



# VIVEKANANDHA

## COLLEGE OF ENGINEERING FOR WOMEN

(An Autonomous Institution Affiliated to Anna University – Chennai)  
(Approved by AICTE - Accredited by NBA New Delhi and ISO 9001:2015 Certified)  
Elayampalayam, Tiruchengode – 637 205, Namakkal District, Tamilnadu.



### B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

#### CURRICULA & SYLLABI

#### REGULATION 2023

(After 16<sup>th</sup> BoS)

Curriculum and Syllabus (1<sup>st</sup> to 4<sup>th</sup> Semester)

(Applicable to the students admitted in the academic year 2023 – 2024)

#### CHOICE BASED CREDIT SYSTEM [CBCS]



**VIVEKANANDHA  
COLLEGE OF ENGINEERING FOR WOMEN**  
(Autonomous Institution, Affiliated to Anna University Chennai)



**COLLEGE VISION**

To impart value based education in Engineering and Technology to empower young women to meet the societal exigency with a global outlook.

**COLLEGE MISSION**

- To provide holistic education through innovative teaching-learning practices
- To instill self confidence among rural students by supplementing with co-curricular and extra-curricular activities
- To inculcate the spirit of innovation through training, research and development
- To provide industrial exposure to meet the global challenges
- To create an environment for continual progress through lifelong learning

**DEPARTMENT VISION**

- To Produce Innovative, Creative, Ethical and Socially responsible Electronics and Communication women engineers to meet the global challenges

**DEPARTMENT MISSION**

- To create a unique learning environment in Electronics and Communication Engineering to mould a strong engineer with professional ethics
- To provide practical exposure to compete in the global market
- Fostering culture of innovation, research and lifelong learning

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Regulation 2023

### CHOICE BASED CREDIT SYSTEM

#### PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1: To offer strong theoretical and practical knowledge with managerial skills and entrepreneurial competencies.

PEO2: To impart analytic and questioning skills to broaden innovative ideas for Research and Development based on Industry requirements.

PEO3: To achieve a high level technical expertise in Electronics and Communication Engineering and inculcate professional ethics and social concern

#### PROGRAM SPECIFIC OUTCOMES (PSOs):

At the end of this program, graduate will be able to:

PSO 1: Comprehend the basic concepts of electronics and communication and apply in the day to day life to design and execute complete engineering systems.


PSO2: Design, verify and validate electronic functional elements for numerous applications including signal processing, communications, computer networks and VLSI.

PSO 3: Demonstrate the intellectual level with peer engineers and others to work together to arrive at a cost-effective, appropriate solution for various problems.


#### PROGRAM OUTCOMES (POs):

PO 1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

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

  
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- PO 3. 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.
- PO 4. 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.
- PO 5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO 6. 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.
- PO 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO 8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO 9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 10. 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.
- PO 11. 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.
- PO 12. 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.

  
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Course Code	Course Name	Category	Periods / Week			Credit C	Maximum Marks		
			L	T	P		CA	ESE	Total
<b>CURRICULUM</b> (Applicable to the students admitted from the academic year 2023 – 2024 onwards)									
<b>THEORY</b>									
U23MA101	Matrices and Calculus*	BSC	3	1	0	4	40	60	100
U23EN101	English for Communication*	HSMC	3	0	0	3	40	60	100
U23CH101	Engineering Chemistry*	BSC	3	0	0	3	40	60	100
U23CS101	Programming for Problem Solving*	ESC	3	0	0	3	40	60	100
U23TA101	தமிழர் மரபு / Heritage of Tamils*	HSMC	1	0	0	1	40	60	100
<b>THEORY INTEGRATED WITH PRACTICAL</b>									
U23GE101	Engineering Graphics*	ESC	2	0	3	3	50	50	100
<b>PRACTICAL INTEGRATED WITH THEORY</b>									
U23GE102	Design Thinking*	EEC	1	0	2	1	50	50	100
<b>PRACTICAL</b>									
U23CH102	Chemistry Laboratory*	BSC	0	0	2	1	60	40	100
U23CS102	Programming for Problem Solving Laboratory*	ESC	0	0	2	1	60	40	100
<b>MANDATORY COURSES</b>									
-	Induction Programme*	3 Weeks				0	-	-	-
U23MCFY2	Indian Constitution*	MC	2	0	0	0	100	-	100
<b>Total</b>						<b>20</b>	<b>520</b>	<b>480</b>	<b>1000</b>

BSC - Basic Science Courses, ESC- Engineering Science Courses, MC-Mandatory courses, HSMC-Humanities and Social Sciences including management courses, EEC – Employability Enhancement courses, CA- Continuous Assessment, ESE - End Semester Examination.

