Fremdsprache A1, 1st Edition: BlueNBells, 2012
2. Huber, K., & Keller, F., "DaF kompakt A1: Deutsch als Fremdsprache," 3rd Edition, Langenscheidt, 2018

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER I

		Category: HSMC				
U25LEG02	Japanese for Engineers - I (Common to all programmes)	L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- Gain basic proficiency in listening, speaking, reading, and writing - understanding everyday conversations, speaking in survival situations, reading short texts, and writing simple sentences
- Acquire essential knowledge of Japanese grammatical structures to support communication and comprehension
- Gain introductory insights into Japanese cultural norms, practices, and everyday life

COURSE OUTCOMES:

CO 1:	Acquire familiarity in the Japanese alphabet and basic vocabulary	Understand
CO 2:	Listen and identify individual sounds of Japanese	Understand
CO 3:	Use basic sounds and words while speaking	Apply
CO 4:	Read and understand simple advertisements, brochures and invitations	Understand
CO 5:	Use basic grammar and appropriate vocabulary in completing language tasks	Remember

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: INTRODUCTION TO JAPANESE WRITING AND GREETINGS **6 + 3**

Hiragana Mastery – Basic greetings & expressions – Desu (~です) – Particles: は (wa), の (no), か (ka) – Basic vocabulary: Professions, countries, school related terms – Cultural note: Bowing – Formal vs. informal speech

UNIT II: KATAKANA AND BASIC COMMUNICATION **6 + 3**

Katakana Mastery – Numbers -time - and age expressions – Vocabulary: Objects, locations and daily expressions – Particles: を (wo), - に (ni) - で (de) – Grammar: Arimasu / Imasu (existence) – Negation: じゃありません / ではありません – Cultural note: Japanese use of numbers and time in daily life

UNIT III: VERB BASICS AND SENTENCE STRUCTURE **6 + 3**

Verb sentence structure – Verb conjugation basics: Non-past affirmative/negative – Asking about objects – Time and location expressions – Vocabulary: Places - classroom items - basic actions – Cultural note: School and work environments in Japan

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: DAILY ACTIVITIES AND VOCABULARY EXPANSION **6 + 3**

Daily routine verbs: おきます, たべます, ねます, etc., – Days of the week – Frequency expressions – Vocabulary: Food - drink - daily routine – Common locations: Library - school - station – Particles: は, を, に, で, も, へ – Cultural note: Japanese daily life and food habits

UNIT V: INTRODUCTION TO KANJI AND PRACTICAL USE **6 + 3**

Kanji: Recognition (~50), Writing (~30) – Practical reading and writing exercises using learned Kanji – Review of particles in context – Integration of all skills through short dialogues and written practice – Cultural note: Importance of Kanji in Japanese society and signage

LIST OF EXPERIMENTS

1. Prepare a family tree chart
2. Record a self-intro video
3. Describe your college
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. 3A Corporation, "Minna no Nihongo Shokyū I: Main Textbook," 2nd Indian Edition, Goyal Publishers & Distributors Pvt. Ltd., New Delhi, 2018
2. Banno, Eri, Yutaka Ohno, Yoko Sakane, Chikako Shinagawa, and Kyoko Tokashiki, "Genki I: An Integrated Course in Elementary Japanese," 3rd Edition, The Japan Times Publishing, Tokyo, 2020

REFERENCES:

1. Yamada, M., & Fujita, T., "Japanese for Beginners: A Practical Approach," 1st Edition, Tuttle Publishing, 2019
2. Takahashi, A., & Sato, M., "Nihongo Pro: Japanese for N5 Level," 1st Edition, KADOKAWA, 2018

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses
Learn Beyond

SEMESTER I

U25LEG03	French for Engineers - I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- Gain basic proficiency in listening, speaking, reading, and writing - understanding everyday conversations, speaking in survival situations, reading short texts, and writing simple sentences
- Acquire essential knowledge of French grammatical structures to support communication and comprehension
- Gain introductory insights into French cultural norms, practices, and everyday life

COURSE OUTCOMES:

CO 1:	Acquire familiarity in the French alphabet and basic vocabulary	Understand
CO 2:	Listen and identify individual sounds of French	Understand
CO 3:	Use basic sounds and words while speaking	Apply
CO 4:	Read and understand simple advertisements, brochures and invitations	Understand
CO 5:	Use basic grammar and appropriate vocabulary in completing language tasks	Remember

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: INTRODUCTION TO FRENCH LANGUAGE AND BASICS **6 + 3**

Alphabet and pronunciation: French sounds – Accents – Spelling names – Greeting people and introducing yourself and others – Asking about someone: names – Nationalities, and countries – Grammar: Subject pronouns (je, tu, il, elle…) - être (to be) - s'appeler (to be called) – Articles: definite/indefinite (le, la, un, une) -Gender and number of nouns – Cultural focus: French-speaking countries – forms of address (tu vs. vous)

UNIT II: DESCRIBING PEOPLE AND BACKGROUND **6 + 3**

Describing yourself and others: nationality – profession – Age – Asking and answering personal questions – Numbers: 0–69 – Talking about languages spoken – Grammar: Verbs avoir (to have parler (to speak) – Negation: ne…pas – Cultural focus: Francophone diversity – naming conventions (nom, prénom)

UNIT III: GRAMMAR AND AGREEMENT IN DESCRIPTIONS **6 + 3**

Gender agreement of adjectives and professions – Asking questions: Interrogative expressions (Où, Quoi, Qui, Quel(le)) – Practice with personal descriptions – More on sentence structure and simple dialogues – Cultural focus: Intercultural identity – Polite introductions and small talk

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: TALKING ABOUT DAILY LIFE **6 + 3**

Describing a typical day – Talking about daily activities and frequency – Saying what you like/don't like doing – Talking about schedules and routines – Cultural focus: A typical day in France – school/work life in Francophone countries

UNIT V: TIME, VERBS, AND DAILY EXPRESSIONS **6 + 3**

Telling time – grammar: Regular -er verbs in present tense – The verb aller (to go) and expressions with faire – Prepositions: à -chez - en - au -Cultural focus: French meal times – Weekend habits – Transportation

LIST OF EXPERIMENTS

1. Prepare a family tree chart
2. Record a self-intro video
3. Describe your college
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Marie-José Lopes & Jean-Thierry Bougnec, "Inspire 2 A1-A2 Méthode de français," 1st Edition, Hachette Français Langue Etrangère, 2020
2. Gibbe, C., Berthet, A., & Hugot, C., "Édito A2: Méthode de français," 1st Edition, Didier, 2024

REFERENCES:

1. Chantal Fougères & Marc de la Harpe, "Le Nouveau Sans Frontières 2: Méthode de français A2," 1st Edition, Hachette FLE, 2020
2. Xavier Maingueneau, "Le Français pour les Nuls: A2-B1," 3rd Edition, Wiley, 2021

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I

U25LEG04	Hindi for Engineers - I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- Gain basic proficiency in listening, speaking, reading, and writing - understanding everyday conversations, speaking in survival situations, reading short texts, and writing simple sentences
- Acquire essential knowledge of Hindi grammatical structures to support communication and comprehension
- Gain introductory insights into Hindi cultural norms, practices, and everyday life

COURSE OUTCOMES:

CO 1:	Acquire familiarity in the Hindi alphabet and basic vocabulary	Understand
CO 2:	Listen and identify individual sounds of Hindi	Understand
CO 3:	Use basic sounds and words while speaking	Apply
CO 4:	Read and understand simple advertisements, brochures and invitations	Understand
CO 5:	Use basic grammar and appropriate vocabulary in completing language tasks	Remember

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: UNIT I INTRODUCTION TO HINDI SCRIPT AND CULTURE **6 + 3**

Devanagari script basics (vowels and consonants) – Hindi sound system (aspirated/unaspirated, retroflex sounds) – Basic greetings and self-introduction – Sentence ending with है (hai) – Vocabulary: Professions – Nationalities – Countries – Family members – Grammar: Personal pronouns (मैं, तुम, आप, वह, यह) – Use of है and क्या (kya) for yes/no questions – Simple nominal sentences – Cultural note: Indian naming conventions – Forms of address (तुम vs. आप) – Gestures like namaste and head nods – Sociolinguistic formality

UNIT II: SENTENCE STRUCTURE AND EVERYDAY CONTEXTS **6 + 3**

Introducing others – Talking about objects and places – Yes/no and WH- questions – Negation using नहीं – Use of यह (yeh) – वह (voh) – Vocabulary: Everyday objects – Common locations – Classroom and household terms – Grammar: Postpositions में (mein), से (se), का/की/के (possessives) – Verb basics with है and नहीं है, Subject-object-verb (SOV) structure – Cultural note: Spatial metaphors in Hindi, gestures with demonstratives, plural forms, and respect levels

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: DESCRIBING DAILY LIFE AND HABITS 6 + 3

Describing daily routines like waking – Eating – Going – Returning – Sleeping – Vocabulary: Daily activities – Time expressions – Common verbs – Talking about routines in present tense – Adverbs of frequency: हमेशा - कभी-कभी - कभी नहीं – Grammar: Present tense of जाना - खाना - करना - उठना - सोना – Verb agreement by gender and number – Use of को (ko) as object marker – Cultural note: Time perception – Daily routines in Indian homes – Lifestyle differences – Typical student/professional day

UNIT IV: EXPANSION OF VERB USE AND QUESTIONS 6 + 3

Extended verb usage in different contexts – Asking and answering questions with Wh-words – Expressing possession – Giving simple commands and requests – Vocabulary: Verbs of movement – Expression – Need – Grammar: Imperatives – Compound verbs – Continued use of postpositions – Sentence expansion using connectors – Cultural note: Politeness in commands – Body language in communication – Informal/formal tone shift

UNIT V: PRACTICAL COMMUNICATION AND REVIEW 6 + 3

Role-plays: shopping – Traveling, introducing family – Speaking about preferences and opinions – Listening to simple dialogues and identifying key points – Vocabulary: Common nouns – Adjectives – Survival phrases – Grammar: Review of present tense – Pronouns – Postpositions – Negation – Cultural note: Real-life communication scenarios – Marketplace culture – Indian transportation and hospitality norms

LIST OF EXPERIMENTS

1. Prepare a family tree chart
2. Record a self-intro video
3. Describe your college
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Pavithra Publications, "Spoken Hindi: Through Tamil," 2nd Edition, Pavithra Publications, Chennai, 2015
2. Dakshina Bharat Hindi Prachar Sabha, "Prathamic Text Book: New Syllabus," 1st Edition, Dakshina Bharat Hindi Prachar Sabha, Madras, 2023

REFERENCES:

1. Ganga, K., & Ramesh, V., "Learn Hindi in 30 Days: A Beginner's Guide," 3rd Edition, Hindi Academy, 2020
2. Vyas, S., "Spoken Hindi for Beginners," 1st Edition, Orient BlackSwan, 2018

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I

U25LEG09	Chinese for Engineers - I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- Gain basic proficiency in listening, speaking, reading, and writing - understanding everyday conversations, speaking in survival situations, reading short texts, and writing simple sentences
- Acquire essential knowledge of Chinese grammatical structures to support communication and comprehension
- Gain introductory insights into Chinese cultural norms, practices, and everyday life

COURSE OUTCOMES:

CO 1:	Acquire familiarity in the Chinese alphabet & basic vocabulary	Understand
CO 2:	Listen and identify individual sounds of Chinese	Understand
CO 3:	Use basic sounds and words while speaking	Apply
CO 4:	Read and understand simple advertisements, brochures and invitations	Understand
CO 5:	Use basic grammar and appropriate vocabulary in completing language tasks	Remember

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: FUNDAMENTAL CHINESE FOR BEGINNERS 6 + 3

Introduction to Mandarin Chinese, daily greetings – Learning Mandarin alphabet initials, finals, 4 tones and tone change rules (Pinyin 拼音) – Learning numbers 0–20 – Learning basic in-class vocabulary and phrases

UNIT II: NUMBERS AND VOCABULARY EXPANSION 6 + 3

Learning numbers up to 999 – Learning country names and nationalities – Learning personal pronouns and Subject-Verb-Object (SVO) sentence structure – Practice with short dialogues and self-introductions

UNIT III: THE NEW CLASSMATE 6 + 3

Learning vocabulary related to names and introductions – Learning the differences among 是 (to be), 叫 (to be called), 姓 (to have a surname) – Learning how to form questions with 吗 – Learning abbreviated questions with 呢 – Practice dialogues: exchanging names and personal details

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: TIME AND POSSESSION **6 + 3**

What time do you go to the university? – Learning vocabulary for time, dates, and days of the week – Learning grammar: placement of time words (S + Time word + V) – Learning to express possession with 有 / 沒有 – Learning the usage of 的 as a possessive particle – Practice with daily schedules and activities

UNIT V: COMMUNICATION AND REVIEW **6 + 3**

Grammar consolidation: auxiliary verbs and sentence order – Forming positive-negative questions (e.g., 是不是, 有沒有) – Conversational practice: greetings, introductions, time, possession – Role-play in real-life scenarios – Cultural notes: politeness and forms of address – Final review and integrated practice of Units I–IV

LIST OF EXPERIMENTS

1. Prepare a family tree chart
2. Record a self-intro video
3. Describe your college
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Mandarin Training Centre, National Taiwan Normal University, Modern Chinese I時代華語 I, Edited by Chih-Ping Chou, Taipei: Cheng Chung Book Company Ltd., 2019
2. Huayu101 / 華語101, Taiwan Ministry of Education, Taiwan Mandarin Educational Resources Centre, 2018

REFERENCES:

1. Cheng Chung Book Company Ltd, 時代華語 I 教師手冊 [Modern Chinese I Teacher's Manual, 2019
2. www.lmit.edu.tw/bag

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I

U25MCC01	Induction Program - Universal Human Values I (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		2	1	0	0	3

COURSE OBJECTIVES:

- Development of a holistic perspective based on self-exploration about themselves (human beings), family, society, and nature/existence
- Understanding (or developing clarity) of the harmony in the human being, family, society, and nature/existence
- Strengthening of self-reflection
- Development of commitment and courage to act

COURSE OUTCOMES:

CO 1: Recognize the essentials of human values and skills — Understand

CO 2: Analyse connection between profession and happiness — Understand

CO 3: Develop appropriate technologies and management patterns to create harmony in family and society — Understand

CO 4: Evaluate the significance of trust, mutually satisfying human behaviour, and enriching interaction with nature — Understand

CO 5: Demonstrate professional and ethical responsibility — Understand

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	3	3	-	-	-	3	-	-
CO 2	-	-	-	-	-	3	3	3	-	-	3	-	-
CO 3	-	-	-	-	-	3	3	-	-	-	3	-	-
CO 4	-	-	-	-	-	3	3	-	-	-	3	-	-
CO 5	-	-	-	-	-	3	3	3	-	-	3	-	-

SYLLABUS:

UNIT I: INTRODUCTION - NEED, BASIC GUIDELINES, CONTENT, AND PROCESS FOR VALUE EDUCATION 6 + 3

Purpose and motivation for the course – Self-Exploration: what is it – Its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration – Continuous Happiness and Prosperity – A look at basic Human Aspirations – Right understanding, Relationship, and Physical Facilities – the basic requirements for the fulfillment of aspirations of every human being with their correct priority – Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario – Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT II: HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF 6 + 3

Understanding human beings as a co-existence of the sentient 'I' and the material 'Body' – Understanding the needs of Self ('I') and 'Body' – Happiness and Convenience – Understanding the Body as an instrument of 'I' (I being the doer, seer, and enjoyer) – Understanding the harmony of I with the Body: Self-control and Welfare; correct appraisal of Physical needs – Meaning of Prosperity in detail – Programs to ensure Self-control and Welfare

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: HARMONY IN THE FAMILY AND SOCIETY **6 + 3**

Understanding values in human – Human relationships; the meaning of Justice (nine universal values in relationships) and the program for its fulfillment to ensure satisfaction – Trust and Respect as the foundational values of relationship – Understanding the meaning of Trust – Difference between intention and competence – Understanding the meaning of Respect – The Difference between respect and differentiation; and the other salient values in relationship – Understanding the harmony in the society (society being an extension of the family): Peace, Prosperity, Courage, and Coexistence as comprehensive Human Goals – Visualizing a universal harmonious order in society – Undivided Society – Universal Order from family to world family

UNIT IV: HARMONY IN THE NATURE AND EXISTENCE **6 + 3**

Understanding the harmony in Nature, Interconnectedness, and mutual fulfillment among the four orders of nature – Recyclability and self-regulation in nature – Understanding Existence as a Co-existence of mutually interacting units in an all-pervasive space – Holistic perception of harmony at all levels of existence – Practice sessions to discuss human beings as the cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology, etc

UNIT V: HARMONY ON PROFESSIONAL ETHICS **6 + 3**

Natural acceptance of human values – Definitiveness of Ethical Human Conduct – Basic for Humanistic Education – Humanistic Constitution, and Humanistic Universal Order – Competence in professional ethics – Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people, friendly and eco-friendly production systems, and Ability to identify and develop appropriate technologies and management patterns for the above production systems – Case studies of typical holistic technologies, management models, and production systems – Strategy for a transition from the present state to Universal Human Order – At the level of the individual: as socially and ecologically responsible engineers, technologists, and managers – At the level of society: as mutually enriching institutions and organizations

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** 15 Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. R R Gaur, R. Asthana , G P Bagaria, A Foundation course in Human Values and Professional Ethics, 3rd Edition, Excel Books, New Delhi, 2024
2. Prof. K. V. Subba Raju, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition, 2013

REFERENCES:

1. Ivan Illich, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA, 1974
2. E. F. Schumancher, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain, 1973

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I

U25MCC02	Heritage of Tamils (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		1	0	0	0	1

COURSE OBJECTIVES:

- Learn the extensive literature of classical Tamil
- Review the fine arts heritage of Tamil culture
- Realize the contribution of Tamils in Indian freedom struggle

COURSE OUTCOMES:

CO 1:	Understand the extensive literature of Tamil and its classical nature	Understand
CO 2:	Understand the heritage of sculpture, painting and musical instruments of ancient people	Understand
CO 3:	Review on folk and martial arts of Tamil people	Understand
CO 4:	Realization of Thinai concepts, trade and victory of Chozha dynasty	Understand
CO 5:	Understand the contribution of Tamils in Indian freedom struggle, Self-esteem movement and siddha medicine	Understand

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 2	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 3	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 4	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 5	-	-	-	-	-	-	3	3	-	2	-	-	-

SYLLABUS:

UNIT I: LANGUAGE AND LITERATURE 3

Language Families in India - Dravidian Languages – Tamil as a Classical Language – Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature – Management Principles in Thirukural – Tamil Epics and Impact of Buddhism & Jainism in Tamil Land – Bakthi Literature Azhwars and Nayanmars – Forms of minor Poetry – Development of Modern literature in Tamil – Contribution of Bharathiyar and Bharathidhasan

UNIT II: HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

Hero stone to modern sculpture – Bronze icons – Tribes and their handicrafts – Art of temple car making – Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments – Mridhangam, Parai, Veenai, Yazh and Nadhaswaram – Role of Temples in Social and Economic Life of Tamils

UNIT III: FOLK AND MARTIAL ARTS 3

Tattooing, basket weaving,Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance – Sports and Games of Tamils

Head of the Department,
Electronics & Communication Engineering,
PR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: THINAI CONCEPT OF TAMILS 3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature – Aram Concept of Tamils – Education and Literacy during Sangam Age – Ancient Cities and Ports of Sangam Age – Export and Import during Sangam Age – Overseas Conquest of Cholas

UNIT V: CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

Contribution of Tamils to Indian Freedom Struggle – The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement – Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 15 Periods

TEXTBOOKS:

1. Jayanthi Ravikrishna K, Heritage of Tamils, Sri Krishna publications, First Edition, 2023
2. S. Priyadharshini, Heritage of Tamils, V. K. Publications

