CURRICULUM 2025
AUTONOMOUS

B. TECH
ELECTRONICS AND COMMUNICATION ENGINEERING

JAWAHARLAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Autonomous Institution Affiliated to APJ Abdul Kalam Technological University, Jawahar Gardens, Mangalam(po), Ottappalam, Palakkad - 679301

CURRICULUM

FOR

B. TECH DEGREE PROGRAMME

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

2025 SCHEME

(AUTONOMOUS)

JAWAHARLAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Autonomous Institution Affiliated to APJ Abdul Kalam Technological University), Jawahar gardens, Mangalam (PO), Ottapalam, Palakkad, Kerala – 679301

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Passed in 3rd BOS dated :12.06.2025 Passed in 3rd Academic Council dated ; 04.07.2025

JAWAHARLAL COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.TECH DEGREE PROGRAMME

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

CURRICULUM AND FIRST YEAR SYLLABI

2025 SCHEME

ITEM	BOARD OF STUDIES (BOS)	ACADEMIC COUNCIL (AC)
DATE OF APPROVAL	12.06.2025	04.07.2025

HEAD OF THE DEPARTMENT
Chairman, Board of Studies

PRINCIPAL
Chairman, Academic Council

JAWAHARLAL COLLEGE OF ENGINEERING AND TECHNOLOGY

VISION OF THE INSTITUTE

Emerge as a center of excellence for professional education to produce high quality engineers and entrepreneurs for the development of the region and the Nation.

MISSION OF THE INSTITUTE

- To become an ultimate destination for acquiring latest and advanced knowledge in the multidisciplinary domains.
- To provide high quality education in engineering and technology through innovative teaching-learning practices, research and consultancy, embedded with professional ethics.
- To promote intellectual curiosity and thirst for acquiring knowledge through outcome based education.
- To have partnership with industry and reputed institutions to enhance the employability skills of the students and pedagogical pursuits.
- To leverage technologies to solve the real life societal problems through community services.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VISION OF THE DEPARTMENT

To become a Centre of Academic Excellence and Research in the field of ECE to raise Engineers with standards and ethical values with the ability to apply acquired knowledge to find solutions for technologically challenging practical problems.

MISSION OF THE DEPARTMENT

- To impart high-quality education through competent staff and state of art infrastructure
- To provide conducive environment for students to nurture talent and holistic personality development with ethical and human values
- To develop research linkage with leading organizations in India to satisfy the needs of society
- To enable student's skills to solve complex engineering problems in the industry and society in current trends

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

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

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

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

4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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

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

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

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

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

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

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

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

PEOs OF THE DEPARTMENT

- Graduates of Electronics and Communication Engineering will be able to Pursue higher education in interdisciplinary areas or will acquire the required professional skills that make them ready for immediate employment.
- Graduates of Electronics and Communication Engineering will be able to Formulate and solve the contemporary issues in industry and society
- Graduates of Electronics and Communication Engineering will be able to build ethical practices, communication skills and leadership qualities to accomplish in society and nation development

PSOs OF THE DEPARTMENT

- Apply science & mathematics through differential and integral calculus; to solve complex electronics and communication engineering problems.
- Attain the ability to interpret the methods of electronic systems and technical specifications to provide solutions for real life problems in the society.
- Competence in utilizing electronic current advances (both software and hardware) for the design and analysis of complex electronic frameworks in research activities

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B. TECH IN ELECTRONICS AND COMMUNICATION ENGINEERING

For the students admitted from 2025

SCHEDULING OF COURSES

Knowledge Segments and Credits

Every course of B. Tech Programme is placed in one of the **thirteen** categories as listed in the following table. No semester shall have more than six lecture-based courses and two laboratory courses, and/or drawing/seminar/project courses in the curriculum.

SL NO	CATEGORY	CATEGORY CODE	CREDIT
1.	Basic Science Courses	BSC	20
2.	Engineering Science Courses	ESC	28
3.	Programme Core Courses and Comprehensive Viva	PCC	41
4.	Programme Core Labs	PCL	16
5.	Programme Core – Project Based Learning	PCC-PBL	14
6.	Programme Elective Courses	PEC	18
7.	Humanities and Social Sciences including Management Courses	HMC	10
8.	Open Elective Courses	OEC	6
9.	Project Work, Seminar and Internship	PWS	15
10.	Skill Enhancement Courses	SEC	2
11.	Ability Enhancement Courses	AEC	2
12.	Value Added Courses	VAC	0
13.	Mandatory Student Activities (P/F)	MSA	3
TOTAL MANDATORY CREDIT			**175**
14	MINOR		20
15	HONOURS		15

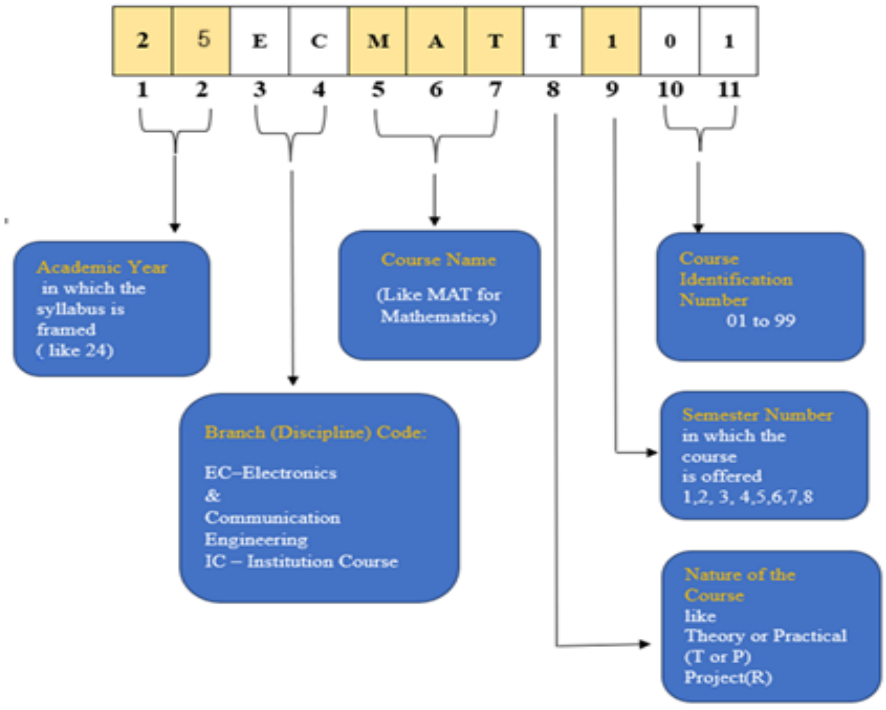
Semester-wise Credit Distribution

SEMESTER	I	II	III	IV	V	VI	VII	VIII	TOTAL
CREDIT	21	22	23	25	23	24	19	18	175
TOTAL	43		48		47		37		

PROGRAM STRUCTURE:

SEMESTER	COURSE CREDIT													
	BSC	ESC	PCC	PCL	PCC-PBL	PEC	HMC	OEC	PWS	SEC	AEC	VAC	MSA	TOTAL
I.	7	12	-	-	-	-	2	-	-	-	-	0	-	**21**
II.	7	10	3	-	-	-	2	-	-	-	-	-	-	**22**
III.	3	3	8	4	2	-	3	-	-	-	-	-	-	**23**
IV.	3	-	11	4	4	-	3	-	-	-	-	-	-	**25**
V.	-	-	11	4	4	3	0	-	-	1	-	-	-	**23**
VI.	-	3	7	4	4	3	-	-	2	1	-	-	-	**24**
VII.	-	-	1	-	-	6	-	3	7	-	2	-	-	**19**
VIII.	-	-	-	-	-	6	-	3	6	-	-	-	3	**18**
TOTAL	**20**	**28**	**41**	**16**	**14**	**18**	**10**	**6**	**15**	**2**	**2**	**0**	**3**	**175**

COURSE CODE:



SEMESTER 1									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./ Week
				L	T	P	R		
1	25ICMATT101	BSC	Linear Algebra, Multivariable Calculus and Series	3	0	0	0	3	3
2	25ICPHYT122	BSC	Semiconductor Physics	3	0	2	0	4	5
3	25ICEGCT103	ESC	Engineering Graphics and Computer-Aided Drawing.	2	0	2	0	3	4
4	25ICBEET104	ESC	Basics of Electrical & Electronics Engineering (Part 1: Electrical Engineering)	2	0	0	0	4	4
			(Part 2: Electronics Engineering)	2	0	0	0		
5	25ICATPT105	ESC	Algorithmic Thinking with Python	3	0	2	0	4	5
6	25ICLPCT106	HMC	Life Skills and Professional Communication	2	0	1	0	2	3
7	25ICEEWP107	ESC	Basic Electrical and Electronics Engineering Workshop	0	0	2	0	1	2
8	25ICVACP108	VAC	Web and Graphics Design	0	0	3	0	0	3
Total								**21**	**29**

SEMESTER 2									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./ Week
				L	T	P	R		
1	25ICMATT201	BSC	Vector Calculus, Ordinary Differential Equations and Transforms	3	0	0	0	3	3
2	25ICCHET222	BSC	Chemistry for Electronics Engineers	3	0	2	0	4	5
3	25ICFCTT203	ESC	Foundations of Computing: From Hardware Essentials to Web Design	2	0	2	0	3	4
4	25ICPGCT204	ESC	Programming in C	2	2	0	0	4	4
5	25ICEEIT205	ESC	Engineering Entrepreneurship & Intellectual Property Rights	2	0	0	0	2	2
6	25ECEDCT206	PCC	Electronic Devices and Circuits	3	0	0	0	3	3
7	25ICHAWT207	HMC	Health and wellness	2	0	1	0	2	3
8	25ICITWP208	ESC	IT Workshop	0	0	2	0	1	2
Total								**22**	**26**

SEMESTER 3									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./ Week
				L	T	P	R		
1	25ICMATT301	BSC	Partial Differential Equations and Complex Variables	3	0	0	0	3	3
2	25ICIAIT302	ESC	Introduction to Artificial Intelligence and Data Science	3	0	0	0	3	3
3	25ECNETT303	PCC	Network Theory	3	1	0	0	4	4
4	25ECDSDT304	PCC	Digital System Design	3	1	0	0	4	4
5	25ECCTET305	PCC-PBL	Computational Tools for Engineers	1	0	0	1	2	3
6	25ICEEST306	HMC	Engineering Ethics and Sustainable Development	2	0	0	0	2	2
7	25ICPSAP307	HMC	Professional Skills for Workplace and Aptitude Readiness	0	0	2	0	1	2
8	25ECDIGP308	PCL	Digital Electronics Lab	0	0	3	0	2	3
9	25ECCASP309	PCL	Circuits and Simulation Lab	0	0	3	0	2	3
Total								**23**	**27**

SEMESTER 4									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./ Week
				L	T	P	R		
1	25ICMATT421	BSC	Probability Distributions, Random Process and Numerical Methods	3	0	0	0	3	3
2	25ECSAST402	PCC	Signals and Systems	3	1	0	0	4	4
3	25ECPCST403	PCC	Principles of Communication Systems	3	1	0	0	4	4
4	25ECLICT404	PCC	Linear Integrated Circuits	3	0	0	0	3	3
5	25ECDSAT405	PCC-PBL	Data Structures & Algorithms Using C	2	0	2	1	4	5
6	25ICIEFT406	HMC	Industrial Economics & Foreign Trade	2	0	0	0	2	2
7	25ICACAP407	HMC	Advanced Communication and Aptitude Skills	0	0	2	0	1	2
8	25ECICSP408	PCL	Integrated Circuits and Simulation Lab	0	0	3	0	2	3
9	25ECCOMP409	PCL	Communication Lab	0	0	3	0	2	3
Total								**25**	**29**

SEMESTER 5									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./ Week
				L	T	P	R		
1	25ECEATT501	PCC	Electromagnetics & Antenna Theory	3	1	0	0	4	4
2	25ECDSPT502	PCC	Digital Signal Processing	3	1	0	0	4	4
3	25ECMAMT503	PCC	Microprocessors & Microcontrollers	3	0	0	0	3	3
4	25ECOEMT504	PCC - PBL	Optimization of Electronic Circuits using Machine Learning	2	0	2	1	4	4
5	25ECXXXT5N5	PEC	PE-1	3	0	0	0	3	3
6	25ICCOIT506	HMC	Constitution of India (P/F)	2	0	0	0	0	2
7	25ICISTP507	SEC	Industry Supported Training Course I	0	0	2	0	1	2
8	25ECDSPP508	PCL	Digital Signal Processing Lab	0	0	3	0	2	3
9	25ECMESP509	PCL	Microcontroller and Embedded System Lab	0	0	3	0	2	3
Total								**23**	**28**

Programme Elective Courses		
SEMESTER 5	**PE-1**	**CREDITS**
25ECMEIT515	Medical Instrumentation	3
25ECFORT525	Fundamentals of Robotics	3
25ECDTCT535	Data Communication	3
25ECSDMT545	Semiconductor Device and Modelling	3
25ECIOTT555	IoT Devices	3

SEMESTER 6									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./ Week
				L	T	P	R		
1	25ICDPDT601	ESC	Design Thinking and Product Development	1	0	2	1	3	4
2	25ECRMET602	PCC	RF & Microwave Engineering	3	1	0	0	4	4
3	25ECCSET603	PCC	Control Systems Engineering	3	0	0	0	3	3
4	25ECVLDT604	PCC-PBL	VLSI Design	3	0	0	1	4	4
5	25ECXXXT6N5	PEC	PE-2	3	0	0	0	3	3
6	25ICISTP606	SEC	Industry Supported Training Course II	0	0	2	0	1	2
7	25ECEMTP607	PCL	Electromagnetics Lab	0	0	3	0	2	3
8	25ECESDP608	PCL	Electronic System Design using VHDL	0	0	3	0	2	3
9	25ECMPRR609	PWS	Mini Project	0	0	0	2	2	2
Total								**24**	**28**

Programme Elective Courses		
Semester 6	**PE2**	**Credits**
25ECESMT615	Embedded Systems in Medicine	3
25ECAIRT625	AI in Robotics	3
25ECITCT635	Information Theory and Coding	3
25ECASDT645	ASIC Design	3
25ECCONT655	Computer Vision	3

SEMESTER 7									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./
				L	T	P	R		
1	25ECCMVT701	PCC	Comprehensive Viva	1	0	0	0	1	1
2	25ECXXXT7N2	PEC	PE-3	3	0	0	0	3	3
3	25ECXXXT7N3	PEC	PE-4	3	0	0	0	3	3
4	25OEXXXT7N4	OEC	Open Elective-1	3	0	0	0	3	3
5	25ICXXXT7N5	AEC	AEC Elective	2	0	0	0	2	2
6	25ECINTR706	PWS	Industry Internship for 30 to 45 Days/ Certification from Professional Body or Organization	0	0	0	2	2	0
7	25ECSEMR707	PWS	Seminar	0	0	0	2	2	2
8	25ECPROR708	PWS	Major Project Phase I	0	0	0	3	3	3
Total								**19**	**17**

Programme Elective Courses		
Semester 7	**PE3**	**Credits**
25ECBIPT712	Biomedical Image Processing	3
25ECSMRT722	Swarm Robotics	3
25ECWLCT732	Wireless Communication	3
25ECCADT742	CMOS Analog IC Design	3
25ECRILT752	Reinforcement Learning	3

Programme Elective Courses		
Semester 7	**PE4**	**Credits**
25ECBSPT713	Biomedical Signal Processing	3
25ECIRAT723	Industrial Robotics and Automation	3
25ECOSCT733	Optical and Satellite Communication	3
25ECCIDT743	CAD for IC Design	3
25ECNLPT753	Natural Language Processing	3

Open Elective Courses		
Semester 7	**OE-1**	**Credits**
25OEMOCT714	Mobile Computing	3
25OEMEMT724	MEMS Technology	3
25OEESDT734	Electronic System Design	3

AEC Electives		
Semester 7	**AEC ELECTIVE**	**Credits**
25ICPMPT715	Project Management: Planning, Execution, Evaluation and Control	2
25ICOBBT725	Organizational Behaviour and Business Communication	2
25ICPCFT735	Proficiency Course in French. (MOOC) (B1 Level)	2
25ICPCGT745	Proficiency Course in German (B1 Level). (MOOC)	2
25ICPCST755	Proficiency Course In Spanish (B1 Level) (MOOC)	2
25ICIJLT765	Introduction to Japanese Language and Culture (N5 Level). (MOOC)	2

SEMESTER 8									
Sl. No	Course Code	Category Code	Course Name	Credit Structure				Credits	Hrs./ Week
				L	T	P	R		
1	25ECXXXT8N1	PEC	PE-5	3	0	0	0	3	3
2	25ECXXXT8N2	PEC	PE-6	3	0	0	0	3	3
3	25OEXXXT8N3	OEC	Open Elective-2	3	0	0	0	3	3
4	25ECPROR804	PWS	Major Project Phase II	0	0	0	6	6	6
5	25ICMSAP805	MSA	Mandatory Student Activity	0	0	0	0	3	0
Total								**18**	**15**

Programme Elective Courses		
Semester 8	**PE5**	**Credits**
25ECMIET811	Medical informatics and Expert systems	3
25ECSADT821	Sensor and Actuator Devices for Robotics	3
25ECFSCT831	5G/6G Communication	3
25ECLPVT841	Low Power VLSI Design	3
25ECBDAT851	Big Data Analytics	3

Programme Elective Courses		
Semester 8	**PE6**	**Credits**
25ECBITT812	Biotelemetry	3
25ECMORT822	Mobile Robotics	3
25ECTCST832	Terahertz Communication and Sensing	3
25ECHIVT842	High Speed Interconnects for VLSI Design	3
25ECDSQT852	Data Science with Quantum Computing	3

Open Elective Courses		
Semester 8	**OE-2**	**Credits**
25OEESAT813	Embedded Systems and Applications	3
25OEBMIT823	Biomedical Instrumentation	3
25OEREST833	Renewable Energy System	3

MSA				
Sl. No	Group	Courses	Credits	Minimum Credit Requirements
1	I	NSS, NCC, NSO (National Sports Organization)	1 (40 Points)	3 Credits (One credit from each Group in 4 years)
2		Arts/ Sports/ Games		
3		Union/ Club Activities/ Field Visit		
4	II	English Proficiency Certification (TOEFL, IELTS, BEC etc)	1 (40 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc)/ Valid Gate Score		
6		Short Term Internship (Minimum 4 weeks), Clinical Exposure/ Training (Minimum 4 weeks), Conferences/ Paper Presentation/ Workshop activities/ Professional body activities, Field Work With output		
7	III	Journal Publication, Patents, Incubation, etc	1 (40 Points)	
8		Skilling Certificates (Approved by The Institute)		

SYLLABUS

SEMESTER-I

25ICMATT101	LINEAR ALGEBRA, MULTIVARIABLE CALCULUS AND SERIES	Category	L	T	P	Credit
		BSC	3	0	0	3

Preamble

This course introduces students to some basic mathematical ideas and tools which are at the core of any engineering course. A brief course in Linear Algebra familiarizes students with some basic techniques in matrix theory which are essential for analyzing linear systems. The calculus of functions of one or more variables taught in this course is useful in modeling and analyzing physical phenomena involving continuous change of variables or parameters and has applications in engineering.

Prerequisite

Basic mathematics at plus two-level which includes single-variable calculus and multivariate calculus.

Course Outcomes

After the completion of the course the student will be able to

CO Number	Course Outcome Statement	Weightage in %
CO1	Apply the matrix concepts to solve problems for a system of equations in engineering (Applying)	20
CO2	Employing the partial derivatives to find the maxima and minima of multivariable functions (Applying)	20
CO3	Apply the concepts of double integrals to find the areas and volumes (Applying)	20
CO4	Utilising the concepts of triple integrals to find the volumes of geometrical shapes (Applying)	20
CO5	Understand the power series expansion of a given function and apply it in engineering (Understanding)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1 *	PSO2 *	PSO3 *
CO1	3	3	3	3	-	3	-	-	1	-	-	3	-	-	-
CO2	3	3	3	3	-	3	-	-	1	-	-	3	-	-	-
CO3	3	3	3	3	-	3	-	-	1	-	-	3	-	-	-
CO4	3	2	3	2	-	3	-	-	1	-	-	3	-	-	-
CO5	3	3	3	3	-	3	-	-	1	-	-	3	-	-	-
AVG	**3**	**2.8**	**3**	**2.8**	**-**	**3**	**-**	**-**	**1**	**-**	**-**	**3**	**-**	**-**	**-**

1-Low; 2-Medium; 3- Strong

* The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable programme Specific outcomes (PSOs)

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	2	1	2	
Remembering	20	20	10	10	20
Understanding	30	30	40	40	30
Applying	50	50	50	50	50
Analyzing					
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	Assignment
Set	
Guided Response	
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution

Total Mark	CIA	ESE	ESE Duration
100	40	60	2.5 hours

Continuous Internal Evaluation Pattern:

Attendance : 6 marks
Continuous Assessment Test (2 numbers) : 20 marks
Assignment/Quiz/Course project : 14 marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration =90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 60 Marks;** **Duration =150 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 9 = 45 Marks

Sample Questions for Course Outcome Assessment

Course Outcome 1 (CO1):

1. Solve the system of equations by Gauss elimination method x+2y+3z=1
   2x+3y+2z=2
   3x+3y+4z=1

2. Consider the matrix: $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$. Find the eigenvalues and eigenvectors of the matrix. Then, use them to diagonalize the matrix A.

3. Determine the rank of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 2 & 5 \end{bmatrix}$.

4. If 2 is an eigen value of $\begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ without using characteristic equation find the other eigen values.

5. For what values of a and b do the system of equation $x + y + z = 6$
   $x + 2y + 3z = 10$
   $x + 2y + az = b$

Course Outcome 2(CO2):

1. The temperature distribution in a metal plate is given by the function $T(x, y) = \frac{xy}{x^2+y^2}$ for$(x, y) \neq (0,0)$ and $T(0,0) = 0$. Investigate the continuity of the function at the point (0,0). Does the limit exist as$(x, y) = (0,0)$? Is the function continuous at that point?
2. A cylindrical tank's volume **V** depends on its radius **r** and height **h** according to the formula$V = \pi r^2 h$. The radius and height of the tank both change with time t as $r(t) = 2 + t$ and $h(t) = 5 - t$. Using the chain rule,find the rate of change of volume of the tank with respect to time t at $t = 1$.
3. Find the absolute maximum and minimum values of the function$f(x, y) = x^2 + y^2 - 2x - 4y$ on the closed and bounded triangular region with vertices at$(0,0), (2,0)$ and $(0,2)$. Analyse the function on the boundaries and at the vertices to determine these values.
4. A production model for a company is given by $P(x, y) = x^2y + 3xy^2$, where x and y represent the amounts of two different resources used. The resources x and y are functions of time t, given by $x(t) = 2t$ and $y(t) = 3 + t^2$. Compute the total derivative of the production P with respect to time $t = 2$.
5. Consider the function $f(x, y) = x^2 - 3x + y^2$ Determine the critical points of f and use the second partial derivative test to classify each critical point as a relative maximum, relative minimum, or saddle point.

Course Outcome 3 (CO3):

1. A lamina occupies the region bounded by $y = \sqrt{x}$ and $= x$. he density function is given by$\delta(x, y) = 3x + 2y$. Find the mass and the coordinates of the center of gravity of the lamina.
2. A swimming pool is circular with a 40-meter diameter. The depth is constant along east-west lines and increases linearly from 2 meters at the south end to 7 meters at the north end. Find the volume of the pool.
3. Change the order of integration and evaluate the integral $\int_0^1 \int_{x^2}^1 e^{y^2} dydx$.
4. Using double integral to find the area enclosed by the cardioid $r = 1 + cos\theta$. Set up and evaluate the corresponding double integral.
5. Using triple integral find the volume of the solid bounded by the cylinder $r = 2$ and the planes$z = 0$ and $z = 3r$. Set up and evaluate the triple integral in cylindrical coordinates.

Course Outcome 4 (CO4):

1. A scientist records the population of a bacterial culture each hour. The population forms a geometric sequence with the first term $a = 500$ and a common ratio $r = 0.8$. Determine if the sequence converges, and if so, find its limit. Additionally, sum the first 10 terms of this sequence.
2. Determine the convergence or divergence of the series $\sum_{n=1}^{\infty} \frac{3n}{n^2+1}$. using the comparison test.
3. Consider the series $\sum_{n=1}^{\infty} \frac{n!}{n^n}$. Use the ratio test to determine if the series converges or diverges.
4. Investigate the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt[n]{n}}$ for absolute and conditional convergence. Does the series converge absolutely, conditionally, or diverge?
5. Use the Leibniz test to determine the convergence of the alternating series$\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2+1}$. Also, determine if the series converges absolutely or conditionally

Course Outcome 5(CO5):

1. Find the Taylor series representation of the function $f(x) = ln\,(1 + x)$ centered at $x = 0$. Determine the radius of convergence of this series.

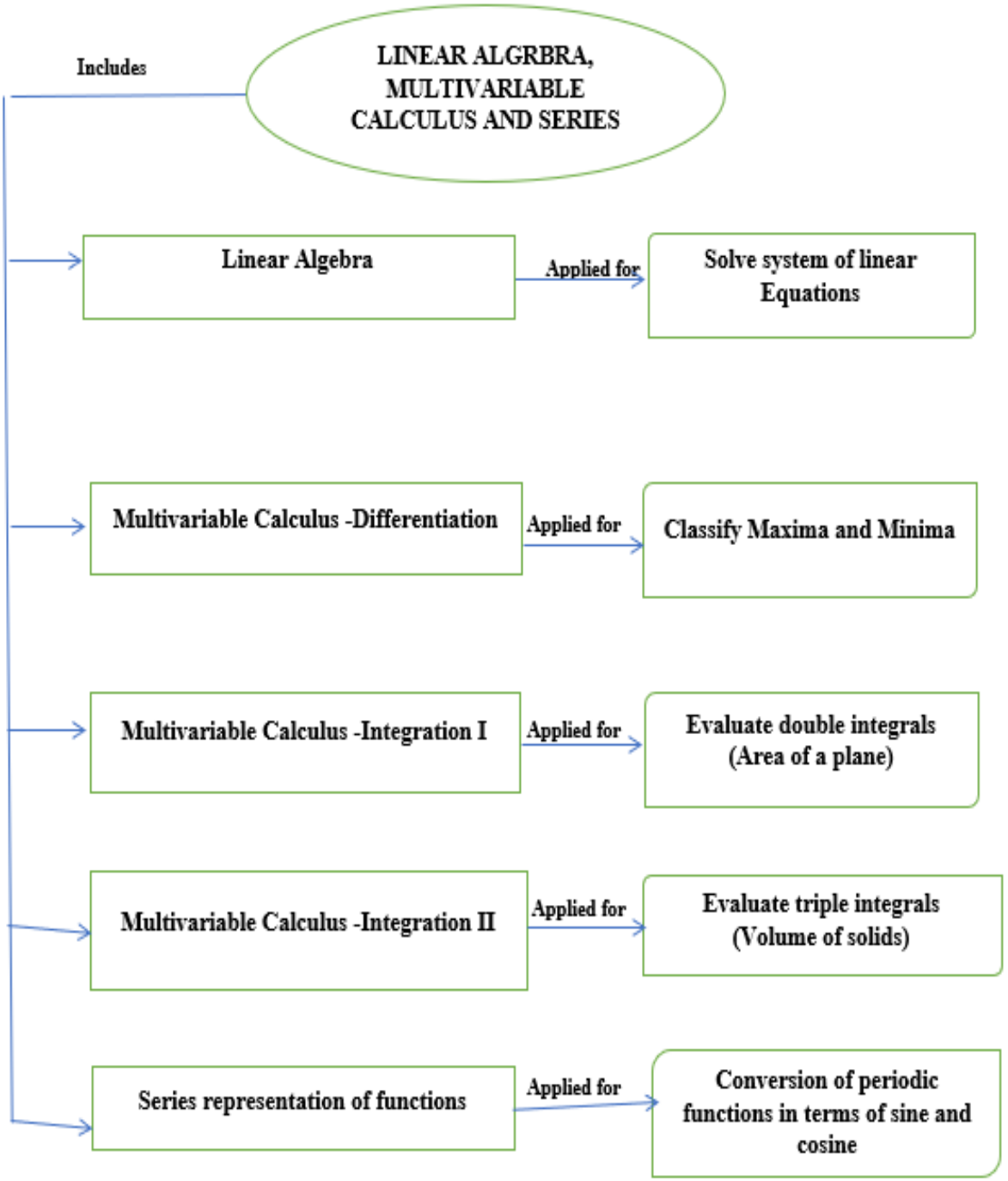
2. Express the function $g(x) = e^x sinx$ as a power series centered at $x = 0$. Combine the known series representations of e^x and $sinx$ to write the first five non-zero terms of the series.

3. Verify if the Fourier series of the function $f(x) = |x|$ defined on the interval $[-\pi, \pi]$ converges to$f(x)$ for all x. Check if the function satisfies Dirichlet's conditions for convergence of its Fourier series.

4. Consider the function $f(x) = x$ defined on the interval $[-\pi, \pi]$. Find its Fourier series representation using Euler formulas. Clearly identify the coefficients for the sine and cosine terms.

5. Given the function $f(x) = x(2 - x)$ on the interval$[0,2]$, find the half-range cosine series representation of $f(x)$. Write out the first three non-zero terms of the series

Concept Map


LINEAR ALGRBRA, MULTIVARIABLE CALCULUS AND SERIES
Includes
Linear Algebra
Applied for
Solve system of linear Equations
Multivariable Calculus -Differentiation
Applied for
Classify Maxima and Minima
Multivariable Calculus -Integration I
Applied for
Evaluate double integrals (Area of a plane)
Multivariable Calculus -Integration II
Applied for
Evaluate triple integrals (Volume of solids)
Series representation of functions
Applied for
Conversion of periodic functions in terms of sine and cosine

Syllabus

MODULE 1

Systems of linear equations - Solution by Gauss Elimination Row echelon form-finding rank from row echelon form fundamental theorem for linear systems - Diagonalization of matrices - Eigen values and eigen vectors

MODULE 2

Concept of limit and continuity of functions of two variables, partial derivatives, chain rule, total derivative, Differentials, Local Linear approximations, Relative maxima and minima

MODULE 3

Double integrals, Reversing the order of integration in double integrals, change of coordinates in double integrals (Cartesian to polar), Finding areas and volume using double integrals, mass and center of gravity of plane laminas.