\*Common for all branches

\* Common for ECE, EEE & BME

  
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Course Code	Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		CA	ESE	Total
<b>THEORY</b>									
U23MA202	Complex Analysis and Ordinary Differential Equations*	BSC	3	1	0	4	40	60	100
U23PH201	Engineering Physics \$	BSC	3	0	0	3	40	60	100
U23EC201	Semiconductor Devices for Modern Electronics	PCC	3	0	0	3	40	60	100
U23TA202	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology*	HSMC	1	0	0	1	40	60	100
<b>THEORY INTEGRATED WITH PRACTICAL</b>									
U23CS203	Python Programming@	ESC	3	0	2	4	50	50	100
U23EN202	Professional Communication*	HSMC	2	0	3	3	50	50	100
<b>PRACTICAL</b>									
U23PH202	Physics Laboratory\$	BSC	0	0	2	1	60	40	100
U23GE204	Engineering Practices Laboratory*	ESC	0	0	3	1	60	40	100
<b>MANDATORY COURSES</b>									
U23MCFY1	Environmental Science and Engineering\$	MC	2	0	0	0	100	-	100
<b>Total</b>						<b>20</b>	<b>480</b>	<b>420</b>	<b>900</b>



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\*Common for all branches

@Common for EEE, ECE, BME & BT

\$ Common for ECE, EEE & BME

  
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Programme	B.E.	Programme Code	103	Regulation	2023				
Department	Electronics and Communication Engineering			Semester	III				
<b>CURRICULUM</b> (Applicable to the students admitted from the academic year 2023 – 2024 onwards)									
Course Code	Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CA	ESE
<b>THEORY</b>									
U23MA303	Transforms and Partial differential Equations*	BSC	3	1	0	4	40	60	100
U23EC301	Circuit Analysis	PCC	3	0	0	3	40	60	100
U23EC302	Signals and System	PCC	3	0	0	3	40	60	100
U23IT302	Data Structure <sup>#</sup>	PCC	3	0	0	3	40	60	100
U23CTCP1	Verbal, Quantitative, Aptitude and Reasoning-I	EEC	2	0	0	1	40	60	100
<b>THEORY INTEGRATED WITH PRACTICAL</b>									
U23EC303	Digital Logic Circuit Design	PCC	3	0	1	4	50	50	100
<b>PRACTICAL</b>									
U23EC304	Devices and Circuits Laboratory	PCC	0	0	2	1	60	40	100
U23IT303	Data Structures Lab <sup>#</sup>	PCC	0	0	2	1	60	40	100
U23CTCP2	Personality Development <sup>@</sup>	EEC	1	0	2	1	60	40	100
<b>Total Credits</b>						<b>21</b>	<b>430</b>	<b>470</b>	<b>900</b>

CA - Continuous Assessment, ESE - End Semester Examination, BSC - Basic Science Courses, PCC – Professional Core Courses, EEC - Employability Enhancement Courses.

<sup>#</sup>Common for IT, CSE, CST, BME, ECE, EEE



\* Common for BME, CIVIL, AGRI, Bio-Tech, ECE, EEE

<sup>@</sup> Common for all branches

  
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Programme	<b>B.E.</b>	Programme Code	<b>103</b>	Regulation		<b>2023</b>			
Department	<b>Electronics and Communication Engineering</b>			Semester		<b>IV</b>			
<b>CURRICULUM</b> (Applicable to the students admitted from the academic year 2023 – 2024 onwards)									
Course Code	Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CA	ESE
<b>THEORY</b>									
U23MA406	Probability and Random Processes	BSC	3	1	0	4	40	60	100
U23EC401	Electromagnetics and Transmission Lines	PCC	3	0	0	3	40	60	100
U23EC402	Electronic Circuits	PCC	3	0	0	3	40	60	100
U23EC403	Analog Integrated Circuits	PCC	3	0	0	3	40	60	100
U23ADL01	Additional Language <sup>@</sup>	EEC	3	0	0	2	40	60	100
<b>THEORY INTEGRATED WITH PRACTICAL</b>									
U23EC404	Digital Signal Processing	PCC	3	0	1	4	50	50	100
<b>PRACTICAL</b>									
U23EC405	Electronic Circuits Laboratory	PCC	0	0	2	1	60	40	100
U23EC406	Analog Integrated Circuits Laboratory	PCC	0	0	2	1	60	40	100
<b>CAREER TRACK COURSES</b>									
	Career Track Course I <sup>@</sup>	EEC	2/0	0	2/0	1	40/60	60/40	100
<b>Total Credits</b>						<b>22</b>	<b>410/430</b>	<b>490/470</b>	<b>900</b>