REFERENCES:

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை, International Institute of Tamil Studies, C.P.T Campus, Chennai
2. கணினித் தமிழ் - முனைவர். இல. சுந்தரம், விகடன் பிரசுரம், அண்ணா சாலை, சென்னை, திசம்பர் 2016
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம், தொல்லியல் துறை வெளியீடு, தமிழ்நாடு அரசு, சென்னை, ஆறாம் பதிப்பு 2020
4. Social Life of Tamils, Dr. K. K. Pillay, A joint publication of TNTB & ESC and RMRL (in print) University of Madras, Chennai, Second Edition 1975
5. The Contributions of the Tamils to Indian Culture, Dr.M.Valarmathi, International Institute of Tamil Studies, C.I.T Campus, Tharamani, Chennai, First Edition 1995

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses
Learn Beyond

SEMESTER I & II

U25MCC03	Design Thinking (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To understand the basics of Design Thinking, its principles, processes, and tools used
- To empathize with stakeholders and frame problems using structured tools and techniques
- To generate ideas, create prototypes, and present solutions effectively using design tools

COURSE OUTCOMES:

CO 1:	Explain purpose and features of design thinking process	Understand
CO 2:	Use required tools to empathize with the stockholders to identify the problem	Apply
CO 3:	Define the identified problem elaborately and clearly	Apply
CO 4:	Develop prototypes for conceptual solutions	Apply
CO 5:	Present the identified solution to all the stakeholders	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	1	2	3	2	-	-	-	-	1	1	1	-	-
CO 2	1	2	3	2	-	-	-	-	1	1	1	-	-
CO 3	1	2	3	2	-	-	-	-	1	1	1	-	-
CO 4	1	2	3	2	-	-	-	-	1	1	1	-	-
CO 5	1	2	3	2	-	-	-	-	1	1	1	-	-

SYLLABUS:

UNIT I: FUNDAMENTALS OF DESIGN THINKING 3 + 6

Introduction to Design Thinking: Definition, relevance, and applications – Contexts and situations where Design Thinking is most effective – Core process of implementing Design Thinking – Stakeholders involved in a Design Thinking approach – Design The Thinking – Personal Visualization, The Wheel of Life, and Balancing Priorities – Understanding and appreciating the concept of 'Design' – The 3 Laws of Design Thinking

UNIT II: THE EMPHATHIZE STAGE 3 + 6

Understanding Stakeholders – Role of Empathy in Design Thinking – Tools: Persona, Journey Mapping, Stakeholder Mapping, CATWOE, Cartographic Perspective (L0), Empathy Map – Case Study

UNIT III: THE DEFINE STAGE 3 + 6

Problem Framing and Reframing – Role of a Design Thinker – Tools: Five Whys, Anti-Pattern, Problem Paraphrasing, Challenge Mapping – Introduction to LORD Skillset – Case Study

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: THE DIVERGENCE AND CONVERGENCE STAGE **3 + 6**

Ideation through Divergent and Convergent Thinking – Tools: Brainstorming, Metaphor, Random Association, End-State Visualization, 10gm–100gm–1000gm – Prototyping Basics – Wire framing – Case Study – Communicating for Effective Outcome

UNIT V: THE COMMUNICATION STAGE **3 + 6**

Presenting and Packaging Design Outcomes – Tools: 4Cs Framework, Naming, Packaging, Storyboarding, Presentation Techniques, Distribution Methods

LIST OF EXPERIMENTS

1. Personal Visualization
2. 3 Laws of Design Thinking®
3. Persona
4. Journey Mapping
5. Cartographic Perspective
6. Anti-Pattern, Problem Paraphrasing
7. Brainstorming
8. 10gm–100gm–1000gm
9. Prototyping Basics
10. Storyboarding
11. Presentation Techniques

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, HarperCollins Publishers Ltd., 2018
2. Idris Mootee, Design Thinking for Strategic Innovation, John Wiley & Sons Inc, 2013
3. Arun Jain, UnMukt: Science & Art of Design Thinking, School of Design Thinking, 2020

REFERENCES:

1. Roger Martin, The Design of Business: Why Design Thinking is the Next Competitive Advantage,Harvard Business Press, 2009
2. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), Design Thinking: Understand – Improve– Apply, Springer, 2011
3. Liedtka , Andrew King, Kevin Bennett , Book - Solving Problems with Design Thinking - Ten Stories of What Works, Columbia Business School Publishing, 2013
4. Maurício Vianna, Ysmar Vianna, Isabel K. Adler, Brenda Lucena, Beatriz Russo, Design thinking: Business Innovation, MJV Press, 2011
5. Burgelman, Christensen, and Wheelwright, Strategic Management of Technology and Innovation, 5th Edition, McGraw Hill Publications, 2017

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I & II

U25MCC04	Computer Fundamentals and Coding Essentials (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To develop an understanding of fundamental computing concepts such as data types, variables, operators and algorithmic problem-solving.
- To enable students to write, debug, and execute simple programs in C using control structures, arrays and strings for solving basic scientific and engineering problems.
- To introduce the basic structure and functioning of computer systems, including hardware, software, operating systems and file management.

COURSE OUTCOMES:

CO 1: Build basic computational concepts such as data types, variables, operators, algorithms to solve simple problems — **Apply**

CO 2: Develop simple programs using input/output operations, control structures, arrays, and strings in C language — **Apply**

CO 3: Describe the fundamental components of a computer system and explain the role of operating systems and file management in computing — **Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	3	2	2	-	-	-	-	-	-	2	-	-
CO 2	3	3	3	-	2	2	-	-	-	-	2	-	-
CO 3	3	2	-	-	2	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: FUNDAMENTALS OF COMPUTING — **3 + 5**

Introduction to algorithms and flowcharts –Data types, variables, and operators

UNIT II: INTRODUCTION TO PROGRAMMING — **6 + 5**

Programming languages overview - Input/output, conditional statements, loops - Basic data structures: arrays and strings - Overview of Logic gates and basic digital circuits - System software

UNIT III: INTRODUCTION TO COMPUTERS — **6 + 5**

Evolution of Computers - Overview of computer hardware and software - Number Systems - Understanding input/output devices, memory, storage – Basics of operating systems and file management

LIST OF EXPERIMENTS

1. Identifying computer components
2. Installation and debugging of Operating System
3. Programs using variables and data types

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

4. Programs using Conditional Statements
5. Programs using Loops and Iterations
6. Program using Nested Loops & Pattern Printing

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 30 Periods

TEXTBOOKS:

1. Glenn Brookshear J and Dennis Brylow, "Computer Science: An Overview" , 13th Edition, Perarson, 2020
2. Rajaraman V and Neeharika Adabala "Fundamentals of Computers", 6th Edition PHI Learning Private Limited, 2015
3. Yashavant Kanetkar, "Let Us C", 17th Edition, BPB Publications, 2020

REFERENCES:

1. Reema Thareja, "Programming in C", 2nd Edition, Oxford University Press, 2016
2. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", 1st Edition, Oxford University Press, 2009

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER I & II

U25MCC05	Biology for Engineers (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To understand the biological concepts from an engineering perspective
- To understand the importance of human physiology and sensing techniques
- To perform the various laboratory tests with the relevant instruments / equipment

COURSE OUTCOMES:

CO 1:	Interpret the biological concepts of cell and its structure	**Understand**
CO 2:	Describe the importance of human physiology	**Understand**
CO 3:	Summarize the various sensing techniques and assistive devices	**Understand**
CO 4:	Utilize the instruments / equipment to perform the microbial growth and laboratory tests	**Precision**
CO 5:	Apply the principles to demonstrate the microbial growth and laboratory test	**Precision**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	1	-	-
CO 2	2	1	-	-	-	-	-	-	-	-	1	-	-
CO 3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO 4	3	2	1	1	-	-	-	1	2	1	1	-	-
CO 5	3	2	1	1	-	-	-	1	2	1	1	-	-

SYLLABUS:

UNIT I: BASICS OF CELL 5

Cell structure and function – Cell division – Mitosis – Meiosis – Cell Membrane potential

UNIT II: HUMAN PHYSIOLOGY 5

Circulatory system – Respiratory system – Digestive system – Neurology system Carbohydrates – Proteins and amino acid – Nucleic acid (DNA and RNA)

UNIT III: SENSING TECHNIQUES AND ASSISTIVE DEVICES 5

Sensory organs: Eyes and ears – Visual aids – Hearing aids – Electronic nose – Electronic tongue – Electronic skin

UNIT IV: BIOINSPIRATION 15

Demonstration on bionic principles in nature-inspired design – Exploration of biomimetic materials and their engineering applications – Identification of natural structures mimicked in robotics and sensors – Observation and analysis of bioinspired prototypes (e.g., soft actuators, lotus-effect surfaces)

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT V: BASIC LABORATORY TESTS **15**

Separation of serum – Identification of blood groups – Estimation of blood pressure – Measurement of pH – Acquisition of ECG signals – Introduction to bioinformatics for biomedical data interpretation: visualization of gene/protein sequences, exploration of databases such as NCBI and UniProt, and understanding their applications in clinical diagnostics and personalized medicine

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Campbell N.A., Reece J.B., Urry L., Cain M.L. and Wasserman S.A., "Biology: A global approach", 12th edition, Pearson Education Ltd, 2020
2. Thyagarajan S., Selvamurugan N., Rajesh M.P., Nazeer R.A., Thilagaraj W., Barathi S., and Jaganthan M.K., "Biology for Engineers", 1st edition, Tata McGraw-Hill, 2018
3. Elaine N. Marieb and Suzanne. M. Keller, "Essential of Human Anatomy and Physiology", 12th edition, Pearson Education, 2017

REFERENCES:

1. Leslie Cromwell, Erich A. Pfeiffer, Fred J. Weibell, "Biomedical Instrumentation", 2nd Edition, Prentice Hall, 2011
2. Arthur T Johnson, "Biology for Engineers", 1st edition, CRC press, 2011
3. David. L. Nelson, Michael. M. Cox, "Lehninger Principles of Biochemistry", 7th edition, WH Freeman, 2017
4. John Enderle and Joseph Bronzino, "Introduction to Biomedical Engineering", 3rd edition, Academic Press, 2012

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER II

		Category: HSMC				
U25ENG02	English Proficiency II (Common to all programmes)	L	T	P	J	C
		0	0	2	0	1

COURSE OBJECTIVES:

- Be an active listener for better comprehension and retention
- Identify main points in spoken materials such as lectures, podcasts, and conversations

COURSE OUTCOMES:

CO 1: Deploy effective listening strategies in academic, technical and everyday situations — **Remember**

CO 2: Engage in discussions expressing opinions and responding to ideas and arguments — **Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	2	3	-	2	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	2	-	-

LIST OF EXPERIMENTS

1. Listening to Lectures: Structure and Emphasis – Note-making Techniques: capturing main ideas and details – Conversations, Dialogues and Identifying Opinions – Podcasts and Interviews – Active Listening Skills: Overcoming Barriers and Improving Focus
2. Listening for Specific Information: Facts, Figures, and Sequences – Global Accents: British, American, Australian – Following Instructions and Procedures: Task-based listening – Listening to Technical Explanations: Engineering Concepts – Short Writing Task: Summary or outline from technical input
3. Listening to Workplace Conversations: Meetings, Calls and Voice Notes – Listening to News & Current Events: Identifying Main Ideas and Recognizing – Colloquial Expressions and Idioms in Context: Enhancing comprehension of informal speech

CONTACT PERIODS:

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

TEXTBOOKS:

1. Rob Freire and Tamara Jones, "Q: Skills for Success: Listening & Speaking", Level 4, 3rd edition, Oxford University Press, 2019
2. Ashraf M. Rizvi and Priyadarshi Patnaik, "Effective Technical Communication", 3rd Edition, McGraw Hill, 2024

REFERENCES:

1. Nixaly Leonardo, "Active Listening Techniques:30 Practical Tools to Hone Your Communication Skills", Embassy Books, 2022
2. Heather R. Younger, "The Art of Active Listening: How People at Work Feel Heard, Valued, and Understood", Berrett-Koehler Publishers, 2023

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER II

U25MA203	Linear Alegebra and Complex Variables (Common to BM, EC)	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To introduce the concepts of linear algebra and complex analysis relevant to engineering systems
- To apply matrix methods and complex techniques in solving engineering problems
- To develop analytical skills for modeling and analyzing engineering systems using linear algebra and complex variables

COURSE OUTCOMES:

CO 1:	Understand vector spaces and linear transformations in engineering contexts	**Understand**
CO 2:	Apply matrix operations and eigenvalue analysis to engineering systems	**Apply**
CO 3:	Utilize complex variables and functions in solving engineering problems	**Apply**
CO 4:	Apply and solve systems of linear equations relevant to engineering applications	**Apply**
CO 5:	Model and simulate engineering systems using linear algebra and complex analysis techniques	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	2	-	-	-	-	-	-	-	-	1	-	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	-	-
CO 3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 4	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 5	3	3	-	2	1	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: VECTOR SPACES AND LINEAR TRANSFORMATIONS **6 + 6**

Definition and examples – Linear combinations – Span – Linear independence – Basis and dimension – Linear transformations – Kernel and range – Applications in engineering systems

UNIT II: MATRICES AND EIGENVALUE ANALYSIS **6 + 6**

Matrix operations – Determinants – Inverse and transpose – Rank – Eigenvalues and eigenvectors – Diagonalization – Applications to engineering systems

UNIT III: COMPLEX VARIABLES AND FUNCTIONS **6 + 6**

Complex numbers – Functions of a complex variable – Analytic functions – Cauchy-Riemann equations – Conformal mapping – Applications in engineering

UNIT IV: SYSTEMS OF LINEAR EQUATIONS **6 + 6**

Transient response of RL, RC and RLC circuits with DC and sinusoidal excitations – Two port networks – Z and Y parameters

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT V: SIMULATIONS USING LINEAR ALGEBRA AND COMPLEX ANALYSIS **6 + 6**

Modeling engineering systems using linear algebra – Simulation using complex analysis techniques – Case studies and applications

LIST OF EXPERIMENTS

1. Vector Spaces and Linear Transformations – Visualize vector spaces and subspaces – Implement linear transformations and analyze their effects
2. Matrices and Eigenvalue Analysis – Perform matrix operations and compute eigenvalues/eigenvectors – Apply diagonalization to engineering problems
3. Complex Variables and Functions – Plot complex functions and analyze their properties – Implement conformal mappings and explore applications
4. Systems of Linear Equations – Solve systems using Gaussian elimination and LU decomposition – Apply solutions to engineering case studies
5. Modeling and Simulation – Develop models of engineering systems using linear algebra and complex analysis – Simulate and analyze system behavior

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. David C. Lay, Linear Algebra and Its Applications, 5th Edition, Pearson Education, 2015
2. James Ward Brown and Ruel V. Churchill, Complex Variables and Applications, 9th Edition, McGraw-Hill Education, 2013

REFERENCES:

1. Gilbert Strang, Introduction to Linear Algebra, 5th Edition, Wellesley Cambridge Press, 2016
2. Dennis G. Zill and Patrick D. Shanahan, A First Course in Complex Analysis with Applications, 3rd Edition, Jones & Bartlett Learning, 2011
3. Howard Anton and Chris Rorres, Elementary Linear Algebra: Applications Version, 11th Edition, Wiley, 2013

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

Centre for Academic Courses

SEMESTER II

U25PH206	Materials Science for Electronics Engineering	Category: BSC				
		L	T	P	J	C
		2	0	0	2	3

COURSE OBJECTIVES:

- To understand the classification of materials and their electrical, dielectric, thermal, and optical properties for applications in communication device
- To examine the principles and applications of piezoelectric, pyroelectric, magneto-resistive materials, nano scale materials and optoelectronic devices and emerging materials for next-generation flexible electronics and medical devices
- To Summarize the relationship between electronic band structures and semiconductor doping, and classify the role of quantum effects in modern spin-based chip technologies

COURSE OUTCOMES:

CO 1: Classify the materials based on their electrical, dielectric, thermal, and optical properties for applications in communication devices **Understand**

CO 2: Outline the principles of optoelectronic devices and emerging materials to solve engineering problems in flexible electronics and power devices. **Understand**

CO 3: Demonstrate spintronic devices and quantum tunneling in nanoelectronics systems **Apply**

CO 4: Construct sensors for temperature, pressure, motion and light detection in robotics and IoT systems **Apply**

CO 5: Implement quantum materials in nanoelectronics, and use conductive polymers / biocompatible nanocomposites for antenna and medical device applications **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	-	1	1
CO 2	2	1	-	-	-	-	-	-	-	-	-	1	-
CO 3	3	2	1	1	-	-	-	-	-	-	-	1	-
CO 4	3	2	1	1	-	-	-	-	-	-	-	1	-
CO 5	3	2	1	1	-	-	-	-	-	-	-	-	3

SYLLABUS:

UNIT I: CLASSIFICATION OF MATERIALS **6 + 6**

Conductors, semiconductors, and insulators – Material Categories: ceramics, polymers, and composites – Electrical, dielectric, thermal, and optical properties for communication devices –Material selection for ICs, PCBs, antennas, sensors, and high-frequency components

UNIT II: OPTOELECTRONIC AND EMERGING MATERIALS **6 + 6**

Transparent Conducting Oxides – Nonlinear Optical materials – Light Emitting Diode – Photodetectors (Si, InGaAs) – Emerging Materials & amp; Applications: 2D materials (graphene, TMDCs) for flexible electronics – Wide-bandgap semiconductors (SiC, GaN) for power devices

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: TRANSISTOR AND CHIPS **6 + 6**

Overview of transistors – Charge transport and electronic band structures – Semiconductor doping – Charge hopping, excitation, and quantum tunnelling – Spintronics fundamentals and spin-based devices in chip technology – nano electronic systems – Tunnel FETs

UNIT IV: MATERIALS FOR SENSORS AND APPLICATIONS **6 + 6**

Piezoelectric materials – Pyroelectric materials – Electroactive polymers – Magneto-resistive and shape memory alloys – Applications of sensors in temperature, pressure, motion, and light detection in robotics – IoT and automation

UNIT V: ADVANCED FUNCTIONAL MATERIALS **6 + 6**

Nanostructured Materials – Materials for Antennas: High-conductivity metals and composites for traditional designs – Flexible conductive polymers – Biomaterials: biocompatibility – Polymers nanocomposites used in medical electronics

LIST OF PROJECTS

1. Material Selection for a Communication Device (PCB or Antenna)
2. Comparative Analysis: Conductors, Semiconductors, and Insulators
3. Interactive Chart: Electrical, Dielectric, and Optical Properties
4. Flexible Electronics Demo with Graphene/2D Materials (Conceptual)
5. Design of a Simple LED Photodetector Circuit
6. TCO vs. Traditional Conductors in Displays (Research Project)
7. Build a Simple Transistor-Based Amplifier
8. Quantum Tunneling and Tunnel FETs (Simulation or Animation)
9. Poster: Evolution from Classical Transistors to Spintronics
10. Build a Piezoelectric Sensor for Motion Detection
11. Thermal Sensing with Pyroelectric Materials
12. Smart Material Applications in Robotics (Conceptual Model)
13. Comparative Study: 0D vs. 1D vs. 2D Nanomaterials
14. Flexible Antenna Model Using Conductive Ink or Foil
15. Biocompatibility of Materials in Medical Electronics

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** 30 Periods **Total:** 60 Periods

TEXTBOOKS:

1. William D. Callister, Jr, David G. Rethwisch, "Materials Science and Engineering An Introduction", 10th edition,Wiley, 2017
2. Balasubramanian K, "Smart Materials and Sensors for Industrial Applications", IK International, 2016

REFERENCES:

1. R. P. Rana, S. K. Arya, "Electronic Materials and Processes", 5th edition, S. K. Kataria & Sons, New Delhi, 2020
2. V. K. Khanna, "Nanoelectronics: Devices and Circuits", 1st edition, McGraw Hill Education, New Delhi, 2020
3. D. K. Bhattacharya, "Sensors and Transducers", 2nd edition, New Age International, 2020
4. D. K. Bhattacharya, "Biomaterials and Medical Electronics", 1st edition, New Age International, 2023
5. https://nptel.ac.in/courses/117102056

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

6. https://nptel.ac.in/courses/112106302

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER II

U25CY201	Environmental Science and Sustainability (Common to all programmes)	Category: BSC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To provide the basic concepts of ecosystems, biodiversity, air and water systems and how to protect them
- To analyze the effects of human activities on the lithosphere, waste generation, and environmental health, and evaluate disaster management and technological solutions
- To apply the principles of sustainable living and green technologies in alignment with the UN Sustainable Development Goals

COURSE OUTCOMES:

CO 1: Utilize the ecosystem and biodiversity conservation concepts to address environmental issues — **Apply**

CO 2: Implement atmospheric and hydrospheric concepts for water quality parameter determination. — **Apply**

CO 3: Develop effective strategies to manage land-use challenges, agricultural issues, and waste management practices — **Apply**

CO 4: Utilize technological tools to monitor environmental issues, resource recovery, and pollution control processes — **Apply**

CO 5: Implement sustainable development strategies for green practices and waste management — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	-	-	2	1	1	-	1	-	-
CO 2	3	2	1	1	-	-	2	1	1	-	1	-	-
CO 3	3	2	1	1	-	-	2	1	1	-	1	-	-
CO 4	3	2	1	1	-	-	2	1	1	-	1	-	-
CO 5	3	2	1	1	-	-	2	1	1	-	1	-	-

SYLLABUS:

UNIT I: ENVIRONMENTAL SCIENCE AND BIODIVERSITY — **3 + 6**

Ecosystems – Classification, Structure, Energy Flow, Ecological Succession – Biodiversity – Importance, Values and Levels – India as a Mega-diversity Nation – Red Data Book, Hotspots and Conservation of Biodiversity Self-Learning and Case Studies – Wildlife Crime in India (Poaching) – Man and Wildlife Conflict (e.g., Elephant-Human conflict in Odisha or Assam)

UNIT II: ATMOSPHERE AND HYDROSPHERE — **3 + 6**

Atmosphere – Structure, Climatic Zones, Air Quality Standards (National & WHO), Air Pollution – Causes, effects, control measures, Carbon Emissions – Greenhouse Effect, Global Warming. Hydrosphere – Hydrological Cycle – Water Quality Parameters, water pollution – Causes, effects, control measures, Overutilization of Ground Water – Water Conservation Strategies, Microplastics as emerging pollutants-Causes, effects and control measures Self-Learning and Case Studies – Atmosphere – Urban air quality (Delhi, Beijing case), Hydrosphere – (National Water Mission (NAPCC), NRCP, Jal Shakti Abhiyan – Cape Town Water Crisis (2017–2018)

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: LITHOSPHERE AND SOLID WASTE MANAGEMENT **3 + 6**

Lithosphere – Composition, Plate tectonics, continental drift, Soil Nutrients, Nitrogen cycles, Soil Pollution – Causes, effects (Land degradation, desertification) and control measures, Agriculture – Problems of modern agriculture. E-waste-causes, effects and control measures. Solid Waste Management – Types & Sources of waste, waste management processes. Self-Learning and Case Studies - (Land degradation – Rajasthan - Soil erosion – Narmada River Basin, MP – Desertification – Thar Desert – Eco buddy program).

UNIT IV: GLOBAL ISSUES, HUMAN WELFARE AND ROLE OF TECHNOLOGY **3 + 6**

Disasters & Disaster management cycle – Floods, Landslides, Land Clearing Projects – Dam sites, Highways projects. Resettlement and Rehabilitation (R&R). Population – Global and national growth patterns, Population explosion, Role of information Technology (IT) in Environmental studies and human health monitoring. Self-Learning and Case Studies – Use of IT in environmental monitoring (GIS, Remote Sensing, sensors, data loggers) Pollution Monitoring – Water, Air.

UNIT V: SUSTAINABLE DEVELOPMENT AND GREEN PRACTICES **3 + 6**

Sustainable Development – Introduction, Concepts and Strategies, Sustainable Practices and Circular Economy – 5Rs, Zero Waste Lifestyle Sustainable Development – Introduction, Concepts and Strategies, Sustainable Practices and Circular Economy – 5Rs, Zero Waste Lifestyle. Sustainable Agriculture, Green Technologies – Green Chemistry and reagent in industries, Environmental Management – ISO 14001:2004, energy efficiency, sustainable transport, carbon sequestration. Self-Learning and Case Studies - Overview of United Nations SDGs (focus on SDGs 6, 7, 11, 12, 13), Role of India in implementing SDGs, Ambikapur, Chhattisgarh – Zero waste city model, Pune, Maharashtra – Integrating informal waste sector, Delhi Metro – Energy efficiency, carbon credits from regenerative braking, solar power use, Kochi, Kerala – Sustainable urban transport with water metro and public transit integration.

LIST OF EXPERIMENTS

1. Estimation of hardness (total, temporary, permanent) in water samples
2. Iodometric / Argentometric determination of available chlorine in a sample of bleaching powder.
3. Estimation of dissolved oxygen in water.
4. Determination of nitrate/ammonium estimation — colorimetric tests for nitrate/ammonium to study N availability
5. Recovery of Aluminum from waste materials.
6. Photocatalytic degradation of dye using TiO_2.
7. Synthesis of biodesel from vegetable oil.
8. Coir pith composting and application study.
9. Determination of conductivity, TDS and turbidity test for potable water

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. E. Bharucha, "Environmental Studies for Undergraduate Courses", 2nd edition, Hyderabad, University Press (India) Pvt. Ltd., 2005
2. R. Rajagopalan, "Environmental Studies: From Crisis to Cure", 3rd edition, New Delhi: Oxford University Press, 2016
3. A. Kaushik and C. P. Kaushik, "Environmental Science and Engineering" 5th edition, New Delhi: New Age International Publishers, 2019
4. R. R. Hiremath, "Sustainable Development", 1st edition, New Delhi: Himalaya Publishing House, 2008

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

5. P. D.Sharma, "Ecology and Environment" 13th edition, Meerut: Rastogi Publications, 2020

REFERENCES:

1. P. Meenakshi, "Elements of Environmental Science and Engineering" 1st edition, New Delhi: Prentice Hall of India, 2005
2. G. R. Chatwal and Harish Sharma, "A Textbook of Environmental Studies" 3rd edition, Mumbai: Himalaya Publishing House, 2018
3. A. Kumar, "Environmental Studies", Revised edition, Patna: Bharati Bhawan Publishers & Distributors, 2019
4. V. Desai, "Environment and Sustainable Development" 1st edition, Mumbai: Himalaya Publishing House, 2009
5. G. K. Taneja, Gopal and S. C. Sharma, "Environmental Sustainability and Development", 2nd edition, New Delhi: Deep and Deep Publications, 2010

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER II

U25CSG05	Computational Problem Solving using Python (Common to AD, AM, BM, CB, CS, EC, EE, IT, SC)	Category: ESC				
		L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To introduce the foundational concepts of Python programming
- To equip students with skills in functional and object-oriented programming
- To develop proficiency in core data structures and file handling techniques
- To enable learners to apply Python for real-world data analysis and visualization

COURSE OUTCOMES:

CO 1:	Understand basic Python syntax, data types, and debugging using script and interactive modes	Understand
CO 2:	Develop programs using conditionals, loops, functions, recursion, and apply appropriate variable scopes	Apply
CO 3:	Implement object-oriented concepts and manipulate Python collections using slicing, aliasing, and comprehension	Apply
CO 4:	Perform file operations, handle exceptions, and manage modules, packages, and dependencies in Python	Apply
CO 5:	Apply NumPy, Pandas, and visualization tools to perform data analysis and generate real-world insights	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 2	3	2	1	1	-	-	-	-	-	-	2	-	-
CO 3	3	2	1	1	-	-	-	-	-	-	2	-	-
CO 4	3	2	1	1	-	-	-	-	-	-	2	-	-
CO 5	3	2	1	1	1	-	-	-	-	-	2	-	-

SYLLABUS:

UNIT I: PYTHON BASICS AND PROGRAMMING CONSTRUCTS **6 + 6**

Python interpreter – Script and interactive mode – Execution flow – Data types – Variables – Expressions – Statements – Operators – IO Operations – Comments – Error types – Debugging techniques – Basic IDE usage

UNIT II: CONTROL STRUCTURES AND FUNCTIONAL PROGRAMMING **6 + 6**

Conditional statements – Boolean logic – Loops – Function definition – Function arguments and its types – Return values – Scope – Recursion

UNIT III: CORE DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING **6 + 6**

Python Collections and Data Manipulation: String – List – Tuples – Set – Dictionary – Slicing, Mutability, Aliasing, Packing and unpacking – List comprehension. Classes and Object Oriented Programming (OOP) – Class definition – Constructors – Instance methods – Inheritance – Method overloading and overriding.

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: FILE HANDLING, EXCEPTIONS, AND MODULES **6 + 6**

Text and CSV file operations: File operations – Handling using with keyword. Exception handling: Try, Except, Else, Finally, Custom exceptions – Command line arguments using sys.argv – Modules, Packages and Virtual environments – Managing dependencies with PIP

UNIT V: DATA ANALYSIS AND VISUALISATION WITH COMPUTATIONAL THINKING **6 + 6**

NumPy: Slicing, Broadcasting and Vectorized Operations. Pandas: Series and Data frames – Reading and writing files – Data Filtering, Sorting, Grouping and Aggregation. Visualization: Matplotlib

LIST OF EXPERIMENTS

1. Demonstrating Python Programming Using Simple Statements and Expressions
2. Solving Problems Using Decision Making and Looping Constructs
3. Creating Programs Using Lists, Tuples, and Sets
4. Manipulating Data Using Dictionaries
5. Handling Exceptions and String Operations in Python
6. Implementing Programming Using User-Defined and Recursive Functions
7. Implementing Object-Oriented Programming Using Classes and Inheritance
8. Performing File Operations and Using Python Modules
9. Exploratory Data Analysis Using NumPy and Pandas
10. Data Visualization Using Matplotlib

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. Reema Thareja, "Python programming: Using problem solving approach", 1st Edition, Oxford Press, 2017
2. William McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, 2nd Edition, Shroff/O'Reilly Publication, 2017

REFERENCES:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016
2. Ashok Namdev Kamthane and Amit Ashok Kamthane, "Programming and Problem Solving with Python", 2nd Edition, McGrawHill Education, 2018
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", 1st Edition, Pearson India Education Services Pvt. Ltd., 2016

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

Centre for Academic Courses

SEMESTER II

		Category: ESC				
U25CEG01	Basics of Civil Engineering (Common to AD, AM, BM, CB, CS, EC, EE, IT, SC)	L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To provide knowledge about different types of building materials
- To teach the difference between conventional and modern infrastructure systems

COURSE OUTCOMES:

CO 1:	Explain traditional and modern building materials, their properties, and applications	Understand
CO 2:	Describe substructure and superstructure components with their functions and construction methods	Understand
CO 3:	Discuss basic concepts of highways, railways, airways, and waterways	Understand
CO 4:	Explain BIM principles, green building concepts, and smart city planning	Understand
CO 5:	Describe sustainable practices in material selection, solid waste management, and eco-friendly construction	Understand

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	-	-	-	-	-	-	-	1	-	-
CO 2	3	2	1	-	-	-	-	-	-	-	1	-	-
CO 3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO 4	3	2	1	-	-	-	-	-	-	-	1	-	-
CO 5	3	2	1	-	-	-	-	-	-	-	1	-	-

SYLLABUS:

UNIT I: BUILDING MATERIALS AND COMPONENTS **9 + 25**

Building Materials: Introduction – Bricks – Stones – Sand – Aggregate – Cement – Mortar – Concrete – Steel – Wood – Smart materials. Surveying: Objects – Classification – Sub Structures: Soil Classification – Bearing capacity – Foundation – Function – Requirements – Types of foundations – Super Structures: Brick masonry – Stone masonry – Beams – Columns – lintels – Roofing – Flooring – Plastering – Damp proofing – Weathering course

UNIT II: BASIC INFRASTRUCTURE AND TRANSPORTATION **6 + 5**

Introduction to Highways – Railways – Airways and Waterways – Building Information Modeling (BIM) – Solid waste management system – Concept of Green Building – Benefits of Green Buildings – Green Building Materials – Smart Cities

LIST OF EXPERIMENTS

1. Compressive Strength test on Bricks
2. Water absorption test on Bricks
3. Water absorption test on coarse aggregates
4. Impact Test on aggregates
5. Determination of Specific gravity of soil solids

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

6. Study on Centre line marking for building components - Foundations

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. S K Duggal, "Building Materials", Sixth Edition, New Age International Publishers, 2025
2. Sharma. S.K, "Civil Engineering Construction Materials", Khanna Publishing House, New Delhi, 2024

REFERENCES:

1. K.K. Dwivedi and K.K. Shukla.," Basic Civil Engineering & Engineering Mechanics", Dhanpat rai & Co PVT Ltd., 2020
2. Subramanian K.P., "Highways, Railways, Airport and Harbour Engineering", 10th Edition, Scitech Publications (India), Chennai, 2018

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

Centre for Academic Courses

SEMESTER II

		Category: ESC				
U25EEG01	Basics of Electrical Engineering (Common to AD, AM, BM, CB, CE, CS, EC, IT, SC)	L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To introduce the fundamentals of electric circuits, power systems, and basic electrical measurements
- To provide an understanding of electrical machines and SMPS with relevance to computing applications
- To create awareness of electrical installations, safety practices, and protective systems in practical environments

COURSE OUTCOMES:

CO 1:	Analyse basic electrical circuits using Ohm's and Kirchhoff's laws	**Analyze**
CO 2:	Measure electrical quantities using appropriate instruments	**Understand**
CO 3:	Explain the working principles and applications of Electrical Machines and SMPS	**Understand**
CO 4:	Identify the components of residential electrical installations	**Apply**
CO 5:	Apply electrical safety procedures and identify protective devices used in electrical systems	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	-	-	-	-	-	-	-	-	2	-	-
CO 2	3	2	-	-	-	-	-	-	-	-	2	-	-
CO 3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO 4	3	2	-	-	-	-	-	-	-	-	2	-	-
CO 5	3	2	-	-	-	-	-	-	-	-	2	-	-

SYLLABUS:

UNIT I: FUNDAMENTALS OF ELECTRIC CIRCUITS AND MEASUREMENTS **5 + 10**

Ohm's Law, Kirchhoff's Laws (KVL, KCL) – Series and parallel circuits, voltage and current division – Introduction to AC and DC supply –Power, energy, and power factor – Basic measuring instruments: Voltmeter, Ammeter, Wattmeter, Energy Meter

UNIT II: ELECTRICAL MACHINES AND POWER CONVERSION DEVICES **5 + 10**

Single Phase Transformer, DC Machines and Three Phase Induction Motor: Working principle, types, and applications – Stepper and Servo motors: Basics and applications – Switched Mode Power Supply: concept, types (buck, boost, buck-boost), and applications

UNIT III: ELECTRICAL INSTALLATIONS AND SAFETY **5 + 10**

Components of a simple electrical installation – Earthing, Fuses, MCB, ELCB – Single-line diagram of a residential system – Introduction to batteries, UPS and inverters – Electrical safety measures and shock preventions

LIST OF EXPERIMENTS

1. Verification of Ohm's Law and Kirchhoff's Laws
2. Measurement of voltage, current, and power in DC circuits
3. Load test on a single-phase transformer

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

4. Speed control of DC motor
5. Starting and reversal of direction of a three-phase induction motor
6. Demonstration of SMPS and UPS operation

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. D.P. Kothari and I.J. Nagrath, "Basic Electrical Engineering", 4th edition, Tata McGraw Hill, 2024
2. V.K. Mehta & Rohit Mehta, "Principles of Electrical Engineering and Electronics", 2nd revised edition, S. Chand, 2019

REFERENCES:

1. D.P. Kothari and I.J. Nagrath, "Basic Electrical and Electronics Engineering", 2nd edition, Tata McGraw Hill, 2020
2. M.H. Rashid, "Power Electronics: Circuits, Devices and Applications", 4th edition, Pearson Education, 2023
3. Hughes, "Electrical and Electronic Technology", Pearson Education, 12th edition, 2016

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER II

		Category: ESC				
U25MEG02	Basics of Mechanical Engineering (Common to AD, AM, BM, CB, CE, CS, EC, EE, IT, SC)	L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To provide the fundamental knowledge of mechanical elements, actuation systems, and manufacturing processes essential for engineering applications
- To develop an understanding of energy conversion, thermodynamics, heat transfer, fluid mechanics, and power generation systems for solving practical problems

COURSE OUTCOMES:

CO 1: Identify the mechanical elements and actuation systems used in basic engineering applications — **Understand**

CO 2: Classify various manufacturing processes and distinguish between shaping, joining, and additive manufacturing methods — **Understand**

CO 3: Interpret the concepts of thermodynamics, heat transfer, and fluid mechanics to practical engineering problems — **Understand**

CO 4: Identify the various conventional and non-conventional methods of power generation — **Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	1	-	1	1	-	-	-	-
CO 2	2	1	-	-	1	1	-	1	1	-	-	-	-
CO 3	2	1	-	-	-	-	-	1	1	-	-	-	-
CO 4	2	1	-	-	-	1	-	1	1	-	-	-	-

SYLLABUS:

UNIT I: MECHANICAL ELEMENTS AND ACTUATION SYSTEMS — **3 + 8**

Mechanical elements – Gears, chains, shaft, keys, coupling, bolts, nuts, screws, spring, bearings – Actuators – Hydraulics actuators, pneumatics actuators

UNIT II: FUNDAMENTALS OF MANUFACTURING PROCESSES — **4 + 4**

Introduction to manufacturing – Classification of manufacturing processes – Shaping processes – Casting, molding, powder metallurgy, additive manufacturing (FDM, SLA) – Joining processes – Arc welding, brazing and soldering

UNIT III: BASICS OF THERMAL AND FLUID SYSTEMS — **4 + 12**

Basic thermodynamics concepts – System, surroundings, properties, state, process, cycle, laws of thermodynamics and its application – Heat transfer basics – Modes of heat transfer – Conduction, convection, and radiation (basic explanation with examples) – Properties of fluids – Density, specific gravity, viscosity, surface tension, capillarity – Pressure and measurements, pascal's law – Types of fluid flow – Introduction to pumps and its types

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

UNIT IV: ENERGY CONVERSION SYSTEMS **4 + 6**

Introduction to IC and EC Engines – General layout and working of electric vehicle – Power plant – Working and types – Thermal power plant – Hydro power plant – Nuclear power plant – Gas power plant

LIST OF EXPERIMENTS

1. Determine the velocity ratio using simple and compound gear trains
2. Construct and demonstrate a basic pneumatic circuit using single-acting and double-acting cylinders
3. Demonstrate the working of 3D printer by printing a simple object
4. Determination of heat transfer coefficient under natural convection from vertical cylinder
5. Verification of Bernoulli's theorem
6. Performance characteristics of a centrifugal pump
7. Demonstration on IC engine components

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Pravin Kumar, "Basic Mechanical Engineering", 3rd Edition, Pearson Education India, 2018
2. H. S. Bawa, "Manufacturing Processes", Latest Edition, Tata McGraw-Hill Education, 2004

REFERENCES:

1. P. K. Nag, "Engineering Thermodynamics", 6th Edition, Tata McGraw Hill Education, 2017
2. Godfrey C. Onwubolu, "Mechatronics: Principles and Applications", 1st Edition, Elsevier, 2006
3. P. K. Nag, "Power Plant Engineering", 4th Edition, McGraw Hill Education, 2017

