KPR Institute of Engineering and Technology

Learn Beyond

(Autonomous, Affiliated to Anna University)

CURRICULUM AND SYLLABI

REGULATIONS – 2025

Department of

Mechanical Engineering

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 recognized as a premier centre in the field of mechanical engineering education, research and development to meet the changing needs of industry and society

Mission

The mission of the department is to

- Provide fundamental and skill-based education in mechanical engineering through innovative practices in teaching and learning
- Establish centres of excellence in collaboration with reputed industries, professional bodies and research laboratories
- Promote entrepreneurship with leadership qualities, ethics, and human values for the society at large

III. Program Educational Objectives (PEOs)

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

PEO1: Excel in their professional career with competencies in the field of Mechanical and Allied Engineering

PEO2: Apply modern research and simulation tools to solve industrial and societal needs

PEO3: Practice professional and ethical values in their respective organizations and society

IV. Program Outcomes (POs)

Graduates of the MECHANICAL 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)

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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 MECHANICAL ENGINEERING will be able to

PSO1: Design, develop and implement advanced mechanical systems by applying engineering principles for improved performance and less human effort.

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

PSO2: Apply quality tools to ensure quality, articulate maintenance principles and demonstrate managerial skills to comprehend the mechanical engineering processes and services.

VI. PEO / PO Mapping

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	3	3	2	3	3	2
PEO 2	3	3	3	3	3	-	-	1	-	1	3	2	1
PEO 3	-	-	-	-	-	2	3	3	3	3	3	2	2

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	-	-	-	-	-	-	-	✓	✓	-	✓	-	✓
	Matrices and Calculus	✓	✓	-	✓	✓	-	-	-	-	-	-	-	-
	Engineering Physics	✓	✓	-	-	-	-	-	-	-	-	-	-	-
	Applied Chemistry for Mechanical Engineers	✓	✓	✓	✓	-	✓	-	-	-	-	✓	✓	-
	Problem Solving using C	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	-
	Digital Technologies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
	Introduction to Mechanical Elements	✓	✓	-	-	✓	✓	✓	-	-	-	✓	✓	-
	Français pour les Ingénieurs – French I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Nihongo no Enginia – Japanese I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Hindi for Engineers - I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Deutsch für Ingenieure – German I	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Induction Program - Universal Human Values I	-	-	-	-	-	✓	✓	✓	-	-	✓	-	-
	தமிழர் மரபு / Heritage of Tamils	-	-	-	-	-	-	✓	✓	-	✓	-	-	-
	Design Thinking	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	-
	Biology for Engineers	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-
	Computer Fundamentals and Coding Essentials	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-
II	English Proficiency II	-	-	-	-	-	-	-	✓	✓	-	✓	-	✓
	Mathematical Transforms	✓	✓	-	✓	✓	-	-	-	-	-	-	✓	-
	Materials Science	✓	✓	-	✓	✓	-	-	-	-	-	-	✓	-
	Environmental Science and Sustainability	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	-
	Programming with Python	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	-
	Interfacing of Electrical and Electronic Components	✓	-	-	-	✓	-	-	-	✓	✓	-	-	-
	Engineering Graphics	✓	✓	-	-	✓	-	✓	✓	✓	-	✓	✓	-

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

Sem	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
	Engineering Mechanics	✓	✓	-	-	✓	-	-	✓	✓	-	✓	✓	-
	Hindi for Engineers - II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Français pour les Ingénieurs – French II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Nihongo no Enginia – Japanese II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Deutsch für Ingenieure – German II	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Universal Human Values II	-	-	-	-	-	-	-	✓	✓	-	✓	-	✓
	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	-	-	-	-	-	-	✓	✓	-	✓	-	-	-
	Design Thinking	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	-
	Biology for Engineers	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-
	Computer Fundamentals and Coding Essentials	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-

28/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

Learn Beyond

MECHANICAL 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	U25MA102	Matrices and Calculus	BSC	TwL	2	-	2	-	3
3	U25PH101	Engineering Physics	BSC	TwL	2	-	2	-	3
4	U25CY105	Applied Chemistry for Mechanical Engineers	BSC	TwL	2	-	2	-	3
5	U25CSG02	Problem Solving using C	ESC	TwL	2	-	2	-	3
6	U25CSG03	Digital Technologies	ESC	T	1	-	-	-	1
7	U25ME101	Introduction to Mechanical Elements	PCC	TwL	1	-	4	-	3
8	U25LEG01 U25LEG02 U25LEG03 U25LEG04	Deutsch für Ingenieure – German I Nihongo no Enginia – Japanese I Français pour les Ingénieurs – French I Hindi 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	தமிழர் மரபு / 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	U25MA204	Mathematical Transforms	BSC	TwL	2	-	2	-	3
3	U25PH204	Materials Science	BSC	TwP	2	-	-	2	3
4	U25CY201	Environmental Science and Sustainability	BSC	TwL	1	-	2	-	2
5	U25CSG06	Programming with Python	ESC	TwL	2	-	2	-	3
6	U25EEG03	Interfacing of Electrical and Electronic Components	ESC	TwL	1	-	2	-	2
7	U25MEG03	Engineering Graphics	ESC	L	-	-	4	-	2
8	U25ME201	Engineering Mechanics	PCC	TwL	2	-	2	-	3

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

No	Course Code	Title	Category	Type	L	T	P	J	C
9	U25LEG05 U25LEG06 U25LEG07 U25LEG08	Deutsch für Ingenieure – German II Nihongo no Enginia – Japanese II Français pour les Ingénieurs – French II Hindi for Engineers - II	HSMC	TwL	1	-	2	-	2
Total									**21**
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
10	U25MCC06	Universal Human Values II	MCC	MCC	2	1	-	-	3
11	U25MCC07	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	MCC	Tamil Courses	1	-	-	-	1
12	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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