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Course Code	Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CA	ESE
<b>CURRICULUM</b> (Applicable to the students admitted from the academic year 2023 – 2024 onwards)									
<b>THEORY</b>									
U23EC501	Control System Engineering	PCC	3	0	0	3	40	60	100
U23EC502	Processor and Embedded Systems Design	PCC	3	0	0	3	40	60	100
U23EC503	Analog and Digital Communication	PCC	3	0	0	3	40	60	100
U23EC504	Antenna's and Waveguides	PCC	3	0	0	3	40	60	100
<b>PRACTICAL</b>									
U23EC505	Processor and Embedded Systems Design Laboratory	PCC	0	0	2	1	60	40	100
U23EC506	Analog and Digital Communication Laboratory	PCC	0	0	2	1	60	40	100
U23EC507	Mini project-I	EEC	0	0	3	1	100	-	100
<b>PROFESSIONAL ELECTIVES</b>									
	Professional Elective I	PEC	3	0	0	3	40	60	100
<b>OPEN ELECTIVES</b>									
	Open Elective I	OEC	3	0	0	3	40	60	100
<b>CAREER TRACK COURSE</b>									
	Career Track Course III	EEC	3	0	0	1	100	-	100
<b>Total Credits</b>						<b>22</b>	<b>560</b>	<b>440</b>	<b>1000</b>



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Programme	<b>B.E.</b>	Programme Code	<b>103</b>	Regulation	<b>2023</b>				
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>VI</b>				
<b>CURRICULUM</b> (Applicable to the students admitted from the academic year 2023 – 2024 onwards)									
Course Code	Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CA	ESE
<b>THEORY</b>									
U23EC601	VLSI and Chip Design	PCC	3	0	0	3	40	60	100
U23EC602	Computer and Communication Networks	PCC	3	0	0	3	40	60	100
U23EC603	Management Quality and Ethical Values	PCC	3	0	0	3	40	60	100
U23EC604	Internet of Things	PCC	3	0	0	3	40	60	100
<b>PRACTICAL</b>									
U23EC605	VLSI and Chip Design Laboratory	PCC	0	0	2	1	60	40	100
U23EC606	Computer and Communication Networks Laboratory	PCC	0	0	2	1	60	40	100
U23EC607	Mini Project -II	EEC	0	0	2	1	100	-	100
<b>PROFESSIONAL ELECTIVES</b>									
	Professional Elective II	PEC	3	0	0	3	40	60	100
<b>OPEN ELECTIVES</b>									
	Open Elective II	OEC	3	0	0	3	40	60	100
<b>CAREER TRACK COURSE</b>									
	Career Track Course IV	EEC	3	0	0	1	100	-	100
<b>Total Credits</b>						<b>22</b>	<b>560</b>	<b>440</b>	<b>1000</b>



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Programme	<b>B.E.</b>	Programme Code	<b>103</b>	Regulation		<b>2023</b>			
Department	<b>Electronics and Communication Engineering</b>			Semester		<b>VII</b>			
<b>CURRICULUM</b> (Applicable to the students admitted from the academic year 2023 – 2024 onwards)									
Course Code	Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CA	ESE
<b>THEORY</b>									
U23EC701	RF and Microwave Engineering	PCC	3	0	0	3	40	60	100
U23EC702	Digital Image Processing	PCC	3	0	0	3	40	60	100
<b>PRACTICAL</b>									
U23EC703	Project Phase I	EEC	2	0	0	2	100	-	100
U23EC704	RF and Microwave Engineering Laboratory	PCC	0	0	2	1	60	40	100
<b>PROFESSIONAL ELECTIVES</b>									
	Professional Elective III	PEC	3	0	0	3	40	60	100
	Professional Elective IV	PEC	3	0	0	3	40	60	100
<b>OPEN ELECTIVES</b>									
	Open Elective III	OEC	3	0	0	3	40	60	100
<b>CAREER TRACK COURSE</b>									
	Career Track Course V	EEC	3	0	0	1	100	-	100
<b>Total Credits</b>						<b>19</b>	<b>460</b>	<b>340</b>	<b>800</b>