MODULE 4

Triple integrals, volume calculated as triple integral, triple integrals in cartesian coordinates, triple integrals in cylindrical coordinates,

MODULE 5

Series Representation of Functions - Taylor series –Fourier Series - Fourier series Euler formulas Half range sine and cosine series,properties.

Learning Resources

TEXT BOOKS

Sl.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Erwin Kreyszig	Advanced Engineering Mathematics	10th Edition	John Wiley & Sons	2020
2	H Anton, I Biven, S Davis	Calculus	12th Edition	Wiley	2024

REFERENCE BOOKS

Sl.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	J. Stewart	Essential Calculus	2nd Edition	Cengage Learning	2017
2	B.V Ramana	Higher Engineering Mathematics	39th Edition	McGraw-Hill Education	2023
3	Howard,Anton,Chris Rorres	Elementary Linear Algebra	11th Edition	Wiley	2019

On line study materials:

1. https://nptel.ac.in/courses/112105123/
2. https://youtu.be/XzaeYnZdK5o?si=2IyMWT5JNmtmzMEn
3. https://youtu.be/md5UCR7mcIY?si=jh94s18XP-LBw8F3
4. https://youtu.be/4QFsiXfgbzM?si=K0oM3ilxYXkCy_bH

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1	**Linear Algebra**	**9**	
1.1	Systems of Linear Equations	1	
1.2	Solution by Gauss Elimination Row echelon form-finding rank from row echelon form	3	CO1
1.3	Eigen values and Eigen vectors	2	
1.4	Diagonalization of matrices	3	
2	**Multivariable calculus-Differentiation**	**9**	
2.1	Concept of limit and continuity of functions of two variables, partial derivatives	2	
2.2	Differentials	1	CO2
2.3	Local Linear approximations	2	
2.4	Chain rule	1	
2.5	Total derivative	1	
2.6	Maxima and minima	2	
3	**Multivariable calculus-Integration -I**	**9**	
3.1	Double integrals (Cartesian)-evaluation	2	CO3
3.2	Change of coordinates (Cartesian to polar),	2	
3.3	Reversing the order of integration	2	
3.4	Finding areas and volumes	1	
3.5	Mass and center of gravity of plane laminas	2	
4	**Multivariable calculus-Integration -II**	**9**	
4.1	Triple integrals	2	
4.2	Volume calculated as triple integrals	2	CO4
4.3	Triple integrals in Cartesian coordinates	3	
4.4	Triple integrals in cylindrical coordinates	2	
5	**Series representation of functions**	**9**	
5.1	Taylor series	1	
5.2	Series representation of exponential, trigonometric, logarithmic functions	2	CO5
5.3	Fourier series	2	
5.4	Euler formulas	1	
5.5	Half range sine and cosine series	3	
Total Hours		**45**	

COURSE DESIGNED BY	VERIFIED BY
Ms. Dayana K Asst. Professor, BS & H, JCET E Mail ID: dayanak@jawaharlalcolleges.com	Prof. K R Vijayakumaran Pillai Professor and Head, BS & H, JCET E Mail ID:krvijay@jawaharlalcolleges.com

25ICPHYT122	SEMICONDUCTOR PHYSICS	Category	L	T	P	Credit
		BSC	3	0	2	4

Preamble

The aim of the Engineering Physics program is to offer students a solid background in the fundamentals of Physics and to impart that knowledge in Electronics Engineering. The program is designed to make the students gain practical knowledge to correlate with the theoretical studies and use the principles in the right way to implement the modern technology.

Prerequisite

Higher secondary level Physics- Concepts of Oscillations and waves, Semiconductor, Nano scale, basics of magnetism, phenomena of light, Differential equations

Course Outcomes

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

COs	Course Outcome Statement	Weightage in %
CO1	Explain the fundamentals of Semiconductor Physics (Understanding)	20
CO2	Analyze the behavior of semiconductor materials in various semiconductor devices, and validate their characteristics through experimental verification. (Analyzing)	20
CO3	Analyze the behavior of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices and apply the knowledge of nanotechnology in various applications (Analyzing)	20
CO4	Classify the properties of magnetic materials, apply vector calculus to analyze static magnetic fields, and utilize Maxwell's equations to solve various engineering problems, corroborating these findings through experimental verification. (Understanding)	20
CO5	Analyze the underlying principles of various photonic devices, explain the operation of solid-state lighting devices and fiber optic communication systems, and validate their functionality through experiments. (Analyzing)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	-	3	2	-	2	1	3	-	-	3	1	-	-
CO2	3	3	3	-	3	-	2	1	3	-	-	3	1	-	-
CO3	2	3	-	2	3	-	2	1	3	-	-	3	1	-	-
CO4	3	1	-	-	1	-	2	1	3	-	-	3	1	-	-
CO5	3	1	1		2	1	2	1	3	-	-	3	1	-	-
Avg	**2.6**	**2.2**	**2**	**2.5**	**2.2**	**1**	**2**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**-**

1-Low; 2-Medium; 3- Strong

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	2	1	2	
Remembering	20	20	10	10	20
Understanding	30	30	40	40	30
Applying	50	40	50	40	40
Analyzing		10		10	10
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	Assignment
Set	
Guided Response	Practical
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Total Mark	CIA	ESE	ESE Duration
100	60	40	2.5 Hours

Continuous Internal Evaluation Pattern:

Attendance : 9 Marks

Continuous Assessment Test (2 numbers) : 24 Marks

Practical : 27 Marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration = 90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 40 Marks** **Duration = 150 Minutes** Part A: 5 X 8 = 40 Marks

Sample Questions for Course Outcome Assessment*

Course Outcome 1 (CO1):

1. Explain the significance of the energy gap in semiconductors and how it affects their electrical properties..
2. Derive the expression for electrical conductivity using the Classical Free Electron Theory.
3. The Fermi energy of a metal at absolute zero is 5.5 eV. Calculate the probability that an electron occupies a state with energy 5.6 eV at a temperature of 300 K.

Course Outcome 2(CO2):

1. What is the difference between a half-wave and a full-wave rectifier? Explain.
2. Explain the mechanism of Zener breakdown and Avalanche breakdown. How are they different?
3. Describe the role of a MOSFET in power electronics applications.

Course Outcome 3 (CO3):

1. Analyze the physical significance of the wave function, exploring its implications in advanced practical applications
2. What is the difference between the time-dependent and time-independent forms of the Schrodinger equation?
3. What are some potential applications of graphene and carbon nanotube-based devices?

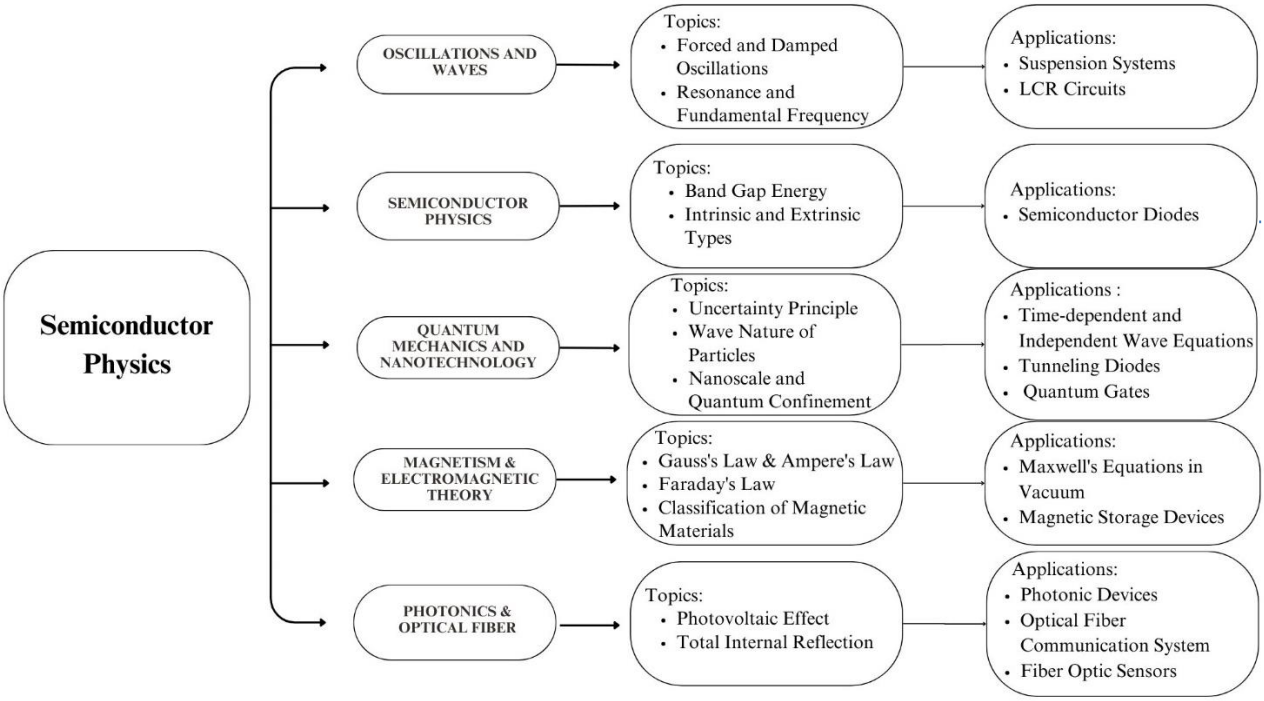
Course Outcome 4 (CO4):

1. How can Ampère's Circuital Law be utilized to determine the magnetic field strength generated by a current-carrying wire loop of complex geometry? Discuss the practical implications of applying this law in the design and analysis of electromagnetic devices such as transformers or solenoids
2. Using the equation of continuity, Gauss's divergence theorem, and Stokes's theorem, deduce Maxwell's equations.
3. An electromagnetic wave is described by $E = 100\ e^{[8\pi i\ [10\ 14\ t - (10\ 6\ z / 3)]}$ V/m. Find the direction of propagation of the wave, speed of the wave and magnetic flux density in the wave.

Course Outcome 5 (CO5):

1. Illuminate the operational dynamics of a solar cell.
2. In what scenarios would you recommend implementing photodiodes over other light-detection devices, considering factors such as working principle, sensitivity, response time, and spectral range?
3. Calculate the numerical aperture and acceptance angle of a fiber with a core refractive index of 1.54 and a cladding refractive index of 1.50 when the fiber is inside water of refractive index 1.33

Concept Map



Syllabus

Module 1

Introduction to Semiconductor Physics

Classification of materials- conductors, semiconductors insulators, Classical free electron Theory, Electric conductivity, Fermi Dirac distribution, Variation of Fermi function with temperature, Semiconductors- Intrinsic and extrinsic semiconductors, P-N junction Diode, Diode equation (Derivation).

Module 2

Semiconductor devices and its Applications

Rectifiers- Full wave and Half wave, Zener breakdown and Avalanche breakdown, Applications of Zener diode, Transistor, FET, MOSFET (qualitative aspects).

Module 3

Quantum Mechanics and Nanotechnology

Introduction for the need of Quantum mechanics, Wave nature of Particles, Uncertainty principle, Applications-Absence of electrons inside a nucleus, Wave function. Formulation of time dependent and independent Schrodinger wave equations

Introduction to Nano science and technology, Increase in surface to volume ratio for nano materials, Carbon nanotube, Graphene and carbon nanotube devices, General applications of nanotechnology.

Module 4

Magnetism & Electromagnetic Theory

Magnetic field and Magnetic flux density, Gauss's law for Magnetic flux density, Ampere's Circuital law, Faraday's laws, Magnetic permeability and susceptibility, Gauss divergence theorem & Stokes' theorem, Equation of continuity, Derivation of Maxwell's Four equations in vacuum.

Module 5

Photonics and fiber optics

Introduction to photonics-Photonic Devices-Light Emitting Diode, Photo detectors -Junction and PIN photodiodes, phototransistors, Solar cells Voltage- Current Characteristics Optic fiber -Principle of propagation of light, Types of fibers- Step index and Graded index fibers, Acceptance Angle, Numerical aperture, fiber optic communication system (block diagram), Optical Fiber Sensors – Intensity and Phase Modulated Sensors, Applications of optical fiber in various fields.

Learning Resources

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	M.N.Avadhanulu, P.G.Kshirsagar,TVS Arun Murthy	A Text book of Engineering Physics	New Edition	S.Chand &Co	2019
2	H.K.Malik , A.K. Singh	Engineering Physics	Second Edition	McGraw Hill Education	2019

REFERENCE BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
4	Dominic and. A. Nahari	A Text Book of Engineering physics	New Edition	Owl Books Publishers,	2018
5	Premlet B.,	Advanced Engineering Physics	Tenth Edition	Phasor Books	2017
6	Simen Sze	Semiconductor Physics and devices	Third Edition	Wiley publiications	2021

7	**M.N.Avadhanulu, A.A.Dani and Pokely P.M**	**Experiments in Engineering Physics**	**Second**	**S.Chand&Co**	**2008**
8	**Dr Ruby Das (Author), C S Robinson (Author), Rajesh Kumar (Author**	**A Textbook for Engineering Physics Practical**	**Second**	**Laxmi Publications Pvt Ltd**	**2014**
9	**S. K. Gupta,**	**Engineering physics practicals**	**Second**	**Krishna Prakashan Pvt. Ltd**	**2014**

On line study materials:

1. https://youtube.com/playlist?list=PLcwp2fRcIXJVaQ3AuNElHIPGTBknaCSMe&si=ITUg97R-Mdm5aHFm
2. https://youtube.com/playlist?list=PLQzUXa8lZVq8lfZN5836sohUpRCt2b6oB&si=JqGaMS3-Wku8Cwhy
3. https://youtu.be/Z_RtYSnuVOo?si=GENvPLsz0roapXAJ
4. https://youtu.be/BuBOsyl84Ao?si=FvHJeLm-91m-wsAG
5. https://youtu.be/ZRmXM2FL5s4?si=qMIIztluiOrwcl3r
6. https://youtu.be/xE70wbPonZc?si=JX_V5Ps6tQa-yrYu
7. https://youtu.be/cEi-fT_KSIM?si=LLmf-gFeIeYI8Ga6

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1.	**Introduction to Semiconductor Physics**	**9**	CO1
1.1	Classification of materials- conductors, semiconductors insulators	1	
1.2	Classical free electron Theory	1	
1.3	Electric conductivity	1	
1.4	Fermi Dirac distribution,	1	
1.5	Variation of Fermi function with temperature,	2	
1.6	Semiconductors	1	
1.7	Intrinsic and extrinsic semiconductors	1	
1.8	P-N junction Diode, Diode equation (Derivation)	1	
2.	Semiconductor devices and its Applications	**9**	
2.1	Rectifiers	1	
2.2	Full wave and Half wave	1	
2.3	direct and indirect band gap semiconductors, Carrier concentration in intrinsic semiconductors	1	

2.4	Zener breakdown	2	CO2
2.5	Avalanche breakdown	1	
2.6	Applications of Zener diode,	1	
2.7	Transistor, FET(qualitative aspects)	1	
2.8	MOSFET (qualitative aspects)	1	
3	**Quantum Mechanics & Nanotechnology**	**9**	CO3
3.1	Introduction for the need of Quantum mechanics, Wave nature of Particles	1	
3.2	Uncertainty principle, Applications-Absence of electrons inside a nucleus.	1	
3.3	Physical Meaning of wave function	1	
3.4	Formulation of time dependent Schrodinger wave equation -	1	
3.5	Formulation of Schrodinger's time independent wave equation	1	
3.6	Introduction to Nano science and Technology	2	
3.7	Increase in surface to volume ratio for nano material, Carbon nanotube.	1	
3.8	Graphene and carbon nanotube devices, General applications of nanotechnology	1	
4	**Magnetism & Electro Magnetic Theory**	**9**	CO4
4.1	Magnetic field and Magnetic flux density, Gauss's law for Magnetic flux density, Ampere's Circuital law,	1	
4.2	Faraday's law in terms of Electromotive force produced by changing magnetic flux.	1	
4.3	Magnetic permeability and susceptibility	1	
4.4	Gauss divergence theorem & Stokes' theorem of integrals	2	
4.5	Equation of continuity	1	
4.6	Derivation of Maxwell's First equation in vacuum	1	
4.7	Derivation of Maxwell's Second and Third equations in vacuum	1	
4 8	Derivation of Maxwell's Fourth equation in vacuum	1	
5	**Photonics and Fiber optics**	**9**	CO5
5.1	Introduction to photonics-Photonic Devices-Light Emitting Diode.	1	
5.2	Photo detectors -Junction and PIN photodiode, phototransistors	1	
5.3	Solar cells - Current-Voltage Characteristics	1	
5.4	Optic fiber-Principle of propagation of light	1	
5.5	Types of fibers-Step index and Graded index fibers	2	
5.6	Acceptance angle, Numerical aperture –Derivation	1	
5.7	Fiber optic communication system (block diagram)	1	

5.8	Optical Fiber Sensors – Intensity and Phase Modulated Sensors Industrial, Medical and Technological applications	1	
	TOTAL	45 hours	

PHYSICS LAB

Expt No	Name of the Experiment	No. of Hours
1	Voltage - Current Characteristics of p-n junction diode	2
2	Voltage - Current Characteristics of Zener diode	2
3	Deflection Magnetometer- Determination of Moment of Magnet- Tan A and Tan B Position.	2
4	Determination of Magnetic field along axis of a current carrying coil - Stewart and Gee's Apparatus	2
5	Voltage - Current Characteristics of Light Emitting diode	2
6	Drawing of voltage current characteristics of a Solar cell and the determination of maximum power	2
7	Determination of Acceptance angle and numerical aperture of fiber optic cable.	2

COURSE DESIGNED BY	VERIFIED BY
Ms. Sreevidya P Asst. Professor, B S and H Dept, JCET E. Mail ID: sreevidya3923.phy@jawaharlalcolleges.com	Ms. Sandhya N S Asst. Professor, B S and H Dept, JCET E. Mail ID: sandhya.physic@jawaharlalcolleges.com

25ICEGCT103	ENGINEERING GRAPHICS AND COMPUTER AIDED DRAWING	Category	L	T	P	Credit
		ESC	2	0	2	3

Preamble

To enable the student to effectively perform technical communication through graphical representation as per global standards.

Prerequisite

None

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Draw the projection of points and lines located in different quadrants manually and using CAD tools.	20
CO2	Prepare multi view orthographic projections of objects by visualizing them in different positions manually and using CAD tools.	20
CO3	Draw sectional views and develop surfaces of a given object manually and using CAD tools.	20
CO4	Prepare pictorial drawings using the principles of isometric projections to visualize objects in three dimensions manually and using CAD tools.	20
CO5	Prepare orthographic views by converting 3D views using both manual drawing and CAD tools.	20

Mapping with Programme Outcomes and Programme Specific Outcomes

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

3- Strong; 2-Medium; 1-Low

Assessment Pattern: Cognitive Domain

Cognitive	Continuous Assessment Tests	Assignment	Terminal

Levels	1	2	1	2	Examination
Remembering					
Understanding	20	20	40	20	20
Applying	80	80	60	80	80
Analyzing					
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	Assignment
Set	
Guided Response	CAD Practice
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution

Total Mark	CIA	ESE	ESE Duration
100	60	40	2.5 Hours

Continuous Internal Assessment Pattern:

Attendance : 9 marks
Continuous Assessment Test (2 numbers) : 24 marks
Assignment/Quiz/ Practical : 27 marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration =90 Minutes** **Theory Evaluation** 5 X 6 = 30 Marks **Practical Evaluation** 2 X 8 = 16 Marks 1X 4 = 4 Marks
End Semester Exam	**Total = 40 Marks;** **Duration =150 Minutes** Part A: 5 X 8 = 40 Marks

Sample Questions for Course Outcome Assessment

(Questions may be framed based on the outline given under each course outcome)

Course Outcome 1 (CO1):

1. Locate points in different quadrants as per given conditions.
2. Problems on lines inclined to both planes.
3. Find True length, Inclinations and Traces of lines**.**
4. Prepare drawings using CAD

Course Outcome 2 (CO2)

1. Draw orthographic views of solids and combination solids
2. Draw views of solids inclined to any one reference plane.
3. Draw views of solids inclined to both reference planes.
4. Prepare drawings using CAD

Course Outcome 3 (CO3):

1. Draw views of solids sectioned by a cutting plane
2. Find location and inclination of cutting plane given true shape of the section
3. Draw development of lateral surface of solids and also its sectioned views
4. Prepare drawings using CAD

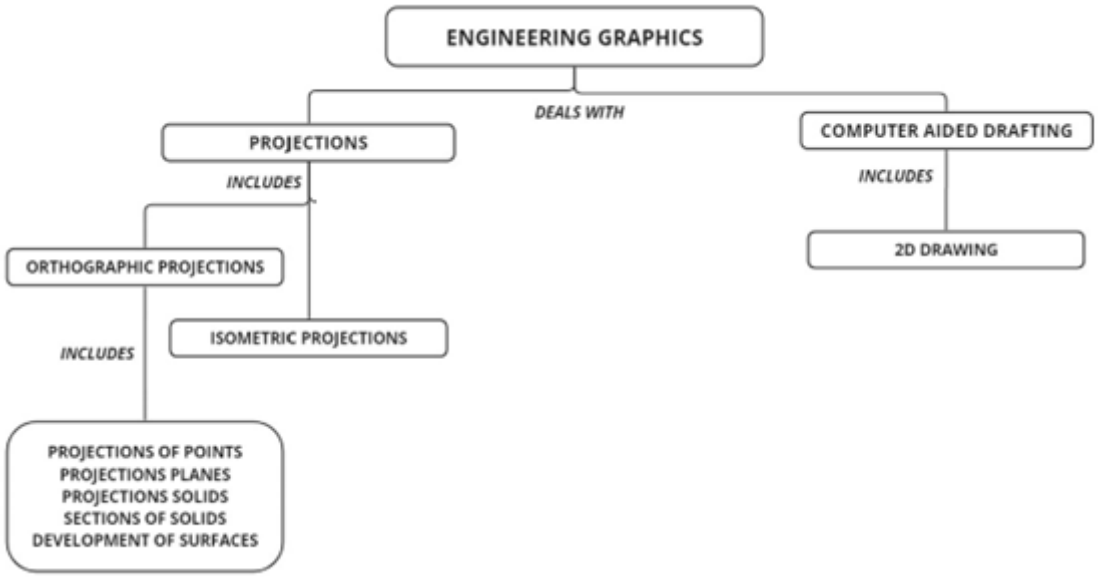
Course Outcome 4 (CO4):

1. Draw Isometric views/projections of solids
2. Draw Isometric views/projections of combination of solids
3. Prepare drawings using CAD

Course Outcome 5 (CO5):

1. Draw Orthographic views of solids from given three-dimensional view
2. Prepare three-dimensional drawings of the given combination of solids using CAD
3. Prepare Orthographic views of solids using CAD.

Concept Map



Syllabus

MODULE 1

BASICS AND PROJECTIONS OF STRAIGHT LINES

Introduction: Relevance of technical drawing in engineering field. Types of lines, Dimensioning, BIS code of practice for technical drawing. Orthographic projection of Points and Lines: Projection of points in different quadrants, Projection of straight lines inclined to one plane and inclined to both planes. Trace of line. Inclination of lines with reference planes True length of line inclined to both the reference planes. (Line rotation method only) (Minimum 10 manual drawings and 5 CAD drawings compulsory)

MODULE 2

PROJECTIONS OF SOLIDS

Orthographic projection of planes. (Introduction only). Orthographic projection of Solids: Projection of Simple solids such as Triangular, Rectangle, Square, Pentagonal and Hexagonal Prisms, Pyramids, Cone and Cylinder. Projection of solids with axis inclined to one of the reference planes and with axis inclined to both reference planes. (Minimum 10 manual drawings and 5 CAD drawings compulsory)

MODULE 3

SECTIONS OF SOLIDS AND DEVELOPMENT OF SURFACES

Sections of Solids: Sections of Prisms, Pyramids, Cone, Cylinder with axis in vertical position and cut by different section planes. True shape of the sections. Development of Surfaces: Development of surfaces of the above solids and solids cut by different section planes. The shortest distance between two points on the surface of solids. (Minimum 10 manual drawings and 5 CAD drawings compulsory)

MODULE 4

ISOMETRIC PROJECTION

Isometric Projection: Isometric View and Projections of Prisms, Pyramids, Cone, Cylinder, Frustum of Pyramid, Frustum of Cone, Sphere, Hemisphere and their combinations. (Minimum 10 manual drawings and 5 CAD drawings compulsory)

MODULE 5

MULTIVIEW PROJECTIONS

Conversion of Pictorial Views: Conversion of pictorial views into orthographic views. Introduction to 3D Modelling Using CAD Software. (Minimum 10 manual drawings and 5 CAD drawings compulsory)

Learning Resources

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Bhatt, N., D.	Engineering Drawing	Fifty Oneth Edition	Charotar Publishing House Pvt Ltd.	2022
2	Varghese, P. I.	Engineering Graphics	Thirty Fourth edition	V I P Publishers	2023

REFERENCE BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	John, K. C.	Engineering Graphics	Ninth Edition	Prentice Hall India Publishers	2009
2	Anilkumar, K. N.	Engineering Graphics	Second Edition	Adhyuth Narayan Publishers	2016
3	Venugopal, K	Engineering Drawing & Graphics	Ninth edition	New Age International Publishers	2011
4	T. Jeyapoovan	Engineering Graphics using AutoCAD	Third Edition	7/e Vikas Publication	2015
5	Dr.H. Ganesan, Sreejith K V and Ragesh P R	Engineering Graphics	First edition	Sree Krishna Publication	2016

ONLINE STUDY MATERIALS:

1. https://onlinecourses.nptel.ac.in/noc24_me140/preview
2. https://onlinecourses.nptel.ac.in/noc23_me144/preview

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1.	**Basics and Projections of Straight Lines**		CO1
1.1	Introduction to graphics, types of lines, Dimensioning	1	

1.2	Concept of principle planes of projection, different quadrants, locating points on different quadrants	1	
1.3	Projection of lines, inclined to one plane.	2	
1.4	Lines inclined to both planes	1	
1.5	Line rotation method of solving, problems on line rotation method	2	
1.6	CAD Practice	2	
2	**Projections of Solids**		CO2
2.1	Introduction to projections of planes	1	
2.2	Introduction of different solids, Simple position plan and elevation of solids	1	
2.3	Problems on views of solids inclined to one plane	1	
2.4	Problems on views of solids inclined to both planes	2	
2.5	Practice problems on solids inclined to both planes	2	
2.6	CAD Practice	2	
3	**Sections of Solids and Development of Surfaces**		CO3
3.1	Introduction to section planes. AIP and AVP. Principle of locating cutting points and finding true shape	1	
3.3	Problems on sections of different solids	2	
3.4	Principle of development of solids, sectioned solids	2	
3.5	Problems on shortest distance between two points on the surface of solids	2	
3.6	CAD Practice	2	
4	**Isometric projection**		CO4
4.1	Principle of Isometric View and Projection, Isometric Scale. Problems on simple solids	2	
4.2	Isometric problems on Frustum of solids, Sphere and Hemisphere	2	
4.3	Problems on combination of different solids	3	
4.4	CAD Practice	2	
5	**Multiview Projections**		CO5
5.1	Practice on conversion of pictorial views into orthographic views	4	
5.2	Introduction to 3D Modelling in CAD	5	
	TOTAL	**60 hours**	

COURSE DESIGNED BY	VERIFIED BY
Mr. Ragesh P R Asst. Professor, ME Dept, JCET E. Mail ID: rageshpr84@gmail.com	Dr. Sujesh G Asso. Professor and Head, Aero Dept, JCET E. Mail ID:sujeshg@jawaharlalcolleges.com

25ICBEET104	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	Category	L	T	P	Credit
		ESC	4	0	0	4

Preamble

This course aims to prepare the students on the fundamentals of DC and AC circuits, basic principles of electrical circuits and machines. It also provides a better knowledge to understand the concept of Semiconductor devices, basic electronic circuits and the technologies used in communication systems paving the way for exploring its applications across diverse domains.

Prerequisite

Basic knowledge of Physics.

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Apply fundamental concepts DC and AC circuits (Applying)	15
CO2	Apply the fundamental laws of Electromagnetic Induction and the Analysis of simple AC circuits (Applying)	20
CO3	Apply the fundamentals of 3-phase AC systems and electrical Machines (Applying)	15
CO4	Describe the working of BJT, FET, RISC, and CISC processors (Understanding)	15
CO5	Outline the principle of rectifiers, amplifiers, and oscillators (Understanding)	20
CO6	Explain the principle of radio and cellular communication (Understanding)	15

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1*	PSO2*	PSO3*
CO1	3	1	-	-	-	-	-	-	-	-	-	2	-	2	2
CO2	3	1	-	-	-	-	-	-	-	-	-	2	-	2	2
CO3	2	1	-	-	-	-	-	-	-	-	-	2	-	2	2
CO4	2	1	-	-	-	-	-	-	-	-	-	2	-	2	2
CO5	2	1	-	-	-	-	-	-	-	-	-	2	-	2	2
CO6	2	1	-	-	-	-	-	-	-	-	-	2	-	2	2
AVG	2.3	1	-	-	-	-	-	-	-	-	-	2	-	2	2

1-Low; 2-Medium; 3- Strong

*The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable Programme Specific Outcomes (PSOs)

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	2	1	2	
Remembering	20	20	-	-	20
Understanding	40	40	-	-	40
Applying	40	40	100	100	40
Analyzing					
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	Assignment
Set	
Guided Response	
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution:

Total Mark	CIE	ESE	ESE Duration
100	40	60	2.5hours

Continuous Internal Evaluation Pattern:

Attendance : 6 marks
Continuous Assessment Test (2 numbers) : 20 marks
Assignment/Quiz/Course project : 14 marks

Question Paper Pattern:

Type of Test	Pattern	Mark Division
Internal Series Test I	**Total = 50 Marks;** **Duration =90 Minutes** Part A: 6 X 3 = 18 Marks Part B: 4X 5 = 20Marks : 2X 6 = 12 Marks	Part A: 3 questions each from Module 1 & 4 Part B: 2 questions each from Module 2 & 5: 1 question each from Module 1 & 4
Internal Series Test II	**Duration =90 Minutes** Part A: 6 X 3 = 18 Marks Part B: 4 X 5 = 20Marks : 2X 6 = 12 Marks	Part A: 3 questions each from Module 3 & 6 Part B: 2 questions each from Module 2 & 5 : 1 question each from Module 3 & 6
End Semester Exam	**Total = 60 Marks;** **Duration =150 Minutes** Part A: 8 X 3 = 24 Marks Part B: 6X 6= 36 Marks	Part A: 1 question each from Module 1,3,4 & 6 2 questions each from Module 2& 5 Part B: 1 question from each Modules

Sample Questions for Course Outcome Assessment

Course Outcome 1 (CO1):

1. Solve problems based on current division rule.
2. Solve problems with Mesh/node analysis.
3. Solve problems on fundamentals of alternating current**.**

Course Outcome 2 (CO2):

1. Problems on electromagnetic induction.
2. Problems on different AC circuits.
3. Problems related to single phase AC power**.**

Course Outcome 3 (CO3):

1. Problems on three phase AC circuits.
2. Problems related to Star and Delta connections.
3. Explanation of different types of machines.