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

PRE-REQUISITES:

- - Nil -

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	-	1
CO 2	-	-	-	-	-	-	-	2	3	-	2	-	1

SYLLABUS:

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

LEARN BEYOND CONTENT:

- Readathon – Reading online articles – Book Review

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

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

2. Thomas L. Means, "English and Communication for Colleges", 4th Edition, Cengage India Private Limited, 2017

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

U25MA102	Matrices and Calculus (Common to CE, CH, ME, MI)	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To build competence in using matrices for solving systems and modeling physical systems
- To apply techniques of calculus for engineering analysis involving rates of change, motion, and area/volume estimation
- To interpret real-world problems in terms of calculus and matrix methods for design and analysis

COURSE OUTCOMES:

CO 1: Solve engineering problems involving systems of equations and matrix-based methods **Apply**

CO 2: Use differential calculus to solve and optimize engineering processes **Apply**

CO 3: Apply integration techniques to find areas and volumes in engineering models **Apply**

CO 4: Interpret physical scenarios like motion and system changes using calculus concepts **Apply**

CO 5: Understand and apply concepts of matrix transformations and characteristic values to engineering models such as vibrations and stability **Understand**

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	3	2	-	-	-	-	-	-	-	-	-	-	-
CO 4	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 5	2	2	-	2	1	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: MATRIX METHODS FOR ENGINEERING PROBLEMS **6 + 6**

Review of matrix operations – Determinant – based methods for inverse computation – Solving systems of equations using inverse method and Cramer's rule – Applications to circuit analysis and structural systems

UNIT II: CALCULUS FOR MAXIMA MINIMA **6 + 6**

Applications of Derivative in optimization: maxima and minima – Rate of change in physical systems (e.g., flow rate, motion) – Higher – order derivatives in design and behavior analysis

UNIT III: TECHNIQUES AND APPLICATIONS OF INTEGRATION **6 + 6**

Definite integrals for area under curves and between curves – Volume calculation by integration (e.g., rotating objects, storage tanks) – Techniques: Substitution and integration by parts – Engineering application-based examples

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

UNIT IV: CALCULUS OF DYNAMICS AND OPTIMIZATION **6 + 6**

Motion along a line: position, velocity, acceleration – Time – rate problems in machines, piping systems – Models for Improving Engineering Efficiency – Cost and Design Criteria

UNIT V: MATRIX APPLICATIONS IN SYSTEM BEHAVIOUR **6 + 6**

Matrix–based transformations in 2D/3D systems – Characteristic values (eigenvalues) and characteristic directions (eigenvectors) – Applications: Vibrations in mechanical systems, system stability in control processes

LIST OF EXPERIMENTS

1. System Solving using Matrices – Implement and solve matrix systems arising from real applications – Visualize and interpret results
2. Rate-Based and Design Improvement Modeling – Model and solve rate-based engineering problems using derivatives (e.g., fluid flow, heat transfer) – Apply calculus to optimize designs (e.g., beam dimensions, tank volume
3. Integration for Design Computations – Estimate areas/volumes for components – Plot 2D and 3D integrated shapes
4. Motion and System Dynamics Visualization. – Plotting and Analyzing Motion – Dynamic System Simulation
5. Characteristic Value Applications – Compute eigenvalues/eigenvectors for simple systems – Apply to stability and vibration models

LEARN BEYOND CONTENT:

- Structural systems – Dynamic systems – Flow systems

CONTACT PERIODS:

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

TEXTBOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 10th Ed., 2018
2. Gilbert Strang, Introduction to Applied Mathematics, Wellesley-Cambridge Press, 2016

REFERENCES:

1. George B. Thomas, Thomas' Calculus, Pearson, 13th Ed., 2018
2. Grewal,B.S. Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2017
3. Dennis G. Zill, Advanced Engineering Mathematics, Cengage, 2012

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

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

PRE-REQUISITES:

- - Nil -

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:	Evaluate stress-strain relationships, modulus of elasticity, and bending moment to analyze mechanical behavior of solids and structures	**Evaluate**
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 concepts in semiconductors and devices such as Hall effect sensors and Schottky diodes	**Apply**
CO 5:	Practice the principles of laser and fiber optics in industrial and medical applications	**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	3	2	-	-	-	-	-	-	-	-	-	-	-
CO 4	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 5	2	2	-	-	-	-	-	-	-	-	-	-	-

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

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

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

LEARN BEYOND CONTENT:

- Torsional Pendulum – Hologram – Fiber optics communication system

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

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.
22/8/25

3. H.K. Malik and A.K. Singh "Engineering Physics" Publisher: McGraw Hill Education India 2022

4. https://onlinecourses.nptel.ac.in/noc20cy17/preview

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

U25CY105	Applied Chemistry for Mechanical Engineers	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To introduce the synthesis, properties, and applications of polymers, composites and smart materials
- To describe corrosion mechanisms, fuel types, combustion, emissions, and lubrication systems
- To explain modern energy storage and conversion technologies with applications

COURSE OUTCOMES:

CO 1:	Explain the synthesis of polymers, composites, and smart materials used in industries	**Understand**
CO 2:	Apply corrosion prevention methods in practical situations	**Apply**
CO 3:	Explain energy output and environmental impact of different types of fuels	**Understand**
CO 4:	Predict the performance of lubricants and additives using standard industrial tests	**Apply**
CO 5:	Demonstrate the fabrication and working principle of different energy storage technologies	**Apply**

CO - PO MAPPING:

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

SYLLABUS:

UNIT I: POLYMERS & COMPOSITES **6 + 6**

Introduction, Synthesis, properties and applications of PMMA, ABS, Teflon, Moulding Techniques – Compression, Injection, Extrusion, 3D printing, Rapid prototyping Conductive and Photoactive Polymers – Synthesis – PANI, PEDOT(Poly-3,4-ethylenedioxythiophene), conduction mechanisms, exciton generation, properties and applications – Geo & Green polymers – aluminosilicates, PLA, PHA, types, synthesis and applications, Composites – Types, fabrication, GFRP (Glass Fiber Reinforced Polymer), CFRP (Carbon Fiber Reinforced Polymer) – properties, processing and applications, Smart polymers – Self-healing and shape memory polymers

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

UNIT III: FUELS AND COMBUSTION 6 + 6

Introduction – Classification, calorific value, Petroleum refining, LPG & CNG, Fuel Performance in Engines – octane, cetane rating, knocking in SI and CI engine, alternate and green additives, Biofuels – biodiesel, bioethanol, hydrogen, methanol, ammonia, green prospects – Flue gas analysis, three-way catalytic converter, Diesel Exhaust Fluid (DEF) – Adblue – Mechanism, Clean combustion technologies – carbon capture and storage, zero carbon emission concept – Propellants – Type, components, characteristic, properties, Green Propellants

UNIT IV: LUBRICANTS AND ADDITIVES 6 + 6

Lubrication – types – Solid (Graphite, MoS_2), semi-solid (greases), liquid (mineral, synthetic), Mechanisms – Hydrodynamic, boundary lubrication – chemical properties and testing – Viscosity index, pour point, flash, fire point, aniline point and corrosion stability – Lubricant additives and functions – antioxidants, detergents, dispersants, anti-wear agents, viscosity index improvers – Green Lubricants – Nano-lubricants, biodegradable lubricants, industrial applications – Gear oils, engine oils (2-stroke, 4-stroke), hydraulic fluids, cutting fluids, SAE grades, API/ACEA standards

UNIT V: ENERGY STORAGE SYSTEMS 6 + 6

Batteries – Classification, Fabrication and Working – Li-polymer, $LiFePO_4$. Fuel Cells – Proton exchange membrane, Solid oxide fuel cell, Microbial fuel cells and Green hydrogen production and applications – Laws of photochemistry – Jablonski diagram – Solar cell technologies – Dye-sensitized solar cells – Super capacitors – Electrostatic double layer, pseudocapacitors, hybrid supercapacitors – Battery lifecycle management

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. Estimation of saponification value of biodiesel
6. Proximate analysis of coal
7. Viscosity and Viscosity Index measurement of an engine oil using Redwood viscometer
8. Estimate the concentration of copper (Cu^{2+}) or nickel (Ni^{2+}) in a given solution using colorimetric analysis based on Beer-Lambert's law

LEARN BEYOND CONTENT:

- Preparation of biodegradable plastic
- Polymer composites preparation from waste polymeric materials
- Electroplating of copper on metallic objects
- Electroless Ni plating on objects
- Conductometric estimation of acid mixture
- Determination of Fe using UV spectrophotometer
- Determination of acid strength and pKa in Pb-Acid battery
- Determination of Cloud point and Pour point of Lubricants

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

CONTACT PERIODS:

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

TEXTBOOKS:

1. S.S. Dara and S.S. Umare, "A Textbook of Engineering Chemistry", 12th edition, Chand Publishing, New Delhi, 2024
2. Wiley India Pvt. Ltd., "Engineering Chemistry", 2nd edition, Wiley India Pvt. Ltd., New Delhi, 2013
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
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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

U25CSG02	Problem Solving using C (Common to CE, CH, ME)	Category: ESC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To provide exposure to problem-solving through programming
- To develop computational thinking perspective of one's discipline
- To write, compile and debug programs using the C language

COURSE OUTCOMES:

CO 1: Describe the basic organization of computers and number systems, and construct flowcharts, algorithms, and pseudocode to represent solutions for real-world problems — **Understand**

CO 2: Develop C programs using variables, data types, operators, control structures, and input/output functions to solve basic scientific and statistical problems — **Apply**

CO 3: Implement one-dimensional and two-dimensional arrays and perform string operations such as searching, sorting, and matrix manipulations — **Apply**

CO 4: Design modular programs using functions, recursion, and pointers for efficient memory usage and structured data handling — **Apply**

CO 5: Construct and manipulate programs using structures and unions to model and solve real-world problems — **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	1	-

SYLLABUS:

UNIT I: INTRODUCTION — **6 + 6**

Generation and Classification of Computers – Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems. Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart

UNIT II: C PROGRAMMING BASICS — **6 + 6**

Problem formulation – Problem Solving - Introduction to 'C' programming – Structure of a 'C' program – Compilation and linking processes – Constants, Variables – Data Types – Expressions using operators – Managing Input and Output operations – Decision Making and Branching – Looping statements – Solving simple scientific and statistical problems

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

Arrays – Initialization – Declaration – One-dimensional and Two-dimensional arrays. String- String operations – String Arrays. Simple programs – sorting – searching – matrix operations

UNIT IV: FUNCTIONS AND POINTERS **6 + 6**

Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion – Pointers – Definition – Initialization – Pointers arithmetic – Pointers and arrays – Example Problems

UNIT V: STRUCTURES AND UNIONS **6 + 6**

Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives

LIST OF EXPERIMENTS

1. Program Using Basic Input/Output and Arithmetic Expressions
2. Program to Solve a Scientific Problem using Decision Making and Looping
3. Program for Sorting Elements in a One-Dimensional Array
4. Program for Matrix Addition using Two-Dimensional Arrays
5. Program for String Manipulation using Standard String Functions
6. Program using User Defined Functions with Pass by Value and Reference
7. Program using Structures and Nested Structures
8. Program using String and Arrays for Solving Engineering Problems
9. Program using User Defined Functions for Solving Engineering Problems
10. Program using Structures for Solving Engineering Problems