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Programme	<b>B.E.</b>	Programme Code	<b>103</b>	Regulation	<b>2023</b>				
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>VIII</b>				
<b>CURRICULUM</b> (Applicable to the students admitted from the academic year 2023 – 2024 onwards)									
Course Code	Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CA	ESE
<b>PROFESSIONAL ELECTIVES</b>									
	Professional Elective IV	PEC	3	0	0	3	40	60	100
	Professional Elective V	PEC	3	0	0	3	40	60	100
<b>PRACTICAL</b>									
U23EC801	Project Phase II	EEC	0	0	16	8	60	40	100
<b>Total Credits</b>						<b>14</b>	<b>140</b>	<b>160</b>	<b>300</b>


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Cumulative Course Credit: **160 (2023-2027 Batch)**


  
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CAREER TRACK COURSES											
Sem	Course Code	Course Name	Category	Periods/Week				Credit	Maximum Marks		
				L	T	P	C		CA	ESE	Total
<b>Track 1 - Entrepreneurship</b>											
IV	U23CTCE1	Entrepreneurial Mindset and Business Model Canvas	EEC	-	-	2	1	60	40	100	
V	U23CTCE2	Product Innovation, Commercialization and Finance	EEC	2	-	-	1	40	60	100	
VI	U23CTCE3	Intellectual Property Rights	EEC	2	-	-	1	40	60	100	
<b>Track 2 - Competitive Examination</b>											
IV	U23CTCP3	Verbal , Quantitative Aptitude and Reasoning -II	EEC	2	-	-	1	40	60	100	
V	U23CTCG1	History & Culture of India and Indian Geography	EEC	2	-	-	1	40	60	100	
VI	U23CTCG2	Indian economy and Freedom struggle in India & Tamil Nadu	EEC	2	-	-	1	40	60	100	
<b>Track 3 - Higher Studies</b>											
IV	U23CTCP3	Verbal, Quantitative Aptitude and Reasoning -II	EEC	2	-	-	1	40	60	100	
V	U23CTCH1	Higher Studies in Abroad & India	EEC	2	-	-	1	40	60	100	
VI	U23CTCH2	Social Networking for Higher Studies	EEC	2	-	-	1	40	60	100	
<b>Track 4 - Placement</b>											
IV	U23CTCP3	Verbal , Quantitative Aptitude and Reasoning -II	EEC	2	-	-	1	40	60	100	
V	U23CTCP4	Leveraging Arithmetic and Codes Snippet	EEC	2	-	-	1	40	60	100	
VI	U23CTCP5	Integrated Reasoning and Pseudo Code	EEC	2	-	-	1	40	60	100	



  
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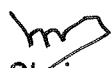
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Programme	<b>B.E</b>	Programme Code				<b>103</b>	Regulation			<b>2023</b>					
Department	<b>Electronics and Communication Engineering</b>					Semester			<b>I</b>						
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P		C	CA	ESE	Total						
<b>U23MA101</b>	<b>Matrices and Calculus</b>	3	1	0	4	40	60	100							
<b>Course Objective</b>	The Main Objective of the course is														
	<ul style="list-style-type: none"> <li>To develop the use of matrix algebra techniques that is needed by engineers for practical applications.</li> <li>To familiarize the students with differential calculus.</li> <li>To familiarize the student with functions of several variables. This is needed in many branches of engineering.</li> <li>To make the students understand various techniques of integration.</li> <li>To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.</li> </ul>														
	At the end of the course the students will be able to										Knowledge level				
	<b>CO1:</b> Use the matrix algebra methods for solving practical problems.										K1,K3				
	<b>CO2:</b> Apply differential calculus tools in solving various application problems.										K2,K4				
<b>CO3:</b> Able to use differential calculus ideas on several variable functions.										K3,K5					
<b>CO4:</b> Apply different methods of integration in solving practical problems.										K2,K5					
<b>CO5:</b> Apply multiple integral ideas in solving areas, volumes and other practical problems.										K3,K5					
<b>Pre-requisites</b>	-														
<b>CO / PO Mapping</b>													<b>CO/PSO Mapping</b>		
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak															
<b>COs</b>	Programme Outcomes (POs)												PSOs		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PS O1</b>	<b>PS O 2</b>	<b>PS O 3</b>
<b>CO 1</b>	3	2		1	1								2		
<b>CO 2</b>	3	3	2		1								2		
<b>CO 3</b>	3		2	1									2		
<b>CO 4</b>	3	2	2	1	1								2		
<b>CO 5</b>	3		1	1	1								2		
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignment.															
3. End-Semester examinations															
<b>Indirect</b>															
1. Course - end survey															
<b>Content of the syllabus</b>															