Head of the Department.
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER II

U25MEG03	Engineering Graphics (Common to CE, CH, EC, EE, ME)	Category: ESC				
		L	T	P	J	C
		0	0	4	0	2

COURSE OBJECTIVES:

- To impart knowledge of BIS standards and conventions in engineering graphics for the accurate construction of curves, projections and developments
- To develop the ability to visualize and represent 3D objects in 2D space through orthographic projections, sectional views and development of surfaces
- To enhance the drafting skills to interconvert between isometric and orthographic views for practical engineering application using CAD Software

COURSE OUTCOMES:

CO 1: Illustrate engineering curves with BIS standards for effective engineering communication **Understand**

CO 2: Apply the principles of orthographic projection to represent points, straight lines, plane surfaces, and solids on engineering drawing sheets **Understand**

CO 3: Construct projections of truncated and frustums solids and develop the lateral surfaces of solids **Understand**

CO 4: Convert the isometric views of simple objects to orthographic views and vice versa **Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	-	-	-	-	2	1	2	-	2	-	-
CO 2	3	1	-	-	-	-	1	1	2	-	-	-	-
CO 3	3	1	-	-	2	-	-	1	2	-	-	-	-
CO 4	3	2	-	-	2	-	2	1	2	-	2	-	-

LIST OF EXPERIMENTS

1. Introduction, drawing instruments and its uses, sheet layout, BIS conventions, lines, lettering and dimensioning practices lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. agency, parallelism, inclination and perpendicularity (Not for Exam)
2. Manual construction of ellipse, parabola, and hyperbola by eccentricity method
3. Construction of involute of square and circle by manual drafting
4. Projection of points in all four quadrants by manual drafting
5. Projection of lines inclined to both horizontal and vertical planes by manual drafting
6. Projection of planes inclined to both horizontal and vertical planes by manual drafting
7. Projection of solids inclined to one plane and parallel to other planes using AUTOCAD
8. Section of solids with base resting on HP using AUTOCAD
9. Development of lateral surfaces of solids with base on HP using AutoCAD
10. Construction of isometric views of simple and truncated solids using AutoCAD
11. Sketching orthographic views from pictorial representation of 3D objects using AutoCAD

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

CONTACT PERIODS:

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

TEXTBOOKS:

1. N.D. Bhatt and V.M. Panchal, "Engineering Drawing", Charotar Publishing House, Gujarat, 55th edition, 2025
2. K. Venugopal and V. Prabhu Raja, "Engineering Graphics", New Age International (P) Limited, 2022
3. D.M.Kulkarni, A.P.Rastogi and A.K.Sarkar, "Engineering Graphics with AutoCAD", PHI Learning Private Limited, New Delhi, Revised Edition, 2021

REFERENCES:

1. K. V. Natrajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2017
2. Sam Tickoo, "AutoCAD 2024 for Engineers and Designers", Dreamtech Press, 2024

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

SEMESTER II

U25EC201	Circuit Analysis	Category: PCC				
		L	T	P	J	C
		3	0	0	0	3

COURSE OBJECTIVES:

- To learn the basic concepts and different methods of circuit analysis
- To understand the concept of network theorems and transient response
- To study the basic concepts of resonance circuits and two port network parameters

COURSE OUTCOMES:

CO 1:	Solve the given circuits using mesh current, node voltage methods and network topology	**Apply**
CO 2:	Apply network theorems to solve complex networks	**Apply**
CO 3:	Analyze the transient and steady state response of RL, RC and RLC circuits	**Analyze**
CO 4:	Interpret the behavior of resonance and coupled circuits	**Understand**
CO 5:	Determine the two port network parameters and their relationship	**Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	-	-	-	-	-	-	-	-	-	-
CO 2	3	2	1	-	-	-	-	-	-	-	-	-	-
CO 3	3	3	2	-	-	-	-	-	-	-	-	-	-
CO 4	2	1	-	-	-	-	-	-	-	-	-	-	-
CO 5	2	1	-	-	-	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: FUNDAMENTALS OF CIRCUITS AND NETWORK TOPOLOGY 9

Introduction – Mesh current and node voltage methods of analysis for DC circuits – Network terminology – Incidence and reduced incidence matrices – Trees – Cutsets – Fundamental cutsets and Tie sets

UNIT II: NETWORK THEOREMS 9

Network theorems for DC circuits – Superposition theorem, Thevenin's theorem, Norton's theorem, reciprocity theorem, maximum power transfer theorem, Millman's theorem

UNIT III: TRANSIENT ANALYSIS 9

Phasor relationship for R, L, and C, Phasor diagram – Natural and forced response – Steady-state and Transient analysis of RL, RC, RLC circuits using Laplace Transform

UNIT IV: RESONANCE AND COUPLED CIRCUITS 9

Series and Parallel resonance – Variation of impedance and current with frequency, bandwidth, Q-factor, selectivity – Coupled circuits – Self-inductance, mutual inductance, dot rule, coefficient of coupling

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT V: NETWORK PARAMETERS 9

Network parameters – Z-parameters, Y-parameters, transmission (ABCD) parameters, hybrid parameters – Parameter conversions, Interconnection of two-port networks – Symmetry and Reciprocity

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. William H. Hayt, Jr. Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", 8th edition, McGraw Hill, 2018
2. Joseph Edminister and Mahmood Nahvi, "Electric Circuits", Schaum's Outline Series, 5th edition,Tata McGraw Hill, New Delhi, 2018

REFERENCES:

1. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", 6th edition, McGraw Hill, 2019
2. A.Bruce Carlson, "Circuits: Engineering Concepts and Analysis of Linear Electric Circuits", 2nd edition, 2017
3. Sudhakar.A and Shyammohan S Palli, "Circuits and Networks: Analysis and Synthesis", 5th edition, McGraw Hill, 2015
4. Allan H.Robbins, Wilhelm C. Miller, "Circuit Analysis Theory and Practice", 5th edition, Cengage Learning, 2013

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

Centre for Academic Courses

SEMESTER II

		Category: PCC				
U25EC202	Electronic Devices and Circuits	L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To learn the fundamentals of semiconductor devices
- To familiarize the application of diode and transistor
- To analyze the frequency response of transistor amplifier

COURSE OUTCOMES:

CO 1:	Explain the fundamentals of semiconductor devices	**Understand**
CO 2:	Construct electronic circuits using the PN junction diode for various applications	**Apply**
CO 3:	Demonstrate the input and output characteristics of BJT and JFET	**Apply**
CO 4:	Apply suitable biasing methods for amplifier	**Apply**
CO 5:	Analyze the frequency response of CE amplifier	**Analyze**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	1	1	-
CO 2	3	2	1	1	-	-	-	2	2	-	1	1	-
CO 3	3	2	1	1	-	-	-	2	2	-	1	1	-
CO 4	3	2	1	1	1	-	-	2	2	-	1	1	-
CO 5	3	3	2	2	2	-	-	2	2	-	1	1	-

SYLLABUS:

UNIT I: SEMICONDUCTOR FUNDAMENTALS **6 + 6**

Introduction to semiconductors – Conductivity of semiconductors – Law of mass–action – Variation in semiconductor parameters with temperature – Drift and diffusion current – PN junction diode and Zener diode

UNIT II: DIODE APPLICATIONS **6 + 6**

Rectifiers – Half wave and full wave rectifier circuits – LC filters – Voltage regulators – Positive and negative Clippers and Clampers

UNIT III: BJT AND FET **6 + 6**

NPN and PNP Transistors – Early effect – Input and output characteristics of CE configuration – Characteristics of JFET and MOSFET

UNIT IV: BIASING AND COMPENSATION TECHNIQUES **6 + 6**

DC and AC load line– Biasing methods – Collector to base bias, voltage divider bias – Stability factor – Compensation techniques

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT V: FREQUENCY ANALYSIS OF BJT AMPLIFIERS 6 + 6

h-parameter transistor model – Small signal analysis of CE amplifier – Miller effect – High frequency analysis of CE amplifiers

LIST OF EXPERIMENTS

1. VI characteristics of PN diode and Zener diode
2. Applications of PN diode
3. Characteristics of BJT and JFET
4. Frequency response of CE and CS amplifiers using simulation tool
5. Design of wave shaping circuits using simulation tool
6. Design of DC regulator power supply using simulation tool
7. Characteristics of MOSFET using simulation tool

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. Donald A Neaman, "Semiconductor Physics and Devices", 4th edition, Tata McGraw–Hill Inc. 2012
2. S. Salivahanan, N.Sureshkumar, A. Vallavaraj, "Electronic Devices and Circuits", 3rd edition, Tata McGraw–Hill Inc., 2010

REFERENCES:

1. Yang, "Fundamentals of Semiconductor devices", 1st edition, McGraw Hill International, 2017
2. Jacob Millman, Christos C Halkias, Satyabrata Jit, "Electronic Devices and Circuits", 4th edition, McGraw Hill India, 2015
3. Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory", 11th edition, Pearson Prentice Hall, 2014
4. R.S.Sedha, "A Text Book of Applied Electronics", 3rd edition, S. Chand Publications, 2006

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

SEMESTER II

U25LEG05	German for Engineers - II (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To improve comprehension of real-life conversations in familiar everyday situations (shopping, dining, describing spaces, etc.)
- To develop fluency in expressing preferences, describing people, homes, and daily routines using basic sentence structures
- To build competence in writing short, structured texts such as messages, descriptions, and informal communications

COURSE OUTCOMES:

CO 1: Engage in simple conversations while shopping, dining, or asking for information using appropriate vocabulary and phrases **Remember**

CO 2: Describe people, homes, weather, and daily routines using structured sentences with correct grammar **Understand**

CO 3: Read and interpret simple texts such as product labels, menus, signs, and weather updates **Understand**

CO 4: Write short messages or descriptions related to everyday topics like hobbies, weather, or family **Understand**

CO 5: Apply core grammatical rules such as adjective endings, possessive pronouns, and prepositions of place with improved accuracy **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: EVERYDAY SHOPPING AND DINING **6 + 3**

Shopping for groceries and clothes – Ordering food and drinks at a restaurant – Talking about prices and quantities – Expressing preferences – Reading menus, labels, and receipts – Grammar: Accusative case review with articles and adjectives, Plural forms of nouns, Adjective endings in nominative and accusative – Cultural Focus: Eating habits in Germany, Austria, and Switzerland – Supermarket etiquette – Restaurant culture – Tipping practices

UNIT II: PEOPLE AND PERSONAL INTERESTS **6 + 3**

Talking about family and relationships – Describing people's appearance and personality – Hobbies and free time activities – Likes and dislikes – Grammar: Possessive pronouns - Adjective endings with possessive pronouns – Word order in main clauses – Cultural Focus: Family structures – Popular hobbies and sports – Work-life balance in German-speaking countries

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: HOME AND LIVING **6 + 3**

Describing your home and rooms – Furniture and household items – Talking about home layout and comfort – Grammar: Two-way prepositions with accusative/dative – Use of es gibt – Describing location vs. movement – Cultural Focus: Typical German homes – Living arrangements – Interior design norms

UNIT IV: SEASONS AND WEATHER **6 + 3**

Talking about weather and seasons – Seasonal activities – Preferences for seasons – Grammar: Temporal phrases – Review of present tense verb usage with seasonal context – Use of weil (because) – Cultural Focus: Seasonal festivals like Weihnachten and Oktoberfest – Weather patterns in German speaking countries

UNIT V: PUTTING IT TOGETHER – DAILY LIFE **6 + 3**

Combining shopping – Personal life – Home, and seasonal activities into daily routines – Conversational practice across units – Grammar: Practice of main and subordinate clauses – Sentence structure review – Verb position with weil and prepositions – Cultural Focus: Daily routines in Germany – Overview of regional variations in culture and habits

LIST OF EXPERIMENTS

1. Prepare a city map
2. Video: Talk about your daily routine
3. Describe your school (using past tense)
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Buscha, A., & Szita, S., "Begegnungen Deutsch als Fremdsprache A1+: Integriertes Kurs- und Arbeitsbuch," 1st Edition, 2021
2. Brüseke, R., "Grammatik leicht A1," 1st Edition, 2019

REFERENCES:

1. Netzwerk Deutsch als Fremdsprache A1, 1st Edition: BlueNBells, 2012
2. Huber, K., & Keller, F., "DaF kompakt A1: Deutsch als Fremdsprache," 3rd Edition, Langenscheidt, 2018

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Centre for Academic Courses

Learn Beyond

SEMESTER II

		Category: HSMC				
U25LEG06	Japanese for Engineers - II (Common to all programmes)	L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To improve comprehension of real-life conversations in familiar everyday situations (shopping, dining, describing spaces, etc.)
- To develop fluency in expressing preferences, describing people, homes, and daily routines using basic sentence structures
- To build competence in writing short, structured texts such as messages, descriptions, and informal communications

COURSE OUTCOMES:

CO 1: Engage in simple conversations while shopping, dining, or asking for information using appropriate vocabulary and phrases — **Remember**

CO 2: Describe people, homes, weather, and daily routines using structured sentences with correct grammar — **Understand**

CO 3: Read and interpret simple texts such as product labels, menus, signs, and weather updates — **Understand**

CO 4: Write short messages or descriptions related to everyday topics like hobbies, weather, or family — **Understand**

CO 5: Apply core grammatical rules such as adjective endings, possessive pronouns, and prepositions of place with improved accuracy — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: SHOPPING AND QUANTITIES — **6 + 3**

Shopping-related expressions – Asking prices and quantities – Counting objects with counters: ～つ, ～人, ～枚, ～本 – Describing wants using ～がほしいです – Offering and requesting using ～をください – Grammar: Verbs in -masu form (かいます, かります, あげます, もらいます) – Particles: と, や, から, まで – Sentence structures: ～があります / ～がいます, ～は～にあります – Vocabulary: Money, items, colors, shops – Kanji: Numbers (一～十), Days (日, 月, 火) – Basic shopping terms – Cultural note: Japanese currency – Store etiquette – Giving/receiving customs

UNIT II: DAILY LIFE AND TIME EXPRESSIONS — **6 + 3**

Talking about schedules and habits – Expressing future plans using time expressions and verb tense – Grammar: Verb conjugation (non-past affirmative/negative) – Introduction to te-form: ～てください, ～てもいいです – Sequence with ～てから – Frequency expressions: ～まいにち, ～ときどき, ～よく – Vocabulary: School/work schedule, leisure activities, public places, transportation – Kanji: Days of the week (月, 火, 水, 木, 金, 土, 日) – Time-related (時, 分, 半) – Motion verbs (行く, 来る, 帰る) – Cultural note: Japanese daily routines – Work-life balance, punctuality

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: MAKING REQUESTS AND SEQUENCING ACTIONS 6 + 3

Talking about likes and dislikes: ～がすきです / ～がきらいです – Describing abilities: ～がじょうずです / ～がへたです – Vocabulary: Hobbies, sports, entertainment terms – Inviting someone using ～ませんか – Accepting or declining invitations: いいですね / ちょっと – Grammar: Verb forms for expressing preference and intention – Particle: が for subject in expressions of ability and preference – Kanji: Verbs related to hobbies (見, 聞, 読, 書, 食) – Nouns related to interests – Cultural note: Popular hobbies in Japan – Seasonal pastimes – Communication norms in social invitations

UNIT IV: HOBBIES AND PREFERENCES 6 + 3

Asking and giving directions – Describing locations of people and things – Using maps and signs – Grammar: Particles に and で for location and direction – Expressions: ～のまえに, ～のとなりに, ～のなかに – Vocabulary: Places in town – Transportation terms – Directional phrases – Kanji: Location and place words (駅, 右, 左, 上, 下, 中) – Common public signs – Cultural note: Navigating Japanese cities – Polite phrases for asking directions – Public transport norms

UNIT V: ABILITIES AND SOCIAL INTERACTIONS 6 + 3

Review of shopping – Preferences, routines, and directions – Roleplays: at the store, planning a weekend – Inviting a friend – Asking for help and giving opinions – Grammar: Integrated use of learned verb forms and particles – Vocabulary: Reinforcement through conversation – Kanji: Mixed use in real-life contexts – Cultural note: Everyday conversation etiquette – Blending formal and informal speech – Real-life scenarios in Japan

LIST OF EXPERIMENTS

1. Prepare a city map
2. Video: Talk about your daily routine
3. Describe your school (using past tense)
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. 3A Corporation, "Minna no Nihongo Shokyū I: Main Textbook," 2nd Indian Edition, Goyal Publishers & Distributors Pvt. Ltd., New Delhi, 2018
2. Banno, Eri, Yutaka Ohno, Yoko Sakane, Chikako Shinagawa, and Kyoko Tokashiki, "Genki I: An Integrated Course in Elementary Japanese," 3rd Edition, The Japan Times Publishing, Tokyo, 2020

REFERENCES:

1. Yamada, M., & Fujita, T., "Japanese for Beginners: A Practical Approach," 1st Edition, Tuttle Publishing, 2019
2. Takahashi, A., & Sato, M., "Nihongo Pro: Japanese for N5 Level," 1st Edition, KADOKAWA, 2018

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER II

U25LEG07	French for Engineers - II (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To improve comprehension of real-life conversations in familiar everyday situations (shopping, dining, describing spaces, etc.)
- To develop fluency in expressing preferences, describing people, homes, and daily routines using basic sentence structures
- To build competence in writing short, structured texts such as messages, descriptions, and informal communications

COURSE OUTCOMES:

CO 1: Engage in simple conversations while shopping, dining, or asking for information using appropriate vocabulary and phrases — **Remember**

CO 2: Describe people, homes, weather, and daily routines using structured sentences with correct grammar — **Understand**

CO 3: Read and interpret simple texts such as product labels, menus, signs, and weather updates — **Understand**

CO 4: Write short messages or descriptions related to everyday topics like hobbies, weather, or family — **Understand**

CO 5: Apply core grammatical rules such as adjective endings, possessive pronouns, and prepositions of place with improved accuracy — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: FOOD AND SHOPPING ESSENTIALS — **6 + 3**

Food items – Quantities – Packaging – Prices – Navigating markets and stores – Asking for prices and quantities – Expressing preferences and choices – Grammar: Partitive articles (du - de la - des) – Expressions of quantity (un kilo de - beaucoup de - etc.) – Use of il y a – Verb prendre (to take) – Vouloir (to want) – Acheter (to buy) in the present tense – Cultural Focus: French culinary culture – Market etiquette – Typical meals and menus

UNIT II: DINING OUT AND CAFÉ CULTURE — **6 + 3**

Ordering in a café or restaurant – Understanding menus – Making polite requests – Expressing likes and dislikes – Talking about meals – Grammar: Adjective placement and agreement with nouns – Review of present tense verbs – Questions and polite forms – Cultural Focus: Café culture in France and Francophone regions – Dining customs – Tipping practices

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: DESCRIBING HOME AND SURROUNDINGS **6 + 3**

Talking about where you live – Describing your home and rooms – Locating objects in a room – Discussing furniture and appliances – Grammar: Prepositions of place (sur - sous - devant - derrière - entre) – Demonstrative adjectives (ce - cette - ces) – Verb habiter and other -er verbs – Cultural Focus: Types of housing in France – Apartment etiquette – Real estate ads in Francophone cities

UNIT IV: DAILY ROUTINES AND PERSONAL DESCRIPTIONS **6 + 3**

Describing people – Talking about daily routines – Introduction to reflexive verbs – Using adverbs of place (ici - là-bas) – Giving simple directions – Grammar: Reflexive verbs (s'habiller, se lever) – Adverbs of place – Review of verb placement – Cultural Focus: Urban vs. rural living – Typical neighborhood life in French cities

UNIT V: LEISURE, WEATHER, AND SOCIAL LIFE **6 + 3**

Talking about hobbies and sports – Weekend activities – Making and responding to invitations – Expressing preferences and future intentions – Grammar: Verbs faire, aimer, préférer, sortir, aller – Contractions with à and de (au, du) – Near future tense (futur proche: aller + infinitive) – Use of on – Cultural Focus: Leisure activities in Francophone countries – Popular sports and pastimes – Social norms around outings and gatherings

LIST OF EXPERIMENTS

1. Prepare a city map
2. Video: Talk about your daily routine
3. Describe your school (using past tense)
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Marie-José Lopes & Jean-Thierry Bougnec, "Inspire 2 A1-A2 Méthode de français," 1st Edition, Hachette Français Langue Etrangère, 2020
2. Gibbe, C., Berthet, A., & Hugot, C., "Édito A2: Méthode de français," 1st Edition, Didier, 2024

REFERENCES:

1. Chantal Fougères & Marc de la Harpe, "Le Nouveau Sans Frontières 2: Méthode de français A2," 1st Edition, Hachette FLE, 2020
2. Xavier Maingueneau, "Le Français pour les Nuls: A2-B1," 3rd Edition, Wiley, 2021

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Avinashi, Coimbatore - 641 407.