Course Outcome 4 (CO4):

1. Define the operating point in the context of a BJT amplifier.
2. Why is it required to have a FET in amplifiers**?**
3. Compare RISC and CISC processors.

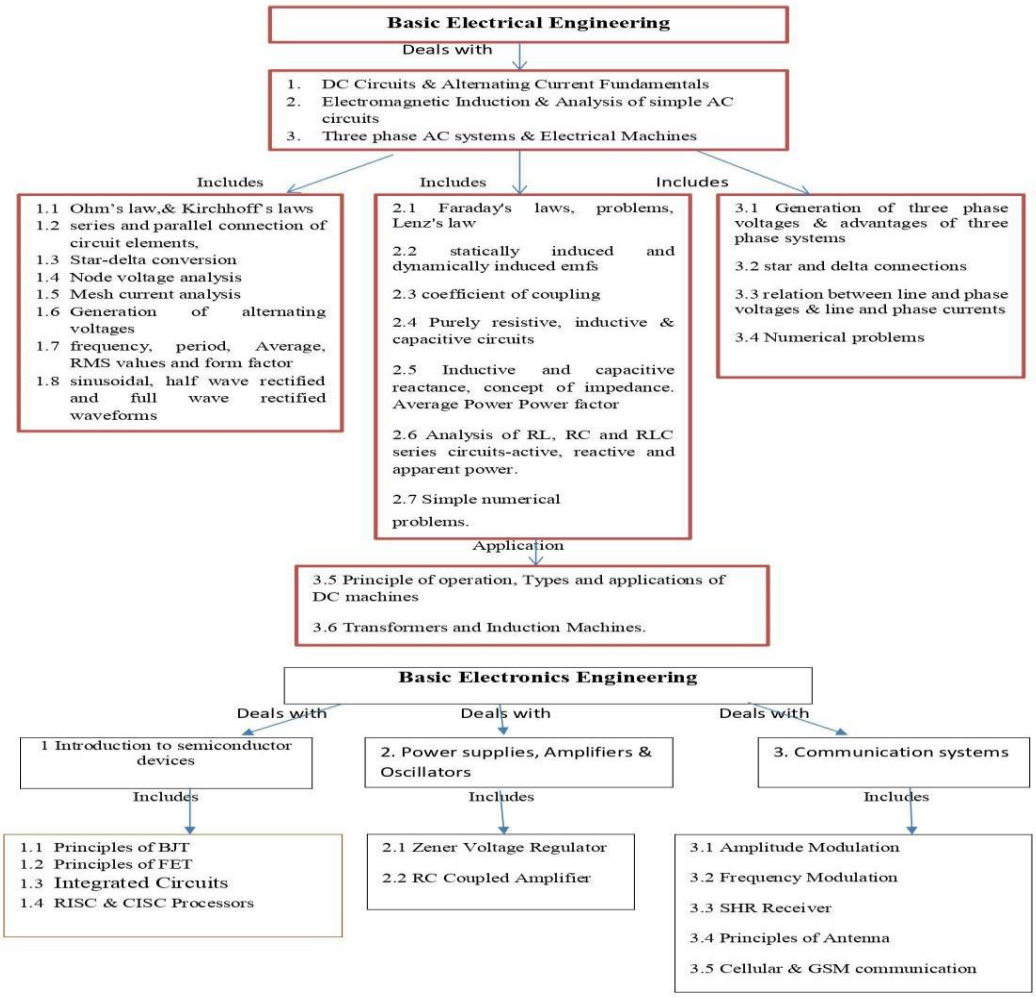
Course Outcome 5 (CO5):

1. Draw the block diagram of DC power supply.
2. Explain the concept of feedback?
3. Explain the working principle of operation of oscillators.

Course Outcome 6 (CO6):

1. What is the working principle of an antenna when used in a radio transmitter?
2. Explain the need for two separate sections RF and IF sections in a superheterodyne receiver.
3. What is meant by a cell in cellular communication?

Concept Map



Syllabus

MODULE 1:

DC Circuits & Alternating Current Fundamentals

Basic circuit elements and sources, Ohm's law, Kirchoff's laws, series and parallel connection of circuit elements, Star-delta conversion (resistive networks only- derivation not required)-problems. Node voltage analysis, Mesh current analysis

Alternating Current fundamentals: Generation of alternating voltages-Representation of sinusoidal waveforms: frequency, period, Average, RMS values and form factor of waveforms-(sinusoidal, half wave rectified and full wave rectified waveforms)

MODULE 2:

Electromagnetic Induction & Analysis of simple AC circuits

Electromagnetic Induction: Faraday's laws, problems, Lenz's law- statically induced and dynamically induced emfs - Self-inductance and mutual inductance, coefficient of coupling (Direct Numerical only)

Analysis of simple AC circuits: Purely resistive, inductive & capacitive circuits; Inductive and capacitive reactance, concept of impedance. Average Power, Power factor. Analysis of RL, RC and RLC series circuits-active, reactive and apparent power. Simple numerical problems.

MODULE 3:

Three phase AC systems & Electrical Machines

Three phase AC systems: Generation of three phase voltages; advantages of three phase systems, star and delta connections (balanced only), relation between line and phase voltages, line and phase currents- Numerical problems

Electrical Machines: Principle of operation, Types and applications of DC machines, AC machines-Transformers, Synchronous and Induction Machines. (Only an elementary qualitative treatment is envisaged.)

MODULE 4

Introduction to Semiconductor devices:

Passive and Active Components, Bipolar Junction Transistors: PNP and NPN structures, Principle of operation, relation between current gains in CE, CB and CC, input and output characteristics of common emitter configuration. Junction Field Effect Transistor, Structure, Types, Parameters, Principle of operation, characteristics, Basic of logic gates and Universal gates, Integrated Circuits-SSI, MSI, LSI, VLSI and ULSI. Introduction to RISC and CISC processors

MODULE 5

Basic electronic circuits:

Block diagram description of a dc power supply, working of a full wave rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator, Concept of Feedback in Amplifiers and Oscillators, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response, Working of RC Phase Shift Oscillator.

MODULE 6

Introduction to Communication Systems: Elements of Communication System, Principle of AM & FM, frequency bands used for various communication systems, block diagram of super

heterodyne receiver, Principle of antenna – radiation from accelerated charge. Mobile communication: basic principles of cellular communications, principle and block diagram of GSM, Introduction to IoT and its architecture.

Learning Resources

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	D P Kothari, I J Nagrath	Basic Electrical Engineering	Fourth edition	Tata McGraw Hill	2019
2	Chinmoy Saha	Basic Electronics Principles and Applications	First edition	Cambridge University Press	2018

REFERENCE BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
3	Leonard S Bobrow	Fundamentals of Electrical Engineering	Second edition	Oxford University Press	2005
4	NN Bhargava	Basic electronics and Linear Circuits	Second edition	McGraw Hill	2017

Online study materials:

1. https://www.youtube.com/watch?v=w8Dq8blTmSA
2. https://youtu.be/3TR_DS_7z2w

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1.	**DC Circuits & Alternating Current Fundamentals**	10	CO1
1.1	Basic circuit elements and sources, Ohm's law, Kirchoff's laws,	1	
1.2	series and parallel connection of circuit elements, Star-delta conversion	2	
1.3	Node voltage analysis, Mesh current analysis	3	
1.4	Alternating Current fundamentals: Generation of alternating voltages-Representation of sinusoidal waveforms: frequency, period	2	
1.5	Average, RMS values and form factor of waveforms-Numerical Problems	2	
2	**Electromagnetic Induction & Analysis of simple AC circuits**	10	CO2
2.1	Electromagnetic Induction: Faraday's laws, problems,	2	
2.2	Lenz's law- statically induced and dynamically induced emfs - Self-inductance and mutual inductance, coefficient of coupling	2	
2.3	Purely resistive, inductive & capacitive circuits; Inductive and capacitive reactance, concept of impedance	2	
2.4	Reactive and Apparent power. Simple numerical problems	2	
	Average Power Power factor. Analysis of RL, RC and RLC series circuits	2	
3	**Three phase AC systems & Electrical Machines**	10	CO3
3.1	Three phase AC systems: Generation of three phase voltages; advantages of three phase systems,	2	
3.2	Star and delta connections	2	
3.3	Relation between line and phase voltages, line and phase currents- Numerical problems	2	
3.4	Electrical Machines: Principle of operation, Types and applications of DC machines,	2	
3.5	Transformers and Induction Machines	2	
4	**Introduction to Semiconductor devices:**	10	CO4
4.1	Bipolar Junction Transistors: PNP and NPN structures, Principle of operation	2	
4.2	Relation between current gains in CE, CB and CC, input and output characteristics of common emitter configuration	2	
4.3	Junction Field Effect Transistor, Structure, Types, Parameters,	2	
4.4	Principle of operation, characteristics.	2	
4.5	Basics of logic gates and Universal gates	1	
4.6	Integrated Circuits, Introduction to RISC and CISC processors	1	
5	**Basic electronic circuits**	10	CO5
5.1	Block diagram description of a dc power supply, Working of a full wave rectifiers	2	
5.2	capacitor filter, working of simple zener voltage regulator	2	
5.3	Concept of Feedback in Amplifiers and Oscillators	2	
5.4	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response	2	

5.5	Working of RC Phase Shift Oscillator	2	
6	**Introduction to Communication Systems**	10	CO6
6.1	Elements of Communication System, Principle of AM & FM,	2	
6.2	frequency bands used for various communication systems, block diagram of super heterodyne receiver	2	
6.3	Principle of antenna – radiation from accelerated charge	1	
6.4	Mobile communication: basic principles of cellular communications.	2	
6.5	principle and block diagram of GSM	2	
6.6	Introduction to IoT and its architecture	1	
Total Hours		**60**	

COURSE DESIGNED BY	**VERIFIED BY**
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25ICSATPT105	ALGORITHMIC THINKING WITH PYTHON	Category	L	T	P	Credit
		ESC	3	0	2	4

Preamble

This course introduces students to algorithmic thinking and problem-solving using Python programming. It emphasizes breaking down complex problems into simpler sub-problems and designing efficient algorithms to solve them. Students will learn Python programming basics, control structures, data structures, and libraries, enabling them to develop and implement effective solutions for real-world problems.

Prerequisite

None

Course Outcomes

After the completion of the course the student will be able to

CO Number	Course Outcome Statement	Weightage in %
CO1	Interpret the fundamentals of problem-solving and algorithm design. (Understanding)	20
CO2	Develop Python programs using basic programming concepts. (Applying)	20
CO3	Define and utilize functions for data manipulation in Python. (Applying)	20
CO4	Manipulate and operate on arrays using Python and NumPy. (Applying)	20
CO5	Perform file handling operations in Python with exception handling. (Applying)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

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

1-Low; 2-Medium; 3- Strong

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	2	1	2	
Remembering	20	20	20		20
Understanding	40	40	40	40	40
Applying	40	40	40	60	40
Analyzing					
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	
Set	Practical
Guided Response	Tutorial
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution

Total Mark	CIA	ESE	ESE Duration
100	60	40	2.5 Hours

Continuous Internal Assessment Pattern:

Attendance : 9 marks
Continuous Assessment Test (2 numbers) : 24 marks
Assignment (Case study) / Practical (Activity) : 27 marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration =90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 40 Marks;** **Duration =150 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 5 = 25 Marks

Sample Questions for Course Outcome Assessment

Course Outcome 1 (CO1):

1. Classify the various types of algorithms and explain their importance in programming.
2. Outline the steps involved in designing an algorithm to perform the sum and average of n numbers.
3. Explain different programming problem-solving techniques.
4. Develop an algorithm to control the functioning of traffic lights at a busy intersection. The lights should change every 60 seconds for each direction, and there should be a 5-second all-red signal for pedestrian crossing between each light change.

Course Outcome 2 (CO2):

1. Write a Python program to demonstrate the use of different data types, including lists, tuples, strings, sets, frozen sets, and dictionaries.
2. Write a Python program to set up the Python programming environment and create a simple program that prints "Hello, World!" and performs a basic arithmetic operation.

Course Outcome 3 (CO3):

1. Identify the different types of function arguments in Python, including positional arguments, keyword arguments, and default arguments. Provide scenarios where each type is useful.
2. Define the term "return value" in the context of functions. Describe how functions return data to the calling code, and what the benefits of using return values are.
3. Discuss the use of global variables in Python functions. Describe how global variables can be modified and accessed within functions, and the best practices for using them.

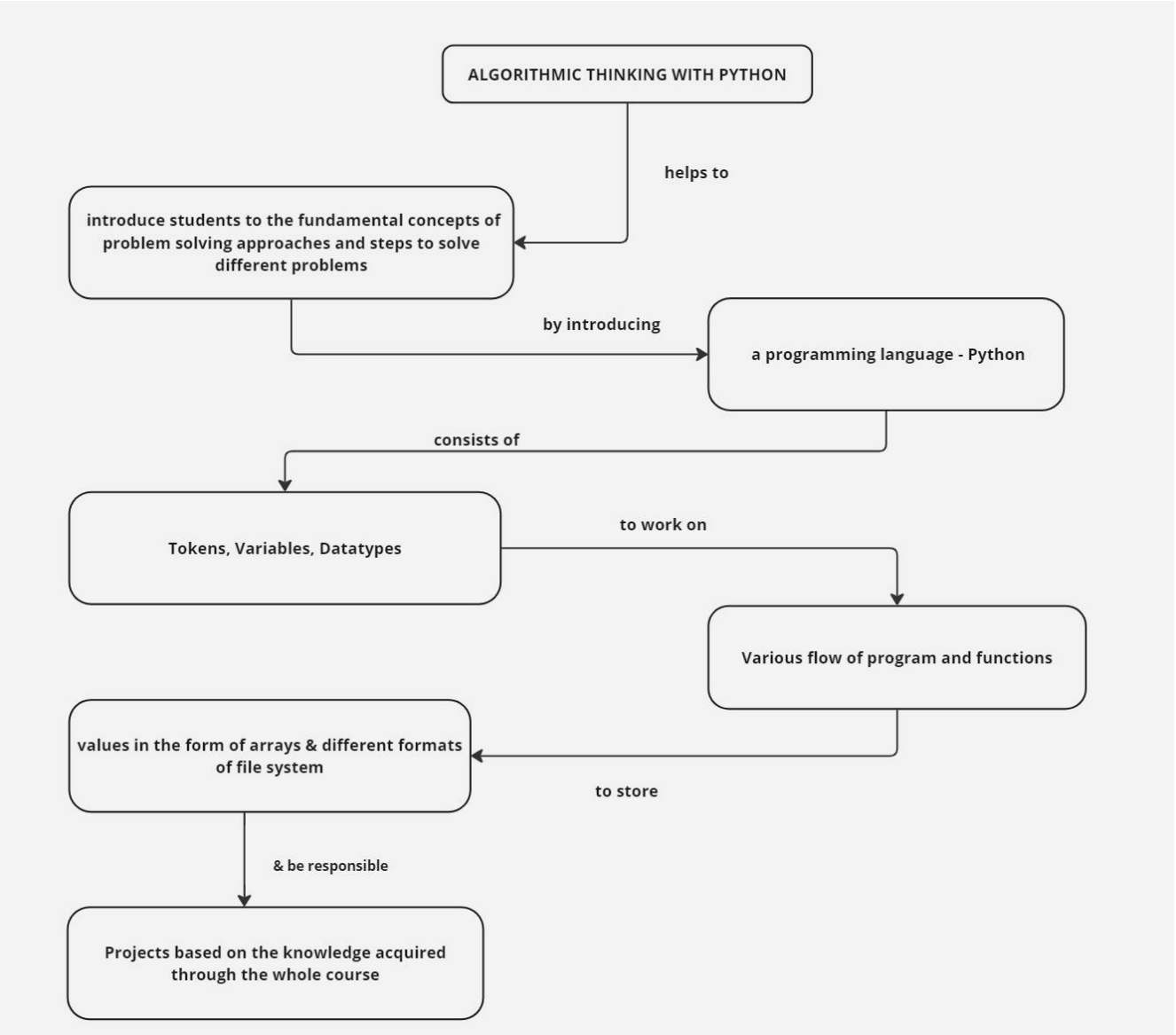
Course Outcome 4 (CO4):

1. Compare and contrast Python lists and NumPy arrays in terms of functionality.
2. Write a Python code snippet to create a NumPy array and demonstrate indexing and slicing.
3. Explain how to perform arithmetic operations on NumPy arrays with examples.

Course Outcome 5 (CO5):

1. Write a Python program to append new data to an existing text file without overwriting the existing content. Handle exceptions that may arise during file operations.
2. Create a CSV file containing student records with attributes like name, age, and grade. Implement a Python script to read this CSV file, perform data analysis, and generate a summary report.

Concept Map



Syllabus

MODULE I

Introduction to Problem Solving - Problems-Problem solving strategies- Trial and Error, Heuristics, Means End Analysis, Backtracking-Approaches in problem Solving- Top-Down, Bottom Up

Problem Solving Process-Breaking a Problem into Subproblems, Overview of Solution by Writing Step-by-Step Procedures (Algorithms), Types of algorithms- Sequential, Selective, Iterative. Representation of Procedures by Flowchart, Implementation of Algorithms, Case Study for Problem-Solving Concepts.

MODULE II

Introduction to Python Programming -Python -Setting Up Python Programming Environment - Program structure- Character set, Token, Variables, Overview of Datatypes, Flow of Control - Decision making statements, Looping Statements, Jumping Statements

MODULE III

Introduction to Functions & **Data Collections Manipulation** -

Defining a Function- Applications, Scopes inside a program, Global, Local, Instance Variables, Types of Functions, Inbuilt Functions- Data Structure Manipulation using inbuilt functions, Modules. Introduction to User-defined Functions, Parts and Types, Recursion.

MODULE IV

Introduction to Arrays- Arrays, Importance of arrays in numerical computing. Difference between Python lists and NumPy arrays, Setting up NumPy. Creating arrays, Indexing and slicing, Arithmetic & Mathematical Operations, Transposing, Splitting and Copying Arrays.

MODULE V

File Handling -Files - Text, Binary & CSV Files- Operation on files types- reading, writing & appending- Exceptions.

Learning Resources

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Maureen Sprankle, Jim Hubbard	Problem Solving and Programming Concepts	Seventh Edition	Pearson	**2011**
2	Mark Summerfield	Programming in Python 3: A Complete Introduction to the Python Language	**2nd Edition**	Pearson Education,	**2018**

REFERENCE BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Mark Lutz,	Python Pocket Reference	Fifth Edition	O Reilly	**2014**

2	Eric Matthes	Python Crash Course A Hands-On, Project - Based Introduction to Programming	2nd Edition	No Starch Press, Inc	**2019**

Online study materials:

1. https://nptel.ac.in/courses/106106145
2. https://nptel.ac.in/courses/106106182
3. https://nptel.ac.in/courses/106106182
4. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1.	**Introduction to Problem Solving**	**9 hrs**	CO1
1.1	Problems and problem-solving strategies	1	
1.2	Problems Solving Techniques	1	
1.3	Writing Step-by-Step Procedures (Algorithms)	1	
1.4	Types of Algorithms- Sequential Flow	1	
1.5	Selective Flow Control Algorithms	1	
1.6	Iterative Flow Control Algorithms	1	
1.7	Implementation of Algorithms with examples	1	
1.8	Representing Procedures with Flowcharts	1	
1.9	Case Study of Real-World problems	1	
2.	**Introduction to Python Programming**	**9 hrs**	
2.1	Setting Up Python Programming Environment,	1	
2.2	Introduction to Variable Sets -Token,	1	
2.3	Tokens- Keywords, Identifiers, Literals, Punctuators	1	
2.4	Variables, Overview of Datatypes	1	

2.5	Operators- Arithmetic, Relational, Membership, Identity, Logical	1	CO2
2.6	Operator Precedence, Expressions	1	
2.7	Flow of Control - Decision making statements	1	
2.8	Looping Statements	1	
2.9	Jumping Statements		
3.	**Introduction to Functions & Data Collections Manipulation**	**9 hrs**	CO3
3.1	Defining a Function- Applications, Types of function	1	
3.2	Scopes inside a program, Global, Local, Instance Variables	1	
3.3	List Manipulation using inbuilt functions	1	
3.4	Tuple Manipulation using inbuilt functions	1	
3.5	String Manipulation using inbuilt functions	1	
3.6	Dictionary Manipulation using inbuilt functions	1	
3.7	Modules	1	
3.8	Introduction to User-defined Functions, Parts and Types	1	
3.9	Recursion	1	
4.	**Introduction to Arrays**	**9 hrs**	CO4
4.1	Arrays, Importance of arrays in numerical computing	1	
4.2	Difference between Python lists and NumPy arrays, Setting up NumPy	1	
4.3	Creating arrays	1	
4.4	Indexing and slicing arrays	1	
4.5	Array Arithmetic & Mathematical Operations	1	
4.6	Reshaping and Transposing arrays	1	
4.7	Stacking and Splitting arrays	1	
4.8	Copying Arrays- Different types of Copying technique	1	
4.9	Case study of arrays in real world scenario	1	

5.	**File Handling and Exceptions**	**9 hrs**	
5.1	Introduction to Files and its types - Text, Binary & CSV Files	1	
5.2	Text File - Reading the text data	1	
5.3	Text File - Writing & Appending the text data	1	
5.4	Binary File - Reading data	1	
5.5	Binary File - Writing data	1	
5.6	CSV File - Reading data	1	CO5
5.7	CSV File - Writing data	1	
5.8	Exceptions	1	
5.9	Handling Exceptions	1	
	Total	45 hours	

LAB QUESTIONS

SL NO.	QUESTIONS	HOUR
	MODULE 1	
1	**You are tasked with designing a calculator that performs basic arithmetic operations (addition, subtraction, multiplication, division). **Task**: • Implement the calculator using the **Top-Down approach** by breaking down the operations into subproblems (e.g., input handling, operation execution, output display). • Implement the same calculator using the **Bottom-Up approach**, starting with basic functions for each operation and then building the entire solution. • Compare the two approaches in terms of ease of implementation and scalability. • Write a flowchart for each approach and explain your process.	2
2	**You are developing a program to manage a simple library system. The system allows the user to: • Search for a book by title (sequential algorithm)	2

	• Check if a user is eligible for membership based on age (selective algorithm - if age >= 18, eligible; else, not eligible) • Keep track of borrowed books with a maximum limit of 5 books (iterative algorithm to ensure no more than 5 books are borrowed). **Task**: • Write the algorithms for each functionality. • Represent the algorithms in a flowchart. • Implement the algorithms in Python and test them using sample inputs.	
3	You are developing a program to manage a simple library system. The system allows the user to: • Search for a book by title (sequential algorithm) • Check if a user is eligible for membership based on age (selective algorithm - if age >= 18, eligible; else, not eligible) • Keep track of borrowed books with a maximum limit of 5 books (iterative algorithm to ensure no more than 5 books are borrowed). ** **Task**: • Write the algorithms for each functionality. • Represent the algorithms in a flowchart. • Implement the algorithms in Python and test them using sample inputs.	2
4	A delivery company needs to find the shortest route to deliver packages across three cities (A, B, and C). The distance between the cities is known: • A to B = 50 km • A to C = 70 km • B to C = 30 km **Task**: Use means-end analysis to determine the best delivery route that minimizes travel distance. **Steps**: • Break the problem down into subproblems. • Write a step-by-step algorithm showing how means-end analysis is used to find the shortest path. • Create a flowchart representing the algorithm and implement it using Python or pseudocode.	2
	MODULE 2	
5	** Write a Python program that takes the age of a user as input and determines the life stage they are in based on the following conditions:	2

	• 0–12 years: "Child" • 13–19 years: "Teenager" • 20–35 years: "Young Adult" • 36–60 years: "Adult" Above 60 years: "Senior"	
6	**: Write a Python program that takes a string input from the user and counts the number of vowels and consonants in the string. • Use variables and appropriate data types to store and manipulate the input. • Display the results, showing the counts of vowels and consonants separately.	2
7	Write a python program to generate multiplication table of a number given by the user.	2
8	Write a Python program that accepts a number from the user and checks if it is even or odd. • If the number is even, display "Even Number,"otherwise display "Odd Number." Use decision-making statements (`if-else`) to determine the output.	2
9	Write a simple Python program to take two numbers as input from the user and perform basic arithmetic operations (addition, subtraction, multiplication, division, modulus, floor division, exponentiation). • Display the results for each operation.	2
	MODULE 3	
10	**Write a Python program to define a function that calculates the factorial of a number provided by the user. • Use a for loop to calculate the factorial. • Demonstrate how to call the function in the main program and display the result.	2
11	**Write a Python program that defines a recursive function to calculate the sum of all integers from 1 to a given number n.	2
12	Write a Python program that takes a list of numbers and performs the following operations using inbuilt functions: • Find the maximum and minimum numbers in the list. • Sort the list in ascending and descending order.	2

	• Find the sum and average of the numbers in the list.	
13	Write a Python program that defines a global variable and a function that declares a local variable with the same name. • Show how to access and modify the global variable both inside and outside the function. • Display the value of the local and global variables separately.	2
	MODULE 4	
14	** Write a Python program to create two NumPy arrays of the same shape. • Perform element-wise addition, subtraction, multiplication, and division on the arrays. • Display the results of each operation.	2
15	Write a Python program to create a 2D NumPy array (matrix) and perform the following: • Transpose the matrix. • Create a copy of the original matrix and modify the copied matrix without affecting the original.	2
16	**Write a Python program to create a 2D NumPy array and perform the following operations: • Calculate the mean, median, and standard deviation of the array. • Use NumPy functions for these calculations and display the results.	2
17	Write a Python program to create a 1D NumPy array with 12 elements and reshape it into a 3x4 2D array. • Display both the original and the reshaped arrays.	2
	MODULE 5	
18	**Write a Python program to read a text file containing a list of names (one name per line) and display the names on the console. • Handle exceptions for file not found.	2
19	Write a Python program that takes user input to create a list of favorite foods and writes this list to a text file. • Each food item should be on a new line in the file.	2

20	**Write a Python program to create a CSV file containing student names and their grades. • Then, read the CSV file and display its contents.	2
21	Write a Python program that appends a new food item to the existing text file created in the previous task. • Ensure that the program checks if the file exists before appending.	2
** Questions are mandatory, 3 questions from each module should be implemented during the laboratory session.		
TOTAL		**30 hrs**

COURSE DESIGNED BY	VERIFIED BY
Ms. Divya Visakh Asst. Professor, CSE Dept, JCET E. Mail ID: divya3954.cse@jawaharlalcolleges.com	Mr. Ambarish A Asst. Professor, CSE Dept, JCET E. Mail ID: ambarish4056.cse@jawaharlalcolleges.com

25ICLPCT106	LIFESKILLS AND PROFESSIONAL COMMUNICATION	Category	L	T	P	Credit
		HMC	2	0	1	2

Preamble

Life Skills and Professional Communication provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

Prerequisite:

None

Course Outcomes: On the successful completion of the course students will be able to:

CO Number	Course Outcome Statement	Weightage in %
CO1	Define and identify key life skills necessary for personal and professional success. (Understanding)	20
CO2	Explain the importance of cultivating good habits through moral and value-based practices, managing stress, and navigating emotions with structured approaches for healthier regulation. (Understanding)	20
CO3	Enhance understanding of cognitive processes, thinking styles, critical and creative thinking, and proficiency in problem-solving, along with essential 21st-century skills for innovative and analytical reasoning. (Understanding)	20
CO4	Utilize skills and knowledge effectively in group discussions and apply career planning strategies to contribute meaningfully to collaborative work environments. (Applying)	20
CO5	Acquire the requisite knowledge and skills to communicate with clarity and impact, and to contribute positively in collaborative work environments. (Applying)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1 *	PSO2 *	PSO3 *
CO1	1	-	-	-	-	2	-	1	2	2	1	3	-	-	-
CO2	-	-	-	-	-	-	-	-	3	-	-	2	-	-	-
CO3	-	1	1	1	-	2	1	1	2	2	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CO5	-	-	-	-	-	2	-	-	2	3	-	3	-	-	-
AVG	**1**	**1**	1	1	-	2	1	1	2.2	2.3	1	**2.4**	-	-	-

1-Low; 2-Medium; 3- Strong
* The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable programme Specific outcomes (PSOs)

Assessment Pattern: Continuous Internal Evaluation

Cognitive Levels	Continuous Assessment Test	Continuous Assessment Test	Regular Assessment		
	1	2	Group Discussion	Presentation Skills	Case Study
Remembering	20	20	20	20	20
Understanding	60	60	20	20	20
Applying	20	20	40	40	20
Analysing	-	-	20	20	40
Evaluating	-	-	-	-	-
Creating	-	-	-	-	-

Assessment Pattern: Psychomotor

Psychomotor Skill	Practical Component
Perception	Communication Skills, Subject Clarity and Impact
Set	Stress Management
Guided Response	Group Discussion Skills and Group Dynamics
Mechanism	Problem-solving Techniques
Complex Overt Responses	Emotional Regulation
Adaptation	Behaviour, Mannerisms, Platform Skills and Professional Environment
Origination	

Assessment Pattern: Cognitive Domain

Total Marks	CIA	Duration
100	100	2 Hours

Continuous Internal Assessment Pattern

Attendance:	**15**
Continuous Assessment Test:	**35**
Activity and Case Study:	**50**
Total:	**100**

Question Paper Pattern

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks; Duration =90 Minutes** Part A: 5 X 4 = 20 Marks Part B: 5 X 6 = 30 Marks

Sample Questions for Course Outcome Assessment

Course Level Assessment Questions

Course Outcome 1 (CO1):

1. Highlight the significance of self-awareness in personal development?
2. Elucidate how effective communication can improve interpersonal relationships?
3. Distinguish between critical thinking and creative thinking?
4. Expound the importance of setting goals and achieving them in professional growth?
5. In what ways can authoritative, affiliative, coaching, coercive, democratic, and pace-setting leadership styles influence team dynamics and performance?