  
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<b>Unit – I</b>	<b>MATRICES</b>	Periods	<b>12</b>
Characteristic equation – Eigen values and Eigenvectors of a real matrix– Properties of Eigen values and Eigenvectors – Cayley-Hamilton theorem(excluding proof) – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms. Simple application in encoding message using 2×2 matrix.			
<b>Unit – II</b>	<b>DIFFERENTIAL CALCULUS</b>	Periods	<b>12</b>
Limit, Continuity, Differentiability, Rules of differentiation, Differentiation of various functions, Rolle’s theorem (excluding proof), Mean value theorem(excluding proof), Taylor’s theorem(excluding proof), Maxima and Minima. Applications: Newton’s law of cooling – Heat flow problems.			
<b>Unit – III</b>	<b>FUNCTIONS OF SEVERAL VARIABLES</b>	Periods	<b>12</b>
Partial differentiation – Homogeneous functions and Euler’s theorem(excluding proof) – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor’s series for functions of two variables(excluding proof) – Maxima and minima of functions of two variables. Applications: Lagrange’s method of undetermined multipliers.			
<b>Unit – IV</b>	<b>INTEGRAL CALCULUS</b>	Periods	<b>12</b>
Definite and Indefinite Integrals- Methods of integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions –Reduction formula $\int_0^{\frac{\pi}{2}} \cos^n x dx, \int_0^{\frac{\pi}{2}} \sin^n x dx .$			
<b>Unit – V</b>	<b>MUTIPLE INTEGRALS</b>	Periods	<b>12</b>
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.			
<b>Total Periods</b>			<b>60</b>
<b>Text Books</b>			
1.	Stewart, J. Calculus: Early Transcendentals (8 <sup>th</sup> Edition), Cengage Learning, 2015.		
2.	Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 43 <sup>rd</sup> Edition, 2014.		
<b>References</b>			
1.	Kreyszig E, Advanced Engineering Mathematics (10 <sup>th</sup> Edition), John Wiley (2015).		
2.	Bali. N., Goyal. M. and Watkins. C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7 <sup>th</sup> Edition, 2009.		
3.	Thomas. G. B., Hass. J, and Weir. M.D, “Thomas Calculus “, 14 <sup>th</sup> Edition, Pearson India, 2018.		
4.	Anton H, Calculus: Early Transcendentals, 10 <sup>th</sup> Edition, Wiley (2016).		
5.	B V Ramana, Higher Engineering Mathematics, Tata McGraw Hill Education Pvt Ltd., New Delhi (2016)		
<b>E-Resources</b>			
1.	<a href="https://freevideolectures.com">https://freevideolectures.com</a> , All Courses , Calculus , UCLA		
2.	<a href="http://www.learnerstv.com/Free-engineering-Video-lectures">www.learnerstv.com/Free-engineering-Video-lectures</a>		
3.	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>		