LEARN BEYOND CONTENT:

- File Handling
- Dynamic Memory Allocation

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

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

PRE-REQUISITES:

- - Nil -

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

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

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

LEARN BEYOND CONTENT:

- Case Study of Digital Technologies of Real time application

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

U25ME101	Introduction to Mechanical Elements	Category: PCC				
		L	T	P	J	C
		1	0	4	0	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To familiarize the fundamental concepts of automobile components
- To acquire the foundational knowledge in smart manufacturing processes and actuator mechanisms
- To provide hands-on skills in basic mechanical operations in assembling, connecting, and testing electrical and electronic circuits

COURSE OUTCOMES:

CO 1: Explain the fundamental concepts, construction and working principles of automobile system **Apply**

CO 2: Apply appropriate smart manufacturing techniques for given engineering problems **Apply**

CO 3: Discuss the operation and application of various actuators and control components in mechanical systems **Apply**

CO - PO MAPPING:

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

SYLLABUS:

UNIT I: INTRODUCTION TO MACHINE ELEMENTS **5 + 24**

IC Engines – Electrical vehicle – Suspension system – Gear box – Clutches – Brakes – Differential – Fuel system – Steering – Bearings – Mechanical Joints and Fasteners

UNIT II: BASICS IN SMART MANUFACTURING **5 + 24**

Laser cutting – Modeling – Prototype – Functional prototype – Fused deposition modeling – Digital light processing – Selective laser melting – Stereolithography – Laminated object manufacturing – Selective laser sintering – Wire arc additive manufacturing

UNIT III: ACTUATORS **5 + 12**

Relay – Solenoid valve – Single acting and double acting cylinder – DCV – FCV – Electromagnetic switches – Check valve – FRL unit – Compressor – Couplings and conveyor

LIST OF EXPERIMENTS

1. Assembly and Dismantling of IC Engines
2. Modelling of mechanical component using FUSION 360
3. Fabrication of Flapping mechanism to make a Ornithopter

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

4. Fabrication of Gripper Mechanism using Fly ball
5. Demonstration of Laserworks software
6. Perform laser engraving cum cutting of thin sheets
7. Slicing of CAD model using CURA software
8. 3D prototyping of simple components using FDM method
9. Perform basic pneumatic actuation with directional control valve
10. Perform safety door operation using pneumatic actuators

LEARN BEYOND CONTENT:

- Use of shape memory alloys in couplings and actuators

CONTACT PERIODS:

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

TEXTBOOKS:

1. S.K. Gupta, "A Textbook of Automobile Engineering", 2nd Edition, S. Chand Publishing, 2020
2. I. Gibson, D.W. Rosen, and B. Stucker, "Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing", 3rd Edition, Springer, 2021
3. W. Bolton, "Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering", 8th Edition, Pearson Education, 2021

REFERENCES:

1. R.S. Khurmi, and J.K. Gupta, "A Textbook of Machine Design", 25th Edition, Eurasia Publishing House Pvt. Ltd, 2011
2. M.P. Groover, "Automation, Production Systems, and Computer-Integrated Manufacturing", 5th Edition, Pearson Education, 2020
3. A. Esposito, "Fluid Power with Applications", 7th Edition, Pearson Education, 2009

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

U25LEG01	Deutsch für Ingenieure – German I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- - Nil -

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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

U25LEG02	Nihongo no Enginia – Japanese I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- - Nil -

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,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.
22/8/25

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

U25LEG03	Français pour les Ingénieurs – French I (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- - Nil -

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)

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

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

PRE-REQUISITES:

- - Nil -

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, 22/8/25
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

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

PRE-REQUISITES:

- - Nil -

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I

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

PRE-REQUISITES:

- - Nil -

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

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

PRE-REQUISITES:

- - Nil -

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	-	1
CO 2	-	-	-	-	-	-	-	2	3	-	2	-	-

SYLLABUS:

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

LEARN BEYOND CONTENT:

- TED Talks – Podcast creation – Peer Interview

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:

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

U25MA204	Mathematical Transforms (Common to CE, CH, EE, ME, MI)	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To understand Fourier analysis for periodic and aperiodic signals
- To apply Laplace transforms for solving linear ODEs with initial conditions
- To use Z-transforms for analyzing discrete – time systems

COURSE OUTCOMES:

CO 1: Understand and construct Fourier series representations of periodic functions, and apply them to solve basic signal analysis and engineering problems **Understand**

CO 2: Apply Fourier transform techniques to analyze and interpret continuous-time signals in the frequency domain **Apply**

CO 3: Compute Laplace transforms of standard functions and use them to model and analyze engineering systems involving differential equations **Apply**

CO 4: Use inverse Laplace transforms and convolution theorem to solve ordinary differential equations with initial conditions in engineering applications **Apply**

CO 5: Apply discrete-time systems using Z-transforms, and solve difference equations relevant to digital signal processing and control systems **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	3	2	-	-	-	-	-	-	-	-	-	1	-
CO 4	3	2	-	-	-	-	-	-	-	-	-	1	-
CO 5	2	2	-	2	1	-	-	-	-	-	-	-	-

SYLLABUS:

UNIT I: FOURIER SERIES **6 + 6**

Dirichlet's conditions – General Fourier series – Even and odd functions – Half-range sine and cosine series – Parseval's identity

UNIT II: FOURIER TRANSFORM **6 + 6**

Fourier transform pair – Sine and cosine transforms – Basic properties – Transforms of standard functions – Convolution theorem

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

UNIT III: LAPLACE TRANSFORM 6 + 6

Standard functions – Unit step and delta functions – Derivatives and integrals – Transform of periodic functions

UNIT IV: INVERSE LAPLACE TRANSFORM 6 + 6

Inverse Laplace methods – Convolution theorem – Solution of linear ODEs with constant coefficients