Course Outcome 2 (CO2)

1. Illustrate a scenario where you cultivated values such as integrity or empathy. How did this experience shape you and those around you?
2. Enumerate the four A's of stress management and elucidate how each can be utilized to handle stress in a high-pressure situation.
3. Elaborate on how a stress journal can be utilized to recognize your individual stress triggers and the accompanying physical or emotional symptoms.
4. Detail effective relaxation techniques for coping with stress and emotions. Describe how you would incorporate one of these methods into your daily routine.
5. Delve into the ways in which practicing integrity, honesty, and empathy can contribute to effective stress and emotional management.

Course Outcome 3(CO3):

1. How do convergent and divergent thinking vary from each other?
2. What are the mind mapping techniques used to solve a given problem?

3. What roles do the left brain and right brain play in cognitive functions?
4. Do different thinking techniques affect problem-solving efficiency?
5. Give a plan to enhance creative thinking within a team, specifically using the six thinking hats method.

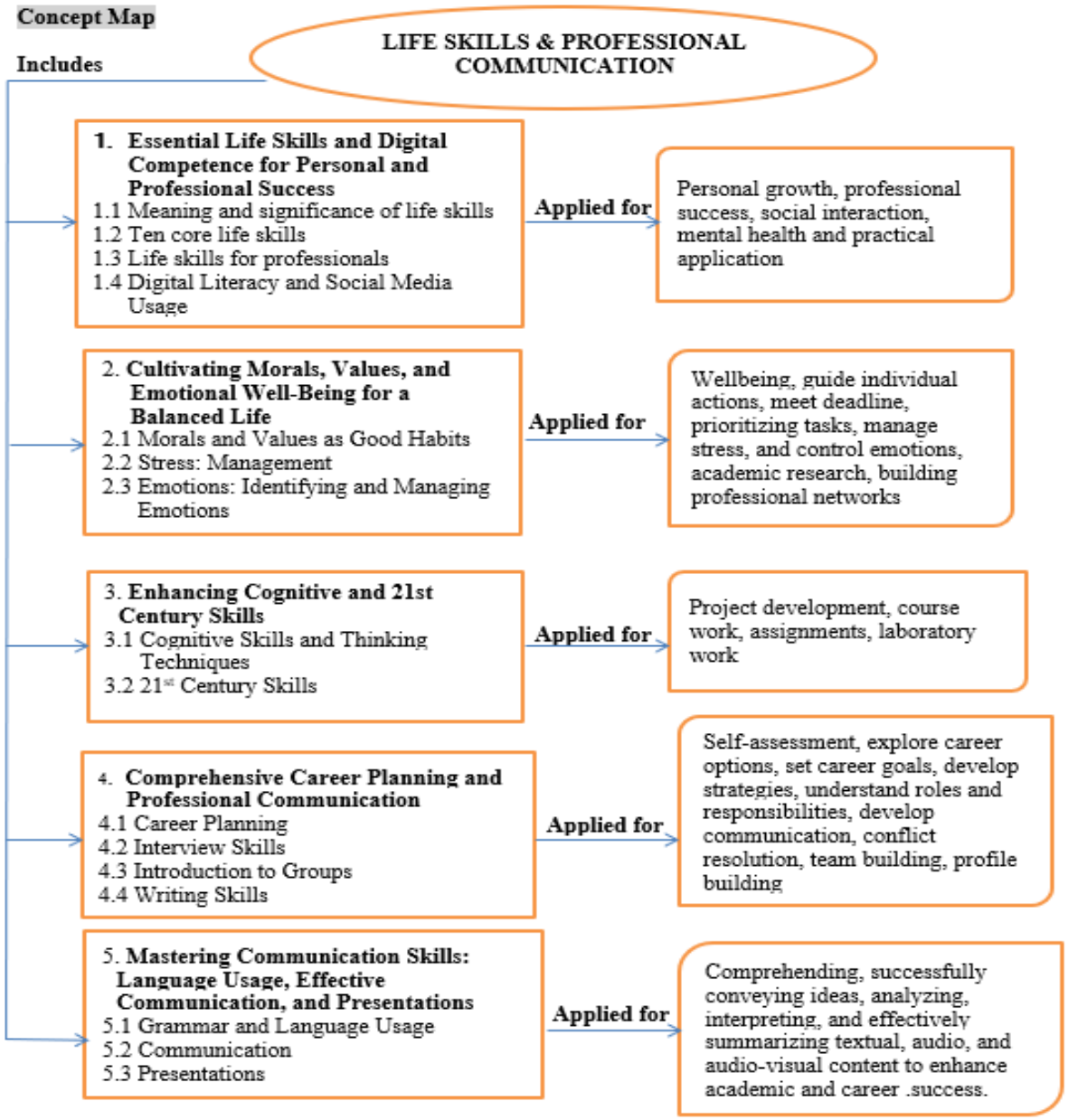
Course Outcome 4 (CO4):

1. In what ways do sources of career information empower students to explore various career paths and opportunities?
2. Harness the key distinctions between technical writing and literary style, and elaborate on how understanding these differences empower students for diverse communication tasks?
3. Elaborate on how students' proficiency in composing letters, CVs, and resumes enables them to effectively present themselves in various professional contexts.
4. Discuss the importance of interview etiquette and how mastering it prepares students to make a positive impression on potential employers.
5. Can you provide examples of how nonverbal cues can impact the interpretation of a message in a professional setting?

Course Outcome 5 (CO5):

1. **Demonstrate** the key elements of an effective presentation. Discuss the importance of structure, content, and delivery in engaging an audience.
2. Elucidate the significance of effective communication across diverse facets of both personal and professional spheres.
3. Delineate the communication process and explicate how information flows within an organization?
4. Complete the sentence with a suitable verb: The group of students _____ eager to participate in the project.
5. The team completed the project ahead of schedule. Change the voice

Concept Map


Concept Map
Includes
LIFE SKILLS & PROFESSIONAL COMMUNICATION
1. Essential Life Skills and Digital Competence for Personal and Professional Success
1.1 Meaning and significance of life skills
1.2 Ten core life skills
1.3 Life skills for professionals
1.4 Digital Literacy and Social Media Usage
Applied for
Personal growth, professional success, social interaction, mental health and practical application
2. Cultivating Morals, Values, and Emotional Well-Being for a Balanced Life
2.1 Morals and Values as Good Habits
2.2 Stress: Management
2.3 Emotions: Identifying and Managing Emotions
Applied for
Wellbeing, guide individual actions, meet deadline, prioritizing tasks, manage stress, and control emotions, academic research, building professional networks
3. Enhancing Cognitive and 21st Century Skills
3.1 Cognitive Skills and Thinking Techniques
3.2 21st Century Skills
Applied for
Project development, course work, assignments, laboratory work
4. Comprehensive Career Planning and Professional Communication
4.1 Career Planning
4.2 Interview Skills
4.3 Introduction to Groups
4.4 Writing Skills
Applied for
Self-assessment, explore career options, set career goals, develop strategies, understand roles and responsibilities, develop communication, conflict resolution, team building, profile building
5. Mastering Communication Skills: Language Usage, Effective Communication, and Presentations
5.1 Grammar and Language Usage
5.2 Communication
5.3 Presentations
Applied for
Comprehending, successfully conveying ideas, analyzing, interpreting, and effectively summarizing textual, audio, and audio-visual content to enhance academic and career .success.

Syllabus

Module 1

Essential Life Skills and Digital Competence for Personal and Professional Success

Life Skills: Meaning and significance, Life skills identified by WHO: 1. Social Skills: Self-awareness, Empathy, Effective communication, Interpersonal relationship. 2.Thinking Skills: Critical thinking, Creative thinking, Decision making, Problem solving, 3. Emotional Skills: Coping with stress and emotions.

Life Skills for Professionals: Positive thinking, Setting goals and achieving them, Motivation (self and others), Leadership (Types and styles)

Digital Literacy: Basics of Digital & Social Media Usage, Creating LinkedIn profiles, Networking online.

Module 2

Cultivating Morals, Values, and Emotional Well-Being for a Balanced Life

Morals and Values as Good Habits: Practicing integrity, Caring and sharing, Honesty, Respect for others, Empathy, Courage, Commitment, Self-confidence, Time management, Avoiding procrastination.

Stress: Understanding and Identifying Stress: reasons and effects, Recognizing signs and symptoms of stress, Personal triggers, Stress Management Techniques: stress diaries, the four A's of stress management.

Emotions: Identifying Emotions, Managing Emotions, Harmful Ways of Dealing with Emotions, Relaxation Techniques.

Module 3

Enhancing Cognitive and 21st Century Skills

Cognitive Skills and Thinking Techniques: Functions of left brain & right brain, Critical thinking, Creative thinking, Analytical thinking, Lateral thinking, Logical thinking, Problem solving techniques, Mind mapping.

21st Century Skills: Creativity (sources of creativity), Collaboration, Innovation, Six thinking hats for brainstorming.

Module 4

Comprehensive Career Planning and Professional Communication
Career Planning: Need and importance of career guidance, Sources of career information, Career guidance centres, Applying for job, Non-verbal communication.

Interview Skills: Types of interviews, Interview etiquette, Group discussions

Introduction to Groups: Composition, Formation, Cycle, Thinking, Consensus, Team, Virtual teams, Managing team performance and conflicts.

Writing Skills: Technical and literary style. CV and Resume writing, Report writing, E-mails, memos.

Module 5

Mastering Communication Skills: Language Usage, Effective Communication, and Presentations

Grammar and Language Usage: Common errors in English usage, commonly misspelled words, Voice, Reported speech, Sentence Structure, Subject-verb agreement, Punctuations.

Communication: Definition, Importance of effective communication, Process, Flow, Barriers, Overcoming barriers, Types of communication.

Presentation: Types with emphasis on visual presentation, audio-visual presentation and podcasts.

LEARNING RESOURCES

Text Books

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Dr. Anubhuti Dubey & Prof Aradhana Shukla	Communication Skills and Personality Development	First	Laxmi Publications Pvt. Ltd.	2023
2	Matt Abrahams	Think Faster, Talk Smarter: How to speak successfully when you are put on the spot	First	Macmillan Business	2023

Reference Books

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Raymond Murphy	English Grammar in Use	Fifth	Cambridge University Press	2023
2	Maithry Shinde	Life Skills & Personality Development	First	Cambridge University Press	2022
3	Remesh S, Vishnu R G	Life Skills	First	Northstar	2021
4	Sabina Pillai and Agna Fernandez	Soft Skills & Employability Skills	First	Cambridge University Press	2018
5	R Hobb	Create to learn: Introduction to digital literacy	First	Wiley	2017
6	Ashraf Rizvi	Effective Technical Communication	Second	McGraw Hill Education	2017
7	Kalyana	Soft Skill for Managers	First	Wiley	2015
8	Shalini Verma	Development of Life Skills and Professional Practice	First	Sultan Chand (G/L) & Company	2014

On line study materials

1	https://www.berkeleywellbeing.com › life-skills
2	https://www.mindinthemaking.org › life-skills
3	https://www.britishcouncil.gr › life-skills ›
4	https://www.skillsyouneed.com › general › life-skills
5	https://ethicsunwrapped.utexas.edu/
6	Stress management strategies: Ways to Unwind - https://www.youtube.com/watch?v=0fL-pn80s-c
7	Signs of Stress https://www.youtube.com/watch?v=n3G0n7HoTr4
8	What is Civic Virtue? - YouTube https://www.youtube.com › watch?v=ANl4MqtHBxg (Levels of Leadership)
9	https://www.youtube.com/watch?v=j6FSaHVufZc (Styles of Leadership)
10	https://www.mhanational.org/helpful-vs-harmful-ways-manage-emotions
11	https://www.edweek.org/teaching-learning/what-is-digital-literacy/2016/11

Methodologies to Transact Life Skills and Professional Communication

Sl. No.	Techniques	Description
1	Discussion	Involves exchange and sharing of ideas, experiences, facts and opinions on a given topic. Can be used in large and small groups.
		A discussion involving two opposing parties with each group expressing

2	Debate	opinions or views about a given topic or subject.
3	Role Play	Short drama episodes or simulations in which participants experience how a person feels in a similar real life situation.
4	Brainstorm	Free expression of ideas among participants on a given issue or question.
5	Story Telling	Telling of narratives with a particular theme, based on actual events.
6	Song and Dances	Musical compositions on topical issues and themes.
7	Drama	Composition in verse or prose intended to portray life, character or to tell a story. It involves presenting conflicts and portraying emotions through action and dialogue.
8	Case Study	True or imaginary story which describes a problem, a situation or a character. May also be a dilemma in which the participants should come up with opinions on how they would resolve the conflict.
9	Miming	Acting without words by the use of gestures, signs, physical movements and facial expressions. The whole idea is communicated through actions.
10	Poetry & Recitals	Compositions which capture events, themes and situations in a short and precise manner. Used in communicating feelings, opinions, ideas, habit and other experiences. Can be in the form of songs, recitations, chants or be dramatized to enhance the acquisition of various Life Skills.
11	Question & Answer	A teacher or learner tries to find information through asking questions and getting answers from the respondent. An effective method of transacting Life Skills Education as it stimulates a learner's thinking and creativity.
12	Games	A structured play can sometimes be used as an educational tool for the expression of aesthetic or ideological elements. It involves mental and physical simulation, and often both.
13	Team Work	Students may be organized to work in pairs or small groups in the classroom. Promotes the maximum participation of all students as they are involved in "thinking and doing" and cooperative skills, such as, listening and communication skills, problem solving and sharing of tasks.
14	Simulation	Students assume / imitate a particular appearance or for- they engage in the act or process of pretending.
15	Demonstration	A method of teaching by examples rather simple explanation or an act of showing or making evident.

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1	**Essential Life Skills and Digital Competence for Personal and Professional Success**	**4**	CO 1
1.1	Life Skills: Meaning and significance, Life skills identified by WHO: 1. Social Skills: Self- awareness, Empathy, Effective communication, interpersonal relationship.	1	
1.2	2. Thinking Skills: Critical thinking, Creative thinking, Decision making, problem solving, 3. Emotional Skills: Coping with stress, coping with emotion.	2	
1.3	Life Skills for Professionals: Positive thinking, Setting goals and achieving them, Motivation (self and others), Leadership (Types and styles)	1	
1.4	Digital Literacy: Basics of Digital & Social Media Usage, Creating LinkedIn profiles, Networking online.	2	
2	**Cultivating Morals, Values, and Emotional Well-Being for a Balanced Life**	**6**	CO 2
2.1	Morals and Values as Good Habits: Practicing integrity, Caring and sharing, Honesty, Respect for others, Empathy, Courage, Commitment, Self-confidence, Time management, Avoiding procrastination.	2	
2.2	Stress: Understanding and Identifying Stress: reasons and effects, Recognizing signs and symptoms of stress, Personal triggers, Stress Management Techniques: stress diaries, the four A's of stress management.	2	
2.3	Emotions: Identifying Emotions, Managing Emotions, Harmful Ways of Dealing with Emotions, Relaxation Techniques.	2	

	.		
3	**Enhancing Cognitive and 21st Century Skills for Innovation and Problem Solving**	**6**	
3.1	Cognitive Skills and Thinking Techniques: Functions of left brain & right brain.	1	
3.2	Critical thinking, Creative thinking, Analytical thinking, Lateral thinking, Logical thinking.	2	
3.3	Problem solving techniques, Mind mapping.	1	CO 3
3.4	21st Century Skills: Creativity (sources of creativity), Collaboration, Innovation, Six thinking hats for brainstorming	1	
4	**Comprehensive Career Planning and Professional Communication Skills**	**6**	
4.1	Career Planning: Need and importance of career guidance, Sources of career information, Career guidance centres, Applying for job, Non-verbal communication.	2	
4.2	Interview Skills: Types of interviews, Interview etiquette, Group discussions	1	
4.3	Introduction to Groups: Composition, Formation, Cycle, Thinking, Consensus, Team, Virtual teams, Managing team performance and conflicts.	1	CO 4
4.4	Writing Skills: Technical and literary style. CV and Resume writing, Report writing, E-mails, memos.	2	
5	**Mastering Communication Skills: Language Usage Effective Communication, and Presentations**	**6**	
5.1	Grammar and Language Usage: Common errors in English usage, commonly misspelled words, Voice.	1	
5.2	Reported speech, Sentence Structure, Subject-verb agreement, Punctuations.	2	
5.3	Communication: Definition, Importance of effective communication, Process, Flow, Barriers, Overcoming barriers, Types of communication.	1	
5.4	Presentation: Types with emphasis on visual presentation, audio-visual presentation and podcasts.	2	CO 5
	TOTAL	30 hours	

Activities

Sl. No	Activity
1	**Essential Life Skills and Digital Competence for Personal and Professional Success** **1. Gantt Chart** Description: Create a Gantt chart representing a project timeline, showing tasks, their durations, and dependencies. Does it help teams plan, schedule, and monitor progress efficiently. Objective: To enhance time management and project organization by breaking tasks into smaller, manageable steps with clear deadlines and responsibilities. **2. Social Media Impact Analysis** Description: Have students analyze the impact of social media on personal and professional life, discussing both positive and negative aspects. Objective: Develop critical thinking about social media usage and its implications. **3. Creating a Professional Online Presence** Description: Guide students in creating or improving their LinkedIn profiles, emphasizing the importance of a professional online presence. Objective: Teach students how to build and maintain a professional online identity.
2	**Cultivating Morals, Values, and Emotional Well-Being for a Balanced Life** **4. Caring and Sharing Circle**: Description: Participants share personal stories of acts of kindness they've experienced or done. Objective: Foster a culture of caring and sharing. **5. Personal Triggers -Journaling**: Description: Journaling to identify personal stress triggers and maintaining stress diaries to log daily stressors and responses. Objective: Understand personal stressors and track and analyse stress patterns
3	**Enhancing Cognitive and 21st Century Skills** **6. Mind mapping Exercise:** Description Create a mind map that outlines your top three professional goals for

	the next two years. For each goal, include the essential skills you need to develop and specific actions you will take to achieve these goals. Objective: Help students visualize and organize their goals and the professional skills required to achieve them using a mind map. **7. Problem solving (utilising logical and creative thinking)** Description: Select a real-life problem (eg. Improving Water Management in Urban Areas) that requires a technical solution and list the study materials needed Objective: Improve thinking and problem solving skills
4	**Comprehensive Career Planning and Professional Communication Skills** **8. Create a LinkedIn Account** Description: Students should create a LinkedIn account, using a personal email. Objective: Help students create a professional LinkedIn profile that effectively showcases their skills, experiences, and career aspirations. **9. Write a Report** Description: Imagine you participated in a group discussion on the topic 'Strategies for Enhancing Team Collaboration in Project Management'. Prepare a report based on the discussions held in class regarding this topic. Objective: To develop students' skills in summarizing group discussions and documenting effective strategies for improving team collaboration in project management.
5	**Mastering Communication Skills: Language Usage Effective Communication, and Presentations** **10. Self-Introduction** Description: Prepare a self-introduction video Objective: Equip students to build their profiles. **11. Nonverbal Communication Charades** Description: Write down different emotions and messages on slips of paper. Students take turns drawing a slip and using only nonverbal communication (gestures, facial expressions, body language) to convey the emotion or message to the class. The class guesses what is being communicated. **Objective**: Enhance awareness and understanding of the importance and types of nonverbal communication.

COURSE DESIGNED BY	VERIFIED BY
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25ICEEWP107	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP	Category	L	T	P	Credit
		ESC	0	0	2	1

Preamble

This is the foundation practical course for the students of circuit branches. The aim of this course is to impart fundamental hands-on skill in carrying out experiments at higher semester practical courses.

Prerequisite

None

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Demonstrate safety measures against electric shocks and identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols (Applying)	16.67
CO2	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings.(Applying)	16.67
CO3	Understand the concepts of Earthing and Assembling of electrical devices. (Applying)	16.67
CO4	Identify and test various electronic components. (Remembering)	16.67
CO5	Draw circuit schematics with EDA tools. (Applying)	16.67
CO6	Assemble and test electronic circuits on boards. (Applying)	16.67

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1*	PSO2*	PSO3*
CO1	2	-	-	-	-	3	-	-	-	-	-	1	-	2	1
CO2	2	-	-	1	-	1	-	1	2	-	-	3	-	2	1
CO3	2	-	-	-	-	3	-	-	-	-	-	3	-	2	1
CO4	3	-	-	-	2	-	-	-	-	-	-	2	-	2	1
CO5	3	-	-	-	-	-	-	-	-	-	-	2	-	2	1
CO6	3	-	-	-	2	-	-	-	-	-	-	1	-	2	1
AVG	**2.5**	**-**	**-**	**1**	**2**	**2.3**	**-**	**1**	**2**	**-**	**-**	**2**	**-**	2	1

3- Strong; 2-Medium; 1-Low
*The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable Program Specific Outcomes (PSOs)

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	
Set	Practical
Guided Response	Practical
Mechanism	Practical
Complex Overt Responses	
Adaptation	
Origination	

Mark distribution

Total Marks	CIA Marks	ESE Marks	ESE Duration
100	60	40	2.5 Hours

Continuous Internal Assessment (CIA) Pattern:

Attendance	9 Marks
Regular class work/tutorials/assignments	27 Marks
Continuous Assessment Test (Minimum 2 numbers)	24 Marks

Syllabus

ENGINEERING WORKSHOP

(Any Six Experiments from Electrical Workshop and Any Six Experiments from Electronics Workshop)

1. a) Demonstrate the precautionary steps adopted in case of Electrical shocks.

b) ldentify different types of cables, wires, switches, fuses, fuse carriers, MCB, ELCB and MCCB with ratings.

2. Wiring of simple light circuit for controlling light/ fan point (PVC conduit wiring)

3. Wiring of light/fan circuit using Two-way switches. (Staircase wiring)

4. Wiring of Fluorescent lamps and light sockets (6A) with a power circuit for controlling power device. (16A socket)

5. Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and Energy meter.

6. a) ldentify different types of batteries with their specifications.

b) Demonstrate the Pipe and Plate Earthing Schemes using Charts/Site Visit.

7. Assembling of Extension Board

8. Familiarization/Identification of electronic components with specification (Functionality, type, size, colour coding, package, symbol, cost etc. [Active, Passive, Electrical, Electronic, Electro-mechanical, Wires, Cables, Connectors, Fuses, Switches, Relays, Crystals, Displays, Fasteners, Heat sink etc.)

9. Drawing of electronic circuit diagrams using BIS/IEEE symbols and introduction to EDA tools (such as EasyEDA, XCircuit), Interpret data sheets of discrete components and IC's, Estimation and costing.

10. Familiarization/Application of testing instruments and commonly used tools. [Multimeter, Function generator, Power supply, DSO etc.] [Soldering iron, Desoldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and de-soldering station etc.]

11. Testing of electronic components [Resistor, Capacitor, Diode, Transistor and JFET using multimeter.]

12. Inter-connection methods and soldering practice. [Bread board, Wrapping, Crimping,

Soldering - types - selection of materials and safety precautions, soldering practice in connectors and general-purpose PCB, Crimping.]

13. Printed circuit boards (PCB) [Types, Single sided, Double sided, PTH, Processing methods, Design and fabrication of a single sided PCB for a simple circuit with manual etching (Ferric chloride) and drilling.]

14. Assembling of electronic circuit/system on general purpose PCB, test and show the

functioning (Any Two circuits).

(i) Fixed voltage power supply with transformer, rectifier diode, capacitor filter, Zener /IC regulator.

(ii) Square wave generation using IC 555 timer in IC base.
(iii) Sine wave generation using IC 741 OP-AMP in IC base.
(iv) RC coupled amplifier with transistor BC107.

15. a) Familiarization of Arduino IDE

b) LED blinking with different ON/OFF delay timings with i) inbuilt LED ii) Externally interfaced LED

LIST OF EXERCISES

(All experiments mandatory)

No.	Topic	No. of Hours	Course Outcome
1	a) Demonstrate the precautionary steps adopted in case of Electrical shocks. b) ldentify different types of cables, wires, switches, fuses, fuse carriers, MCB, ELCB and MCCB with ratings.	2	CO1
2	Wiring of simple light circuit for controlling light/ fan point (PVC conduit wiring)	2	CO2
3	Wiring of light/fan circuit using Two-way switches. (Staircase wiring)	2	CO2

4	Wiring of Fluorescent lamps and light sockets (6A) with a power circuit for controlling power device. (16A socket)	2	CO2
5	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and Energy meter.	2	CO2
6	a) Identify different types of batteries with their specifications. b) Demonstrate the Pipe and Plate Earthing Schemes using Charts/Site Visit.	2	CO1 CO3
7	Assembling of Extension Board	2	CO3
8	Wiring of a Single phase Distribution Board	2	CO3
9	Familiarization/Identification of electronic components with specification (Functionality, type, size, colour coding, package, symbol, cost etc. [Active, Passive, Electrical, Electronic, Electro-mechanical, Wires, Cables, Connectors, Fuses, Switches, Relays, Crystals, Displays, Fasteners, Heat sink etc.)	2	CO4
10	Drawing of electronic circuit diagrams using BIS/IEEE symbols and introduction to EDA tools (such as EasyEDA, XCircuit), Interpret data sheets of discrete components and IC's, Estimation and costing.	2	CO5
11	Familiarization/Application of testing instruments and commonly used tools. [Multimeter, Function generator, Power supply, DSO etc.] [Soldering iron, Desoldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and de-soldering station etc.]	2	CO4
12	Testing of electronic components [Resistor, Capacitor, Diode, Transistor and JFET using multimeter.]	2	CO4
13	Inter-connection methods and soldering practice. [Bread board, Wrapping, Crimping, Soldering - types - selection of materials and safety precautions, soldering practice in	2	CO6

	connectors and general-purpose PCB, Crimping.]		
14	Printed circuit boards (PCB) [Types, Single sided, Double sided, PTH, Processing methods, Design and fabrication of a single sided PCB for a simple circuit with manual etching (Ferric chloride) and drilling.	2	CO6
15	Assembling of electronic circuit/system on general purpose PCB, test and show the functioning (Any Two circuits). (i) Fixed voltage power supply with transformer, rectifier diode, capacitor filter, Zener /IC regulator. (ii) Square wave generation using IC 555 timer in IC base. (iii) Sine wave generation using IC 741 OP-AMP in IC base.	2	CO6
16	a) Familiarization of Arduino IDE b) LED blinking with different ON/OFF delay timings with i) inbuilt LED ii) Externally interfaced LED	2	CO5
	Total Hours	**32**	

Learning Resources

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	J B Gupta	Basic Electronics	Second	Katson Books	2013
2	B L Theraja, A K Theraja	A Textbook of Electrical Technology Volume I Basic Electrical Engineering	Third	S Chand	2014

REFERENCE BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Paul B Zbar, Albert P Malvino, Michael A Miller	Basic Electronics A Text Lab Manual	Seventh	Tata McGraw Hill	2015
2	M S Sukhija, T K Nagsarkar	Basic Electrical and Electronics Engineering	First	Oxford Higher Education	2012

On line study materials:

1. http://vlabs.iitkgp.ac.in/be/
2. https://www.youtube.com/watch?v=JRT-KTFmiQo&list=PL2Q_0aXptwl1foD9eKFGXo3iQfOriDmp5
3. https://www.youtube.com/playlist?list=PL7qxHC_-XSZkFfFzFKwx9iKc1IlgqXU8C
4. https://www.youtube.com/playlist?list=PL9Q_x6Cmsav8z4sVCwx0X2hiGMSYC0Ffg
5. https://youtu.be/jZsSzhhBQ-c?si=dhWlrJA6yLf4bEHw

COURSE DESIGNED BY	VERIFIED BY
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25ICVACP108	WEB AND GRAPHICS DESIGN	Category	L	T	P	Credit
		VAC	0	0	3	0

Preamble

This is a value-added course that offers students hands-on experience in creating a website using WordPress. This course also covers fundamental HTML structures and focuses on poster creation using the Canva tool.

Prerequisite

None

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Understand the basic HTML tags and web development process (Understanding)	22
CO2	Familiarize the use of CSS and JavaScript in developing a website and basics of website hosting. (Understanding)	28
CO3	Familiarize with the WordPress platform and be able to create a basic website (Understanding)	12
CO4	Add hyperlinks, images to their website using WordPress features. (Applying)	21
CO5	Create customized posters using Canva (Applying)	17

Mapping of Course Outcomes with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	1	-	1	-	-	1	-	-	-	1	-	-	2
CO2	2	-	-	-	3	-	-	1	-	-	-	2	-	-	2
CO3	2	-	2	-	3	-	-	1	-	2	-	2	-	-	2
CO4	2	-	2	-	3	-	-	1	-	3	-	2	-	-	2
CO5	2	-	-	-	3	-	-	1	-	3	-	3	-	-	2
AVG	**2**	-	**1.6**	-	**2.6**	-	-	**1**	-	**2.6**	-	**2**	-	-	**2**

1-Low; 2-Medium; 3- Strong;

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	
Set	Hands-on Sessions
Guided Response	Exercises
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution

Total Mark	CIA	ESE	ESE Duration
100	100	-	-

Continuous Internal Evaluation Pattern:

Attendance : 15 marks
Practical : 50 marks
Assessment Test : 35 marks

Syllabus

MODULE 1

Introduction to HTML. Tags in HTML, Attributes in Tags, Forms in HTML, Multimedia in HTML, URLs- Basic concepts, Relative URLs, URL Challenges and beyond URLs, Introduction to Cascading Style Sheets, Style Inclusion methods, Applying Style to the document, Selectors in CSS, CSS Strings and Keywords, Properties in CSS

MODULE 2

Browser Specific features, Character Entities and Fonts, Major Themes of CSS, Frameworks of CSS, Introduction to JavaScript, Technology Stack, Front End Frameworks and Back End layers, Introduction to Data and Database, Server and deployment and Web Browsers, Content Management System, Web development Process, Test a website, Website Hosting., Sessions and Cookies, Website Post-Launch Checklist

MODULE 3

Introduction To Wordpress, Getting started with WordPress- Creating a WordPress Site (Installing WordPress), Installing WordPress with a Web Host's "1-Click Install"- Logging Into the WordPress Admin & General Site Settings, General WordPress Settings- Writing Posts & Formatting Text- Posts versus Pages, Creating a New Blog Post-Using the Visual Editor, Pasting Without Formatting & Clearing Formatting, Formatting Heading, Publishing a Post Deleting a Post Restoring a Post from the Trash, Publishing a Post (Making it Live), Adding a Read More Link to a Post

MODULE 4

Creating Links (Hyperlinks), Adding Images & Managing the Media Library, adding an Image Gallery, Adding Video, Categories, Tags, & Reading Settings, Widgets Editing & Adding Widgets, Menus About Menus & Locations Adding & Removing Links in Menus Creating Submenus, Opening Menu Links in a New Tab, Installing Themes, Customizing Theme Appearance, WordPress Plugins: About, Installing, & Updating.