  
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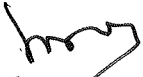
	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University Chennai) Elayampalayam, Tiruchengode – 637 205														
Programme	B.E	Programme code	103	Regulation	2023										
Department	<b>Electronics and Communication Engineering</b>			Semester	I										
Course code	Course name	Periods per week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23EN101</b>	<b>English for Communication</b>	3	0	0	3	40	60	100							
Objective	The main objective of this course is to: <ul style="list-style-type: none"> <li>• Improve the communicative ability of learners.</li> <li>• Make learners read widely in order to practice writing</li> <li>• Make learners develop vocabulary and strengthen grammatical understanding</li> <li>• Assist students in the development of intellectual flexibility, creativity, and cultural literacy so that they may engage in life-long learning.</li> <li>• Identify and begin to apply the language features of academic and professional writing and speaking</li> </ul>														
Outcomes	The students who complete this course successfully are expected to:						Knowledge Level								
	<b>CO1:</b> Use appropriate vocabulary in a professional context						K1								
	<b>CO2:</b> Write appropriately based on the knowledge gained through reading of a variety of materials						K1								
	<b>CO3:</b> Use language through their grammatical acquisition						K2								
	<b>CO4:</b> Read and infer meanings of technical texts						K2								
	<b>CO5:</b> Comprehend and retain the contextual and syntax understanding from reading.						K3								
Pre-Requisites	<b>Nil</b>														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak													<b>CO/PSO Mapping</b>		
Cos	Programme Outcomes (Pos)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1						2			3	3		3			2
CO 2						2			3	3		3			2
CO 3						2			3	3		3			2
CO 4						2			3	3		3			2
CO 5						2			3	3		3			2
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignments															
3. End-Semester examinations															
<b>Indirect</b>															
1. Course – end survey															



  
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Content of the syllabus			
<b>Unit – I</b>		Periods	<b>9</b>
<p><b>Listening</b>-Introduction to Different Types of Listening, Listening to Casual Conversations, <b>Speaking</b>-Introduction to develop the Art of Speaking, Giving Self Introduction, <b>Reading</b>-Understanding the Basics of Reading Skills, Reading Instructions and Technical Manuals, <b>Writing</b>- Introduction to writing strategies, Writing Definitions, <b>Focus on Language</b> - - Technical terms (Jargon), Word Formation with Prefixes and Suffixes, Using Active Voice and Passive Voice, Basic sentence patterns, Tenses (past, present, perfect and continuous tenses).</p>			
<b>Unit – II</b>		Periods	<b>9</b>
<p><b>Listening</b>- Listening to lectures, listening to description of equipment, <b>Speaking</b>-Strategies for Developing Conversational Skills, Short Conversations through Role Play Activities, <b>Reading</b>- Reading Comprehension, Reading e-mails, Reading Headlines, Predicting the Content, <b>Writing</b>- Note making, Writing Descriptions, <b>Focus on Language</b>- Collocations, One word substitution, Subject – verb agreement</p>			
<b>Unit – III</b>		Periods	<b>9</b>
<p><b>Listening</b>- Listening to different kinds of interviews (Face – to – face, radio, TV and telephone interviews), <b>Speaking</b>-Describing an Object, Asking Questions, Participating in Discussions <b>Reading</b>- Intensive reading, Reading passages for gist. <b>Writing</b>- Writing short &amp; lengthy e-mails with emphasis on Brevity, Clarity, Coherence and Cohesion), <b>Focus on Language</b>-Sequential Connectives, Impersonal Passive</p>			
<b>Unit – IV</b>		Periods	<b>9</b>
<p><b>Listening</b>-Note Taking, <b>Speaking</b>- Improving Fluency through Narration. <b>Reading</b>-Reading passages for specific information- Phone messages, Reading and Transferring Information. <b>Writing</b>- Effective writing strategies, Informal writing, Writing a Memo, <b>Focus on Language</b>- Cause and Effect, Conditional Statements (if – clauses and types), Usage of Modal Verbs.</p>			
<b>Unit – V</b>		Periods	<b>9</b>
<p><b>Listening</b>- Listening to understand Modulation, Listening to Welcome Speeches, <b>Speaking</b>- Delivering Welcome Address, Understanding Segmental and Suprasegmental Features- Practicing Stress, Pause and Intonation, <b>Reading</b>- Reading for a purpose, Reading Business Documents, Interpreting Charts and Graphs,. <b>Writing</b>- Describing a Process. <b>Focus on Language</b> -Synonyms and Antonyms, Common Errors in English.</p>			
		<b>Total Periods</b>	<b>45</b>
<b>Text Books:</b>			
1.	Sumant. S, Pereira Joyce, Shameem.M, Selvarajan.R-English Communication Skills,Vijay Nicole imprints Pvt.Ltd, 2015.		
2.	Sokkaalingam, S.RM., The Art Of Speaking EnglishVersatile Publishing House,2018.		
<b>References:</b>			
1.	Dr. Padma Ravindran, Poorvadevi, M. Y. Abdur Razack- English for life, English for work,		