SEMESTER II

U25LEG08	Hindi for Engineers - II (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To improve comprehension of real-life conversations in familiar everyday situations (shopping, dining, describing spaces, etc.)
- To develop fluency in expressing preferences, describing people, homes, and daily routines using basic sentence structures
- To build competence in writing short, structured texts such as messages, descriptions, and informal communications

COURSE OUTCOMES:

CO 1:	Engage in simple conversations while shopping, dining, or asking for information using appropriate vocabulary and phrases	**Remember**
CO 2:	Describe people, homes, weather, and daily routines using structured sentences with correct grammar	**Understand**
CO 3:	Read and interpret simple texts such as product labels, menus, signs, and weather updates	**Understand**
CO 4:	Write short messages or descriptions related to everyday topics like hobbies, weather, or family	**Understand**
CO 5:	Apply core grammatical rules such as adjective endings, possessive pronouns, and prepositions of place with improved accuracy	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: SHOPPING LANGUAGE AND NUMBER USAGE **6 + 3**

Interacting in markets and shops – Asking prices and quantities – Expressing need and preference – Vocabulary: Fruits – Vegetables – clothes – Money terms – Numbers (1–100) – Classifiers: किलो - दर्जन – Use of polite requests – Grammar: Verbs चाहना - लेना -देना in present tense – Use of कुछ and कितना – Postpositions: के लिए - के पास – Emphatic words: ही - भी – Cultural note: Indian market etiquette – Bargaining norms – Respectful phrases for shopkeepers – Currency handling

UNIT II: DESCRIBING PEOPLE AND RELATIONSHIPS **6 + 3**

Talking about family and people – Describing physical appearance and personality – Expressing family relations – Vocabulary: Family members – Descriptive adjectives – Colors – Body parts – Grammar: Adjective agreement by gender and number – Possessives with का/की/के – Verb होना in past tense (था/थी/थे) – Using का रिश्ता for relationships – Honorific subject-verb agreement – Cultural note: Kinship terms – Family address norms – Formal/informal differences – Indian respect systems

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: HOBBIES, LIKES, AND SOCIAL LANGUAGE 6 + 3

Talking about hobbies and free time – Expressing likes and dislikes – Making suggestions and invitations – Vocabulary: Leisure activities – hobbies - entertainment words – Days of the week – Grammar: पसंद होना constructions – Compound verb use with करना (e.g., किताब पढ़ना) – Use of मुझे X पसंद है – Use of को for preferences – Future tense basics with गा/गी/गे – Cultural note: Indian leisure culture – Film and music – Inviting friends – Group social etiquette

UNIT IV: EVERYDAY CONVERSATIONS AND NEEDS 6 + 3

Describing needs and routines in daily life – Making polite offers and requests – Talking about simple problems and solutions – Vocabulary: Basic needs – Services – Tools – simple household and health terms – Grammar: Requests with क्या आप...? – Use of चाहिए – Conditional phrases with अगर (if) – More on present vs. future tense use – Cultural note: Navigating services in India – Polite refusals – Help seeking expressions

UNIT V: RECAP AND REAL-LIFE PRACTICE 6 + 3

Conversational roleplays: shopping – Family introductions – Hobby discussion – Describing routines and asking for help – Combining sentence structures from previous units – Vocabulary: Review and integrate all learned sets – Grammar: Review of verb tenses – Guestion structures – Postpositions – Honorifics – Cultural note: Integrating cultural etiquette with language use – Real-world scenarios for communication in Hindi

LIST OF EXPERIMENTS

1. Prepare a city map
2. Video: Talk about your daily routine
3. Describe your school (using past tense)
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Pavithra Publications, "Spoken Hindi: Through Tamil," 2nd Edition, Pavithra Publications, Chennai, 2015
2. Dakshina Bharat Hindi Prachar Sabha, "Prathamic Text Book: New Syllabus," 1st Edition, Dakshina Bharat Hindi Prachar Sabha, Madras, 2023

REFERENCES:

1. Ganga, K., & Ramesh, V., "Learn Hindi in 30 Days: A Beginner's Guide," 3rd Edition, Hindi Academy, 2020
2. Vyas, S., "Spoken Hindi for Beginners," 1st Edition, Orient BlackSwan, 2018

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER II

U25LEG10	Chinese for Engineers - II (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

COURSE OBJECTIVES:

- To improve comprehension of real-life conversations in familiar everyday situations (shopping, dining, describing spaces, etc.)
- To develop fluency in expressing preferences, describing people, homes, and daily routines using basic sentence structures
- To build competence in writing short, structured texts such as messages, descriptions, and informal communications

COURSE OUTCOMES:

CO 1: Engage in simple conversations while shopping, dining, or asking for information using appropriate vocabulary and phrases — **Remember**

CO 2: Describe people, homes, weather, and daily routines using structured sentences with correct grammar — **Understand**

CO 3: Read and interpret simple texts such as product labels, menus, signs, and weather updates — **Understand**

CO 4: Write short messages or descriptions related to everyday topics like hobbies, weather, or family — **Understand**

CO 5: Apply core grammatical rules such as adjective endings, possessive pronouns, and prepositions of place with improved accuracy — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: WOULD YOU LIKE TO HAVE COFFEE OR TEA? — **6 + 3**

Learning transposed objects – Learning how to express "too", "also" with 也 – Learning how to express "excessively" with 太.....了 – Learning numerical system in Chinese – Learning how to express "more than" with 多

UNIT II: WHERE IS MY WALLET? — **6 + 3**

Learning 在 as a verb with a place word – Learning location of an action (S + 在 + 處所詞 (PW) + 動作 (V)) – Learning how to express suggestion with 吧 – Learning noun + directional word as a place word – Learning existential sentences with 有

UNIT III: LET'S PLAY TENNIS THIS WEEKEND! — **6 + 3**

Learning how to express acquired skills with 會 (know how to) – Learning complement marker 得– Learning 有(一)點(兒) as an adverb – Learning auxiliary verb 可以

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: HOW MUCH IS THIS? **6 + 3**

Learning new vocabulary for shopping – Learning measure words (個, 本, 張, 件) – Learning how to ask and answer about prices (多少錢).Using 塊, 毛, 分 for money – Practicing shopping dialogues

UNIT V: WHAT'S YOUR FAVORITE FOOD? **6 + 3**

Learning new vocabulary for food and drinks – Learning common verbs for eating and drinking (吃, 喝) – Expressing preferences with 喜歡 / 不喜歡 – Using 還是 to make choices – Role-play: ordering food in a restaurant

LIST OF EXPERIMENTS

1. Prepare a city map
2. Video: Talk about your daily routine
3. Describe your school (using past tense)
4. Presentation related to culture
5. Dialogue roleplay
6. Mock interview

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Mandarin Training Centre, National Taiwan Normal University, Modern Chinese I時代華語 I, Edited by Chih-Ping Chou, Taipei: Cheng Chung Book Company Ltd., 2019
2. Huayu101 / 華語101, Taiwan Ministry of Education, Taiwan Mandarin Educational Resources Centre, 2018

REFERENCES:

1. Cheng Chung Book Company Ltd, 時代華語 I 教師手冊 [Modern Chinese I Teacher's Manual, 2019
2. www.lmit.edu.tw/bag

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER II

U25MCC06	Universal Human Values II (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		2	1	0	0	3

PRE-REQUISITES:

- U25MCC01 - Universal Human Values I

COURSE OBJECTIVES:

- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature

COURSE OUTCOMES:

CO 1:	Evaluate the significance of value inputs in formal education and start applying them in their life and profession	**Understand**
CO 2:	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc	**Understand**
CO 3:	Analyze the value of harmonious relationship based on trust and respect in their life and profession	**Understand**
CO 4:	Examine the role of a human being in ensuring harmony in society and nature	**Understand**
CO 5:	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession	**Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	-

SYLLABUS:

UNIT I: INTRODUCTION-BASIC HUMAN ASPIRATION, ITS FULFILLMENT THROUGH ALL ENCOMPASSING RESOLUTION **6 + 3**

The basic human aspirations and their fulfillment through Right understanding and Resolution – Right understanding and Resolution as the activities of the Self-self being central to Human Existence – All encompassing Resolution for a Human Being – Its details and solution of problems in the light of Resolution

UNIT II: RIGHT UNDERSTANDING - KNOWER, KNOWN & THE PROCESS **6 + 3**

The domain of right understanding starting from understanding the human being and extending up to understanding nature/ existence – its interconnectedness and co-existence – and finally understanding the role of human being in existence (human conduct)

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: UNDERSTANDING HUMAN BEING **6 + 3**

Understanding the human being comprehensively as the first step and the core theme of this course – Human being as co-existence of the self and the body – The activities and potentialities of the self-basis for harmony/contradiction in the self

UNIT IV: UNDERSTANDING NATURE AND EXISTENCE **6 + 3**

A comprehensive understanding about the existence – Nature being included – The need and process of inner evolution – Particularly awakening to activities of the Self: Realization – Understanding and Contemplation in the Self

UNIT V: UNDERSTANDING HUMAN CONDUCT, ALL-ENCOMPASSING RESOLUTION & HOLISTIC WAY OF LIVING 6 + 3

Understanding Human Conduct – Different aspects of all encompassing Resolution – Holistic way of living for Human Being with all encompassing resolution covering all four dimensions of human endeavor viz., realization, thought, behavior and work leading to harmony at all levels from Self to Nature and entire Existence

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** 15 Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

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

REFERENCES:

1. E G Seebauer & Robert L. Berry, Fundamentals of Ethics for Scientists &Engineers, Oxford University Press, 2000
2. M Govindrajran, S Natrajan& V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd
3. B P Banerjee, Foundations of Ethics and Management, Excel Books, 2005
4. B L Bajpai, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER II

U25MCC07	Tamils and Technology (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		1	0	0	0	1

COURSE 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

COURSE OUTCOMES:

CO 1:	Understand the weaving and ceramic technology of ancient Tamil people nature	**Understand**
CO 2:	Understand the construction technology, building materials in Sangam period and case studies	**Understand**
CO 3:	Infer the metal process, coin and beads manufacturing with relevant archeological evidence	**Understand**
CO 4:	Realize the agriculture methods, irrigation technology and pearl diving	**Understand**
CO 5:	Apply the knowledge of scientific Tamil and Tamil computing	**Understand**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 2	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 3	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 4	-	-	-	-	-	-	3	3	-	2	-	-	-
CO 5	-	-	-	-	-	-	3	3	-	2	-	-	-

SYLLABUS:

UNIT I: WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries

UNIT II: DESIGN AND CONSTRUCTION TECHNOLOGY 3

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) – Thirumalai Nayakar Mahal – Chetti Nadu Houses, Indo-Saracenic architecture at Madras during British Period

UNIT III: MANUFACTURING TECHNOLOGY 3

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

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea – Fisheries – Pearl – Conche diving – Ancient Knowledge of Ocean – Knowledge Specific Society

UNIT V: SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil – The role of journals in the development of scientific Tamil – Scientific Tamil vocabulary – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project

CONTACT PERIODS:

Lecture: 15 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 15 Periods

TEXTBOOKS:

1. Tamils and Technology, K. Jayanthi Ravikrishna, Sri Krishna publications, Mahalakshmi Nagar, Velappanchavadi, Chennai – 600 007, First Edition 2023
2. Tamils and Technology, S. Priyadharshini, V. K. Publications, 55, Gopuram Colony, Sivakasi – 626 124

REFERENCES:

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை, International Institute of Tamil Studies, C.P.T Campus, Chennai
2. கணினித் தமிழ் - முனைவர். இல. சுந்தரம், விகடன் பிரசுரம், அண்ணா சாலை, சென்னை, திசம்பர் 2016
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம், தொல்லியல் துறை வெளியீடு, தமிழ்நாடு அரசு, சென்னை, ஆறாம் பதிப்பு 2020
4. The Contributions of the Tamils to Indian Culture, Dr. M. Valarmathi, International Institute of Tamil Studies, C.I.T Campus, Tharamani, Chennai, First Edition 1995
5. Studies in the History of India with Special Reference to Tamil Nadu, Dr. K. K. Pillay, 1979

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER III

U25MA302	Probability and Statistics (Common to BM, CE, CH, EC, EE, ME, MI)	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- U25MA101 - Calculus and Differential Equations / U25RMA101 - Multivariable Calculus and Applications

COURSE OBJECTIVES:

- To introduce the fundamental concepts of probability and statistics relevant to engineering
- To facilitate with students, use their understanding of statistical methods for data analysis and inference in their areas of study
- To develop probabilistic models to handle uncertainty and charts to check for quality control in engineering systems

COURSE OUTCOMES:

CO 1: Explain the fundamental concepts of probability and examine discrete probability distributions — **Understand**

CO 2: Apply suitable continuous distributions, such as uniform, exponential and normal to interpret and analyse statistical data — **Apply**

CO 3: Calculate and evaluate covariance and correlation to examine the relationship between two random variables using pairs of random variables — **Apply**

CO 4: Determine the estimation theory of parameters, testing of hypotheses for means and apply the Chi-square test for attribute independence — **Apply**

CO 5: Perform analysis of variances to compare the means of multiple samples and apply control charts to check for quality control — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	1	-	-	-	-	-	-	-	-
CO 2	3	2	-	-	2	-	-	-	-	-	-	-	-
CO 3	3	2	-	-	2	-	-	-	-	-	-	-	-
CO 4	3	2	-	-	2	-	-	-	-	-	-	-	-
CO 5	3	2	-	-	2	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: ONE-DIMENSIONAL DISCRETE RANDOM VARIABLES — **6 + 6**

Probability – Conditional probability, independence – Baye's theorem – Discrete random variables, probability mass functions – Cumulative distribution functions – Mean and variance – Binomial, Poisson and geometric distributions

UNIT II: ONE-DIMENSIONAL CONTINUOUS RANDOM VARIABLES — **6 + 6**

Continuous random variables – Probability density functions – Cumulative distribution functions – Mean and variance – Uniform, exponential, normal distributions

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: TWO-DIMENSIONAL PROBABILITY DISTRIBUTIONS **6 + 6**

Two dimensional discrete and continuous random variables – Marginal probability distributions – Independence – Covariance – Correlation

UNIT IV: INFERENTIAL STATISTICS **6 + 6**

Estimation - Point estimation – Interval estimation – Hypothesis testing – Hypotheses concerning means – Large, small samples - Chi square test for independence of attributes

UNIT V: ANOVA AND STATISTICAL QUALITY CONTROL **6 + 6**

Analysis of variance – Completely randomized designs – Randomized block designs – Control charts for measurements ($\bar{X}$, R charts) – Control charts for attributes (p, np)

LIST OF EXPERIMENTS

1. One-Dimensional Discrete Random Variables – Mean and Variance of discrete RVs. – Discrete Probability distributions
2. One-Dimensional Continuous Random Variables – Mean and Variance of Continuous RVs. – Continuous Probability distributions
3. Two- Dimensional Probability Distributions – Marginal Probability distributions – Covariance and Correlation
4. Inferential Statistics – Estimation theory – Testing of hypotheses
5. ANOVA and SQC – Analysis of Variance. – Control charts ($\bar{X}$, R, p, np)

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. Douglas C. Montgomery and George C. Runger, "Applied Statistics and Probability for Engineers", Wiley, 2018
2. Richard A. Johnson, "Miller & Freund's Probability and Statistics for Engineers", Pearson Education, New Delhi, 2017

REFERENCES:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, "Probability & Statistics for Engineers & Scientists, Pearson Education, New Delhi, 2016
2. Jay L. Devore, "Probability and Statistics for Engineering and the Sciences", Cengage Learning, NewDelhi 2020
3. Sheldon M Ross, "Introduction to Probability and Statistics for Engineers and Scientists", Academic press, USA, 2020
4. Robert V. Hogg, Elliot Tanis and Dale Zimmerman, "Probability and Statistical Inference", Pearson Education, USA, 2014

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER III

U25EC301	Signals and Systems	Category: PCC				
		L	T	P	J	C
		3	0	0	0	3

COURSE OBJECTIVES:

- To understand the basic properties of signals and systems
- To apply various transforms to continuous time and discrete time signals
- To apply Laplace transform to LTI continuous time systems and Z transform to LTI discrete time systems

COURSE OUTCOMES:

CO 1: Classify continuous-time and discrete-time signals and systems based on their fundamental properties **Understand**

CO 2: Compute Fourier series, Fourier and Laplace transforms of continuous time signals **Apply**

CO 3: Analyze linear time-invariant continuous-time systems using convolution and Laplace transform to obtain system responses **Analyze**

CO 4: Determine Fourier transform and Z-transform of discrete time signals **Apply**

CO 5: Examine linear time-invariant discrete-time systems using convolution and Z-transform to determine system responses **Analyze**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	1	-	-
CO 2	3	2	1	-	-	-	-	-	-	-	1	-	-
CO 3	3	3	2	-	-	-	-	-	-	-	1	-	-
CO 4	3	2	1	-	-	-	-	-	-	-	1	-	-
CO 5	3	3	2	-	-	-	-	-	-	-	1	-	-

SYLLABUS:

UNIT I: CLASSIFICATION OF SIGNALS AND SYSTEMS 9

Introduction – Standard signals – Operations on signal – Classification of continuous time (CT) and discrete time (DT) signals – Periodic and aperiodic signal, odd and even signal, energy and power signal, deterministic and random signal, causal and non-casual signal – Classification of CT and DT systems – Linear and non-linear, static and dynamic, time variant and time invariant, causal and non-causal, stable and unstable

UNIT II: REPRESENTATION OF CONTINUOUS TIME SIGNALS 9

Fourier series representation – Trigonometric Fourier series – Exponential Fourier Series- Continuous time Fourier transform (CTFT) – Properties – Inverse continuous time Fourier transform – Laplace transform – properties – Inverse Laplace transform

UNIT III: LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS 9

Introduction to LTI-CT system – Convolution integral – Properties – CT system analysis using Laplace transform – Impulse and step response – Interconnection of CT systems

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: REPRESENTATION OF DISCRETE TIME SIGNALS 9

Baseband signal sampling – Applications – Discrete time Fourier transform (DTFT) – Properties – Frequency response – Z transform – Properties – Inverse Z transform

UNIT V: LINEAR TIME INVARIANT DISCRETE TIME SYSTEMS 9

Introduction to LTI-DT system – Pole-zero plot – Stability – Convolution sum – Properties – DT system analysis using Z transform – Impulse and step response – Interconnection of DT systems

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", 2nd edition, Pearson, 2015
2. Simon Haykin, Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley, 2002
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007

REFERENCES:

1. Michael J. Roberts, "Fundamentals of Signals and Systems", 2nd edition, Tata McGraw Hill, 2018
2. R.E. Zeimer, W.H. Tranter and R.D. Fannin, "Signals and Systems – Continuous and Discrete", 4th edition, Pearson, 2014
3. H P Hsu, "Signals and Systems", 3rd edition, Tata McGraw Hill, 2014
4. B.P. Lathi,"Principles of Linear Systems and Signals", 2nd edition, Oxford, 2009

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

KPR Institute of Engineering and Technology
Centre for Academic Courses
Coimbatore

SEMESTER III

		Category: PCC				
U25EC302	Analog Electronics	L	T	P	J	C
		3	0	0	0	3

PRE-REQUISITES:

- U25EC202 - Electronic Devices and Circuits / U25RECG02 - Electronic Devices and Circuits

COURSE OBJECTIVES:

- To learn the fundamentals of multistage amplifiers
- To understand the operation of tuned and power amplifiers
- To study the effects of feedback concept

COURSE OUTCOMES:

CO 1:	Design high gain amplifiers using the concepts of differential and multistage amplifiers	**Apply**
CO 2:	Implement PMOS and NMOS current mirror circuits to generate stable bias currents	**Apply**
CO 3:	Explain the fundamentals of tuned amplifiers and power amplifiers	**Understand**
CO 4:	Apply negative feedback techniques to improve the performance of an amplifier	**Apply**
CO 5:	Analyze the performance of various sinusoidal and non-sinusoidal oscillators	**Analyze**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	-	-	-	-	-	-	-	1	1	-
CO 2	3	2	1	-	-	-	-	-	-	-	1	1	-
CO 3	2	1	-	-	-	-	-	-	-	-	1	1	-
CO 4	3	2	1	-	-	-	-	-	-	-	1	1	-
CO 5	3	3	2	-	-	-	-	-	-	-	1	1	-

SYLLABUS:

UNIT I: HIGH GAIN BJT AMPLIFIERS 9

Differential amplifier – DC transfer characteristics and CMRR – Darlington amplifier – Bootstrap technique – Small signal analysis of cascade and cascode configurations – Multistage frequency effect

UNIT II: MOSFET AMPLIFIERS 9

Low frequency and High frequency analysis of MOSFET amplifier – Current mirror – Current sources – PMOS and NMOS current sources, Cascode current source, Wilson current source – Amplifiers with resistive load, active load and depletion load

UNIT III: TUNED AMPLIFIERS AND POWER AMPLIFIERS 9

Single tuned capacitive coupled amplifier, quality factor of a tank circuit, gain and bandwidth – Stagger tuned amplifier – Power amplifiers – classification – Class A power amplifier – Class B power amplifier – Push pull and complementary symmetry configuration – Class AB power amplifier

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Avasur, Coimbatore - 641 407.