MODULE 5

Introduction To Canva, Logging / Setup Canva Account -Layouts & Templates- Learn how to use the pre-designed layouts -Downloading your work - Working with text- Adding pages to a design-Image-Text features and Charts, Fonts, Colors, and Images- Typography and font pairing -Using icons effectively -Organizing the dashboard - Sharing designs -Adding links- Color codes - Color scheme, Brand Kit - Magic Resize -Paid Elements - Folders for Element, Background Remover - Teams, Exporting and Scheduling - Learn more advanced techniques - Learn how to create a logo from scratch

Learning Resources

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Robin Krambröckers	Create Your Own Website: Learn Web Design with HTML & CSS	Edition	Robin Krambröckers	2020
2	Julie C. Meloni Jennifer Kyrnin	HTML, CSS, and JavaScript All in One	3rd Edition	Pearson Education	2020

REFERENCE BOOKS

Sl.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Selynna Payne	Practical WordPress for Beginners: A Guide on How to	1st Editio.n	Independently published	2022

		Create and Manage Your Website (PQ Unleashed: Practical Skills)			
2	Catherine B. Barrientos	HOW TO USE CANVA: A Comprehensive Guide To Graphic Design, Providing Detailed Step-by-step Methods Tailored For Beginners, Marketers, And Entrepreneurs.	1st Edition	Kindle Edition	2024

Online study materials:

https://learn.wordpress.org/courses/
https://www.canva.com/

Course contents and Lecture Schedule

Module No.	Topic	No. of Hours	CO
1	**BASICS OF WEB DEVELOPMENT**	13	
1.1	Introduction to HTML	1	
1.2	Tags in HTML	1	
1.3	Attributes in Tags	1	CO1
1.4	Forms in HTML	1	
1.5	Multimedia in HTML	1	
1.6	URLs- Basic concepts, Relative URLs	1	
1.7	URL Challenges and beyond URLs	1	
1.8	Introduction to Cascading Style Sheets	1	
1.9	Style Inclusion method	1	
1.10	Applying Style to the document	1	
1.11	Selectors in CSS	1	

1.12	CSS Strings and Keywords	1	
1.13	Properties in CSS	1	
2	**CSS and its features**	17	
2.1	Browser Specific features	1	
2.2	Character Entities and Fonts	1	
2.3	Major Themes of CSS	1	
2.4	Frameworks of CSS	1	CO2
2.5	Introduction to JavaScript	1	
2.6	Technology Stack	1	
2.7	Front End Frameworks and Back End layers	1	
2.8	Introduction to Data and Database	1	
2.9	Server and deployment and Web Browsers	1	
2.10	Content Management System	1	
2.11	Web development Process Introduction	1	
2.12	Web development Process Application	1	
2.13	Test a website	1	
2.14	Website Hosting introduction	1	
2.15	Website Hosting application	1	
2.16	Sessions and Cookies	1	
2.17	Website Post-Launch Checklist	1	
3	**INTRODUCTION TO WORDPRESS**	7	
3.1	Getting started with WordPress- Creating a WordPress Site (Installing WordPress)	1	
3.2	Installing WordPress with a Web Host's "1-Click Install"- Logging Into the WordPress Admin & General Site Settings	1	

3.3	General WordPress Settings- Writing Posts & Formatting Text- Posts versus Pages-	1	CO3
3.4	Creating a New Blog Post-Using the Visual Editor Pasting Without Formatting & Clearing Formatting Formatting Heading	1	
3.5	Publishing a Post Deleting a Post Restoring a Post from the Trash	1	
3.6	Publishing a Post (Making it Live)	1	
3.7	Adding a Read More Link to a Post	1	
4	**Creating Links (Hyperlinks)**	13	CO4
4.1	Adding Images	1	
4.2	Managing Libraries	1	
4.3	Adding an Image Gallery	1	
4.4	Adding Video	1	
4.5	Categories, Tags, & Reading Settings	1	
4.6	Reading the settings	1	
4.7	Widgets Editing & Adding Widgets	1	
4.8	Menus About Menus & Locations Adding & Removing Links in Menus Creating Submenus Opening Menu Links in a New Tab	1	
4.9	Installing Themes	1	
4.10	Customizing Theme Appearance	1	
4.11	Customizing the themes with multimedia	1	
4.12	WordPress Plugins: About, Installing, & Updating	1	
5	**INTRODUCTION TO CANVA**	10	CO5
5.1	Logging / Setup Canva Account -Layouts & Templates- Learn how to use the pre-designed layouts -	1	
5.2	Downloading your work - Working with text- Adding pages to a design-Image-Text features and Charts	1	
5.3	Fonts, Colors, and Images- Typography and font	1	

	pairing -Using icons effectively	
5.4	Organizing the dashboard - Sharing designs -Adding links- Color codes - Color scheme	1
5.5	Brand Kit - Magic Resize -Paid Elements	1
5.6	Folders for Element	1
5.7	Background Remover - Teams, Exporting and Scheduling	1
5.8	Learn more advanced techniques - Learn how to create a logo from scratch	1
5.9	Videos Overview / Editing - Video Tools	1
5.10	Animations - Animated Presentation	1
	Total Hours	**60**

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SEMESTER-II

25ICMATT201	VECTOR CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORMS	Category	L	T	P	Credit
		BSC	3	0	0	3

Preamble

This course introduces the concepts and applications of differentiation and integration of vector valued functions, differential equations, Laplace and Fourier Transforms. The objective of this course is to familiarize the prospective engineers with some advanced concepts and methods in Mathematics which include the Calculus of vector valued functions, ordinary differential equations and basic transforms such as Laplace and Fourier Transforms which are invaluable for any engineer's mathematical tool box. The topics treated in this course have applications in engineering.

Prerequisite

Basic mathematics at Plus two-level which includes single-variable calculus and multivariate calculus

Course Outcomes

After the completion of the course the student will be able to

COs	Course Outcome Statement	Weightage in %
CO1	Compute the derivatives and line integrals of vector functions and learn their applications (Applying)	**20**
CO2	Understand the concept of surface and volume integrals and learn t h e i r inter-relations and applications (Understanding)	**20**
CO3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients (Applying)	**20**
CO4	Compute Laplace transform and apply them to solve ordinary differential equations arising in engineering (Applying)	**20**
CO5	Understand Fourier transforms of functions and apply them to solve problems arising in engineering (Understanding)	**20**

Mapping with Programme Outcomes and Programme Specific Outcomes

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

1-Low; 2-Medium; 3- Strong

* The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable programme Specific outcomes (PSOs)

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	2	1	2	
Remembering	20	20	10	10	20
Understanding	30	30	40	40	30
Applying	50	50	50	50	50
Analyzing					
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	Assignment
Set	
Guided Response	
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Total Mark	CIA	ESE	ESE Duration
100	40	60	2.5 hours

Continuous Internal Evaluation Pattern:

Attendance : 6 Marks

Continuous Assessment Test (2 numbers) : 20 Marks

Assignment/Quiz/Course project : 14 Marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration = 90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 60 Marks;** **Duration =150 Minutes** **Part A: 5 X 3 = 15 Marks** **Part B: 5 X 9 = 45 Marks**

Sample Questions for Course Outcome Assessment

Course Outcome 1 (CO1):

1. How would you calculate the speed, velocity and acceleration at any instant of a particle moving in space whose position vector at time t is (t)?
2. Find the work done by the force field $F = (e^x - y^3) + (\cos y + x^3)$j on a particle that travels once around the unit circle centered at origin having radius 1
3. When do you say that a vector field is conservative? What are the implications if a vector field is conservative?

Course Outcome 2(CO2):

1. Evaluate the flux of the vector field) $f = (x, y, z)$ through the surface of the paraboloid $z = 1 - x^2 - y^2$ for $0 \le z \le 1$ of the vector field $F\ (x, y, z) = z\boldsymbol{k}$ across the sphere $x^2 + y^2 + z^2 = a^2$
2. For $\mathbf{F}=(xy^2,yz^2,x^2z)$, use the divergence theorem to evaluate $\iint \mathbf{F}\cdot d\mathbf{S}$ where S is the sphere of radius 3 centered at origin..
3. Calculate $\oint_C -x^2y\,dx + xy^2dy$, where C is the circle of radius 2 centered on the origin.

Course Outcome 3 (CO3):

1. Solve the differential equation $y'' + y = 0.001x^2$ using method of undetermined coefficient.
2. Solve the differential equation of $y''' - 3y'' + 3y' - y = e^x - x - 1$.
3. Use spherical coordinates to evaluate $\iiint (x^2 + y^2 + z^2)^3$ dv where B is the unit ball defined by $B = \{(x, y, z): x^2 + y^2 + z^2 \le 1\}$

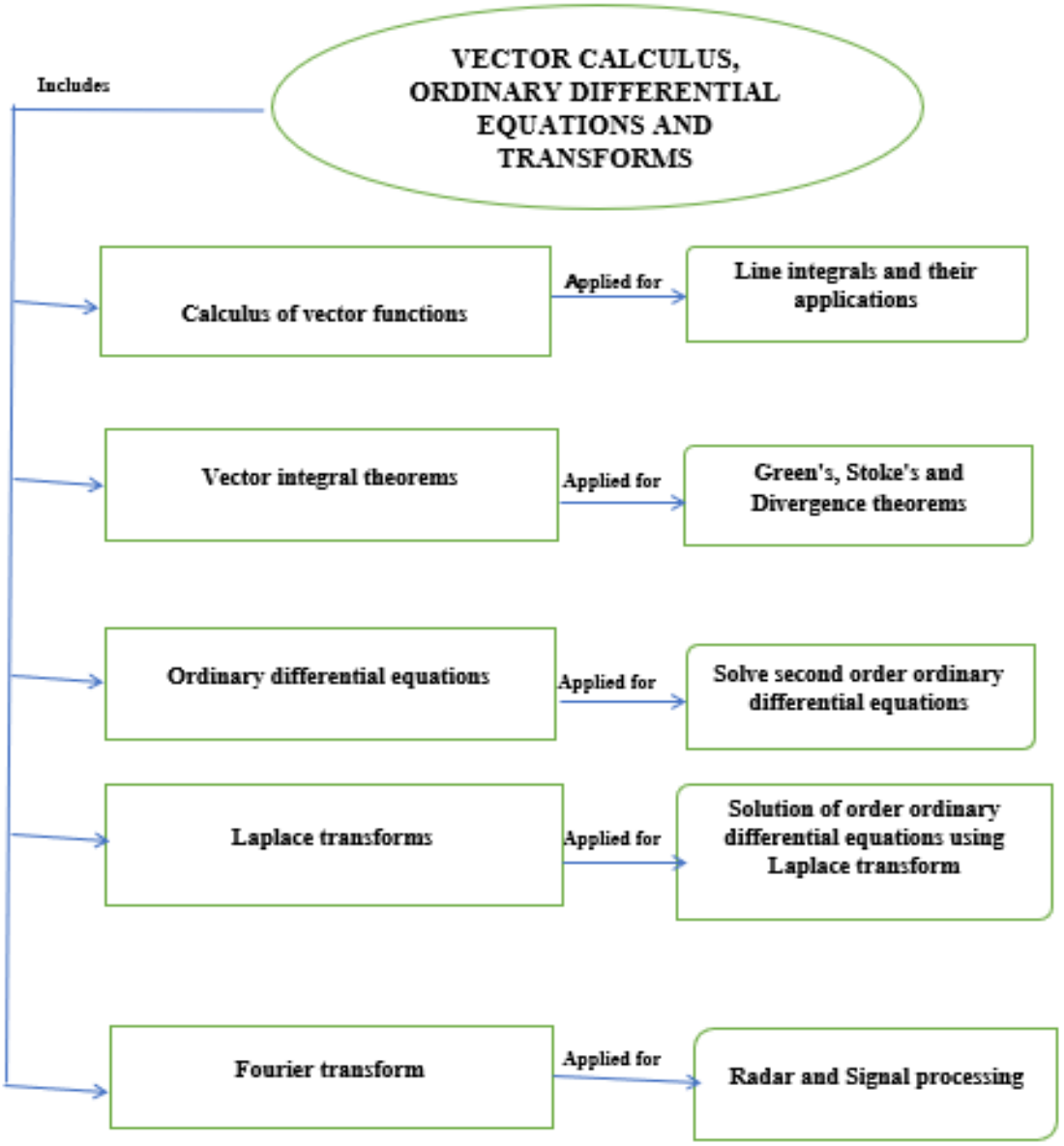
Course Outcome 4 (CO4):

1. Find Laplace Transform of Unit step function.
2. Solve the differential equation of $y^{11} + 9y = (t - \pi)$? Given $y\ (0) = 2$, $y'\ (0) = 0$
3. What is the inverse Laplace Transform of $F(s) = \frac{1}{s^2+4}$,

Course Outcome 5 (CO5):

1. Find the Fourier integral representation of function defined by
$f(x) = e^{-x}$ for $x > 0$ and $f(x) = 0$ for $x < 0$.
2. What are the conditions for the existence of Fourier Transform of a function $f(x)$?
3. Find the Fourier transform of $f(x) = 1$ for $|x| < 1$ and $f(x) = 0$ otherwise.

Concept Map


VECTOR CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORMS
Includes
Calculus of vector functions
Applied for
Line integrals and their applications
Vector integral theorems
Applied for
Green's, Stoke's and Divergence theorems
Ordinary differential equations
Applied for
Solve second order ordinary differential equations
Laplace transforms
Applied for
Solution of order ordinary differential equations using Laplace transform
Fourier transform
Applied for
Radar and Signal processing

SYLLABUS

MODULE 1

Vector valued function of single variable, derivative of vector function, motion along a curve-velocity, speed and acceleration. Concept of scalar and vector fields, Gradient, divergence and curl, Line integrals of vector fields, work as line integral, Conservative vector fields, independence of path and potential function (results without proof).

MODULE 2

Green's theorem (for simply connected domains, without proof) and applications to evaluating line integrals and finding areas, Flux integrals over surfaces using divergence theorem (without proof) and its applications to finding flux integrals, Stokes' theorem (without proof) and its applications to finding line integrals of vector fields and work done.

MODULE 3

Homogenous linear differential equation of second order, superposition principle, general solution, homogenous linear ODEs with constant coefficients-general solution. Existence and uniqueness (without proof). Non homogenous linear ODEs-general solution, solution by the method of undetermined coefficients (for the right-hand side of the Form (x^n, e^{kx}, $sinax$, $cosax$), Method of variation of parameters.

MODULE 4

Laplace Transform and its inverse, Existence theorem (without proof), linearity, Laplace transform of basic functions, first shifting theorem, Laplace transform of derivatives and integrals, solution of differential equations using Laplace transform, Unit step function, Second shifting theorems. Convolution theorem (without proof) and its application to finding inverse Laplace transform of products of functions, Solution of ordinary differential equation using Laplace transform.

MODULE 5

Fourier integral representation, Fourier sine and cosine integrals. Fourier sine and cosine transforms, inverse sine and cosine transform. Fourier transform and inverse Fourier transform, basic properties. The Fourier transforms of derivatives, Convolution theorem.

Learning Resources

TEXT BOOKS

Sl. No.	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	H. Anton, I. Biven, S.Davis	Calculus	12th Edition	Wiley	2024
2	Erwin Kreyszig	Advanced Engineering Mathematics	10th Edition	John Wiley & Sons	2016

REFERENCE BOOKS

Sl. No.	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	B.V Ramana	Higher Engineering Mathematics	39th Edition	McGraw-Hill Education	2023
2	J. Stewart	Essential Calculus	2nd Edition	Cengage	2017
3	Maurice D. Weir, Joel Hass, Christopher Heil Przemyslaw Bogacki	Thomas Calculus	15th Edition	Pearson	2024

Online study materials:

1. https://youtu.be/0ph5PU3Fsdc?si=2yKCoxkguw7OdsT4
2. https://youtu.be/ksS_yOK1vtk?si=C_Tbsb7OBjNGBfo1
3. https://youtu.be/NBcGLLU90fM?si=ddSFB0Y0B5zzjvx3
4. https://youtu.be/d7NF-_8vVv4?si=2Tuom3pi2Uo_adgC
5. https://youtu.be/HoGNkZclxDU?si=tcWwE5CYZ50D5CAj

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1	**Calculus of vector functions**	9	
1.1	Vector valued function of a scalar variable - derivative of vector valued function of scalar variable t-geometrical meaning	2	
1.2	Motion along a curve-speed, velocity, acceleration	2	CO1
1.3	Gradient, directional derivative, divergent and curl	2	
1.4	Line integrals with respect to arc length, line integrals of vector fields. Work done as line integral	2	
1.5	Conservative vector field, independence of path, potential function	1	
2	**Vector integral theorems**	9	
2.1	Green's theorem and it's applications	3	
2.2	Flux integral and their evaluation using divergence theorem	2	CO2
2.3	Divergence theorem and applications	2	
2.4	Stokes theorem and applications	2	
3	**Ordinary Differential Equations**	9	
3.1	Homogenous linear equation of second order, Superposition principle, general solution	2	
3.2	Homogenous linear ODEs of second order with constant coefficients	2	
3.3	Second order Euler-Cauchy equation	1	CO3
3.4	Non homogenous linear differential equations of second order with constant coefficient-solution by undetermined coefficients	2	
3.5	Solution by variation of parameters.	2	

4	**Laplace Transform**	9	
4.1	Laplace Transform, inverse Transform, Linearity, First shifting theorem, transform of basic functions	2	
4.2	Transform of derivatives and integrals	1	
4.3	Solution of Differential equations, Initial value problems by Laplace transform method.	2	CO4
4.4	Unit step function	1	
4.5	Second shifting theorem	2	
4.6	Convolution and related problems.	1	
5	**Fourier Transform**	9	
5.1	Fourier integral representation	2	
5.2	Fourier Cosine and Sine integrals and transforms	2	
5.3	Complex Fourier integral representation, Fourier transform and its inverse transforms, basic properties	3	CO5
5.4	Fourier transform of derivatives, Convolution theorem	2	
	TOTAL HOURS	**45**	

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25ICCHET222	CHEMISTRY FOR ELECTRONICS ENGINEERS	Category	L	T	P	Credit
		BSC	3	0	2	4

Preamble

The aim of Chemistry for Electronics Engineers is to enable the students to enhance the knowledge in the concepts of chemistry for engineering applications and to familiarize the students with different application oriented topics like spectroscopy, electrochemistry, Photochemistry, instrumental methods etc. This course introduces scientific approach and to familiarize with the experiments in chemistry relevant for research projects in higher semesters.

Prerequisite

Concepts of chemistry introduced at the plus two levels.

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Apply the basic concepts of electrochemistry and storage device to explore its possible application in various engineering field(Applying)	20
CO2	Apply the various spectroscopic techniques like UV-Visible, IR and its application (Applying)	20
CO3	Understand the different analytical methods for characterizing a chemical mixture or a compound and the basic concept of nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications(Understanding)	20
CO4	Understand types of conducting polymers and advanced polymers in engineering (Understanding)	20
CO5	Understand the different display systems and sensors used in electronic devices. (Understanding)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	3	3		2			3	1	2	2
CO2	3	2	2	2	2	3	3		2			3	1	2	2
CO3	3	2	3	2	2	3	3		2			3		2	2
CO4	3	2	3	2	2	3	3	2	2			3		2	3
CO5	3	2	3	2	2	3	2	1	2			3		3	3
Avg	**3**	**2**	**2.8**	**2**	**2**	**3**	**2.8**	**1.5**	**2**			**3**	**1**	**2.2**	**2.4**

1-Low; 2-Medium; 3-Strong

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	**2**	1	2	
Remembering	20	20	10	10	20
Understanding	30	30	40	40	30
Applying	50	40	50	40	40
Analyzing		10		10	10
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project/Assignment/Practical Component
Perception	Assignment
Set	
Guided Response	Practical
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Total Mark	CIA	ESE	ESE Duration
100	60	40	2.5 Hours

Continuous Internal Evaluation Pattern:

Attendance	:	9 Marks
Continuous Assessment Test (2 numbers)	:	24 Marks
Practical	:	27 Marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration = 90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 40 Marks** **Duration = 150 Minutes** Part A: 5 X 8 = 40 Marks

Sample Questions for Course Outcome Assessment

Course Outcome 1(CO1):

1. In redox titration using Potassium permanganate as oxidising agent, dilute Hydrochloric acid cannot be used to provide acidic medium, whereas dilute sulphuric acid can be used, explain using standard reduction potentials.
2. A Zn rod is dipped in 0.3 M $CuSO_4$ solution at 25 ^{0}C. Displacement reaction takes place then it attains equilibrium. Find the Equilibrium constant for this reaction.
3. Explain the construction and application of SHE.

Course Outcome 2 (CO2):

1. Most of the organic compounds shows a strong and broad absorption around 3000cm^{-1} .Assign this absorption.
2. Account for the fact that acetyl acetone exhibits bands at 1613cm $^{-1}$ and 1725 cm^{-1}due to carbonyl stretching mode and also broad band at 3000-2700cm^{-1} for OH stretching.
3. State Beer Lambert's law. Deduce it mathematical and graphical representation.

Course Outcome 3 (CO3):

1. How nanomaterials are classified on the basis of materials.
2. Describe a technique used for surface characterization of a sample.
3. Summarize the principle and working involved in Gas chromatography.

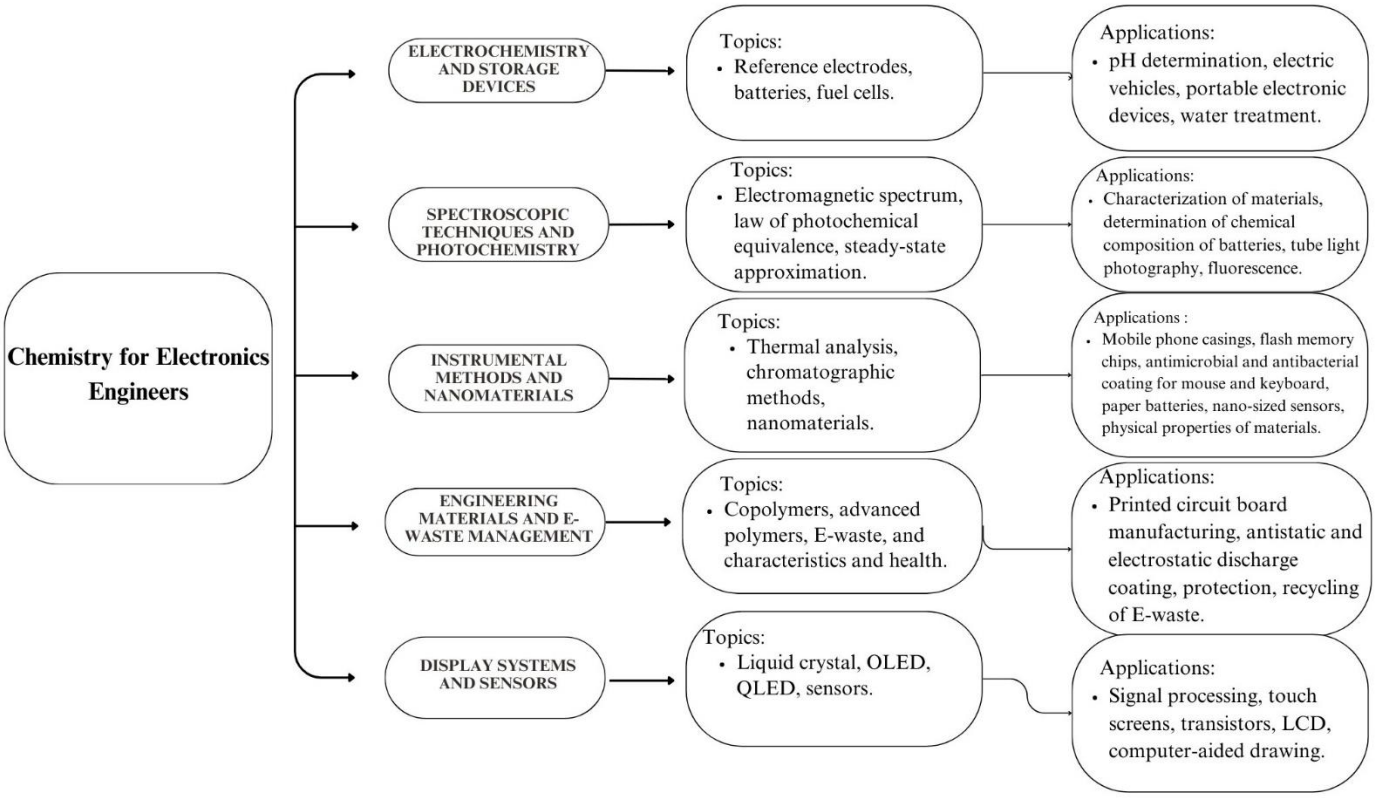
Course Outcome 4 (CO4):

1. Describe the synthesis, properties and application of a polymer which is used in making light weight military equipment.
2. Give the synthesis and application of ABS.
3. Describe the classification of copolymers.

Course Outcome 5 (CO5):

1. Demonstrate the working and construction of OLED with a neat diagram.
2. Outline advantages of QLED.
3. Explain the classification of liquid crystals and any two applications in detail.

Concept Map



Syllabus

Module 1
Electrochemistry and Storage devices

Introduction - Differences between electrolytic and electrochemical cells. Reference electrodes –SHE, Glass Electrode - Construction and Working-Determination of pH using glass electrode. Nernst Equation ,single electrode potentials and cell (Numericals) - Potentiometric titration - Introduction –Acid and base titration only. Batteries: – lithium-ion battery

Module 2
Spectroscopic Techniques

Introduction- Types of spectrum - electromagnetic spectrum - molecular energy levels – BeerLambert's law (Numericals). UV-Visible Spectroscopy – Principle - Types of electronic transitions - Instrumentation of UV-Visible spectrometer and applications. IR-Spectroscopy – Principle- Application of IR spectroscopy.

Module 3
Instrumental Methods and Nanomaterials

Thermal analysis –TGA- Principle, instrumentation (block diagram) and applications – TGA of CaC_2O_4 .H_2O and polymers. DTA-Principle, instrumentation (block diagram) and applications - DTA of CaC_2O_4 .H_2O. Chromatographic methods - Basic principles and applications of TLC-Retention factor.
Nanomaterials - Definition - Classification - Chemical methods of preparation - Hydrolysis and Reduction - Applications of nanomaterials - Surface characterisation -SEM – Principle and instrumentation (block diagram).

Module 4
Engineering Materials

Copolymers - Definition - Types - Random, Alternating, Block and Graft copolymers - ABS - preparation, properties and applications. Kevlar-preparation, properties and applications.Conducting polymers -Polyaniline- preparation, properties and applications.

Module 5
Display systems and Sensors.

Liquid crystals-Introduction, classification and Applications of liquid crystal displays -Properties and application of OLED's and QLED's.
Sensors-Introduction to sensors-Principle, working and applications of Electrochemical sensors.