UNIT V: Z–TRANSFORM 6 + 6

Z–transforms – Properties – Inverse Z-transform – Initial/final value theorems – Solution of difference equations

LIST OF EXPERIMENTS

1. Fourier Series – Fourier Series Approximation – Even/Odd Functions and Half-Range Expansions
2. Fourier Transforms – FFT and Spectral Analysis. – Convolution Theorem
3. Laplace Transforms – Laplace of Basic Functions – System Response Using Laplace
4. Inverse Laplace and ODE Solving – Inverse Laplace Transform – ODE Solving Using Laplace
5. Z-Transform Applications – Z-Transform and Sequence Analysis – Digital Filter Design and Stability

LEARN BEYOND CONTENT:

- Spectral leakage and windowing in Fourier analysis – Z-transform in digital control of DC motors

CONTACT PERIODS:

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

TEXTBOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th ed., Wiley India, 2018
2. Wylie C. R. & Barrett L. C., Advanced Engineering Mathematics, Tata McGraw-Hill, 2016
3. Grewal B. S., Higher Engineering Mathematics, 44th ed., Khanna Publishers, 2017

REFERENCES:

1. Andrews, L.C & Shivamoggi, B., Integral Transforms for Engineers, SPIE Press, 2016
2. Bali N. P. & Manish Goyal, Engineering Mathematics, 12th ed., Laxmi Publications, 2016
3. Peter V. O'Neil, Advanced Engineering Mathematics, Cengage, 2016
4. James G., Advanced Modern Engineering Mathematics, 3rd ed., Pearson, 2013

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

		Category: BSC				
U25PH204	Materials Science (Common to CH, ME)	L	T	P	J	C
		2	0	0	2	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To understand the fundamental principles of magnetic ,dielectric , superconducting and phase change materials and their technological applications
- To explore the characteristics and uses of emerging engineering materials such as metallic glasses, shape memory alloys, and nanomaterials
- To develop skills in microstructural analysis using various characterization techniques

COURSE OUTCOMES:

CO 1:	Categorize magnetic and di-electric materials for various applications	**Analyze**
CO 2:	Illustrate the physical phenomena of superconductors and their technological applications	**Apply**
CO 3:	Analyze the properties and applications of new engineering materials like SMAs and nanomaterials	**Analyze**
CO 4:	Apply characterization techniques for microstructural analysis of materials	**Apply**
CO 5:	Classify and evaluate the performance of phase change materials for energy-related applications	**Evaluate**

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	2	-	-	-	-	-	-	-	-	-	1	-
CO 4	3	2	-	1	1	-	-	-	-	-	-	-	-
CO 5	3	2	-	1	1	-	-	-	-	-	-	1	-

SYLLABUS:

UNIT I: MAGNETIC AND DIELECTRIC MATERIALS **6 + 6**

Classification of magnetic materials – Domain theory – Hysteresis – Hard and soft magnetic materials – Dielectric materials – Types of polarization – Langevin-Debye equation – Dielectric breakdown – Ferroelectricity

UNIT II: SUPERCONDUCTING MATERIALS **6 + 6**

Superconductors – Meissner effect – Persistent current – Critical temperature – Critical magnetic field – Isotope effect – Type I, Type II superconductors – BCS theory of Superconductivity – High temperature superconductors – Josephson Effect – SQUID – Magnetic levitation

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

UNIT III: NEW ENGINEERING MATERIALS **6 + 6**

Metallic glasses – Types, melt spinning process, applications – Shape memory alloys – Phases, shape memory effect, pseudo elastic effect – NiTi alloy – Applications – Nanomaterials: ball milling, chemical vapour deposition, properties and applications – Carbon nanotubes: types and applications

UNIT IV: PHASE CHANGE MATERIALS **6 + 6**

Classification of phase change materials – Fabrication methods: Encapsulation and Electro spinning Techniques – Thermophysical properties – Phase change material composites – Applications – Building and Construction – Thermal storage in Solar water heater

UNIT V: MATERIALS CHARACTERIZATION TECHNIQUES **6 + 6**

UV Visible spectroscopy – FTIR – X Ray Diffraction – Optical microscopes for surface studies – Rayleigh criterion – resolving power – Atomic force microscope – Scanning electron microscope – Transmission electron microscope

LIST OF PROJECTS

1. Comparative Study of Hard vs. Soft Magnetic Materials
2. Design of a Magnetic Storage Demonstration
3. Demonstrating Polarization in Dielectric Materials
4. Research Poster: Ferroelectric Materials and Their Uses
5. Magnetic Levitation Demo Using a Superconducting Kit
6. Simulation/Poster: Type I vs. Type II Superconductors
7. SQUID Applications in Medicine and Geophysics
8. Study of Critical Temperature of YBCO Superconductor
9. Fabrication of a Metallic Glass Ribbon via Melt Spinning (Simulation/Model)
10. NiTi Shape Memory Alloy Demonstration
11. Synthesis of Nanoparticles Using Ball Milling (Review or Lab Study)
12. Carbon Nanotubes: Properties and Application Review
13. Thermal Storage Using Phase Change Material (PCM)
14. Fabrication of PCM Capsules (Model/Simulation)
15. Comparison of Thermal Response in PCM vs Non-PCM Insulated Boxes

LEARN BEYOND CONTENT:

- Three phase four wire – Balanced star and delta load – Unbalance star and delta load

CONTACT PERIODS:

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

TEXTBOOKS:

1. Serway, R.A. & Jewett, J.W., "Physics for Scientists and Engineers", 10th Edition, Cengage Learning, 2018
2. Budinski, K.G. & Budinski, M.K., "Engineering Materials: Properties and Selection", 10th Edition, Pearson Education, 2020

REFERENCES:

1. Kasap, S.O., "Principles of Electronic Materials and Devices", 4th Edition, McGraw Hill Education, 2018
2. Kittel, C., "Introduction to Solid State Physics", 8th Edition, Wiley, 2004

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

3. Cabeza, L.F. (Ed.), "Phase Change Materials and Their Applications", Springer, 2020

4. https://archive.nptel.ac.in/courses/115/103/115103030/

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

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

PRE-REQUISITES:

- - Nil -

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: Describe ecosystems functions and the importance of protecting biodiversity — **Understand**

CO 2: Analyze the atmospheric and hydrospheric issues such as pollution, climate change, and water crises using global and local case studies — **Analyze**

CO 3: Estimate land-related challenges, agriculture-related issues and waste management methods — **Apply**

CO 4: Assess the role of population, disaster management, and IT tools in addressing environmental and public health challenges — **Apply**

CO 5: Apply the concepts of sustainability, circular economy, green chemistry and energy efficiency in real-world scenarios and Sustainable Development Goals — **Apply**

CO - PO MAPPING:

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

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)

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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, Carbon Footprint and reduction strategies Hydrosphere – Hydrological Cycle – Water Quality Parameters, water pollution – Causes, effects, control measures, Overutilization of Ground Water – Water Conservation Strategies 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)

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 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 – Floods, Landslides, Disaster management cycle, Land Clearing Projects – Dam sites, Highways projects, Resettlement and Rehabilitation (R&R) Population – Global and national growth patterns, Population explosion and its ecological footprint Role of Information Technology (IT) – Fundamentals of GIS, Open Sources GIS- QGIS, OSM (Open Series Map) – Use of IT in human health monitoring – Disease tracking and prediction using big data and AI (e.g., COVID-19 apps), Health information systems – Telemedicine, electronic health records (EHRs) 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 Agriculture, Sustainable Energy – Biofuels, low-impact renewable energy, Concepts of carbon credits and emissions trading 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. Determination of molecular weight and degree of polymerisation of a given polymer using an Ostwald Viscometer
2. Estimation of hardness (total, temporary, permanent) in water samples
3. Iodometric determination of available chlorine in a sample of bleaching powder
4. Monitoring of air quality using sensors
5. Estimation of dissolved oxygen in water
6. Determination of soil moisture content and water holding capacity of soil
7. Recovery of aluminium from waste materials
8. Photocatalytic degradation of dye using TiO_2
9. Synthesis of biodesel from vegetable oil

LEARN BEYOND CONTENT:

- Mapping Indian biodiversity hotspots using GIS tools or visual mapping software
- Determination of Particulate Matter emissions from stationary sources

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

- Measurement of noise levels in different environments using a dosimeter
- Life Cycle Assessment (LCA) experiment: Compare traditional vs green products (energy, materials, emissions)
- Coir pith composting and application study
- Field survey and GPS-based mapping of waste dump sites or urban agriculture sites
- Simulation of disaster management cycle (Preparedness → Response → Recovery → Mitigation)
- Carbon footprint calculator activity for individual or institutional ecological footprint

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
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,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

U25CSG06	Programming with Python (Common to CE, ME)	Category: ESC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To understand the syntax and semantics of Python programming
- To implement programs using Python data structures
- To gain expertise in using Python libraries for solving real-time problems

COURSE OUTCOMES:

CO 1:	Describe the basic operations of tokens, data types, and operators in Python	**Understand**
CO 2:	Demonstrate the use of control statements for decision-making and iteration in Python programs	**Apply**
CO 3:	Develop programs using Python data structures such as strings, lists, tuples, sets, and dictionaries	**Apply**
CO 4:	Implement exception handling and file operations in Python programs	**Apply**
CO 5:	Apply Python libraries such as NumPy and Pandas to analyze and solve real-world data problems	**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	1	-

SYLLABUS:

UNIT I: LANGUAGE BASICS **6 + 6**

Python interpreter and interactive mode – Tokens – Data types – Numbers and math functions – Input and Output operations – Comments – Reserved words – Indentation – Operators and expressions – Precedence and associativity – Type conversion – Debugging – Common errors in Python

UNIT II: CONTROL STATEMENTS **6 + 6**

Selection – Conditional branching statements – if – if-else – Nested-if – if-elif-else statements – Iterative statements – while – for loop – break – continue and pass statements

UNIT III: FUNCTIONS AND MODULES **6 + 6**

Functions – Function Definition and Function call – Variable scope and Lifetime – Return statement – Lambda functions or Anonymous functions – Recursion – Custom Modules and Packages

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

UNIT IV: PYTHON DATA STRUCTURES **6 + 6**

Strings – Slicing – Immutability – Built-in string methods and functions – Concatenating – Appending and Multiplying strings – String modules – List – Creation – Accessing values – Slicing – List methods – In-built functions for Lists – Tuples – Creation – Operations on tuples – Traversing – Indexing and Slicing – Tuple assignment – In-built functions for tuples – Sets – Creation – Operations – Dictionaries – operations and methods

UNIT V: EXCEPTION, FILE HANDLING AND PACKAGES **6 + 6**

Exceptions – Errors and Exceptions – Handling exception – Built-in and User-defined exceptions – Files – Types – Operations – Open – Read – Write – Close. Packages – Numpy and Pandas

LIST OF EXPERIMENTS

1. Python Program Demonstrating Language Basics: Data Types, Operators, and Expressions
2. Python Program Demonstrating Control Statements: Conditional and Iterative Statements
3. Python Program Demonstrating Functions and Recursion
4. Python Program Demonstrating Lambda Functions and Custom Modules
5. Python Program Demonstrating String and List Operations
6. Python Program Demonstrating Tuple, Set, and Dictionary Operations
7. Python Program Demonstrating Exception Handling and File Operations
8. Python Program using Strings and Lists for Solving Engineering Problems
9. Python Program using User Defined Functions for Solving Engineering Problems
10. Python Program Using CSV for Data Interchange in Engineering Projects