UNIT IV: FEEDBACK AMPLIFIERS 9

General feedback structure – Effects of negative feedback – Feedback topologies – Feedback amplifier types and analysis – Voltage-series, voltage-shunt, current-series and current-shunt

UNIT V: OSCILLATORS 9

Classification of oscillator, Barkhausen criterion – General form of an oscillator, Analysis of LC oscillators – Hartley, Colpitts – Crystal oscillator – Multivibrators – Astable multivibrator – Monostable multivibrator – Bistable multivibrators – UJT relaxation oscillator

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Jacob Millman, Christos C Halkias and Satyabrata Jit, "Electronic Devices and Circuits", 4th edition, McGraw Hill Education India, 2015
2. Donald A Neamen, "Electronic Circuits Analysis and Design", 4th edition, McGraw Hill Education India, 2014

REFERENCES:

1. Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits Theory and Applications", 7th edition, Oxford University Press India, 2018
2. David A. Bell, "Electronic Devices and Circuits", 5th edition, Oxford University Press India, 2014
3. Dr.R.S.Sedha, " A Textbook of Applied Electronics", Revised Edition, S.Chand Publishing, 2018
4. Robert L. Boylestad and Louis Nasheresky, "Electronic Devices and Circuit Theory", 10th edition, Pearson Education / PHI, 2008
5. A. Anand Kumar, "Pulse and Digital Circuits", 2nd Edition, PHI Learning, 2008

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER III

		Category: PCC				
U25ECG02	Digital System Design (Common to BM, EC)	L	T	P	J	C
		3	0	0	0	3

COURSE OBJECTIVES:

- To understand the fundamentals of digital logic circuits
- To design the combinational logic circuits
- To design the synchronous and asynchronous sequential circuits

COURSE OUTCOMES:

CO 1:	Solve Boolean expressions and realize using universal gates	Apply
CO 2:	Design combinational circuits and implement using logic gates	Apply
CO 3:	Develop synchronous sequential circuits using flip-flops	Apply
CO 4:	Design hazard-free asynchronous sequential circuits	Apply
CO 5:	Implement logic functions using programmable memory devices	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	-	-	-	-	-	-	-	1	1	-
CO 2	3	2	1	-	-	-	-	-	-	-	1	1	-
CO 3	3	2	1	-	-	-	-	-	-	-	1	1	-
CO 4	3	2	1	-	-	-	-	-	-	-	1	1	-
CO 5	3	2	1	-	-	-	-	-	-	-	1	1	-

SYLLABUS:

UNIT I: BOOLEAN THEOREMS AND LOGIC REDUCTION 9

Number system – Complements – Boolean theorems – Codes – Logic gates – NAND and NOR realization– Representation of boolean expression – SOP, POS, canonical form – Simplification of logic functions using K-map, Quine McCluskey method

UNIT II: COMBINATIONAL LOGIC DESIGN 9

Adder-1 Bit adder/subtractor, parallel adder, 2's complement adder/subtractor – Implementation of combinational circuits – Multiplexers,demultiplexers, decoders, encoders – Code converters - Magnitude Comparator – Parity generator and checker

UNIT III: SYNCHRONOUS SEQUENTIAL CIRCUITS 9

Latches and flip-flops – Conversion of flip-flops – Analysis and design of clocked sequential circuits counters – UP/DOWN/ MOD Counter – Shift-registers – Ring and Johnson counter – Finite State Machines design – Mealy and Moore machine – Sequence detector design

UNIT IV: ASYNCHRONOUS SEQUENTIAL CIRCUITS 9

Analysis and design of Asynchronous circuit design – Fundamental mode and Pulse mode – Race Conditions – Hazards in Asynchronous Circuits – Hazard-free logic design

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT V: LOGIC FAMILIES AND MEMORY DEVICES 9

Overview of Logic Families – Propagation Delay, Fan-in, Fan-out, Noise Margin – Programmable Logic Devices – Realization of logic functions using PROM, PLA, PAL

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. M.Morris Mano, Michael D Ciletti, "Digital Design", 6th edition, Pearson, 2018
2. Charles H. Roth, Jr, Larry L. Kinney" Fundamentals of logic design",7th edition, Kluwer Academic Publishers,2014

REFERENCES:

1. Thomas L.Floyd, "Digital Fundamentals", 11th edition, Prentice Hall, 2015
2. S. Salivahanan and S. Arivazhagan, "Digital Circuits and Design", 5th Edition, Oxford University Press, India, 2018
3. Ronald J Tocci, Neal S Widmer, Gregory L Moss, "Digital Systems Principles and Applications", 10th edition, Pearson, 2009
4. D. Donald Givone, "Digital Principles and Design", 4th edition, Tata McGraw Hill, 2008

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER III

U25EC303	Linear Integrated Circuits	Category: PCC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- U25EC202 - Electronic Devices and Circuits

COURSE OBJECTIVES:

- To study the characteristics of operational amplifier
- To learn different applications of op-amp and timers
- To understand the operation of A/D and D/A converters

COURSE OUTCOMES:

CO 1: Explain the DC and AC characteristics of operational amplifier — **Understand**

CO 2: Implement operational amplifier circuits to perform amplification, signal conditioning, and filtering applications — **Apply**

CO 3: Design waveform generators and voltage regulator — **Apply**

CO 4: Construct IC 555 timer based circuits to generate pulse signals and pulse width modulation — **Apply**

CO 5: Examine the performance of different ADC and DAC conversion techniques — **Analyze**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	2	2	-	1	1	-
CO 2	3	2	1	-	-	-	-	2	2	-	1	1	-
CO 3	3	2	1	-	-	-	-	2	2	-	1	1	-
CO 4	3	2	1	-	-	-	-	2	2	-	1	1	-
CO 5	3	3	2	-	-	-	-	2	2	-	1	1	-

SYLLABUS:

UNIT I: OPERATIONAL AMPLIFIER CHARACTERISTICS — **6 + 6**

Introduction to op-amp – Op-amp internal circuit – DC characteristics – AC characteristics – Frequency compensation

UNIT II: OPERATIONAL AMPLIFIER APPLICATIONS — **6 + 6**

Inverting and non-inverting amplifier – Adder – Subtractor – Instrumentation amplifier – Integrator – Differentiator – Active filter – LPF and HPF

UNIT III: WAVEFORM GENERATORS AND VOLTAGE REGULATORS — **6 + 6**

Comparator – Triangular wave generator – Sine wave oscillators – RC phase shift oscillator – Wein bridge oscillator – IC voltage regulator – Fixed voltage series regulator – Functional diagram of IC 723

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: TIMER AND PHASE LOCKED LOOP 6 + 6

IC 555 timer – Astable and monostable operation – IC 555 timer Application – Pulse width modulation – Basic principles of PLL – Voltage Controlled Oscillator – PLL applications – Frequency multiplier

UNIT V: D/A AND A/D CONVERTERS 6 + 6

DAC and ADC specifications – D/A conversion techniques – Weighted resistor, R-2R ladder – A/D conversion techniques – Flash, successive approximation, dual slope converters

LIST OF EXPERIMENTS

1. Design and construct inverting and non-inverting amplifiers using op-amp
2. Design and construct integrator using op-amp
3. Design and construct differentiator using op-amp
4. Design and construct active low-pass filter using op-amp
5. Design and construct active high-pass filter using op-amp
6. Generate a sinusoidal waveform generator using op-amp
7. Design and implement voltage regulator using IC 723/78XX
8. Design and implement multivibrator using IC 555 Timer
9. Construct the D/A converter using op-amp

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. D.Roy Choudhry, 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, PHI, 2015

REFERENCES:

1. S.Salivahanan, V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", 4th reprint, Tata Mc Graw-Hill, 2018
2. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", 4th edi-tion, Tata Mc Graw-Hill, 2016
3. Gray and Meyer, "Analysis and Design of Analog Integrated Circuits", 5th edition, Wiley Inter-national, 2012
4. Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits", 6th edition, PHI, 2009

Head of the Department
Electronics & Communication Engg
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

Institute of Engineering and Technology
Centre for Academic Courses
K.P.R. Coimbatore

SEMESTER III

		Category: PCC				
U25ADG02	Data Structures and Algorithms (Common to AD, BM, EC, EE, MI)	L	T	P	J	C
		3	0	2	0	4

QP PATTERN: A

COURSE OBJECTIVES:

- To understand the fundamental concepts of ADT and data structure types
- To learn linear and non linear data structures
- To explore tree and graph data structures

COURSE OUTCOMES:

CO 1:	Implement linear data structures such as lists, stacks and queues using array-based and linked-list-based techniques	**Apply**
CO 2:	Use searching and sorting techniques to solve real-time data organization problems	**Apply**
CO 3:	Construct tree-based data structures including binary trees, binary search trees and AVL trees to perform efficient data representation, traversal and manipulation	**Apply**
CO 4:	Use graph representations and graph algorithms to solve problems involving traversal, shortest paths, topological ordering and minimum spanning trees	**Apply**
CO 5:	Examine the efficiency of algorithms by determining and comparing their time and space complexity	**Analyze**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	1	-	-	-	-	-	-	-	-
CO 2	3	2	1	1	1	-	-	-	-	-	-	-	-
CO 3	3	2	1	1	1	-	-	-	-	-	-	-	-
CO 4	3	2	1	1	1	-	-	-	-	-	-	-	-
CO 5	3	3	2	2	-	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: LINEAR DATA STRUCTURES – LIST, STACKS, QUEUES **9 + 6**

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list-based implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of linked list: Polynomial ADT, Radix sort, Multilist. Stack ADT – Operations – Applications – Symbol balancing - Evaluating arithmetic expressions – Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – DeQueue – Applications of queues

UNIT II: SEARCHING, SORTING AND HASHING TECHNIQUES **9 + 6**

Searching: Linear Search—Binary Search. Sorting: Bubble sort-Insertion sort-Selection sort- Merge sort - Quick sort. Hashing – Hash Functions – Separate Chaining – Open Addressing –Rehashing – Extendible Hashing

UNIT III: NON-LINEAR DATA STRUCTURES – TREES **9 + 6**

Tree ADT – Tree traversals – Binary Tree ADT – Expression trees – Binary search tree ADT –AVL Trees

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: NON-LINEAR DATA STRUCTURES - GRAPHS **9 + 6**

Introduction to Graph – Types of graph-Representation of graphs – Graph traversal: Breadth-first traversal – Depth-first traversal – Topological ordering –Dijkstra's algorithm- Minimum spanning tree algorithms – Prims algorithm - Kruskal's Algorithm

UNIT V: ALGORITHM ANALYSIS **9 + 6**

Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non recursive algorithms.

LIST OF EXPERIMENTS

1. A small library stores the list of newly arrived books in an array-based structure. The librarian wants to maintain the order of arrival. Given the arrival sequence: "AI Basics", "Data Science", "Python 101", "Algorithms", "Machine Learning", Insert them into an array-based List ADT. A book "Cyber Security" arrives and must be inserted at position 3. Later, "Python 101" is removed as it's damaged. Design the array-based List ADT operations to update the list and display the final order.
2. A hospital needs to maintain a waiting list of patients dynamically as patients arrive and get treated. Insert patients: John, Priya, Abdul, Meera in order. A senior citizen "Ravi" should be added after Priya. "Abdul" leaves before consultation. Using Linked List ADT, show how the list changes after each operation.
3. An airport check-in counter processes passengers using a circular queue system. Passengers arriving in order: P1, P2, P3, P4, P5. The queue size is 4 due to staff shortage. • Enqueue all passengers in order and show how overflow occurs. Two passengers are processed (dequeued). P6 and P7 arrive. Simulate these operations using array-based circular queue and show rear/front updates.
4. A bank uses a linked-list–based queue for serving customers. Customers: A, B, C arrive. Then D arrives. B and C are served. Implement the queue operations and show the dynamic linked list changes.
5. A sports event records running times of participants. The unsorted times are 15.2, 12.8, 20.5, 11.6, 19.3. The coach wants to sort the times to shortlist top performers. Apply Bubble Sort and Insertion Sort separately to sort the timings. Show the status of the list after each pass for both algorithms.
6. An online store wants to quickly sort product prices for discount analysis. Prices are 499, 199, 999, 350, 150, 750. Use Quick Sort (first element as pivot) and show partition steps. Use Merge Sort and show the splitting and merging stages.
7. A college stores roll numbers of students in a system. For a particular exam, the roll numbers are sorted [101, 115, 130, 145, 152, 170, 185]. • Apply Binary Search and show mid calculations for each iteration. Compare it with how Linear Search would behave for the same case. A teacher wants to find whether roll number 152 is present.
8. A company stores employee IDs in a hash table of size 10. Employee IDs: [1001, 1123, 1198, 1455, 1677]. Apply open addressing and closed addressing hashing techniques and show the optimal one.
9. A university stores student scores in a BST for quick rank retrieval. Scores: [75, 60, 90, 45, 65, 85, 95]. Construct the BST. Apply inorder, preorder, and postorder traversal. Later, student scores 45, 65 and 75need removal due to correction. Show the tree after each deletion and state the rule used.
10. A delivery company wants to find the fastest delivery route between warehouses in a city. Given a weighted graph (distances between warehouses): A → B : 4 A → C : 2 B → D : 5 C → B : 1 C → D : 8 D → E : 6 Apply Dijkstra's algorithm starting from A and determine: Shortest path from A to all other warehouses. Distance table update for each step.
11. A telecom company wants to lay cables between cities at minimum cost. The network between cities is modeled as a weighted graph. Apply Prim's algorithm to find the Minimum Spanning Tree and list the edges selected at each step, growing MST, total cost.
12. A power grid network wants to connect electricity stations with minimal wiring cost. The weighted edges between stations are provided. Apply Kruskal's algorithm by sorting edges by weight.

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 75 Periods

TEXTBOOKS:

1. Reema Thareja, "Data Structures and Algorithms", 1st edition, Oxford University Press, 2025
2. Ellis Horowitz, Sartaj Sahni,Susan Anderson Freed, "Fundamentals of Data Structures in C", 2nd Edition, Techno Series, 2024

REFERENCES:

1. R. Venkatesan, S. Lovelyn Rose, "Data Structures", 2nd Edition, Wiley, 2019
2. Seymour Lipschutz, "Data Structures", 2nd Edition, McGraw Hill Education, 2017
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D.Ullman, "The Design and Analysis of Computer Algorithms", 1 st Edition, Pearson Education Asia, 2013

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER III

U25EC304	Analog Electronics Laboratory	Category: PCC				
		L	T	P	J	C
		0	0	2	2	2

PRE-REQUISITES:

- U25EC202 - Electronic Devices and Circuits

COURSE OBJECTIVES:

- To design and analyze BJT and MOSFET amplifier circuits
- To analyze and apply feedback amplifier circuits
- To design oscillator, multivibrator, and current mirror circuits

COURSE OUTCOMES:

CO 1: Apply fundamental concepts of semiconductor devices and analog circuit theory to analyze and design amplifier and oscillator circuits — **Apply**

CO 2: Build analog amplifier and oscillator circuits to meet specified performance requirements — **Apply**

CO 3: Examine the system performance against theoretical values using experimental or simulation methods — **Analyze**

CO 4: Demonstrate individual competency or effective teamwork in designing and implementing the experimental results — **Apply**

CO 5: Apply ethical standards and present experimental results effectively — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	-	-	-	-	-	-	1	1	-
CO 2	3	2	1	1	-	-	-	-	-	-	1	1	-
CO 3	3	3	2	2	2	-	-	2	2	-	1	1	-
CO 4	-	-	-	-	-	-	-	2	-	-	1	1	-
CO 5	-	-	-	-	-	-	2	2	2	-	1	1	-

LIST OF PROJECTS

1. Develop and evaluate Common Emitter amplifier configurations to analyze gain, bandwidth, impedance, and distortion characteristics using SPICE for the given specifications
2. Design and implement Low Pass, High Pass, and Band Pass filters for the given specifications to verify frequency response, gain, roll-off, and attenuation characteristics
3. Construct and evaluate a differential amplifier to measure differential gain and common-mode rejection performance
4. Design and construct a CMOS Common-Source Amplifier using discrete MOSFETs for the given specifications to investigate mid-band gain, bandwidth, and bias stability
5. Implement and evaluate a tuned amplifier to examine resonance behavior, selectivity, and frequency response characteristics
6. Develop and implement open-loop and closed-loop amplifier configurations to demonstrate gain stabilization and bandwidth improvement

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

7. Construct and implement a Hartley oscillator for the given specifications to examine frequency stability and sustained sinusoidal oscillations
8. Develop and construct a Colpitts oscillator to analyze oscillation conditions and frequency stability
9. Design and develop a multistage amplifier for the given specifications to assess overall gain, bandwidth, and gain-bandwidth trade-offs
10. Implement and evaluate an astable multivibrator to verify square-wave generation and timing accuracy
11. Design and evaluate an audio amplifier for the given specifications to ensure faithful signal reproduction across the audio band

CONTACT PERIODS:

Lecture: - Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** 30 Periods **Total:** 60 Periods

REFERENCES:

1. Jacob Millman, Christos C Halkias and Satyabrata Jit, "Electronic Devices and Circuits", 4th edition, McGraw Hill Education India, 2015

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER III

U25ECG03	Digital System Design Laboratory (Common to BM, EC)	Category: PCC				
		L	T	P	J	C
		0	0	2	0	1

COURSE OBJECTIVES:

- To familiarize students with the fundamental concepts of digital logic, combinational circuits, and sequential circuits
- To enable students to design and implement combinational and sequential digital circuits using fundamental logic gates and digital design principles
- To provide hands-on experience in applying digital design techniques to real-time case studies and practical system implementations

COURSE OUTCOMES:

CO 1:	Apply the fundamental concepts of digital logic to construct and verify basic logic circuits	Apply
CO 2:	Analyze the design requirements and implement combinational and sequential circuits	Analyze
CO 3:	Examine the behavior of digital circuits through implementation and verification	Analyze
CO 4:	Demonstrate individual competency or effective teamwork in designing and implementing the experimental results	Apply
CO 5:	Apply ethical standards and present experimental results effectively	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	-	-	-	-	-	-	1	1	-
CO 2	3	3	2	2	-	-	-	-	-	-	1	1	-
CO 3	3	3	2	2	-	-	-	2	2	-	1	1	-
CO 4	-	-	-	-	-	-	-	2	-	-	1	1	-
CO 5	-	-	-	-	-	-	2	2	2	-	1	1	-

LIST OF EXPERIMENTS

1. Verify the logical functions of gates
2. Implementation of combinational logic design using MUX IC's
3. Design and implementation of various data path elements (Adder/Subtractor)
4. Design a circuit to convert one code into another using basic logic gates
5. Design and implement a 4-bit even parity generator and checker
6. Verify the logical functions of flip-flop
7. Design and implementation of synchronous sequential circuit (Counters/ Shift registers)
8. Design and implementation of asynchronous mod counters
9. Design a Mealy/Moore sequence detector for detecting the given sequence

CONTACT PERIODS:

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

REFERENCES:

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

1. M.Morris Mano, Michael D Ciletti, "Digital Design", 6th edition, Pearson, 2018

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER III

U25MNC02	Essence of Indian Traditional Knowledge (Common to all programmes)	Category: MNC				
		L	T	P	J	C
		1	0	0	0	0

COURSE OBJECTIVES:

- Understand the Concept of culture in ancient, medieval and modern period.
- Know the need and importance of Indian languages and Literature.
- Understand the various religion and philosophy in various periods.