Learning Resources

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Arun Lal Srivastav, Abhishek Kumar,Ananthkumar, Vishal Dutt, Pramod Rathore	Sustainable Management of electronic waste	First edition	Wiley	2024
2	Muhammed Arif	Engineering Chemistry Lab Manual	Third Edition	Owl Publishers.	2019
3	Sunita Rattan	Engineering Chemistry Lab manual	First Edition	SK Kataria& sons Publications	2023
4	Dr.A.Ravikrishnan	Engineering Chemistry with Laboratory Manual	Second Edition	Sri Krishna Hi tech	2023

REFERENCE BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Syed E Hasan	Introduction to waste Management	First edition	Wiley	2022
2	Guangye Zhang, Chen Xie, Peng You	Introduction to organic electronic devices	First edition	Springer	2022
3	G. Svehla, B. Sivasankar	Vogel's Qualitative Inorganic Analysis	Seventh edition	Pearson	2023
4	Payal B Joshi	Lab Manual of Engineering Chemistry	First edition	Wiley publishers	2020

Online study materials:

- https://youtu.be/7jOSbtR8mTs?si=cSHQ4CxGiIgP3p7f
- https://youtu.be/0EWCqCIsFOA?si=iYBSZXU8DNJm6qwl
- https://youtu.be/EJeTOUSmkBE?si=z2BS_UkaXfECpYkM
- https://youtu.be/jSNlmOwpxYg?si=bhfgsqroNjKobrhg
- https://youtu.be/a2laTxZn7OA?si=Si3VwL6BY2vTG2w7
- https://youtu.be/SmoBK4-ydvs?feature
- https://youtu.be/wy9MnaTyYpQ?feature
- .https://youtu.be/0OYcPP94Xx8?feature
- https://youtu.be/ZypZbxL3jf0?feature
- https://youtu.be/ok4iEcmF8WQ?feature

Course Contents and Lecture Schedule

No	Topic	No.of Lectures(hrs)	Course Outcome
1	**Electrochemistry and Storage devices**	**9**	
1.1	Introduction - Differences between electrolytic and electrochemical cells. Reference electrodes –SHE.	2	CO1
1.2	Glass Electrode - Construction and Working-Determination of pH using glass electrode.	3	
1.3	Nernst Equation, single electrode potentials and cell (Numerical) - Potentiometric titration - Introduction –Acid and base titration only	2	
1.4	Batteries: lithium-ion battery	2	
2	**Spectroscopic Techniques**	**9**	
2.1	Introduction-Types of spectrum-electromagnetic spectrum-molecular energy levels-Beer Lambert's law (Numerical).	3	CO2
2.2	UV-Visible Spectroscopy – Principle - Types of electronic transitions –	2	
2.3	Instrumentation of UV-Visible spectrometer and applications.	2	
2.4	IR-Spectroscopy – Principle –Applications.	2	
3	**Instrumental Methods and Nanomaterials**	**9**	

3.1	Thermal analysis –TGA- Principle, instrumentation (block diagram) and applications – TGA of $CaC_2O_4.H_2O$ and polymers. DTA-Principle, instrumentation (block diagram) and applications - DTA of $CaC_2O_4 .H_2O$.	2	
3.2	Chromatographic methods - Basic principles and applications of column and TLC	2	
3.3	GC and HPLC -Principle, instrumentation (block diagram) - retention time and applications.	2	CO3
3.4	Nanomaterials - Definition - Classification - Chemical methods of preparation -Hydrolysis and Reduction - Applications of nanomaterials – Surface characterisation - SEM – Principle and instrumentation (block diagram).	3	
4	**Engineering Materials**	**9**	
4.1	Copolymers - Definition - Types - Random, Alternating, Block and Graft copolymers.	2	**CO4**
4.2	ABS -preparation, properties and applications.	2	
4.3	Kevlar-preparation, properties and applications.	2	
4.4	Conducting polymers - Doping -Polyaniline -preparation properties and applications.	3	
5	**Display systems and Sensors.**	**9**	
5.1	Liquid crystals-Introduction, classification and Applications of liquid crystal displays	3	**CO5**
5.2	Properties and application of OLED's and QLED'S	3	
5.3	Sensors-Introduction to sensors, Electrochemical sensors.	3	
	TOTAL	**45 HOURS**	

ENGINEERING CHEMISTRY LAB

LIST OF EXPERIMENTS (MINIMUM 7 MANDATORY)

1. Estimation of dissolved oxygen by Winkler's method
2. Potentiometric titration of HCl and NaOH
3. Calibration of p^H meter and determination of p^H of a solution
4. Synthesis of polymers (a) Urea-formaldehyde resin (b) Phenol-formaldehyde resin
5. Determination of cell constant and conductance of unknown solution using conductivity cell
6. Estimation of Iron in Iron ore.
7. Preparation of nanoparticle (ZnO) by Sol-gel method
8. Estimation of Ferric ion using Colorimetry.

LECTURE SCHEDULE

SL.NO	EXPERIMENTS	NO OF HOURS
1.	Estimation of Dissolved oxygen by Winkler's method	2
2.	Potentiometric titration of HCl and NaOH	2
3.	Calibration of PH meter and determination of PH of a solution.	2
4.	Synthesis of polymers (a) Urea-formaldehyde resin (b) Phenol-Formaldehyde resin.	2
5.	Determination of Cell constant and conductance of unknown solution using conductivity cell	2
6.	Estimation of Iron in Iron ore.	2
7.	Preparation of nanoparticle (ZnO) by Sol-Gel method.	2
8.	Estimation of ferric ion using Colorimetry.	2

COURSE DESIGNED BY	VERIFIED BY
Ms. Sharamol PK Asst. Professor, BS & H, JCET E. Mail ID: shara@jawaharlalcolleges.com	Prof.V.N. Madhusudhasan Asst. Professor, BS & H, JCET E. Mail ID: vnmadhusudhanan@jawaharlalcolleges.com

25ICFCTT203	FOUNDATIONS OF COMPUTING FROM HARDWARE ESSENTIALS TO WEB DESIGN	Category	L	T	P	Credit
		ESC	2	0	2	3

Preamble

This course objective is to provide the comprehensive knowledge and practical skills in assembling, maintaining, troubleshooting and upgrading the computer hardware components. Develop foundational skills in HTML, CSS and JavaScript to create responsive, user-friendly and visually appealing websites.

Prerequisite

None

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Describe the fundamental components of a desktop computer and familiarize with them (Understanding)	20
CO2	Demonstrate assembling of a desktop computer system with the given components and peripherals and setting up BIOS (Understanding)	20
CO3	Understanding of various hardware components that facilitate and enhance connectivity in networks and devices (Understanding)	20
CO4	Understanding basic HTML tags & apply these concepts to web designing (Understanding)	20
CO5	Understanding basic CSS elements and developing responsive, visually appealing, and user-friendly websites using HTML and CSS and JavaScript(Understanding)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

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

1-Low; 2-Medium; 3- Strong

* The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable programme Specific outcomes (PSOs)

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests			Assignment			ESE
	1	**2**	**3 (Tutorial)**	1	2	3	
Remembering	50	40	-	50	40	-	40
Understanding	50	60	-	50	60	-	60
Applying							
Analyzing							
Evaluating							
Creating							

The assessment indicators are in percentages. The continuous internal assessment will carry 40 marks and the external examination, referred to as End Semester Examination, will carry 60 marks.

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	
Set	Practical Sessions
Guided Response	Tutorials
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution

Total Mark	CIA	ESE	ESE Duration
100	60	40	2.5 Hours

Continuous Internal Evaluation Pattern:

Attendance	: 9 marks
Continuous Assessment Test (2 numbers)	: 24 marks
Assignment (Case study) / Practical (Activity)	: 27 marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration =90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 40 Marks;** **Duration =150 Minutes** Part A: 5 X 3 = 15 Marks Part B : 5 X 5 = 25 Marks

Question Paper Pattern

Sample Questions for Course Outcome Assessment

Course Outcome 1(CO1):

1. Explain the basic principles of the Von Neumann architecture. How does it differ from the Harvard architecture?
2. Differentiate between primary memory and secondary memory, providing examples of each. Compare and contrast SRAM and DRAM in terms of speed, cost, and typical usage

Course Outcome 2 (CO2):

1 Illustrate the process of connecting peripheral devices to a newly assembled desktop computer, and highlight the key factors that ensure successful operation.

2 Demonstrate the complete process of assembling a desktop computer system, from installing the motherboard, CPU, RAM, storage devices, and power supply, to setting up the BIOS and ensuring all components are functioning correctly

Course Outcome 3(CO3):

1 Apply the TCP/IP protocol structure to explain how data flows across a network, and discuss the critical role of connectivity hardware in supporting seamless communication

2 Examine how different types of connectivity hardware function together to support network communication and analyze their roles within the OSI and TCP/IP layer frameworks.

Course Outcome 4(CO4):

1 Design a personal portfolio web page using HTML that includes a main heading, a brief introduction about yourself in two paragraphs, a list of your skills or interests with at least three items, a table showcasing your projects (with project name and description as columns), a hyperlink to your LinkedIn profile or personal blog, and an image of yourself or a relevant graphic. Add an appropriate title for your web page.

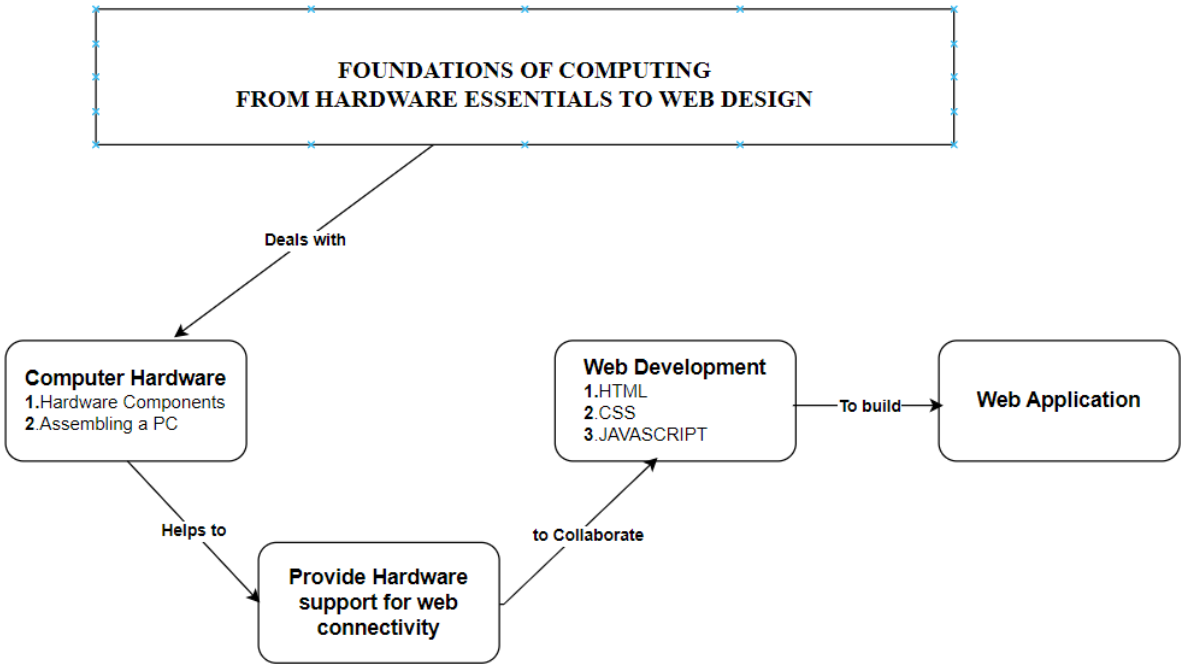
2 Create a simple event announcement web page using HTML that includes a main heading for the event title, at least two paragraphs detailing the event (such as date, time, location, and description), an unordered list of activities or speakers involved with a minimum of three items, a table displaying registration information (with columns for name and contact details), a hyperlink to the event registration page, and an image related to the event. Be sure to include a descriptive title for your web page

Course Outcome 5(CO5):

1 Create a web page for an online workshop that incorporates a CSS menu using inline, embedded, and external stylesheets. Add JavaScript for form validation to ensure attendees provide their name and email address correctly. Additionally, outline the process for setting up a local host server with Apache Tomcat to preview your web page before deploying it to a live server

2 Build a web page for a local book club that includes a navigation menu styled with CSS and a registration form that uses JavaScript for validation. Explain how to set up a local host server using Apache Tomcat to test your web page before making it publicly accessible

Concept Map



Syllabus

Module 1: Introduction to Computer Hardware

Overview of desktop computer Components-Importance of hardware knowledge-Von Neumann architecture & Output Devices-Types and specification-CPU, Memory devices-types primary and Secondary-Cache memory-SRAM-DRAM-EPROM-PROM System Software and Application Software-High Level Language-Low Level Language-Compiler-Assembler-Interpreter

Module 2: Assembling of a desktop computer system & BIOS

Operating System-Types-Concept of booting- POST (Power on Self-Test)- Motherboard-Form factors- (ATX, Micro-ATX, Mini-ITX)- Key components and their functions -CPU socket, RAM slots, PCI slot- Cooling system in a computer- SMPS & UPS-Assembling of a desktop computer

Module 3: Hardware Support for Connectivity

Overview of Connectivity Hardware-Network Devices-Network Interface Card-Router-Modem-Switch-hub-access point-gateway-bridge- OSI Layer-TCP/IP layers

Module 4: Fundamentals of World Wide Web and HTML

World Wide Web-Web Server-Client to web server Communication-Web server to web server communication-DNS Server-Static and dynamic web Pages-Scripts-Client side scripting-Server side scripting-Introduction to web development- Basic structure of an HTML document-HTML tags-HTML elements-inserting images-Lists in HTML

Module 5: Web designing using HTML, CSS &JavaScript

Cascading Style sheet-inline-embedded-external style sheet-building CSS menu-creating user style sheets- Introduction to JavaScript- Adding JavaScript to an HTML page- Simple form validation using JavaScript

Introduction to Web Servers- local host server- Hosting a website on a Server- localhost of Apache Tomcat

Learning Resources

TEXT BOOKS

Sl. No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	K. L. James	Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance	Third Edition	Tata McGraw Hill	2013
2	Jennifer Niederst Robbins	Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics	5th Edition	O'Reilly Media	2018
3	HTML, CSS, and JavaScript All in One, Sams Teach Yourself	Julie C. Meloni Jennifer Kyrnin	First Edition	Pearson	2020

REFERENCE BOOKS

Sl.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Scott Mueller	Upgrading and Repairing PCs	22nd Edition	Que Publishing	2015
2	David A. Patterson, John L. Hennessy	Computer Organization and Design: The Hardware/Software Interface	5th Edition	Morgan Kaufmann	2017
3	Jon Duckett	Web Design with HTML, CSS, JavaScript and Jquery	First	Wiley	2014

Online Study Materials

1. https://onlinecourses.swayam2.ac.in/aic20_sp11/
2. https://nptel.ac.in/courses/106106156
3. https://onlinecourses.nptel.ac.in/noc22_cs48/
4. https://www.shiksha.com/online-courses/networking-and-hardware-courses-certification-training-by-nptel-st615

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1	**Introduction to Computer Hardware**	**6 Hrs**	
1.1	Overview of desktop component-computer hardware, Von-Neuman architecture	1	
1.2	Input devices & output devices, CPU	1	CO1
1.3	Memory -primary, secondary, cache memory	1	
1.4	SRAM, DRAM, EPROM, PROM	1	
1.5	System software, application software, High level and low-level	1	

	language		
1.6	Compiler, Assembler, Interpreter	1	
2	**Assembling of a desktop computer system & BIOS**	**6 Hrs**	
2.1	Operating system-types, Booting-BIOS-POST	1	
2.2	Motherboard-form factors-components	1	
2.3	CPU socket, RAM slots, PCI slot	1	CO2
2.4	Cooling system in computer, SMPS	1	
2.5	Assembling of a desktop computer-lecture 1	1	
2.6	Assembling of a desktop computer-lecture 2	1	
3	**Hardware Support for Connectivity**	**6 Hrs**	
3.1	Overview of Connectivity Hardware	1	
3.2	Introduction to networking devices-NIC	1	
3.3	Router, modem, switch	1	CO3
3.4	Hub. access point, gateway bridge	1	
3.5	OSI layers -functions	1	
3.6	TCP Layers-functions	1	
4	**Fundamentals of World Wide Web and HTML**	**6 Hrs**	
4.1	World Wide web, Web server-communication	1	
4.2	DNS server, Static and dynamic pages	1	
4.3	Client-side scripting & Server-side scripting	1	CO4
4.4	Introduction to web design-HTML	1	
4.5	The basic structure of an HTML document, HTML tags	1	
4.6	HTML elements, inserting images, lists	1	
5	**Web designing using HTML, CSS & JavaScript**	**6 Hrs**	
5.1	Cascading Style sheet-Embedded CSS	1	
5.2	CSS menu-selectors	1	
5.3	JavaScript	1	CO5
5.4	Form validation using JavaScript	1	
5.5	Webserver	1	
5.6	Localhost of Apache Tomcat	1	
	TOTAL	**30 hours**	

LABORATORY HOURS

1	EPROM, PROM,SRAM,DRAM	**2**
2	Familiarization of CPU components	2
3	Describe the initial steps in assembling a desktop computer, including preparing the case, installing the motherboard, and securing the power supply.	2
4	Assembling a computer	2
5	Familiarization of five types of connectivity hardware in a computer	2
6	HTML-web page, paragraph.	2
7	HTML list	2
8	HTML Table, image	2
9	HTML-tags	2
10	CSS-inline	2
11	CSS-Font, style	2
12	CSS-image	2
13	Web page using HTML and CSS	2
14	Javascript	2
15	Form validation using Javascript	2
	TOTAL HOURS	**30**

COURSE DESIGNED BY	VERIFIED BY
Ms. Resmi C. S. Asst. Professor, CSE Dept, JCET E. Mail ID: resmi4086.cse@jawaharlalcolleges.com	Ms. Akhila E. Asst. Professor, CSE Dept, JCET E. Mail ID : mailtoakhilasathish@gmail.com

25ICPGCT204	PROGRAMMING IN C	Category	L	T	P	Credit
		ESC	2	2	0	4

Preamble

This course objective is to provide theoretical and practical experience on fundamentals of C programming as well as the design of simplified computer solutions to real-world problems. Programming concepts, data types, conditional and control structures, functions, arrays, recursion, file handling, and preprocessor directives are all projected in solving the engineering and real-life problems.

Prerequisite

None

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Describe the fundamentals of C language and infer the computer related programs using algorithms and flowcharts. (Understanding)	20
CO2	Introduce the basic concepts of C programming like operators and control statements to understand the structure of a C program. (Understanding)	20
CO3	Describe the concepts of arrays and functions to basic C program (Understanding)	20
CO4	Apply the concept of function, recursion, Structures in writing a C program (Applying)	20
CO5	Handle and Implement file operations and pre-processor directives for a given application (Applying)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	2	-	-	-	1	2
CO2	3	2	-	-	-	-	-	-	-	2	-	-	-	1	2
CO3	3	3	2	-	-	-	-	-	-	2	-	1	-	1	2
CO4	3	3	2	-	-	-	-	-	-	2	-	1	-	1	2
CO5	3	2	2	-	-	-	-	-	-	2	-	1	-	1	2
AVG	**2.8**	**2.2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**1**	**-**	1	2

* The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable programme Specific outcomes (PSOs)

1-Low; 2-Medium; 3- Strong

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests			Assignment			ESE
	1	2	3 (Tutorial)	1	2	3	
Remembering	50%	20%		50%	20%	-	20%
Understanding	50%	40%	30%	50%	40%	-	60%
Applying		40%	70%		40%	-	40%
Analyzing							
Evaluating							
Creating							

The Assessment indicators are in percentages. Continuous Internal Assessment will carry 40 marks and the external examination, referred as ESE, will carry 60 marks.

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	
Set	Practical Sessions
Guided Response	Tutorials
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution

Total Mark	CIA	ESE	ESE Duration
100	40	60	2.5 Hours

Continuous Internal Evaluation Pattern:

Attendance : 6 Marks

Continuous Assessment Test (2 numbers) : 20 Marks

Assignment/Quiz/Course project : 14 Marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration =90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 60 Marks;** **Duration =150 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 9 = 45 Marks

Sample Questions for Course Outcome Assessment

Course Outcome 1(CO1):

1. Write an algorithm to check whether largest of 3 natural numbers is prime or not. Also, draw a flowchart for solving the same problem
2. Write an algorithm and draw its corresponding flowchart to find the sum of n numbers.

Course Outcome 2 (CO2):

1. Write an easy-to-read C program to process a set of n natural numbers and to find the largest even number and smallest odd number from the given set of numbers. The program should not use division and modulus operators.

Course Outcome 3(CO3):

1. Write an easy-to-read C program to process the marks obtained by n students of a class and prepare their rank list based on the sum of the marks obtained. There are 3 subjects for which examinations are conducted and the third subject is an elective where a student is allowed to take any one of the two courses offered

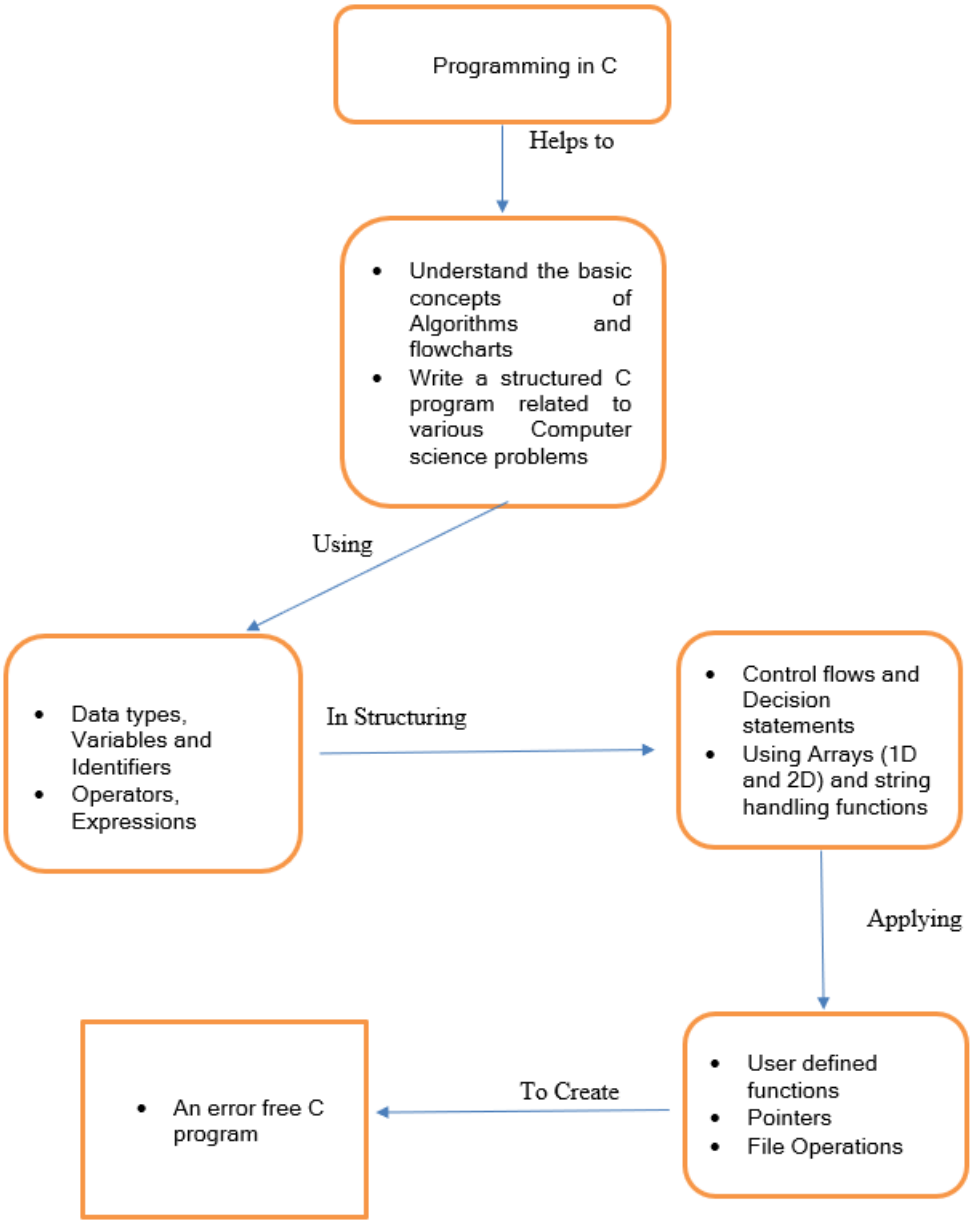
Course Outcome 4(CO4):

1. Write an easy-to-read C program to find the value of a mathematical function f which is defined as follows. f(n) = n! / (sum of factors of n), if n is not prime and f(n) = n! / (sum of digits of n), if n is prime.

Course Outcome 5(CO5):

1. Write an easy-to-read C program to sort a set of n integers and to find the number of unique numbers and the number of repeated numbers in the given set of numbers. Use a function which takes an integer array of n elements, sorts the array using the Bubble Sorting Technique and returns the number of unique numbers and the number of repeated numbers in the given array.

Concept Map



Syllabus

Module 1: Overview and

Introduction to C

Introduction to computing: Algorithms and flowcharts- Art of programming through algorithms and flowcharts- Algorithmic notations and Flowchart symbols- Conceiving simple problems using algorithms and flow charts (Small problems is preferred).

Overview of C: History and its importance- Basic structure of a C program- Executing a basic C program with algorithms and flowcharts.

Character set: C tokens- Keywords and Identifiers- Constants- Variables- Data types- Declaration of variables- Assigning Values to variables.

Managing Input and Output Operations: Reading a character- Writing a character- Formatted Input and Output.

Module 2: Operators and Control flow

Operators: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators- Type Conversions in Expressions, Operator Precedence and Associativity.

Control Flow statements: Decision making using IF statements- Switch Statement, Unconditional Branching using goto statement, While Loop, Do While Loop, For Loop, Break and Continue statements. (Simple programs covering control flow)

Module 3: Arrays and strings

Arrays: One-dimensional Arrays, Declaration of One-dimensional Arrays, Initialization of One-dimensional Arrays, Example programs- Bubble sort, Selection sort, Linear search, Two-dimensional Arrays, Declaration of Two-dimensional Arrays, Initialization of Two-dimensional Arrays, Example Programs-Matrix operations.

Strings: Introduction to Character array- Declaring and Initializing String Variables, Reading Strings from Terminal- String handling functions (strlen, strcpy, strcat and strcmp, puts, gets)- Example Programs (with and without using built-in string functions)

Module 4: Working with functions

Introduction to modular Programming: Functions- Need for functions, Elements of User-defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions, No Arguments and no Return Values, Arguments

but no Return values, Arguments with Return Values, No Arguments but Returns a Value, Passing Arrays to Functions, Recursion, The Scope, Visibility and Lifetime of variables. Structure, Union

and Storage Classes.

Module 5: Pointers and Files

Basics of Pointer: Declaring pointers, accessing data though pointers, NULL pointer, array access using pointers, pass by reference effect File Operations: open, close, read, write, append Sequential access and random access to files: In built file handling functions (rewind (), fseek (), ftell (), feof (), fread (), fwrite ()). Sample programs related to files.

Learning Resources

TEXT BOOKS

Sl.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Gottfried B.S	Programming with C	Third	Tata McGraw Hill	2019
2	E. Balagurusamy	Programming in ANSI C	Eighth	McGraw Hill	2019

REFERENCE BOOKS

Sl.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Anita Goel and Ajay Mittal	Computer fundamentals and Programming in C	Fifth	Pearson	2015
2	Brian W. Kernighan and Dennis M. Ritchie	C Programming Language	Third	Pearson	2008
3	Jacqueline A Jones and Keith Harrow	Problem Solving with C	Second	Pearson Education	2001

Online study materials:

1. https://nptel.ac.in/courses/106105171

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	COs
1.	**Overview and Introduction to C (9 Hours)**		CO1
1.1	Introduction to computing- Algorithms and flow charts-	1	
1.2	Art of programming through algorithms and flowcharts	1	
1.3	Algorithmic notations and Flow chart symbols-	1	
1.4	Conceiving simple problems using algorithms and flow charts	1	
1.5	Overview of C- History and its importance- Basic structure of a C program-	1	
1.6	Executing a basic C program with algorithms and flowcharts	1	
1.7	Character set- C tokens- Keywords and Identifiers- Constants- Variables-	1	
1.8	Data types- Declaration of variables- Assigning Values to variables.	1	
1.9	Reading a character- Writing a character- Formatted Input and Output.	1	
2	**Operators and Control flow (9 Hours)**		CO2
2.1	Various Operators and its uses	1	
2.2	Operators and its examples	1	
2.3	Evaluation of Expressions, Precedence of Arithmetic Operators-	1	
2.4	Type Conversions in Expressions, Operator Precedence and Associativity.	1	
2.5	Decision Making and Branching: Decision making using IF statements-	1	
2.6	Decision making: Switch Statement	1	
2.7	Unconditional Branching using goto statement, While Loop	1	
2.8	Do While Loop, For Loop, Break and Continue statements.	1	
2.9	Simple programs covering control flow	1	
3	**Arrays and strings (9 Hours)**		CO3
3.1	Arrays Declaration and Initialization, 1-Dimensional Array	1	
3.2	Example programs- Bubble sort, Selection sort.	1	
3.3	Example programs- Linear Search	1	

3.4	Two-dimensional Arrays, Declaration of Two-dimensional Arrays, Initialization of Two-dimensional Arrays.	1	
3.5	Example programs-Matrix Multiplication, Transpose of a matrix.	1	
3.6	Character Arrays and Strings: Declaring and Initializing String Variables.	1	
3.7	Reading Strings from Terminal	1	
3.8	String handling functions (strlen, strcpy, strcat and strcmp, puts, gets)	1	
3.9	Example Programs (with and without using built-in string functions)	1	
4	**Working with functions (9 Hours)**		CO4
4.1	Introduction to modular programming, writing functions	1	
4.2	User-defined Functions, Definition of Functions, Return Values and their Types.	1	
4.3	Function Calls, Function Declaration.	1	
4.4	Category of Functions, No Arguments and no Return Values	1	
4.5	Arguments but no Return values, Arguments with Return Values	1	
4.6	Passing Arrays to Functions, Recursion, The Scope	1	
4.7	Visibility and Lifetime of variables	1	
4.8	Structure, Union and Storage Classes.	1	
4.9	Sample programs	1	
5	**Pointers and Files (9 Hours)**		CO5
5.1	Basics of Pointer: declaring pointers.	1	
5.2	Accessing data through pointers	1	
5.3	NULL pointers and declarations	1	
5.4	Array access using pointers	1	
5.5	File Operations: open, close, read, write,	1	
5.6	Append Sequential access and random access to files	1	
5.7	In built file handling functions (rewind (), fseek (), ftell (), feof ()	1	
5.8	Operations - fread (), fwrite ())	1	

5.9	Simple programs covering pointers and files.	1	
	TOTAL	45 hours	
SAMPLE PROGRAMS FOR TUTORIALS**			
T1	Write a C program to print the name and address of the candidate.	1	
T2	Draw the flowchart and write algorithm to check if the number is prime or not.	1	
T3	Draw the flowchart and write algorithm to print the sum of n natural numbers.	1	
T4	Write a C program to simulate a Calculator using Switch statement	1	
T5	Write a C program to check whether given number is Armstrong or not.	1	
T6	Write a C program for pattern printing using loops.	1	
T7	Write a C Program to do a Linear Search and bubble sort	1	
T8	Write a C program to check if the given number is palindrome.	1	
T9	Write a C program to do the Matrix operations	1	
T10	Write a C program to calculate the factorial of a number using recursion.	1	
T11	Write a C program to calculate the factorial of a number using recursion	1	
T12	Write a C program to implement Call by value and Call by reference. (The choice of the program is to be done by the faculty)	1	
T13	Write a C program to implement the concept of Pointers	1	
T14	Write a C program to do file operations (Read and write)	1	
T15	Write a C program to do fseek() and other operations	1	

	TOTAL	15 Hours	

** The tutorial sessions are being conducted on the laboratory.

COURSE DESIGNED BY	VERIFIED BY
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25ICEEIT205	ENGINEERING ENTREPRENEURSHIP AND INTELLECTUAL PROPERTY RIGHTS	Category	L	T	P	Credit
		ESC	2	0	0	2