LEARN BEYOND CONTENT:

- Classes and Objects

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

U25EEG03	Interfacing of Electrical and Electronic Components	Category: ESC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To learn the basic functions and behaviour of electrical and electronic components
- To understand how microcontrollers work and how to connect them with sensors and devices
- To build simple systems using Arduino and Python for real-time applications and troubleshooting

COURSE OUTCOMES:

CO 1:	Identify and explain the characteristics of basic electronic components	**Understand**
CO 2:	Demonstrate working knowledge of Arduino hardware and software	**Apply**
CO 3:	Interface input/output devices and sensors with Arduino	**Apply**
CO 4:	Implement real-time applications integrating electronics and programming	**Apply**
CO 5:	Develop and test embedded systems using Arduino and Python integration	**Apply**

CO - PO MAPPING:

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

SYLLABUS:

UNIT I: BASIC ELECTRONICS AND CIRCUIT COMPONENTS **3 + 6**

Voltage, current, resistance, power – Resistors, capacitors, inductors – Diodes and transistors – Rectifiers (Half, Full, Bridge) – Voltage Regulators – Logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR)

UNIT II: INTRODUCTION TO MICROPROCESSOR AND MICROCONTROLLER **3 + 6**

Basics of microprocessors and microcontrollers – Arduino IDE and pin mapping – Digital and Analog I/O – Simple programs

UNIT III: INTERFACING **3 + 6**

Interfacing LEDs, buzzers, switches – Interfacing sensors: IR, Ultrasonic, Temperature – Relays and actuator control – Debouncing and signal conditioning

UNIT IV: SYSTEM INTEGRATION AND APPLICATIONS **3 + 6**

PWM for motor speed control – Real time data acquisition – Event-driven programming – Arduino–Python communication via serial interface

Head of the Department, 22/8/25
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

UNIT V: SYSTEM INTEGRATION AND DESIGN THINKING **3 + 6**

System Design Methodology – Requirement analysis, block diagram approach, module decomposition – Noise filtering, protection circuits, power management – Product Development Lifecycle: Prototype – Testing – Deployment.– ESD safety, IS/ ISO standards

LIST OF EXPERIMENTS

1. Rectifier circuits
2. Logic gate simulations
3. Blinking LEDs
4. Reading analog input using a potentiometer
5. Serial communication with PC
6. IR-based object detection
7. Ultrasonic sensor – distance measurement
8. Temperature data logging system
9. Relay based motor control
10. PWM based fan control
11. Live sensor data plotting with Python

LEARN BEYOND CONTENT:

- Home automation

CONTACT PERIODS:

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

TEXTBOOKS:

1. Michael McRoberts, Beginning Arduino, 1st Edition, Apress, 2010
2. Jeremy Blum, Exploring Arduino: Tools and Techniques for Engineering Wizardry, 1st Edition, Wiley, 2013

REFERENCES:

1. Michael Margolis, Arduino Cookbook, 1st Edition, O'Reilly Media, 2011
2. Simon Monk, Programming Arduino: Getting Started with Sketches, 1st Edition, McGraw-Hill Education, 2011
3. Mark Geddes, Arduino Project Handbook: 25 Practical Projects to Get You Started, 1st Edition, No Starch Press, 2016
4. J.M. Hughes, Arduino: A Technical Reference: A Handbook for Technicians, Engineers, and Makers, 1st Edition, O'Reilly Media, 2016

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

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

PRE-REQUISITES:

- - Nil -

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	3	-
CO 2	3	1	-	-	-	-	1	1	2	-	-	3	-
CO 3	3	1	-	-	2	-	-	1	2	-	-	3	-
CO 4	3	2	-	-	2	-	2	1	2	-	2	3	-

SYLLABUS:

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

LEARN BEYOND CONTENT:

- Perspective Projection

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

U25ME201	Engineering Mechanics	Category: PCC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To expose various laws of force for equilibrium of rigid bodies
- To introduce the concepts of properties of surfaces and solids
- To impart knowledge on the fundamentals of dynamics of particles and friction

COURSE OUTCOMES:

CO 1:	Identify various force systems in a plane	**Apply**
CO 2:	Solve equilibrium of rigid bodies in two dimensions	**Apply**
CO 3:	Calculate the centroid, area and mass moment of inertia for surfaces and solids	**Apply**
CO 4:	Apply the concept of dynamics of particles	**Apply**
CO 5:	Determine the friction of elements and dynamics of rigid bodies	**Apply**

CO - PO MAPPING:

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

SYLLABUS:

UNIT I: EQUILIBRIUM OF FORCES **6 + 6**

Types of force systems – Coplanar concurrent forces – Resultant – Moment of a force and its application – Couples and resultant of a force system – Equations of equilibrium of coplanar concurrent and non – concurrent force systems – Lami's theorem – Polygon law of forces for resultant

UNIT II: EQUILIBRIUM OF RIGID BODIES **6 + 6**

Free body diagram – Types of supports – Support reactions – Moment of a force about a point – Moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force – Equilibrium of rigid bodies in two dimensions

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

UNIT III: PROPERTIES OF SURFACES AND SOLIDS **6 + 6**

Centroids and centre of mass – Centroids of lines and areas – Rectangular, circular, triangular areas by integration – T section, I section and Hollow section by using standard formula – Theorems of Pappus – Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem – Principal moments of inertia of plane areas – Principal axes of inertia – Mass moment of inertia – Mass moment of inertia for prismatic and cylindrical solids

UNIT IV: DYNAMICS OF PARTICLES **6 + 6**

Displacements, velocity and acceleration – Curvilinear motion – Newton's laws of motion – Work energy equation – Impulse and momentum – Impact of elastic bodies