COURSE OUTCOMES:

CO 1:	Understand Philosophy of Indian culture	Understand
CO 2:	Distinguish the Indian languages and literature.	Understand
CO 3:	Learn the philosophy of ancient, medieval and modern Indian	Remember
CO 4:	Acquire the information about the fine arts in India	Apply
CO 5:	Know the contribution of scientists different eras	Understand

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	2	-	1	-	-	3	-	-	-	-	-	-
CO 2	-	2	-	1	-	-	3	-	-	-	-	-	-
CO 3	-	2	-	1	-	-	3	-	-	-	-	-	-
CO 4	-	2	-	-	-	-	-	-	-	-	-	-	-
CO 5	-	2	-	1	-	-	3	-	-	-	-	-	-

SYLLABUS:

UNIT I: INTRODUCTION TO CULTURE 5

Culture, Civilization, Culture and heritage, General characteristics of culture, Importance of culture inhuman literature, Indian culture, Ancient India, Medieval India, Modern India

UNIT II: INDIAN LANGUAGES AND LITERATURE 5

Indian Languages and Literature-I: The role of Sanskrit, Significance of scriptures to current society, Indian philosophies, other Sanskrit literature, Literature of south India Indian Languages and Literature-II: Northern Indian Languages & literature, Temples and Temple types, Sculptors 's specialties, Temples Individualities Festivals and hopes

UNIT III: RELIGION AND PHILOSOPHY 5

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

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407

UNIT IV: ARTS, SCIENCE, TECHNOLOGY& ENGINEERING IN INDIA 5

Indian painting, Handicrafts, Music, Divisions of Indian classical music, Modern Indian music, Dance and drama, Indian architecture (ancient, medieval and modern), Science and technology in India, Development of science in different periods, Sushruta and Charaka, sages of South India, herbal treatments, Surgery methods of healers, Yoga and pranayama practices, Herbal usages and medication-making methods.

UNIT V: EDUCATION SYSTEM IN INDIA 5

Education in ancient, Medieval and modern India, Aims of education, subjects, languages, science and scientists of Ancient India, Medieval India and Modern India

CONTACT PERIODS:

Lecture: 25 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 25 Periods

TEXTBOOKS:

1. Kapil Kapoor, "Text and Interpretation: The India Tradition", ISBN: 81246033375, 2005.
2. "Science in Samskrit", Samskrita Bharti Publisher, ISBN: 978-8187276333, 2007.

REFERENCES:

1. Satya Prakash, "Founders of Sciences in Ancient India", Vijay Kumar Publisher, 1989.
2. M. Hiriyanna, "Essentials of Indian Philosophy", Motilal Banarsidass Publishers, ISBN: 9788120810990, 2014.
3. S. Narain, "Examinations in Ancient India", Arya Book Depot, 1993.
4. NCERT, "Position Paper on Arts, Music, Dance and Theatre", 2000.
5. B. Kumar Mohanta & Vipin Kumar Singh, "Traditional Knowledge System and Technology in India", 2012.

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER III

U25MCC08	Professional Skill Development - I (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		15 hours				1

COURSE OUTCOMES:

CO 1: Demonstrate technical skill competency through attainment of industry-relevant certifications, participation in competitions, internships, and project-based learning activities — **Apply**

CO 2: Apply research, innovation, and problem-solving skills to develop impactful solutions through projects, publications, patents, and higher education preparation — **Apply**

CO 3: Exhibit leadership, ethical responsibility, community engagement, and professional digital presence to enhance career readiness and lifelong learning — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	2	-	3	1	-	-	2	2	-	-	-
CO 2	2	2	3	3	2	2	-	-	1	1	-	-	-
CO 3	-	-	3	-	-	2	2	3	3	3	2	-	-

GUIDLINES:

- Certifications and Skill Credentials - Free awareness certs, NPTEL/Coursera, Associate-level, Professional-level, Expert-level
- Competitions, Hackathons, and Technical Challenges - Online, institution, state, national, international competitions and hackathons, Kaggle medals
- GATE Preparation and Performance - Study plan, mock tests, registration, appearing, score percentile
- Academic, Industry, and Innovation Projects - Mini-projects, intermediate projects, industry-grade deployed projects, funded or published projects
- Internships and Industrial Training - Virtual, on-site short, core role, CoE on-campus, PPO, PPO converted to offer
- Research Publications, Patents, Intellectual Property - Reading journals, survey papers, conference papers, Scopus/WoS, Q1/Q2 journals, patents from provisional to granted
- Leadership, Community, Digital Presence - Club membership, event roles, office bearer, president, outreach, LinkedIn, GitHub, portfolio, Google Scholar

CONTACT PERIODS:

Lecture: - Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 0 Periods

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

KPR Institute of Engineering and Technology
Centre for Academic Courses
Coimbatore

SEMESTER IV

		Category: PCC				
U25EC401	Analog and Digital Communication	L	T	P	J	C
		3	0	0	0	3

QP PATTERN: A

PRE-REQUISITES:

- U25EC202 - Electronic Devices and Circuits / U25RECG02 - Electronic Devices and Circuits

COURSE OBJECTIVES:

- To understand the fundamentals of analog modulation systems
- To learn information theory concepts and digital modulation techniques
- To apply error control coding for reliable communication

COURSE OUTCOMES:

CO 1: Explain the concept of amplitude modulation schemes, power relations and the noise performance of DSB-SC — **Understand**

CO 2: Illustrate the principle of angle modulation schemes and the noise performance in FM system — **Understand**

CO 3: Analyze various source encoding techniques, waveform coding methods, effects of ISI and its remedial measures in baseband transmission — **Analyze**

CO 4: Compare the performance of various digital modulation schemes — **Analyze**

CO 5: Apply suitable error control coding technique for error detection and correction — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	1	-	2
CO 2	2	1	-	-	-	-	-	-	-	-	1	-	2
CO 3	3	3	2	-	-	-	-	-	-	-	1	-	2
CO 4	2	1	-	-	-	-	-	-	-	-	1	-	2
CO 5	3	2	1	-	-	-	-	-	-	-	1	-	2

SYLLABUS:

UNIT I: AMPLITUDE MODULATION — 9

Elements of communication system – Need for modulation – Classification of amplitude modulation – Time and frequency representations, power relations – Generation and detection of DSB-SC – AM transmitter– Superheterodyne receiver – Noise performance in DSB-SC system

UNIT II: ANGLE MODULATION — 9

Time representation of frequency and phase modulations – Narrowband FM and wideband FM – Direct and Indirect methods of FM generation – FM Discriminator – FM transmitter and receiver – Noise performance in FM system – Pre-emphasis and de-emphasis

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: INFORMATION THEORY AND WAVEFORM CODING 9

Discrete memoryless source – Entropy – Source encoding techniques – Sampling and quantization – PCM – Delta modulation and adaptive delta modulation – Introduction to line coding techniques – Inter-symbol interference – Eye pattern – Correlation receiver – Matched filter

UNIT IV: DIGITAL MODULATION TECHNIQUES 9

Geometric representation of signals – Classification of digital modulation schemes – Generation, detection, PSD and BER of Coherent BPSK, BFSK , QPSK and QAM – Carrier synchronization

UNIT V: ERROR CONTROL CODING 9

Channel coding theorem – Linear block codes – Hamming codes – Cyclic codes – Convolutional codes – Viterbi decoding

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. B.P. Lathi and Zhi Ding, "Modern Digital and Analog Communication Systems", 5th Edition, Oxford University Press, 2022
2. Simon Haykin, "Communication Systems", 5th Edition, Wiley, 2021

REFERENCES:

1. John G. Proakis and Masoud Salehi, "Fundamentals of Communication Systems", 3rd Edition, Pearson Education, 2022
2. George Kennedy, Bernard Davis, and S. R. M. Prasanna, "Electronic Communication Systems", 5th Edition, McGraw Hill, 2020
3. Taub and Schilling, "Principles of Communication Systems", 5th Edition, McGraw Hill, 2021
4. B. Sklar, "Digital Communications: Fundamentals and Applications", 3rd Edition, Pearson Education, 2022

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER IV

U25EC402	Electromagnetic Fields and Transmission Lines	Category: PCC				
		L	T	P	J	C
		3	0	0	0	3

COURSE OBJECTIVES:

- To understand the fundamental concepts of electric and magnetic fields in free space and materials and their relationship through Maxwell's equations
- To study electromagnetic wave equations in different media and waveguides
- To analyze transmission line characteristics and solve impedance matching problems

COURSE OUTCOMES:

CO 1: Illustrate the basic theorems of static electric field and magnetic field — **Understand**

CO 2: Apply the boundary conditions of dielectric and magnetic materials under various time varying conditions for electromagnetic wave propagation — **Apply**

CO 3: Examine the wave behavior in rectangular and cylindrical waveguides — **Analyze**

CO 4: Explain the characteristics of transmission lines and standing wave at high frequencies — **Understand**

CO 5: Apply impedance matching techniques in high-frequency transmission lines — **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	-	1	-	1
CO 2	3	2	1	-	-	-	-	-	-	-	1	-	1
CO 3	3	3	2	-	-	-	-	-	-	-	1	-	1
CO 4	2	1	-	-	-	-	-	-	-	-	1	-	1
CO 5	3	2	1	-	-	-	-	-	-	-	1	-	1

SYLLABUS:

UNIT I: STATIC ELECTRIC AND MAGNETIC FIELD — **9**

Basics of Vector Algebra – Divergence theorem – Stokes theorem – Gauss's law – Applications of Gauss's law – Electric potential – Electric dipole – Electrostatic energy and energy density – Magnetic field intensity for a straight wire – Ampere's circuital law and its applications

UNIT II: BOUNDARY CONDITIONS AND MAXWELL'S EQUATIONS — **9**

Continuity equation – Boundary conditions for electric field – Poisson and Laplace equation – Polarization – Magnetic boundary conditions – Maxwell's Equations – Wave equation and their solutions – Poynting theorem

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT III: WAVEGUIDES 9

General wave behaviours – Transverse electric waves, transverse magnetic waves, transverse electromagnetic waves – TM, TE and TEM waves between parallel plates – TM, TE, and TEM waves in rectangular wave guides

UNIT IV: TRANSMISSION LINES 9

General solution of transmission lines – The infinite line – High frequency transmission lines – Line of zero dissipation – Voltage and current equations – Input and transfer impedance – Open and short circuit impedance – Standing waves – VSWR

UNIT V: IMPEDANCE MATCHING IN HIGH FREQUENCY LINES 9

Impedance matching – Quarter wave transformer – Impedance matching by stubs – Single stub matching – Double stub matching – Smith chart and its applications

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. John.D.Ryder, "Networks, Lines and Fields", 2nd edition, Pearson Education, 2016
2. Matthew.N.O.Sadiku and S.V.Kulkarni, "Principles of Electromagnetics", 6th edition, Oxford, 2015
3. John D Kraus, "Antennas and Wave Propagation", 4th edition, Mc Graw Hill, 2017

REFERENCES:

1. W.H.Hayt, J.A.Buck, M.Jaleel Akhtar, "Engineering Electromagnetics", 9th edition Mc-Graw-Hill, 2018
2. David.J.Griffiths, "Introduction of Electrodynamics", 4th edition, Pearson Education, 2013
3. David.K.Cheng, "Field and Wave Electromagnetics", 2nd edition, Pearson Education, 2013
4. G.S.N Raju, "Electromagnetic Field Theory and Transmission Lines", 1st edition, Pearson Education, 2006

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER IV

U25ECG04	Microprocessors and Microcontrollers (Common to EC, EE)	Category: PCC				
		L	T	P	J	C
		3	0	2	0	4

PRE-REQUISITES:

- U25ECG02 - Digital System Design / U25EE304 - Digital Logic Design

COURSE OBJECTIVES:

- To understand the architecture and functioning of 8085 microprocessors and the 8051, PIC microcontrollers
- To write program in assembly language and embedded C
- To comprehend and implement interfacing techniques for memory, I/O devices, and peripheral components with microcontroller

COURSE OUTCOMES:

CO 1:	Develop assembly language programs to implement ALU operations using 8085 microprocessor	**Apply**
CO 2:	Use timer and serial communication of the 8051 microcontroller for simple applications	**Apply**
CO 3:	Implement control structures, functions and I/O port operations using embedded C	**Apply**
CO 4:	Build real-time applications using the 8051 microcontroller	**Apply**
CO 5:	Design PIC-based interfacing applications using communication protocols	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	-	-	-	2	2	-	1	3	-
CO 2	3	2	1	1	-	-	-	2	2	-	1	3	-
CO 3	3	2	1	1	2	-	-	2	2	-	1	3	-
CO 4	3	2	1	1	2	-	-	2	2	-	1	3	-
CO 5	3	2	1	1	2	-	-	2	2	-	1	3	-

SYLLABUS:

UNIT I: 8085 MICROPROCESSORS **9 + 6**

Architecture – Signals – Addressing modes – Instruction sets – Assembly language programming – Timing diagrams – Interrupts and interrupt service routines

UNIT II: 8051 MICROCONTROLLER **9 + 6**

Harvard architecture – 8051 microcontroller – Internal architecture – Signals – Special Function Registers (SFR) – I/O Pins Ports and Circuits – Instruction set – Timers-Modes, Registers and Timer Programming – Serial Communication – Registers, RS232 standards and programming – Interrupts Programming

UNIT III: EMBEDDED C PROGRAMMING **9 + 6**

Introduction to Embedded C – Structure of an Embedded C Program – Data Types and Variables – Operators and Logic Operations – Decision Making and Looping Statements – Functions in Embedded C – Time Delay Generation – Input/Output Port Programming – Bit Manipulation and Register Access

Head of the Department
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Avinashi, Coimbatore - 641 407.

UNIT IV: 8051 MICROCONTROLLER INTERFACING **9 + 6**

Interfacing of Simple I/O Systems – Switches, LEDs and Buzzers – Interfacing Character and Graphical LCD Displays – Interfacing External ADC and DAC – Stepper Motor Interfacing – DC motor speed control system – Relays

UNIT V: PIC18 MICROCONTROLLER **9 + 6**

Overview of PIC family – Architecture – Memory Organization and Special Function Registers – Signals – Interrupt structure – Development Tools-MPLAB X IDE and XC8 Compiler – Embedded C Programming for PIC – I2C and SPI protocol

LIST OF EXPERIMENTS

1. Perform basic arithmetic and logic operations using 8085 microprocessor
2. Interface display modules with an 8051 microcontroller for control applications using Embedded C
3. Implement real time clock in an 8051 microcontroller using Embedded C
4. Design and implement a robotic arm control system using a stepper motor with an 8051 microcontroller using Embedded C
5. Interface a DAC with an 8051 microcontroller for waveform generation using Embedded C
6. Design a switch-controlled LED indicator system using digital I/O ports in a PIC microcontroller using MPLAB
7. Implement communication protocols (USART/SPI/I2C) in a PIC microcontroller using MPLAB

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 75 Periods

TEXTBOOKS:

1. Krishna Kant, "Microprocessor and Microcontrollers Architecture, Programming and System Design using 8085, 8086, 8051, 8096", 2nd edition, Prentice Hall of India, 2014
2. Mazidi Muhammed Ali, Mazidi Janice Gillispie, "The 8051 Microcontrollers and Embedded Systems", 2nd edition, Pearson Education India, 2012
3. Mazidi, M. A., McKinlay, R. D., and Causey, D., "PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18", 2nd Edition, Pearson Education, 2008. Reprint 2016

REFERENCES:

1. Soumitra Kumar Mandal,"Microprocessors and Microcontrollers Architecture Programming and Interfacing using 8085 8086 & 8051", 1st edition, Tata McGraw Hill, 2011
2. Kenneth Ayala, "The 8051 Microcontrollers",3rd edition, Cengage Learning India, 2007

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

KPR Institute of Engineering and Technology
Centre for Academic Courses
Coimbatore

SEMESTER III & IV

		Category: PCC				
U25CSG11	Object Oriented Programming Using Java (Common to AD, AM, BM, CB, CS, EC, EE, IT, MI, SC)	L	T	P	J	C
		3	0	0	0	3

QP PATTERN: A

COURSE OBJECTIVES:

- To introduce object-oriented programming concepts and Core Java programming fundamentals
- To develop Java applications using classes, inheritance, polymorphism, interfaces, and exception handling mechanisms
- To provide programming skills in multithreading, collections framework, and file handling using Java APIs
- To enable students to develop modular and reusable Java applications using standard libraries and object-oriented design principles

COURSE OUTCOMES:

CO 1:	Use object-oriented programming concepts and core Java fundamentals to develop simple applications	Apply
CO 2:	Implement Java applications using inheritance, polymorphism, abstract classes, interfaces, and packages	Apply
CO 3:	Demonstrate exception handling and multithreading concepts in Java programs	Apply
CO 4:	Develop Java applications using collections, generics, and related utility classes	Apply
CO 5:	Choose suitable file handling, stream processing, and object serialization techniques for Java applications	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	-	-	-	-	-	-	-	-	-
CO 2	3	2	2	1	-	-	-	-	-	-	1	-	-
CO 3	3	2	2	2	-	-	-	-	-	-	2	-	-
CO 4	3	2	2	2	-	-	-	-	-	-	2	-	-
CO 5	3	2	2	1	-	-	-	-	-	-	2	-	-

SYLLABUS:

UNIT I: INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING AND JAVA BASICS 9

Procedure-Oriented vs Object-Oriented Java Features and Platform: JVM, JRE, JDK – Java Program Structure & Memory Layout – Classes and Objects – Static and non-static members, static and non-static Methods, Constructors – Access Modifiers, Abstraction and Encapsulation – Scanner and System classes

UNIT II: INHERITANCE AND POLYMORPHISM 9

Inheritance and types – Polymorphism: Method Overloading and Overriding – Abstract Classes and Methods – Interfaces. Java packages : Built in and user defined packages