Preamble

To provide awareness, develop the skills of entrepreneurship & to encourage the students to become an entrepreneur

Prerequisite

None

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Students will develop an entrepreneurial mindset, characterized by creativity, risk-taking, and the ability to identify and seize business opportunities within the engineering sector. (Understanding)	20
CO2	Students will learn techniques for fostering innovation and creativity in engineering design and product development. (Understanding)	20
CO3	Students will develop the ability to critically assess and validate their business ideas through market research, feasibility studies, and feedback from potential customers and stakeholders. (Understanding)	20
CO4	Students will gain a comprehensive understanding of the various types of institutional support available to entrepreneurs. (Understanding)	20
CO5	Students will gain a thorough understanding of the various types of intellectual property, including patents, trademarks, copyrights, and trade secrets.(Understanding)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	1	1	1	2	2	2	1	-	1	-
CO2	1	3	2	1		-	-	1	1	1	1	-	-	1	-
CO3	-	-	-	-	-	-	-	2	1	1	1	-	-	1	-
CO4	-	-	-	-	-	-	-			1	2	1	-	1	-
CO5	-	-	-	-	-	-	-		1	1	1	1	-	1	-
AVG	**1**	**3**	**2**	**1**		**1**	**1**	**1.33**	**1.66**	**1.2**	**1.4**	**1**	**-**	1	**-**

3- Strong; 2-Medium; 1-Low

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	2	1	2	
Remembering	20	20			**20**
Understanding	80	80	100	100	80
Applying					
Analyzing					
Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component/ Industry Connect
Perception	Assignment
Set	
Guided Response	
Mechanism	Assignment/ Industry Connect
Complex Overt Responses	
Adaptation	
Origination	

Total Mark	CIA	ESE	ESE Duration
100	40	60	2.5 hours

Continuous Internal Evaluation Pattern:

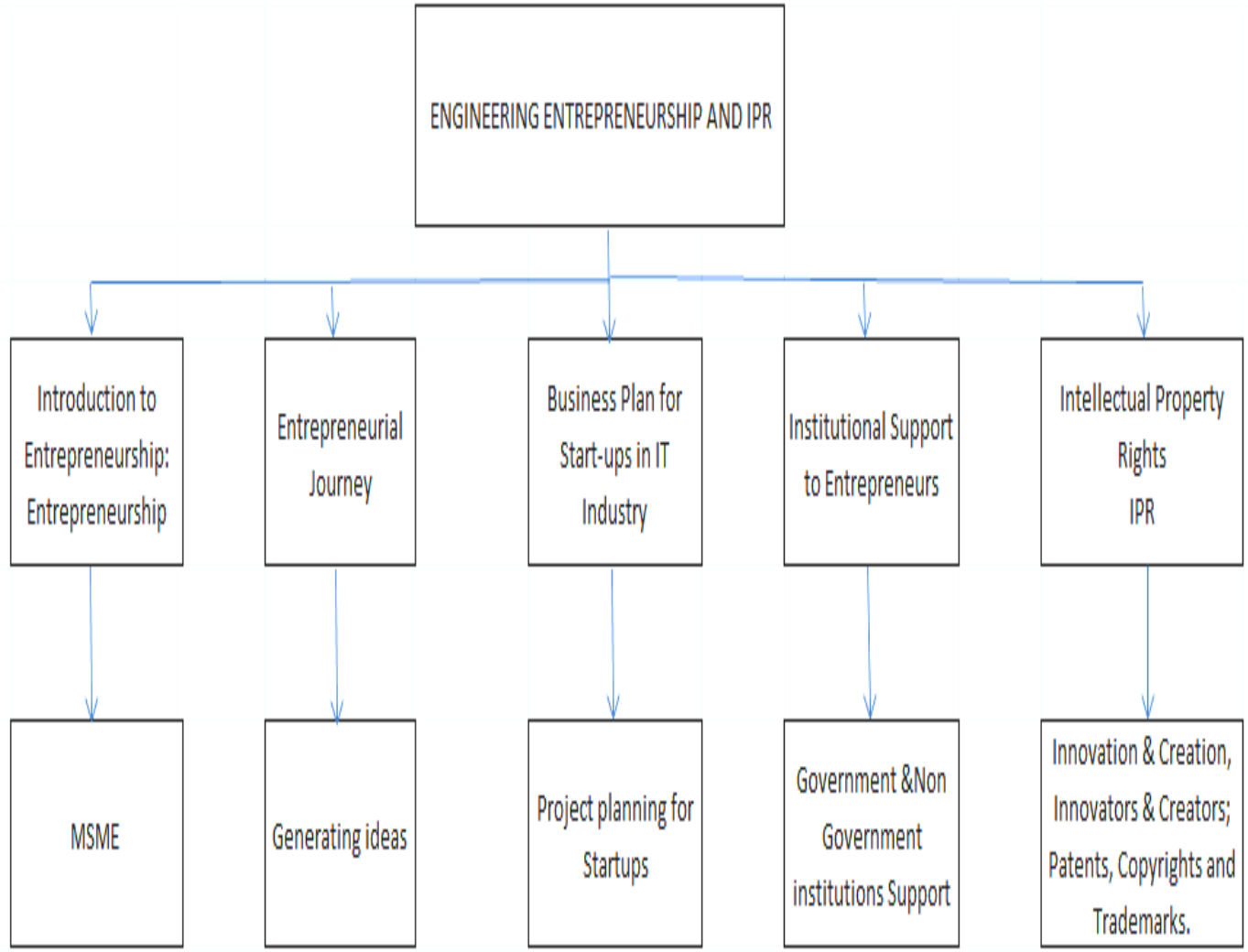
Attendance : 6 marks
Continuous Assessment Test (2 numbers) : 20 marks
Assignment/Quiz/Course project : 14 marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks;** **Duration =90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 60 Marks;** **Duration =150 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks

Sample Questions for Course Outcome Assessment**
(Questions may be framed based on the outline given under each course outcome)
Course Outcome 1 (CO1):
1. Entrepreneurs Characteristics, Types and Motivation
2. Entrepreneurial process.
3. Enterprise- Definition and Classification
Course Outcome 2 (CO2)
1. Generating ideas
2. Define Feasibility analysis, Industry and Competitor analysis
3. Developing effective business model.
Course Outcome 3 (CO3):
1. Project Identification, Market Survey
2. Various Business Planning Methods
3. Writing a Business Plan
Course Outcome 4 (CO4):
1. Institutional Support to Entrepreneurs
2. Need for Institutional support different Government &Non Government institutions
3. Support Entrepreneurs like, NSIC, SIDO, SSIB, SSIDC, SISIs
Course Outcome 5 (CO5):
1. Introduction of IPR
2. General Provisions & Basic principles of IPR
3. IPR like Innovation & Creation, Innovators & Creators; Patents Copyrights and Trademarks

Concept Map



Syllabus

MODULE 1

Introduction to Entrepreneurship: Entrepreneurship- Concept, Nature, Functions and Importance; Entrepreneurs Characteristics, Types and Motivation; Entrepreneurial process; Enterprise- Definition and Classification (MSME Micro, Small & Medium Enterprises).

MODULE 2

Entrepreneurial Journey: Creativity and Innovation, Recognizing opportunities and Generating ideas, Feasibility analysis, Industry and Competitor analysis, developing effective business model.

MODULE 3

Business Plan for Start-ups in IT Industry: Project Identification, Market Survey, Production plan, Operational plan, Marketing plan, Organizational plan and financial plan; writing a

business plan.

MODULE 4
Institutional Support to Entrepreneurs: Need for Institutional support different Government &Non Government institutions to support Entrepreneurs like, NSIC, SIDO, SSIB, SSIDC, SISIs , DTICs, Industrial Estates, Specialized Institutions.

MODULE 5
Intellectual Property Rights: Introduction of IPR, General Provisions & Basic principles of IPR, various perspective of IPR like Innovation & Creation, Innovators & Creators; Patents, Copyrights and Trademarks.

(Learn how to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business. Understand entrepreneurial process by way of studying different cases and performing class activities.)

Learning Resources
BOOKS RECOMMENDED:

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Robert D. Hisrich, Mathew J. Manimala, Michael P Peters and Dean A. Shepherd .	Entrepreneurship	9th Edition	Tata Mc-graw Hill Publishing Co.ltd.-new Delhi	2014
2	Bruce R. Barringer and R. Duane Ireland	Entrepreneurship	4th Edition,	Pearson Publications, New Delhi	2011
3	N.K. Acharya	Text book on intellectual Property Rights	New Edition	Asha Law House New Delhi	2001

Online study materials:
https://archive.nptel.ac.in/courses/109/105/109105176/
https://www.youtube.com/watch?v=Hgj_kRrvbhQ&t=3s
https://www.youtube.com/watch?v=p7vhcob-YkI

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1.	**Entrepreneurship**	5	CO1
1.1	Introduction to Entrepreneurship	1	
1.2	Entrepreneurship- Concept, Nature, Functions and Importance	1	
1.3	Entrepreneurs Characteristics, Types and Motivation; Entrepreneurial process	1	
1.4	Enterprise- Definition and Classification (MSME Micro, Small & Medium Enterprises).	1	
1.5	Case Study: Success and Failure stories of entrepreneurs and discussing their characteristics and reasons for success/failure.	1	
2	**Entrepreneurial Journey**	6	CO2
2.1	Entrepreneurial Journey	1	
2.2	Creativity and Innovation, Recognizing opportunities	1	
2.3	Generating ideas	1	
2.4	Feasibility analysis, Industry and Competitor analysis	1	
2.5	Developing effective business model.	1	
2.6	Idea generation by students.	1	
3	**Business Plan for Start-ups in IT Industry**	5	CO3
3.1	Project Identification	1	
3.3	Market Survey	1	
3.4	Production plan, Operational plan, Marketing plan, Organizational plan and financial plan	1	
3.5	writing a business plan.	1	
3.6	Class Activity: Students asked to finalize on their ideas and start writing business plans	1	
4	**Institutional Support to Entrepreneurs**	5	
4.1	Need for Institutional support different Government &Non Government institutions	1	

4.2	Support Entrepreneurs like, NSIC, SIDO, SSIB, SSIDC, SISIs, DTICs,	2	CO4
4.3	Industrial Estates, Specialized Institutions	2	
5	**Intellectual Property Rights**	9	CO5
5.1	Introduction of IPR	1	
5.2	General Provisions & Basic principles of IPR	2	
5.3	Various perspective of IPR like Innovation & Creation, Innovators & Creators	2	
5.4	Patents, Copyrights and Trademarks.	2	
5.5	Case Study on IPR	2	
	TOTAL	**30 hours**	

Course Designers:

1. tpongik@nehrucolleges.com
2. 2. Dr.Shine K, hodme@jawaharlalcolleges.com

COURSE DESIGNED BY	VERIFIED BY
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25ECEDCT206	ELECTRONIC DEVICES AND CIRCUITS	Category	L	T	P	Credit
		PCC	3	0	0	3

Preamble

The objective of this course is to provide students with a strong foundation in the principles and operation of semiconductor devices such as diodes, transistors, and field-effect transistors (FETs). The course aims to develop the analytical and practical skills required to understand, design, and troubleshoot basic electronic circuits used in various engineering applications.

Prerequisite

Basics of Electrical & Electronics Engineering

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	To learn the operation and characteristics of diodes(Applying)	20
CO2	To discuss the operation of different configurations of transistors. (Applying)	20
CO3	To understand the JFET, MOSFET(Analyzing)	20
CO4	To remember the special conductor devices(Applying)	20
CO5	To learn the role of power electronics devices and devices in real life applications(Understanding)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	2	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO5	2	-	-	-	2		-	-	-	-	-	-	-	2	-
Avg	**2.6**	**2.33**	**2**	-	**2**	-	-	-	-	-	-	-	-	**2**	-

1-Low; 2-Medium; 3- Strong;

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Tests		Assignment		Terminal Examination
	1	2	1	2	
Remembering	20	20	10	10	20
Understanding	30	30	40	40	30
Applying	50	50	50	50	50
Analyzing					

Evaluating					
Creating					

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Assignment/Practical Component
Perception	Assignment
Set	
Guided Response	
Mechanism	Assignment
Complex Overt Responses	
Adaptation	
Origination	

Mark Distribution

Total Mark	CIA	ESE	ESE Duration
100	40	60	2.5 Hours

Continuous Internal Evaluation Pattern:

Attendance : 6 Marks
Continuous Assessment Test (2 numbers) : 20 Marks
Assignment/Quiz/Course project : 14 Marks

Question Paper Pattern:

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks; Duration = 90 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 7 = 35 Marks
End Semester Exam	**Total = 60 Marks** **Duration = 150 Minutes** Part A: 5 X 3 = 15 Marks Part B: 5 X 9 = 45 Marks

Sample Questions for Course Outcome Assessment**

Course Outcome 1(CO1):

1. Analyze a clipper circuit using diodes and predict the output waveform.
2. Explain the V-I characteristics of a PN junction diode with a neat diagram.
3 Describe how a Zener diode regulates voltage in a circuit.

Course Outcome 2(CO2):

1. Explain how a transistor operates in a common-emitter configuration and describe its practical applications.
2. Apply the concept of biasing to ensure proper operation of a BJT amplifier.
3. Draw and label the equivalent circuit of a BJT using the Ebers-Moll representation.

Course Outcome 3 (CO3):

1. Compare and contrast the structure and operation of JFET and MOSFET.
2. Interpret the drain characteristics of a JFET and explain the concept of pinch-off voltage.
3. Examine how the gate voltage controls current in a MOSFET.

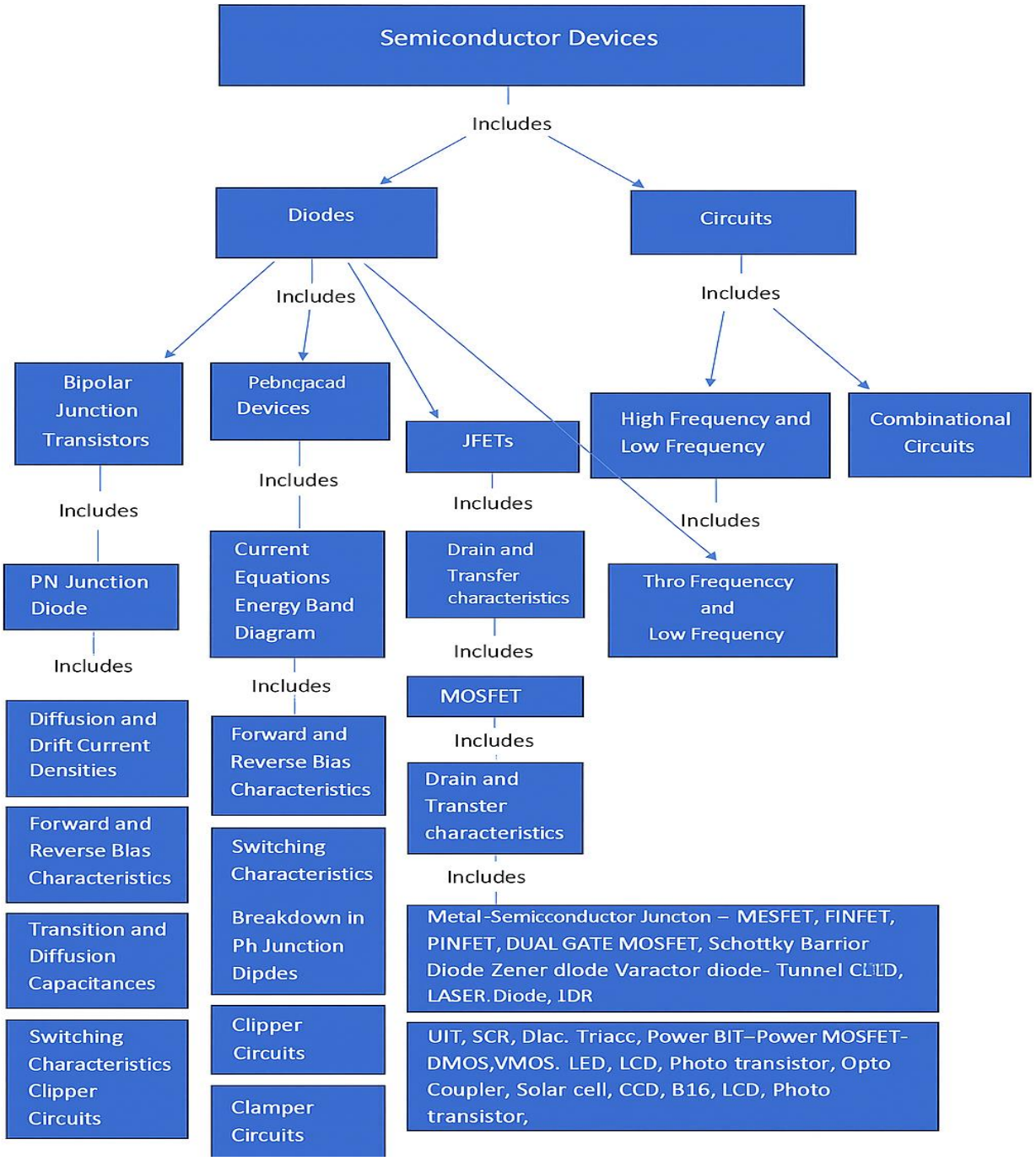
Course Outcome 4 (CO4):

1. Compare the CNTFET with traditional MOSFETs in terms of size and speed.
2. Describe how the capacitance of a varactor diode varies with reverse bias voltage.
3. Explain the construction and working of a MESFET.

Course Outcome 5(CO5):

1. Discuss the real-life use of power MOSFETs in switching power supplies.
2. Explain how TRIACs and DIACs are used in light dimmers and fan regulators.
3. Summarize the role of IGBTs in high-power applications such as electric vehicles.

Concept Map


Semiconductor Devices
Includes
Diodes
Circuits
Includes
Includes
Bipolar Junction Transistors
Pebncjacad Devices
JFETs
High Frequency and Low Frequency
Combinational Circuits
Includes
Includes
Includes
Includes
PN Junction Diode
Current Equations Energy Band Diagram
Drain and Transfer characteristics
Thro Frequenccy and Low Frequency
Includes
Includes
Includes
MOSFET
Diffusion and Drift Current Densities
Forward and Reverse Bias Characteristics
Includes
Drain and Transter characteristics
Forward and Reverse Blas Characteristics
Switching Characteristics
Breakdown in Ph Junction Dipdes
Includes
Metal-Semicconductor Juncton – MESFET, FINFET, PINFET, DUAL GATE MOSFET, Schottky Barrior Diode Zener dlode Varactor diode- Tunnel CLLD, LASER.Diode, 1DR
Transition and Diffusion Capacitances
Clipper Circuits
UIT, SCR, Dlac. Triacc, Power BIT–Power MOSFET-DMOS,VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD, B16, LCD, Photo transistor,
Switching Characteristics Clipper Circuits
Clamper Circuits

Syllabus

Module 1

Semiconductor Diodes

PN junction diode, Current equations, Energy Band diagram, Diffusion and drift current densities, forward and reverse bias characteristics, Transition and Diffusion Capacitances, Switching Characteristics, Breakdown in PN Junction Diodes, Clipper Circuits, Clamper Circuits.

Module 2

Bipolar Junction Transistors

Construction, biasing, operation of NPN and PNP, types of configurations, current equations, relation between transistor parameters, Early effect, Breakdown in transistors, Ebers- Moll Model, Transistor switching

Module 3

Field Effect Transistors

JFETs – Drain and Transfer characteristics, -Current Equations-Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage -Channel length modulation, D-MOSFET, E-MOSFET- Characteristics – Comparison of MOSFET with JFET

Module 4

Special Semiconductor Devices

Metal-Semiconductor Junction- MESFET, FINFET, PINFET, CNTFET, DUAL GATE MOSFET, Schottky barrier diode-Zener diode-Varactor diode –Tunnel diode, LASER diode, LDR.

Module 5

Power Devices and Display Devices

UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS,VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD

LEARNING RESOURCES

TEXT BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	P Ramesh Babu, T R Ganesh Babu	Electron Devices	11th Edition	SCITECH Publications (India) Private Ltd	2013
2	Salivahanan. S, Suresh Kumar. N, Vallavaraj.A	Electronic Devices and circuits	3 rd Edition	Tata McGraw-Hill	2008

REFERENCE BOOKS

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR

1	Robert Boylestad and Louis Nashelsky	Electron Devices and Circuit Theory	10th Edition	Pearson Prentice Hall	2008
2	R.S.Sedha	A Text Book of Applied Electronics	3 rd Edition	S.Chand Publications	2006
3	Betty Lise Anderson, Richard L. Anderson	Fundamentals of Semiconductor devices	2nd Edition	McGraw-Hill	2017

Online study materials:

1. https://nptel.ac.in/courses/108102095
2. https://nptel.ac.in/courses/108102097
3. http://academicearth.org/

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1.	**Semiconductor Diodes**	9	CO1
1.1	PN junction diode, Current equations. Energy Band diagram	2	
1.2	Diffusion and drift current densities, forward and reverse bias characteristics	2	
1.3	Transition and Diffusion Capacitances, Switching Characteristics	2	
1.4	Breakdown in PN Junction Diodes,	1	
1.5	Clipper Circuits, Clamper Circuits.	2	
2	**Bipolar Junction Transistors**	9	CO2
2.1	Construction, biasing,	2	
2.2	operation of NPN and PNP, types of configurations	2	
2.3	current equations, relation between transistor parameters, Early effect	2	
2.4	Breakdown in transistors, Ebers- Moll Model	2	
2.5	Transistor switching	1	
3.	**Field Effect Transistors**	9	CO3
3.1	JFETs – Drain and Transfer characteristics	2	
3.2	Current Equations-Pinch off voltage and its significance	2	
3.3	MOSFET- Characteristics- Threshold voltage, Channel length modulation	2	

3.4	D-MOSFET, E-MOSFET- Characteristics	2	
3.5	Comparison of MOSFET with JFET	1	
4.	**Special Semiconductor Devices**	9	CO4
4.1	Metal-Semiconductor Junction- MESFET, FINFET	2	
4.2	PINFET, CNTFET, DUAL GATE MOSFET	2	
4.3	Schottky barrier diode-Zener diode	2	
4.4	Varactor diode –Tunnel diode	2	
4.5	LASER diode, LDR	1	
5.	**Power Devices and Display Devices**	9	CO5
5.1	UJT, SCR, Diac, Triac	2	
5.2	Power BJT- Power MOSFET- DMOS,VMOS	2	
5.3	LED, LCD	1	
5.4	Photo transistor, Opto Coupler	2	
5.5	Solar cell, CCD	2	
	TOTAL	**45 Hours**	

Course Designers:

COURSE DESIGNED BY	VERIFIED BY
Ms Remya K P Asst. Professor, ECE, JCET E Mail ID: remyakp@jawaharlalcolleges.com	Mr.Sanish V S Asst. Professor, ECE, JCET E Mail ID: sanishvs@jawaharlalcolleges.com

25ICHAWT107	HEALTH AND WELLNESS	Category	L	T	P	Credit
		HMC	2	0	1	2

Preamble

Health and Wellness integrates the multifaceted aspects of wellbeing into the framework of engineering education. It aims to equip students with a comprehensive understanding of physical, mental, emotional, and spiritual well-being, emphasizing the importance of a balanced and healthy lifestyle in both personal and professional contexts. The subject not only enhances the personal health of students but also empowers them to contribute to the broader goals of public health and sustainability, reflecting the core values of engineering ethics and lifelong learning.

Prerequisite:

None

Course Outcomes:

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

COs	Course Outcome Statement	Weightage in %
CO1	Identify the principles and practices that contribute to physical health, through exercise, nutrition, emotional regulation and preventive healthcare measures(Remembering)	20
CO2	Understand key nutritional principles, including nutrient functions, balanced diet components, and the health risks associated with junk food. (Understanding)	20
CO3	Discuss common diseases and lifestyle diseases, including their causes and prevention strategies. (understanding)	20
CO4	Demonstrate the principles and benefits of yoga for physical, mental, emotional, and spiritual well-being. (Applying)	20
CO5	Design and implement diverse fitness activities and their contributions to physical health, emphasizing the significance of regular engagement in planned fitness routines for overall well-being. (Applying)	20

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1 *	PSO2 *	PS03 *
CO1	-	-	-	-	-	2	2	1	-	-	-	2	-	1	-
CO2	-	-	1	-	-		2	-	-	-	-	1	-	1	-
CO3	-	-	1	-	-	2	2	2	2	-	-	2	-	1	-
CO4	-	-	-	-	-		2	-	2	-	-	3	-	1	-
CO5	-	-	-	-	1		2	-	1	-	-	2	-	1	-
AVG	**-**	**-**	**1**	**-**	**1**	**2**	**2**	**1.5**	**1.6**	**-**	**-**	**2**	**-**	1	-

1-Low; 2-Medium; 3- Strong

*The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable Programme Specific Outcomes (PSOs).

Assessment Pattern: Cognitive Domain

Cognitive Levels	Continuous Assessment Test		Regular Assessment		
	1	2	Practical Demonstrations	Journal Recording Daily Basis	Case Study
Remembering	20	20	20	20	20
Understanding	60	60	20	20	20
Applying	20	20	40	40	20
Analysing	-	-	20	20	40
Evaluating	-	-	-	-	-
Creating	-	-	-	-	-

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini Project/Assignment/Practical Component
Perception	Observation
Set	Introduction sessions, Goal setting
Guided Response	Imitation
Mechanism	Demonstrations, Assignment
Complex Overt Responses	Independent Practise
Adaptation	Scenario based exercise
Origination	Innovation projects

Assessment Pattern: Cognitive Domain

Total Marks	CIA	Duration
100	100	2 Hours

Continuous Internal Assessment Pattern

Attendance: **15**
Continuous Assessment Test: **35**
Activity and Case Study: **50**
Total: **100**

Question Paper Pattern

Type of Test	Pattern
Internal Series Test I & II	**Total = 50 Marks; Duration =90 Minutes** Part A: 5 X 6 = 30 Marks Part B: 5 X 4 = 20 Marks

Sample Questions for Course Outcome Assessment

Course Outcome 1 (CO1):

1. Imagine you are a fitness coach for a group of middle-aged clients. Design a weekly exercise program that promotes cardiovascular health, muscular strength, and flexibility. Explain how each component of the program benefits these aspects of physical health.

2. Employ your expertise as a nutritionist to create a meal plan for a family with diverse dietary needs and preferences. Develop a balanced weekly menu that ensures optimal physical health for all family members. Discuss how the different components of the diet support their overall well-being.

3. Implement your understanding of stress management to lead a workshop at a corporate wellness retreat. Create a detailed outline for a session that teaches stress management techniques and coping strategies. Explain how these techniques can be used in daily life to enhance physical health and overall well-being.

4. Leverage your knowledge as a public health advisor to develop a community outreach program that educates the public on preventive healthcare measures. Outline the key components of this program and describe specific preventive practices. Discuss how each practice contributes to disease prevention and promotes long-term physical health.

Course Outcome 2 (CO2)

1. Analyse the roles of macronutrients (carbohydrates, proteins, and fats) and micronutrients (vitamins and minerals) in the body. How do these nutrients interact to support overall bodily functions and maintain health? Provide examples of foods rich in each type of nutrient and discuss their specific contributions to bodily processes.

2. Examine the components of a balanced diet, including carbohydrates, proteins, fats, vitamins, minerals, and water. For each component, analyse why it is essential for maintaining good health and how deficiencies or excesses can impact bodily functions. Use case studies or scenarios to illustrate the effects of an imbalanced diet on health.

3. Investigate the health risks associated with high consumption of sugar, salt, and saturated fats. How do these dietary components contribute to the development of chronic diseases such as obesity, cardiovascular disease, and diabetes? Analyse the physiological mechanisms through which excessive intake of these substances affects the body.

4. Assess the importance of incorporating nutrient-rich foods like fruits, vegetables, whole grains, and lean proteins into the diet. Analyse how these foods contribute to overall health and prevent chronic diseases. Compare and contrast the health outcomes of diets rich in nutrient-dense foods versus diets high in processed and junk foods.

Course Outcome 3(CO3):

1. Evaluate the impact of communicable diseases (such as influenza and malaria) versus non-communicable diseases (such as diabetes and hypertension) on global health. Compare and contrast their causes, and assess which type of disease poses a greater threat to public health in different regions. Provide evidence to support your evaluation.

2. Assess the relative influence of lifestyle factors (diet, physical activity, smoking) versus genetic factors in the development of lifestyle diseases such as heart disease and type 2 diabetes. Support your evaluation with examples.

3. Critically evaluate the effectiveness of various prevention strategies for diseases such as influenza, malaria, diabetes, and hypertension. How do vaccination, hygiene practices, and lifestyle modifications compare in terms of their ability to reduce disease risk? Discuss any limitations and challenges associated with these prevention strategies

4. Evaluate the concept of herd immunity and its effectiveness in preventing the spread of communicable diseases within a population. Discuss the conditions necessary for herd immunity to be achieved and maintained, and analyse the potential consequences of declining vaccination rates on community health. Use real-world examples to illustrate your points.

Course Outcome 4 (CO4):

1. Illustrate your understanding of yoga by defining what it is and explaining its origins. How has yoga evolved over time, and what are its key principles? Provide examples of historical developments and key practices that illustrate this evolution.

2. Show how practicing yoga can lead to physical benefits by describing exercises that improve flexibility, strength, and balance. Provide a demonstration of specific yoga poses or sequences that target these areas and explain their effects on the body.

3. Highlight the mental and emotional benefits of yoga, such as stress reduction and improved focus. Give examples of yoga practices, such as breathing exercises and meditation techniques, and explain how they strengthen emotional resilience and well-being.

4. Explain and show how yoga can contribute to spiritual well-being by promoting self-awareness, mindfulness, and inner peace. Provide examples of yoga practices that encourage these aspects, and discuss their impact on an individual's spiritual health.