UNIT V: FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS **6 + 6**

Friction force – Laws of sliding friction – Equilibrium analysis of simple systems with sliding friction – Wedge friction – Rolling resistance (Basics) – Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere

LIST OF EXPERIMENTS

1. Simulation of Lami's Theorem using three concurrent forces acting at a point
2. Polygon Law of Forces - Simulation of equilibrium of coplanar forces
3. Equilibrium of a simply supported beam under different loading conditions (point load and distributed load)
4. Analysis of a ladder resting against a wall – Study of forces and reactions
5. Determination of centroid of composite sections (T-section, L-section, etc.) using simulation
6. Simulation of Moment of Inertia for different sections (rectangular, circular, triangular) by rotation about centroidal axis
7. Simulation of Projectile Motion – Trajectory, time of flight, maximum height, and range
8. Collision of Two Particles – Conservation of momentum and coefficient of restitution
9. Simulation of sliding block on an inclined plane with friction
10. Comparison of pure rolling vs sliding with rolling resistance

LEARN BEYOND CONTENT:

- Application of engineering mechanics in the human body
- Analysis of forces in cricket bat

CONTACT PERIODS:

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

TEXTBOOKS:

1. S. Timoshenko and D.H. Young, "Engineering Mechanics: Statics", McGraw-Hill Education, 5th Edition, 2017
2. R.C. Hibbeler, "Engineering Mechanics: Statics", Pearson Education, 14th Edition, 2017
3. F.P. Beer, E.R. Johnston and D.F. Mazurek, "Vector Mechanics for Engineers: Statics and Dynamics", McGraw-Hill Education, 12th Edition, 2017
4. J.L. Meriam, and L.G. Kraige, "Engineering Mechanics: Dynamics", Wiley, 9th Edition, 2020

REFERENCES:

1. S. Timoshenko, D.H. Young, J.V. Rao, Sukumar Pati, "Engineering Mechanics", TMH Education, 4th edition, 2016

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.
22/8/25

2. Sanjay Bansal, R.K. Bansal, "A Textbook of Engineering Mechanics", Laxmi Publications Pvt Ltd, 8th edition, 2011

3. N.H. Debey, "Engineering Mechanics Statics and Dynamics", McGraw Hill Education India, 1st Edition, New Delhi 2017

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

U25LEG05	Deutsch für Ingenieure – German II (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- - Nil -

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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

U25LEG06	Nihongo no Enginia – Japanese II (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- - Nil -

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

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

22/8/25

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

2. Takahashi, A., & Sato, M., "Nihongo Pro: Japanese for N5 Level," 1st Edition, KADOKAWA, 2018

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

U25LEG07	Français pour les Ingénieurs – French II (Common to all programmes)	Category: HSMC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- - Nil -

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

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,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

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

PRE-REQUISITES:

- - Nil -

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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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	-	1
CO 2	-	-	-	-	-	-	-	2	3	-	-	-	1
CO 3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	-	1	-	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,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER II

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

PRE-REQUISITES:

- - Nil -

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

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I & II

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

PRE-REQUISITES:

- - Nil -

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	1	-
CO 2	1	2	3	2	-	-	-	-	1	1	1	1	-
CO 3	1	2	3	2	-	-	-	-	1	1	1	1	-
CO 4	1	2	3	2	-	-	-	-	1	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

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

LEARN BEYOND CONTENT:

- Design Thinking for Digital Transformation

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, 22/8/25
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

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

PRE-REQUISITES:

- - Nil -

COURSE OBJECTIVES:

- To introduce the basic structure and functioning of computer systems, including hardware, software, operating systems and file management
- To develop an understanding of fundamental computing concepts such as data types, variables, operators, logic gates 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

COURSE OUTCOMES:

CO 1: Describe the fundamental components of a computer system and explain the role of operating systems and file management in computing — **Understand**

CO 2: Apply basic computational concepts such as data types, variables, operators, algorithms, and logic gates to solve simple problems — **Apply**

CO 3: Develop simple programs using input/output operations, control structures, arrays, and strings in the C language — **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	3	2	2	-	-	-	-	-	-	2	-	-
CO 3	3	3	3	-	2	2	-	-	-	-	2	-	-

SYLLABUS:

UNIT I: INTRODUCTION TO COMPUTERS — **3 + 10**

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

UNIT II: FUNDAMENTALS OF COMPUTING — **6 + 10**

Introduction to algorithms and flowcharts – Overview of Logic gates and basic digital circuits – Data types, variables, and operators

UNIT III: INTRODUCTION TO PROGRAMMING — **6 + 10**

Programming languages overview – Input/output, conditional statements, loops – Basic data structures: arrays and strings

LIST OF EXPERIMENTS

1. Identifying computer components

Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

2. Installation and debugging of the Operating System
3. Programs using variables and data types
4. Programs using Conditional Statements
5. Programs using Loops and Iterations
6. Program using Nested Loops & Pattern Printing

LEARN BEYOND CONTENT:

- Introduction to Debugging and IDEs

CONTACT PERIODS:

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.

SEMESTER I & II

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

PRE-REQUISITES:

- - Nil -

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	1	1	-	-	-	-	-	-	-	-	1	-	-
CO 2	1	1	-	-	-	-	-	-	-	-	1	-	-
CO 3	1	1	-	-	-	-	-	-	-	-	1	-	-
CO 4	1	2	2	1	-	-	-	1	2	1	1	-	-
CO 5	1	2	2	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,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.
22/8/25

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

LEARN BEYOND CONTENT:

- Lab-on-a-Chip

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

22/8/25
Head of the Department,
Mechanical Engineering,
KPR Institute of Engineering and Technology,
Arasur, Coimbatore - 641407.