UNIT III: EXCEPTION HANDLING AND MULTITHREADING 9

Exception Handling: try, catch, throw, throws, finally – Built in exception classes and User defined Exceptions – Multithreading: Thread Lifecycle, Creating Threads, Thread Class and Runnable Interface, Thread Priorities, Synchronization – Inter-thread Communication, Deadlock prevention

Head of the Department.
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: COLLECTIONS FRAMEWORK AND GENERICS 9

Collections Framework – Generics and Type Safety – Wrapper Classes and Autoboxing/Unboxing – Interfaces and Classes: List, Set, Map, Queue – Implementations: ArrayList, LinkedList, HashSet, TreeSet, HashMap, TreeMap – Iterators – Comparator and Comparable Interfaces

UNIT V: JAVA I/O AND FILES 9

Java I/O Framework – Input and Output Streams – Readers and Writers – File I/O using File, FileReader, FileWriter, BufferedReader, BufferedWriter and Files – Console Input using Scanner and Console – Serialization and Deserialization – Object Streams

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Herbert Schildt, "Java: The Complete Reference", 11th Edition, McGraw Hill Education, 2018
2. Cay S. Horstmann and Gary Cornell, "Core Java 2, Vol 1, Fundamentals", 11th Edition, Pearson Education, 2020

REFERENCES:

1. J. Nino and F. A. Hosch, "An Introduction to Programming and OO Design using Java", 1st Edition, John Wiley & Sons, 2018
2. Paul Deitel and Harvey Deitel, "Java SE 8 for Programmers", 3rd Edition, Pearson, 2015
3. E. Balagurusamy, "Programming with Java", 6th Edition, McGraw Hill Education, 2019

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER IV

		Category: PCC				
U25EC403	Digital Signal Processing	L	T	P	J	C
		3	0	2	0	4

PRE-REQUISITES:

- U25EC301 - Signals and Systems

COURSE OBJECTIVES:

- To learn various techniques of DFT
- To design IIR and FIR filters using different techniques
- To learn finite word length effects and the applications of digital signal processing

COURSE OUTCOMES:

CO 1:	Apply DFT and FFT algorithms for efficient computation and frequency analysis of discrete signals	Apply
CO 2:	Design digital IIR filters using analog prototypes and transformation techniques	Apply
CO 3:	Analyze the performance of linear phase FIR filters using Fourier series , frequency sampling, and window methods	Analyze
CO 4:	Illustrate the effects of finite word length in DSP systems	Understand
CO 5:	Implement DSP applications using TMS3206748 processor	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	-	2	-	-	2	2	-	2	-	-
CO 2	3	2	1	-	2	-	-	2	2	-	2	-	-
CO 3	3	3	2	1	2	-	-	2	2	-	2	-	-
CO 4	2	1	-	-	-	-	-	-	-	-	1	-	-
CO 5	3	2	1	-	2	-	-	2	2	-	2	-	-

SYLLABUS:

UNIT I: DISCRETE FOURIER TRANSFORM **9 + 6**

Introduction to DFT and IDFT – Properties of DFT – Computation of DFT using direct method – Fast computation of DFT using fast Fourier transform (FFT) – Radix-2 decimation-in-time (DIT) and decimation-in-frequency (DIF) algorithms – Filtering long data sequences – Overlap save and overlap add methods

UNIT II: INFINITE IMPULSE RESPONSE FILTERS **9 + 6**

Introduction to filters – Analog filter design – Butterworth and Chebyshev filters – Design of digital IIR filters (LPF, HPF) – Impulse invariance and bilinear transform methods – Structure of IIR filter – Direct form I, direct form II and cascade realizations

UNIT III: FINITE IMPULSE RESPONSE FILTERS **9 + 6**

Introduction to FIR – Linear phase characteristics – Design of linear phase FIR filters – Fourier series, frequency sampling, windows : Rectangular, Hamming and Hanning – Structure of FIR filter – Direct forms and linear phase realization

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407

UNIT IV: FINITE WORD LENGTH EFFECTS 9 + 6

Number representation – Fixed point and floating point – Quantization – Truncation and rounding – Types of quantization errors – Estimation of quantization noise power – Input, product and co-efficient quantization methods – Limit cycle oscillations – Dead band effect – Scaling to prevent overflow

UNIT V: DSP APPLICATIONS 9 + 6

Multirate Signal Processing – Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters – Introduction, Applications of adaptive filtering to equalization – DSP processor – TMS320C50, TMS3206748 – Architecture, addressing modes and instruction set

LIST OF EXPERIMENTS

1. Generation of elementary discrete time sequences
2. Convolution and correlation of discrete sequence
3. Discrete Fourier Transform and Fast Fourier Transform
4. Design and implementation of a digital IIR Butterworth and Chebyshev low pass and high pass filter to meet given specifications
5. Design and implementation of Low pass and High pass FIR filter to meet the desired specifications using different window techniques
6. Generation of discrete time signals
7. Linear convolution and circular convolution
8. Implementation of DFT and FFT
9. Up conversion and down conversion for speech signals

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 75 Periods

TEXTBOOKS:

1. John G.Proakis and Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", 4th edition, Pearson Education, 2013
2. B.Venkataramani, M.Bhaskar, "Digital Signal Processors : Architecture, Programming and Applications", 2nd edition, Tata Mc Graw Hill, 2011

REFERENCES:

1. A.V.Oppenheim, R.W. Schafer and J.R. Buck, "Discrete-Time Signal Processing", 3rd edition, Pearson Education, 2019
2. Emmanuel C.Ifeachor and Barrie.W.Jervis, "Digital Signal Processing: A Practical Approach", 2nd edition, Pearson Education, 2017
3. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", 4th edition, Tata McGraw Hill, 2017
4. Andreas Antoniou, "Digital Signal Processing: Signals, Systems and Filters", 1st edition, Tata McGraw Hill, 2017

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

Learn Beyond

SEMESTER IV

		Category: PCC				
U25EC404	Analog and Digital Communication Laboratory	L	T	P	J	C
		0	0	2	0	1

PRE-REQUISITES:

- U25EC202 - Electronic Devices and Circuits

COURSE OBJECTIVES:

- To analyze the performance of analog and digital communication systems, including end-to-end transmission and modulation techniques under ideal and noisy channel conditions
- To evaluate sampling, pulse modulation, digital modulation, and multiplexing techniques using quantitative performance measures such as SNR, bandwidth, spectral efficiency, quantization error, bit error rate and channel capacity
- To perform the line coding, channel coding, and advanced digital communication techniques to ensure reliable transmission, efficient spectrum utilization and effective signal recovery

COURSE OUTCOMES:

CO 1:	Apply fundamental concepts of analog and digital communication to design and analyze communication systems	**Apply**
CO 2:	Analyze the performance of modulation techniques and evaluate parameters such as bandwidth, SNR and spectrum efficiency	**Analyze**
CO 3:	Examine the system performance against theoretical values using experimental or simulation methods	**Analyze**
CO 4:	Demonstrate individual competency or effective teamwork in designing and implementing the experimental results	**Apply**
CO 5:	Apply ethical standards and present experimental results effectively	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	2	-	-	-	-	-	1	-	1
CO 2	3	3	2	2	2	-	-	-	-	-	1	-	1
CO 3	3	3	2	2	2	-	-	2	2	-	1	-	1
CO 4	-	-	-	-	-	-	-	2	-	-	1	-	1
CO 5	-	-	-	-	-	-	2	2	2	-	1	-	1

LIST OF EXPERIMENTS

1. Design and Performance Evaluation of an End-to-End Communication System under Noiseless and Noisy Channel Conditions
2. Performance Analysis of AM, FM, and PM under Noisy and Noiseless Conditions with SNR Evaluation and Bandwidth Comparison
3. Analysis of Signal Sampling and Reconstruction: Under-Sampling, Nyquist Sampling, Over-Sampling, and Flat-Top Sampling
4. Performance Evaluation of PCM, DPCM, DM, and ADM (CVSD): Quantization Error Analysis and Bandwidth Requirement Comparison

Head of the Department
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

5. Verification of Information Theory Concepts and Shannon Channel Capacity Theorem
6. Waveform Analysis and Comparative Study of Pulse Analog Modulation and Digital Modulation Techniques
7. Spectrum Efficiency Analysis of BPSK, QPSK, and QAM: Relationship between Symbol Rate, Bit Rate, and Baud Rate
8. Waveform Generation and Performance Analysis of Line Coding Techniques with Impact on Signal Recovery and Channel Capacity
9. Performance Analysis of Channel Coding Techniques: CRC, Hamming Codes, Linear Block Codes, Convolutional Codes, and LDPC
10. Comparative Study of TDM and TDMA in Multiplexing and Multiple Access Systems

CONTACT PERIODS:

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

REFERENCES:

1. B.P. Lathi and Zhi Ding, Modern Digital and Analog Communication Systems, 5th Edition, Oxford University Press, 2022

Head of the Department,
Electronics & Communication Engineering.
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER III & IV

U25CSG13	Object Oriented Programming Using Java Laboratory (Common to AD, AM, BM, CB, CS, EC, EE, IT, MI, SC)	Category: PCC				
		L	T	P	J	C
		0	0	2	0	1

COURSE OBJECTIVES:

- To understand the fundamental concepts of object-oriented programming using Java for developing modular and reusable applications
- To apply inheritance, polymorphism, exception handling, and multithreading concepts in developing robust Java applications
- To develop collection-based and file-processing applications using Java I/O, generics, and collections framework for real-world problem solving

COURSE OUTCOMES:

CO 1:	Implement the fundamental concepts of object-oriented programming, Java program structure, classes, objects, and encapsulation principles	Apply
CO 2:	Develop Java applications using inheritance, polymorphism, abstract classes, interfaces, and packages	Apply
CO 3:	Implement exception handling and multithreading mechanisms for developing reliable and concurrent applications	Apply
CO 4:	Utilize collections framework, generics, and sorting mechanisms for efficient data management and processing	Apply
CO 5:	Develop file handling and object persistence applications using Java I/O streams, serialization, and deserialization techniques	Apply

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	1	-	-	-	-	-	-	1	-	-
CO 2	3	2	1	1	-	-	-	-	-	-	1	-	-
CO 3	3	2	1	1	-	-	-	-	-	-	1	-	-
CO 4	3	2	1	1	-	-	-	-	-	-	1	-	-
CO 5	3	2	2	2	-	-	-	-	-	-	2	-	-

LIST OF EXPERIMENTS

1. Design and implementation of Java programs demonstrating classes, objects, constructors, and methods
2. Development of applications illustrating static and non-static members, access modifiers, abstraction, and encapsulation
3. Implementation of console-based applications using Scanner and System classes for input and output processing
4. Design and implementation of applications demonstrating inheritance and its various types
5. Development of applications illustrating compile-time and runtime polymorphism using method overloading and method overriding
6. Implementation of applications using abstract classes, interfaces, and dynamic method dispatch mechanisms
7. Design and development of modular Java applications using built-in and user-defined packages
8. Implementation of robust exception handling mechanisms using built-in and user-defined exceptions
9. Development of multithreaded applications using Thread class and Runnable interface

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

10. Design and implementation of synchronized multithreaded applications with inter-thread communication
11. Development of applications demonstrating thread lifecycle management and deadlock prevention techniques
12. Implementation of generic collection-based applications using List, Set, Map, and Queue interfaces
13. Design of applications utilizing Comparator and Comparable interfaces for customized sorting operations
14. Development of file processing applications using Java I/O streams, readers, writers, and buffered streams
15. Implementation of object persistence mechanisms using serialization and deserialization techniques

CONTACT PERIODS:

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

REFERENCES:

1. Herbert Schildt, "Java: The Complete Reference", 11th Edition, McGraw Hill Education, 2018
2. Cay.S.Horstmann and Gary Cornell, "Core Java 2, Vol 1, Fundamentals", 11th Edition, Pearson Education, 2020

Head of the Department,
Electronics & Communication Engineering,
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER IV

U25MNC03	Indian Constitution (Common to all programmes)	Category: MNC				
		L	T	P	J	C
		1	0	0	0	0

COURSE OBJECTIVES:

- To understand the evolution and importance of the Constitution.
- To understand salient features of the Indian Constitution and philosophy of Fundamental Rights
- To gain the knowledge about the state government and local level administration

COURSE OUTCOMES:

CO 1:	Understand the historical background of the Constitution making and its importance for building a democratic India	**Understand**
CO 2:	Understand the value of Fundamental Rights and Duties for becoming a good citizen of India	**Understand**
CO 3:	Analyze the powers of the Central Government	**Analyze**
CO 4:	Understand the role and responsibilities of State and Local Administration	**Understand**
CO 5:	Apply knowledge in strengthening constitutional institutions like Election Commission and UPSC for sustaining democracy	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	-	-	-	-	-	1	2	3	-	-	-	-	-
CO 2	-	-	-	-	-	1	2	3	-	-	-	-	-
CO 3	-	-	-	-	-	1	2	3	-	-	-	-	-
CO 4	-	-	-	-	-	1	2	3	-	-	-	-	-
CO 5	-	-	-	-	-	1	2	3	-	-	-	-	-

SYLLABUS:

UNIT I: HISTORICAL BACKGROUND OF INDIAN CONSTITUTION 5

Introduction to Indian Constitution: Constitution Meaning of the term, History of Making of the Indian Constitution, Evolution of the Indian Constitution, Drafting Committee (Composition and Working).

UNIT II: FEATURES OF INDIAN CONSTITUTION 5

Philosophy and salient features of the Indian Constitution, Citizenship, Fundamental Rights, Duties and their significance, Directive Principles of State Policy, Rights Protective Mechanisms in India; Right to Education Act 2009; Right to Information 2005.

UNIT III: UNION GOVERNMENT 5

Union Legislature (Parliament), Lok Sabha and Rajya Sabha (with Powers and Functions), Union Executive, President of India (with Powers and Functions), Prime Minister and Council of Ministers (with Powers and Functions), Cabinet and Central Secretariat, Union Judiciary (Supreme Court).

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

UNIT IV: STATE GOVERNMENT AND LOCAL ADMINISTRATION 5

Governor, Chief Minister and Council of Ministers, State Secretariat – Roles and Responsibilities, District Administration, Head, Municipalities – Mayor and Role of Elected Representatives, Panchayati Raj, Zila Panchayat – Roles and Responsibilities, Block Level and Village Level Organizational Hierarchy

UNIT V: CONSTITUTIONAL INSTITUTIONS 5

Election Commission of India – Powers and Functions, Electoral Process in India, Methods of Constitutional Amendments and their Limitations, Important Constitutional and gist Emergency Provisions. Case Studies.

CONTACT PERIODS:

Lecture: 25 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 25 Periods

TEXTBOOKS:

1. Durga Das Basu, "Introduction to the Constitution of India", Prentice Hall of India Pvt. Ltd., New Delhi.
2. Subash Kashyap, "Indian Constitution", National Book Trust.

REFERENCES:

1. 1. M. Laxmikanth, "Indian Polity", McGraw Hill Education India, 2013.
2. M. P. Jain, "Indian Constitution Law," 7th Edition, Lexis Nexis, 2014.
3. Raj Kumar, "Ambedkar and Constitution", Commonwealth Publication Pvt. Ltd., New Delhi, 2011

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.

SEMESTER IV

U25MCC09	Professional Skill Development - II (Common to all programmes)	Category: MCC				
		L	T	P	J	C
		15 Hours				1

COURSE OUTCOMES:

CO 1: Demonstrate technical skill competency through attainment of industry-relevant certifications, participation in competitions, internships, and project-based learning activities **Apply**

CO 2: Apply research, innovation, and problem-solving skills to develop impactful solutions through projects, publications, patents, and higher education preparation **Apply**

CO 3: Exhibit leadership, ethical responsibility, community engagement, and professional digital presence to enhance career readiness and lifelong learning **Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	2	-	3	1	-	-	2	2	-	-	-
CO 2	2	3	3	3	2	2	-	-	1	1	-	-	-
CO 3	-	-	3	-	-	2	2	3	3	3	2	-	-

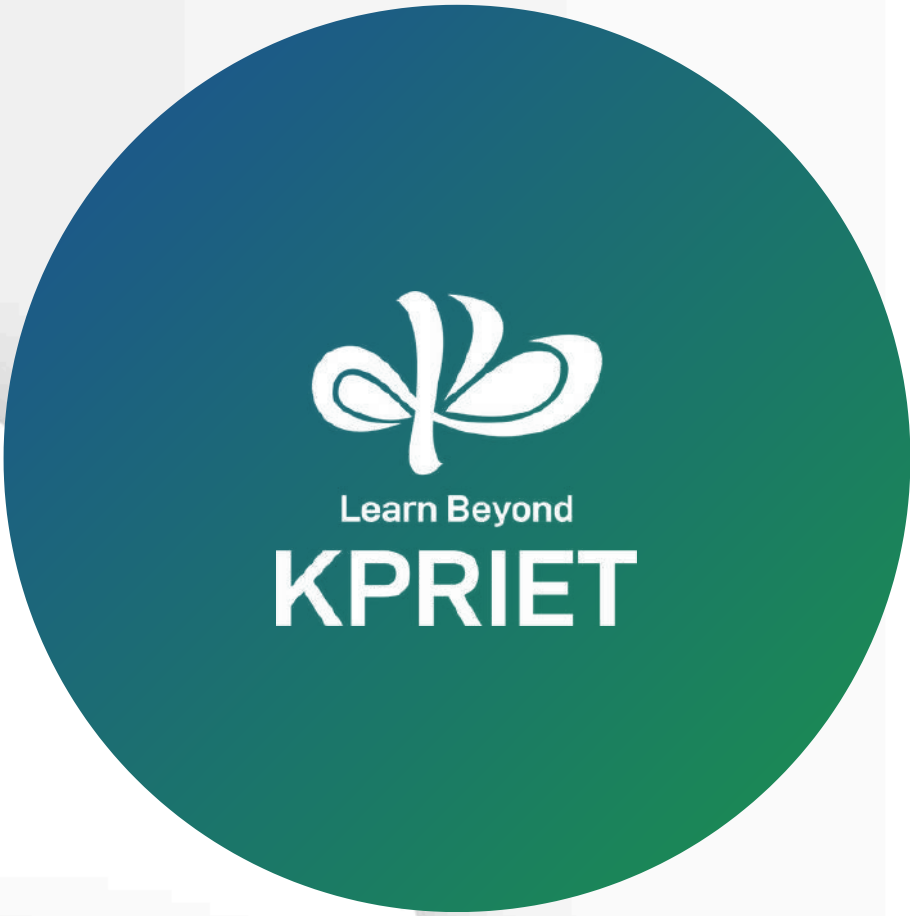
GUIDLINES:

- Certifications and Skill Credentials - Free awareness certs, NPTEL/Coursera, Associate-level, Professional-level, Expert-level
- Competitions, Hackathons, and Technical Challenges - Online, institution, state, national, international competitions and hackathons, Kaggle medals
- GATE Preparation and Performance - Study plan, mock tests, registration, appearing, score percentile
- Academic, Industry, and Innovation Projects - Mini-projects, intermediate projects, industry-grade deployed projects, funded or published projects
- Internships and Industrial Training - Virtual, on-site short, core role, CoE on-campus, PPO, PPO converted to offer
- Research Publications, Patents, Intellectual Property - Reading journals, survey papers, conference papers, Scopus/WoS, Q1/Q2 journals, patents from provisional to granted
- Leadership, Community, Digital Presence - Club membership, event roles, office bearer, president, outreach, LinkedIn, GitHub, portfolio, Google Scholar

CONTACT PERIODS:

Lecture: - Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 0 Periods

Head of the Department,
Electronics & Communication Engineering
KPR Institute of Engineering and Technology
Arasur, Coimbatore - 641 407.


Learn Beyond
KPRIET