Course Outcome 5 (CO5):

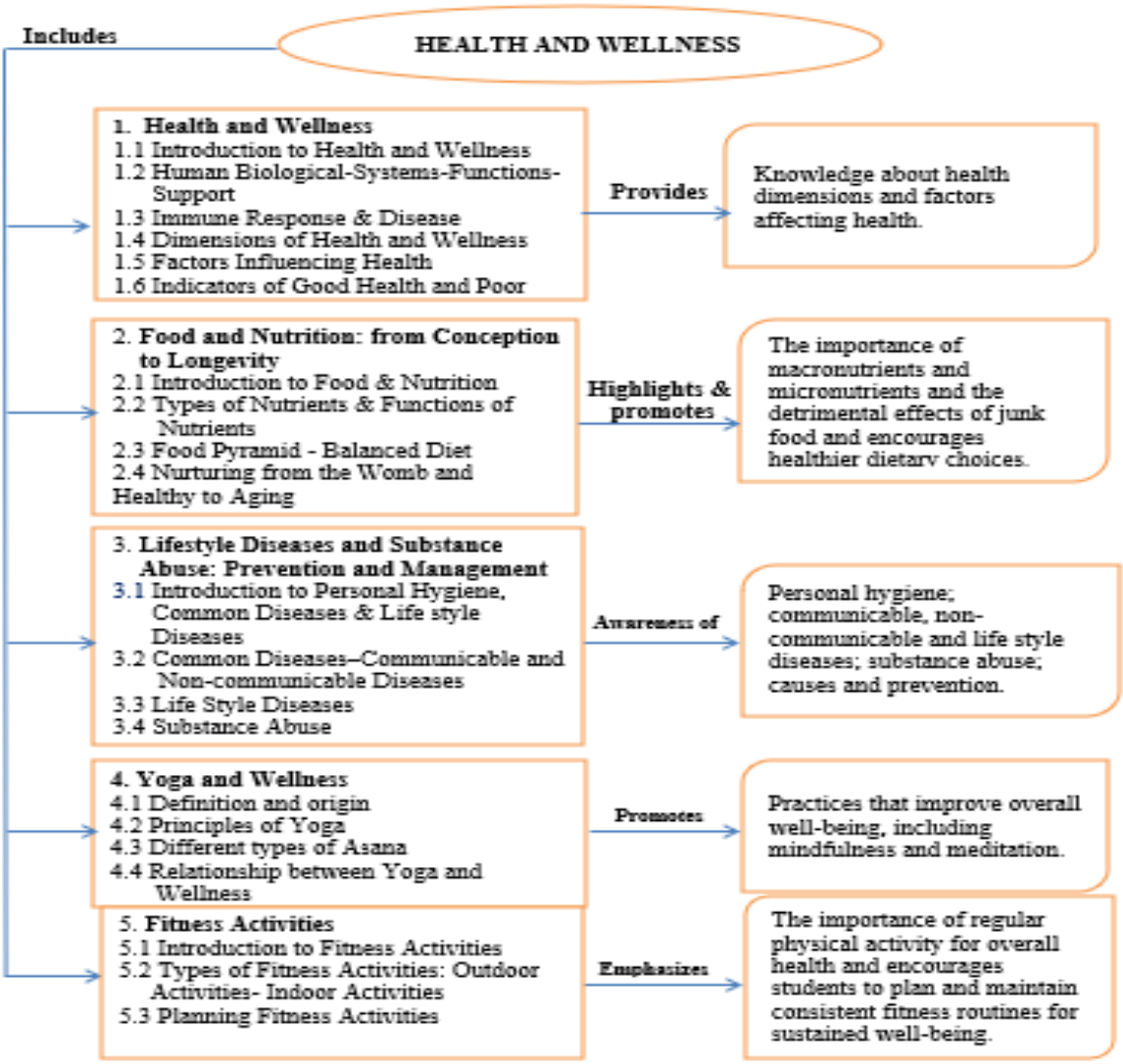
1. Create a balanced and diverse fitness routine. Why is it imperative to integrate various types of exercises into your workout regimen to ensure comprehensive fitness?

2. Implement regular physical activity to promote physical health, mental well-being, and overall vitality. How does a consistent exercise regimen facilitate disease prevention and support longevity?

3. Execute the FITT principle (frequency, intensity, time, and type) to formulate customized fitness programs tailored to individual objectives and needs. How can the FITT framework be utilized to design effective and personalized fitness regimens?

4. Design a variety of fitness activities, encompassing aerobic exercises, strength training, flexibility exercises, and recreational sports. How do these activities synergistically contribute to overall physical health?

Concept Map



Module 1: Health and Wellness

Introduction to Health and Wellness: Meaning and Dimensions of Health and Wellness
Human Biological System: Key Systems and Their Functions, How these Systems Support Overall Health.
Immune Response & Disease: Recognition and response to foreign agents, Mechanisms of overcoming infection, Consequences of failure to eliminate pathogens.
Dimensions of Health and Wellness: Physical Health, Mental Health, Social Health, Environmental Health, Occupational Health, Intellectual Health, Spiritual Health
Factors Influencing Health, Healthcare Services: Accessibility and quality of healthcare.
Indicators of Good Health: Longevity and life expectancy, Low infant mortality rate, High rates of immunization, Adequate nutrition and balanced diet, Regular physical activity.

Indicators of Poor Health: High prevalence of chronic diseases, High rates of communicable diseases, Malnutrition and under nutrition, Poor mental health statistics, High infant and maternal mortality rates.

Module 2: Food and Nutrition: from Conception to Longevity

Introduction to Food and Nutrition: Nutrients and their functions in maintaining good health
Types of nutrients: 1. Macronutrients: Carbohydrates, Proteins, Fats 2. Micronutrients: Vitamins, Minerals.
Functions of Nutrients: Carbohydrates (Primary source of energy)
Proteins (Essential for growth, repair, and maintenance of body tissues)
Fats (Provide energy, support cell growth, protect organs, and keep the body warm),
Vitamins (Facilitate various biochemical reactions in the body; Vitamin A: Vision, immune function; Vitamin C: Antioxidant, skin health; Vitamin D: Bone health, calcium absorption)
Minerals (Structural and functional roles in the body)
Calcium (Bone health, muscle function)
Iron (Oxygen transport, energy production)
Food Pyramid: Meaning and Importance, Components and Sources of a Balanced Diet:
Grains: Provide energy, fiber. Sources: Wheat, rice, oats.
Vegetables: Supply vitamins, minerals, fiber. Sources: Leafy greens, carrots, broccoli.
Fruits: Provide vitamins, minerals, antioxidants. Sources: Apples, bananas, berries.
Proteins: Essential for tissue repair and growth. Sources: Meat, beans, nuts.
Dairy: Important for bone health. Sources: Milk, cheese, yogurt.
Fats and Oils: Necessary for energy and cell function, should be consumed in moderation.
Sources: Olive oil, butter, nuts.
Millets: Provide nutrients, fiber. Sources: Pearl millet (bajra), finger millet (ragi), sorghum (jowar), foxtail millet (kangni), and little millet (kutki).
Nurturing from the Womb to Healthy Aging: Food and Age Groups with special emphasis to Adolescent Health and Wellbeing.
Harmful Effects of Junk Food: Characteristics of Junk Food, Health Impacts of Junk Food.

Module 3: Lifestyle Diseases and Substance Abuse: Prevention and Management

Introduction to Personal Hygiene, Common Diseases & Life style Diseases
Communicable Diseases: Causes (Bacteria, viruses, fungi, parasites), Prevention (Vaccination, hygiene, public health measures)
Non-communicable: Diseases: Alzheimer's disease, Strokes, Heart diseases, Chronic Kidney disease, etc.
Life style Diseases: Obesity: Aetiology(Poor diet, lack of physical activity, genetic factors), Prevention (Healthy diet, regular exercise).
Cardiovascular Disorders: Aetiology (Hypertension, high cholesterol, smoking), Prevention (Healthy lifestyle, regular check-ups),
Diabetes: Aetiology (Insulin resistance, obesity, genetic predisposition), Prevention (Diet management, physical activity, weight control), Glycemic Index,
Liver Diseases: Aetiology (Alcohol abuse, hepatitis, fatty liver disease), Prevention (Avoiding alcohol, healthy diet, vaccination)
Cancer: Aetiology (smoking, radiation, viruses, carcinogens, obesity, hormones, chronic inflammation, a lack of exercise), Prevention: (Avoid alcohol, exercise, healthy diet)

Osteoporosis: Aetiology (reduced bone density & strength, hormonal changes, Poor diet, lack of vitamin C & D, lack of Physical activity)
Back pain: Aetiology (improper lifting, poor posture and lack of regular exercise), Prevention (exercise, right posture etc.)
Substance Abuse: Understanding of substance abuse, Types of substances (Alcohol, Tobacco, pharmaceutical drugs, glue, kerosene, morphine, cannabis, MDMA etc.), Aetiology (Addiction, dependency, health risks), Prevention (Education, counselling, rehabilitation programs.

Module 4: Yoga and Wellness

Definition and origin
Principles of Yoga: Asanas and Pranayama
Benefits of Yoga: Physical, Mental & Emotional, Spiritual.
Different Types of Asana: Padmasana, Bhujangasana, Halasana, Shalabhasana, Dhanurasana, Vajrasana, Chakrasana, Shavasana, Pawanmuktasana, Mandukasana and Uttanpadasana.
Relationship between Yoga and Wellness (Spiritual, Mental, Emotional, Physical).

Module 5: Fitness Activities

Introduction to Fitness Activities
Types of Fitness Activities: Outdoor Activities: Running, jogging, cycling, swimming, Indoor Activities:– Aerobics, Dance (Zumba), Spin Classes
Planning Fitness Activities: Choosing Activities, Creating a Balanced Fitness Routine (Combining cardio, strength training, and flexibility exercise; set goals and track progress), Monitoring Progress, Safety and Preparation (necessary equipment, warm-up, cool-down, prevent injury), Mental Aspects of Fitness (Transforming Negative Thoughts).

LEARNING RESOURCES

Text Books

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Gordon Edlin, Eric Golanty	Health and Wellness	Fourteenth	Jones and Bartlett Publishers	2023
2	Ross and Wilson	Anatomy and Physiology in Health and Wellness	Fourteenth	Oswaal Books And Learning Private Limited	2022

Reference Books

S.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Nashay Lorick	Mental Health Workbook for Women: Exercises to Transform Negative Thoughts and Improve Well Being	Workbook	Rockridge Press	2022

2	Dr. M Swaminathan	Handbook of Food and Nutrition	Third	The Bangalore Printing and Publishing Co. Ltd.	2022
3	Dr. Melody Daniel	Substance Use Disorder: The Detrimental Impact on our Mental Health and Strategies for Overcoming it	Kindle		2022
4	Advika Singh	A Health and Wellness Handbook : 11 Secrets You Should Know to Save a Life	First	Notion Press	2021
5	Emily Attached and Marzia Fernandez	Mental Health Workbook	First	Charlie Creative Lab	2020
6	Alton L. Thygerson	Fitness to be Well: Essential Concepts	Lab Manual	Jones & Bartlett Learning	2018
7	Cliff Nyambichu and Jeff Lumiri	Life Style Diseases: Life Style Disease Management	Kindle		2018
8	Angela Clow, Sarah Edmunds	Physical Activity and Mental Health	First	Human Kinetics	2013
9	Claude Bouchard, Steven N. Blair, William L. Haskell	Physical Activity and Health	Second	Human Kinetics	2012
10	Daryl Siedentop and Hans van der Mars	Introduction to Physical Education, Fitness and Sport	Eighth	McGraw-Hill Education	2012
11	B K S Iyengar	Light on Yoga		Thorsons	2006
12	Puri K, Chandra S.S.	Health and Physical Education		Surjeet Publications	2005
13	Les Snowdown, Maggie Humphrey	Fitness walking		Orient Paperbacks	2005

On line study materials:

1	https://www.medicinenet.com/what_is_health_and_wellness/article.htm
2	https://www.who.int/data/gho/data/major-themes/health-and-well-being
3	https://eatrightindia.gov.in/eatrightschool/assets/resource/file/health-wellness-learning-material.pdf
4	https://www.studocu.com/in/document/christ-deemed-to-be-university/health-psychology/health-and-wellness-notes/27511845
5	https://study.com/academy/course/health-and-wellness.html
6	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5508938/
7	https://portal.ct.gov/-/media/dmhas/skillbuilding/dana/health-and-wellness-full-revised.pdf
8	https://cpacollege.ac.in/assets/uploads/1647505766physical_education_pdf.pdf
9	https://www.centrum.com/learn/articles/18-wellness-tips-for-a-healthier-you/
10	https://portal.ct.gov/-/media/dmhas/skillbuilding/dana/health-and-wellness-full-

	revised.pdf
11	https://occmed.sanfordhealth.org/resources/article-library/the-difference-between-health-and-wellness

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours	Course Outcome
1	**Health and Wellness**	**6**	
1.1	Introduction to Health and Wellness: Meaning and Dimensions of Health and Wellness	1	CO 1
1.2	Human Biological System: Key Systems and Their Functions , How these Systems Support Overall Health, Immune Response & Disease: Recognition and response to foreign agents, Mechanisms of overcoming infection, Consequences of failure to eliminate pathogens.	1	
1.3	Dimensions of Health and Wellness: Physical Health, Mental Health, Social Health, Environmental Health, Occupational Health, Intellectual Health, Spiritual Health	1	
1.4	Factors Influencing Health Healthcare Services: Accessibility and quality of healthcare.	1	
1.5	Indicators of Good Health: Longevity and life expectancy, Low infant mortality rate, High rates of immunization, Adequate nutrition and balanced diet, Regular physical activity.	1	
1.6	Indicators of Poor Health: High prevalence of chronic diseases, High rates of communicable diseases, Malnutrition and under nutrition, Poor mental health statistics, High infant and maternal mortality rates.	1	
2	**Food and Nutrition**	**6**	
2.1	Introduction to Food and Nutrition	1	

2.2	Nutrients and Their Functions in Maintaining Good Health: Types of nutrients: 1. Macronutrients: Carbohydrates, proteins, fats 2. Micronutrients: Vitamins, Minerals. Functions of Nutrients: Carbohydrates (Primary source of energy), Proteins (Essential for growth, repair, and maintenance of body tissues), Fats (Provide energy, support cell growth, protect organs, and keep the body warm), Vitamins (Facilitate various biochemical reactions in the body; Vitamin A: Vision, immune function; Vitamin C: Antioxidant, skin health; Vitamin D: Bone health, calcium absorption), Minerals (Structural and functional roles in the body), Calcium (Bone health, muscle function), Iron (Oxygen transport, energy production)	2	
2.3	Food Pyramid: Meaning and Importance, Components and Sources of a Balanced Diet: Grains: Provide energy, fiber. Sources: Wheat, rice, oats. Vegetables: Supply vitamins, minerals, fiber. Sources: Leafy greens, carrots, broccoli. Fruits: Provide vitamins, minerals, antioxidants. Sources: Apples, bananas, berries. Proteins: Essential for tissue repair and growth. Sources: Meat, beans, nuts. Dairy: Important for bone health. Sources: Milk, cheese, yogurt. Fats and Oils: Necessary for energy and cell function, should be consumed in moderation. Sources: Olive oil, butter, nuts. Millets: Provide nutrients, fiber. Sources: Pearl millet (bajra), finger millet (ragi), sorghum (jowar), foxtail millet (kangni), and little millet (kutki)..	1	CO 2
2.4	Nurturing from the Womb to Healthy Aging: Food and Age Groups with special emphasis to Adolescent Health and Wellbeing.	1	
2.5	Harmful Effects of Junk Food: Characteristics of Junk Food, Health Impacts of Junk Food	1	
3	**Lifestyle Diseases and Substance Abuse: Prevention and Management**	**6**	
3.1	Introduction to Personal Hygiene, Common Diseases & Life style Diseases	1	
3.2	Communicable Diseases: Causes (Bacteria, viruses, fungi, parasites), Prevention (Vaccination, hygiene, public health measures), Non-communicable Diseases	1	

3.3	Life style Diseases: Obesity: Aetiology(Poor diet, lack of physical activity, genetic factors), Prevention (Healthy diet, regular exercise). Cardiovascular Disorders: Aetiology (Hypertension, high cholesterol, smoking), Prevention (Healthy lifestyle, regular check-ups), Diabetes: Aetiology (Insulin resistance, obesity, genetic predisposition), Prevention (Diet management, physical activity, weight control). Liver Diseases: Aetiology (Alcohol abuse, hepatitis, fatty liver disease), Prevention (Avoiding alcohol, healthy diet, vaccination) Cancer: Aetiology (smoking, radiation, viruses, carcinogens, obesity, hormones, chronic inflammation, a lack of exercise), Prevention: (Avoid alcohol, exercise, healthy diet) Osteoporosis: Aetiology (reduced bone density & strength, hormonal changes, Poor diet, lack of vitamin C & D, lack o Physical activity) Back pain: Aetiology (improper lifting, poor posture and lack of regular exercise), Prevention (exercise, right posture etc.)	2	CO 3
3.4	Substance Abuse: Understanding of substance abuse, Types of substances (Alcohol, Tobacco, pharmaceutical drugs, glue, kerosene, morphine, cannabis, MDMA etc.), Aetiology (Addiction, dependency, health risks), Prevention (Education, counselling, rehabilitation programs.	2	
4	**Yoga and Wellness**	**6**	CO 4
4.1	Definition and origin	1	
4.2	Principles of Yoga: Asanas and Pranayama Benefits of Yoga: Physical, Mental & Emotional, Spiritual.	2	
4.3	Different types of asanas : Padmasana, Bhujangasana, Halasana, Shalabhasana, Dhanurasana, Vajrasana, Chakrasana, Shavasana, Pawanmuktasana, Mandukasana and Uttanpadasana.	2	
4.4	Relationship between Yoga and Wellness (Spiritual, Mental, Emotional, Physical)	1	
5	**Fitness Activities**	**6**	
5.1	Introduction to Fitness Activities	1	

5.2	Types of Fitness Activities: Outdoor Activities: Physical Exercises, Running, jogging, cycling, swimming, Indoor Activities: Aerobics, Dance (Zumba), Spin Classes etc.	2	CO 5
5.3	Planning Fitness Activities: Choosing Activities Creating a Balanced Fitness Routine, Monitoring Progress, Safety and Preparation (necessary equipment, warm-up, cool-down, prevent injury)	2	
5.4	Mental Aspects of Fitness	1	
	TOTAL	**30 hours**	

Activities:

Sl. No	Activity
1	**Health and Wellness** **1. Environmental Health Scavenger Hunt** Activity: Conduct a scavenger hunt where students look for environmental factors in their community that can affect health, such as parks, sources of pollution, recycling centers, and community gardens. Have them present their findings. Explanation: Understanding environmental health factors helps students appreciate how their surroundings impact their well-being and the importance of maintaining a healthy environment. **2. Sleep Hygiene Diary** Activity: Have students maintain a sleep diary for a week, recording their sleep duration, quality, and any pre-sleep activities. Discuss the importance of good sleep hygiene and its effects on overall health. Explanation: Good sleep is essential for physical health, cognitive function, and emotional well-being. Tracking sleep habits can help students identify patterns and improve their sleep quality. **3. Health Journaling** Activity: Assign students to keep a health journal for a week, documenting their diet, exercise, sleep patterns, and stress levels. At the end of the week, have them reflect on their habits and identify areas for improvement. Objective: To promote self-reflection and mindfulness about lifestyle choices and their impact on health.

2	**Food and Nutrition** **4. Healthy Recipe Meal/ Balanced Healthy Recipe & Meal for a week** Activity: Ask students to create a healthy recipe using a balanced mix of macronutrients and micronutrients. They should prepare a written recipe and explain the nutritional benefits of each ingredient. Objective: To encourage practical application of nutritional knowledge and creativity in meal planning. **5. Junk Food vs. Healthy Food (Debate)** Activity: Divide the class into two groups. One group will argue in favor of junk food, while the other will argue for healthy food. Each side should present facts about the nutritional content and health impacts of their assigned food type. Objective: To develop critical thinking and understanding of the harmful effects of junk food and the benefits of healthy eating. **6. Morning Hydration Challenge** Activity: Encourage students to drink a tumbler of water every morning for a week and record any changes they notice in their digestive system and overall well-being. Explanation: Drinking water first thing in the morning stimulates the digestive system, hydrate the body after a night's sleep, and improve metabolism. A healthy gut can enhance nutrient absorption, which supports overall health.
3	**Lifestyle Diseases and Substance Abuse: Prevention and Management** **7. Substance Abuse Awareness Workshops** Activity: Invite guest speakers, to conduct Substance Abuse Awareness workshops on topics related to causes, effects, signs and symptoms, prevention, treatment and rehabilitation, impact on families etc. Objective: To educate students about the dangers of substance abuse, the types of substances commonly abused, and strategies for prevention and seeking help. **8. BMI** (Body Mass Index) Activity: Students measure their height and weight to calculate BMI manually or using online tools. Exercise and fitness tracking should be adopted and gradually transformed into habits to achieve a healthy BMI. Objective: To assess weight, Screen for health risks and promote health awareness. **9. Self-Reflection Questionnaire**

	Activity: The students can take 15-20 minutes to answer the questions thoughtfully and honestly. Objective: Encourage participants to reflect on their thoughts, emotions, habits, and aspirations to foster self-awareness and personal growth.
4	**Yoga and Wellness** **10. Yoga Workshop** Activity: Organize a yoga workshop led by a certified yoga instructor. Students will participate in a series of yoga sessions focusing on different aspects such as asanas (poses), pranayama (breathing techniques), and meditation. The instructor can explain the principles and benefits of each practice. Objective: To introduce students to various yoga techniques and provide hands-on experience in practicing yoga for overall wellness. **11a. Yoga Pose Challenge (Any One: 11a or 11b)** Activity: Organize a yoga pose challenge where students take turns leading a group in demonstrating various yoga poses. Each participant can choose their favorite pose or one they want to learn. The challenge can be held outdoors for added fun. Objective: To encourage teamwork, creativity, and exploration of different yoga poses in a playful environment. **11b**. **Yoga Photo Booth** Activity: Set up a yoga-themed photo booth with props such as yoga mats, blocks, straps, and inspirational signs or banners. Students can take fun and playful photos posing in various yoga poses or expressing their love for yoga. Objective: To create lasting memories and celebrate the joy of yoga through creative Photography.
5	**Fitness Activities** **12 Fitness Activity (Students can choose any Two)** **12a. Sprint Relay** Description: Teams race to complete a designated distance – 100/1000 meters, with each team member running a segment of the relay. Objective: Enhance teamwork, speed, and endurance in a competitive and engaging environment. **12b. V Sit Reach Test**

	Description: The V Sit Reach Test is a flexibility assessment used to measure the flexibility of the hamstrings and lower back. In this test, the individual sits on the floor with legs extended in a V shape and reaches forward along a measuring tape to see how far they can stretch. The distance reached is recorded, with higher scores indicating better flexibility. This test is commonly used in fitness settings to monitor flexibility and track improvements over time. Objective: Assess the flexibility of the hamstrings and lower back. **12 c. Push ups** Description: To do push-ups, start in a plank position with your hands placed slightly wider than shoulder-width apart, lower your body by bending your elbows until your chest nearly touches the floor, and then push back up to the starting position while keeping your body in a straight line from head to heels. Objective: Strengthens and builds endurance in the chest, shoulders, triceps, and core muscles. **12 d. Dance-off Competition** Description: Host a dance-off competition where students showcase their dance skills and creativity in various styles such as hip-hop, salsa, or freestyle. Judges or the audience can vote for their favourite performances, and prizes can be awarded for the most impressive dancers. Objective: Promote self-expression, confidence, and enjoyment of movement through dance.

COURSE DESIGNED BY	VERIFIED BY
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25ICITWP208	IT WORKSHOP	Category		L	T	P	Credit
		ESC		0	0	2	1

Preamble

This is a foundational practical course that introduces students to basic ideas of information technology in order to improve their skills and abilities for the successful completion of a technology-based course.

Prerequisite

None

Course Outcomes

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

CO Number	Course Outcome Statement	Weightage in %
CO1	Recognize the different peripherals in a computer system and get to familiarize with different operating systems being used. (Remembering)	20
CO2	Identify different networking devices and have an introduction to the basic cloud storage platforms. (Remembering)	20
CO3	Articulate their presentations using advanced presentation tools like LaTeX (Understanding)	20
CO4	Understand about the different attacks and data breaches in communication networks. (Understanding)	20
CO5	Summarize the emerging technologies like AR and VR and also able to be aware of Cyberethics. (Understanding)	20

Mapping of Course Outcomes with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	3	-	-	-	-	-	2	*	*	*
CO2	-	-	-	-	3	1	-	-	1	-	-	2	-	-	-
CO3	2	-	2	-	3	-	-	-	-	-	-	2	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CO5		-	-	-	3	-	-	3	-	-	-	3	-	-	-
AVG	1.5	-	2	-	2.5	2	-	3	1	-	-	2.2	-	-	-

1-Low; 2-Medium; 3- Strong;

* The faculty handling a particular programme should map the Course Outcomes (COs) with the applicable programme Specific Outcomes (PSOs).

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project/ Assignment/ Practical Component
Perception	
Set	Practical
Guided Response	Practical
Mechanism	
Complex Overt Responses	
Adaptation	
Origination	

Assessment Pattern:

Attendance	: 15 marks
Class work and record evaluation/Viva-voce (CIE)	: 35 marks
Two Assessment Tests	: 50 marks

List of Experiments

1. Introduction to components in CPU. Familiarization of peripherals in computer, different type of cables, ports, and other hardware devices and its functions.

2. Introduction to operating systems like Linux, Windows, Macintosh, Android etc. and familiarization of command prompt and shell. Basic Linux commands such as creating a file, deleting a file, moving a file, and more.

3. Introduction to types of networks, internet, web browsers. Different types of web users. Customize web browsers with the LAN proxy settings, bookmarks, search toolbars and pop-up blockers.

4. Memory devices- Primary and secondary storage devices, cloud and virtual storage options. Introduction to cloud service providers such as AWS, MS Azure, Google etc

5. Productivity tools in Windows - Crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office

tools and its versions.

6. Advanced Presentation tools – overview of LaTeX and Microsoft (MS) office equivalent (FOSS) tool word: Importance of LaTeX and MS office equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word — Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

7. Cyber Hygiene - Different types of attacks, Data leakage and different types of intrusions like in cyber world, malicious transactions, network traffic, and detailed session on Antivirus, Firewalls and IDS and IPS.

8. Security Aspects - From strong passwords to BlockChain - protection to defend internet-connected devices and services from malicious attacks by hackers, spammers, and cybercriminals. Protection against phishing schemes, ransomware attacks, identity theft, data breaches, and financial losses.

9. Introduction to emerging technologies. (Augmented reality (AR), virtual reality (VR), big data, advanced analytics, blockchain, cleantech, the Internet of Things (IoT), and robotics)

10. Cyberethics- moral, legal, and social issues at the intersection of computer/information and communication technologies in cyber world. Introduction to Pen Testing tools.

Learning Resources

TEXT BOOKS

Sl.No	AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1	Peter Norton	Introduction to Computers	7th Edition	McGraw Hill Education	2017
2	Rajkimar Buyya James Broberg Andrzej Goscinski	Cloud Computing: Principles and Paradigms	1st Edition	Wiley	2013
3	Frank Mittelbach Ulrike Fischer	The LaTeX Companion	3rd Edition	Addison-Wesley Professional	2023
4	Joan Lambert Joyce Cox	MOS Study Guide for word, Excel, Powerpoint & Outlook	1st Edition	MS	2011

REFERENCE BOOKS

S.No		AUTHORS	TITLE	EDITION	PUBLISHERS	YEAR
1		Anand Shinde	Introduction to Cyber Security : Guide to the World of Cyber Security	1st Edition	Notion Press	2021
2		Akhil Jabbar Meerja, Mamun Bin Ibne Reaz, Ana Maria Madureira	Emerging Technologies and Applications for a Smart and Sustainable World	1st Edition	Bentham Books	2022
3		Richard A. Spinello	Cyberethics: Morality and Law in Cyberspace	3rd Edition	Jones and Barlett publications	2016

Course contents and Experiment Schedule

Exp.No.	Topic	No. of Hours	CO
1a.	Introduction to components in CPU. Familiarization of peripherals in computer, different type of cables, ports, and other hardware devices and its functions.	1	CO1
1b.	Familiarization of cables, hardware devices and assembling	1	
2a.	Introduction to operating systems like Linux, Windows, Macintosh, Android etc. and familiarization of command prompt and shell.	1	
2b.	Basic Linux commands such as creating a file, deleting a file, moving a file, and more.	1	
3a.	Introduction to types of networks, internet, web browsers. Different types of web users.	1	CO2
3b.	Customize web browsers with the LAN proxy settings, bookmarks, search toolbars and pop-up blockers.	1	
4a.	Memory devices- Primary and secondary storage devices, cloud and virtual storage options.	1	

4b.	Introduction to cloud service providers such as AWS, MS Azure, Google etc.	1	
5a.	Productivity tools in Windows - Crafting professional word documents, excel spread sheets	1	
5b.	Power point presentations and personal web sites using the Microsoft suite of office tools and its versions.	1	
6a.	Advanced Presentation tools – overview of LaTeX and Microsoft (MS) office equivalent (FOSS) tool word: Importance of LaTeX and MS office equivalent (FOSS) tool Word as word Processors	1	CO3
6b.	Details of the four tasks and features that would be covered in each, Using LaTeX and word	1	
6c.	Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.	1	
7a.	Cyber Hygiene - Different types of attacks	1	
7b.	Data leakage and different types of intrusions like in cyber world, malicious transactions	1	
7c.	Network traffic, and detailed session on Antivirus	1	CO4
7d.	Firewalls and IDS and IPS.	1	
8a.	Security Aspects - From strong passwords to BlockChain - protection to defend internet	1	
8b.	Introduction to Cybertools	1	
8c.	Protection against phishing schemes, ransomware attacks, identity theft, data breaches, and financial losses.	1	
9a.	Introduction to Emerging Technologies: AR	1	
9b.	Introduction to Emerging Technologies: VR	1	
9c.	Introduction to Emerging Technologies: Big Data	1	
9d.	Introduction to Emerging Technologies: IoT	1	
9e.	Introduction to Emerging Technologies: Cleantech and Robotics	1	CO5
10a.	Introduction to Cyberethics	1	

10b.	Cybertools: For ethical uses	1	
10c.	Legal and social issues	1	
10d.	Cyberethics: Handling of data	1	
10e.	Introduction to Pen Testing tools	1	
	Total Hours	30	

Online study materials

https://www.geeksforgeeks.org/blockchain-technology-introduction/

https://www.nature.com/articles/s41377-021-00658-8

https://www.ibm.com/topics/ransomware

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