  
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	students Book, Ebek language laboratory pvt ltd, 2011.
2.	Dutt Rajeevan, Prakash. A Course in Communication Skill (Anna University, Coimbatore edition): Cambridge University Press India Pvt.Ltd, 2007.
3.	S.P. Dhanavel, English and Communication Skills for Students of Science and Engineering, Orient Blackswan Pvt, Ltd, 2009.
4.	Technical English – I & II, Sonaversity, Sona College of Technology, Salem, First Edition, 2012.
5.	Meenakshmi Raman and Sangeeta Sharma- Technical communication English Skills for Engineers; oxford University Press, 2008.
<b>E-Resources.</b>	
1.	<a href="http://www.sparknotes.com/lit/the-alchemist/summary.html">http://www.sparknotes.com/lit/the-alchemist/summary.html</a>
2.	<a href="https://www.stephencovey.com/7habits/7habits.php">https://www.stephencovey.com/7habits/7habits.php</a>
3.	<a href="http://en.wikipedia.org/wiki/The_Seven_Habits_of_Highly_Effective_People">http://en.wikipedia.org/wiki/The_Seven_Habits_of_Highly_Effective_People</a>

  
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	Programme	B.E	Programme code	103	Regulation	2023									
Department	<b>Electronics and Communication Engineering</b>			Semester		I									
Course code	Course name	Periods per week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23CH101</b>	<b>Engineering Chemistry</b>	3	0	0	3	40	60	100							
Objective	The main objective of this course is to: <ul style="list-style-type: none"> <li>Recognize the basic technology requirements in water treatment</li> <li>Gain knowledge in basics and preparations, properties and applications of Polymers.</li> <li>Enrich the Knowledge of the students with the basics of Nano materials, their properties and applications.</li> <li>Familiarize about the Non renewable, renewable energy and different types of storage devices in the engineering application.</li> <li>Gain knowledge in destruction and protection of metals for engineering applications.</li> </ul>														
Outcomes	The students who complete this course successfully are expected to:						Knowledge Level								
	<b>CO1:</b> Implement innovative solutions in wastewater treatment process.						K3								
	<b>CO2:</b> Familiarize with the applications of polymers in the field of engineering.						K3								
	<b>CO3:</b> Identify the synthesis methods of Nanoparticles and their industrial applications						K2								
	<b>CO4:</b> Recognize the renewable, non renewable energy and storage devices for domestic and industrial applications.						K3								
<b>CO5:</b> Categorize the metal corrosion in different environment and find out appropriate control techniques to avoid corrosion.						K3									
Pre-Requisites	<b>Nil</b>														
<b>CO / PO Mapping</b>													<b>CO/PSO Mapping</b>		
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak															
Cos	Programme Outcomes (Pos)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	2	1	2	2	2					1	1	2
CO 2	3	2	2	2		2	2	1					2	2	2
CO 3	3	2	2	3	2	1	2	1					2	1	1
CO 4	3	3	2	2	1	1	3	2					3	2	2
CO 5	3	3	3	2	1	2	2	1					2	1	2


  
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<b>Course Assessment Methods</b>			
<b>Direct</b>			
1. Continuous Assessment Test I, II & III			
2. Assignment			
3. End-Semester examinations			
<b>Indirect</b>			
Course – end survey			
<b>Content of the syllabus</b>			
Unit – I	<b>WATER TECHNOLOGY</b>	Periods	9
Introduction-Sources and impurities in Water, Soft and Hard water, Water quality parameters, Types of Hardness – Determination of Hardness by EDTA method, Domestic Water Treatment. Boiler Feed Water –Requisites, Problems due to hard water in boilers – Scale and Sludge formation in boilers-Caustic Embrittlement-Boiler corrosion, Treatment of boiler feed Water – Internal conditioning (Carbonate, Phosphate, and Calgon conditioning) External conditioning – Ion exchange process, Zeolite process, Brackish water –Water purification by Reverse osmosis.			
Unit – II	<b>POLYMER CHEMISTRY</b>	Periods	9
Introduction – Occurrence, definitions – Functionality – Degree of Polymerization, Classification of polymers – structure (Linear, Branched & network polymer structure) block, random & graft copolymers, Tacticity, Tg, molecular weight – number and weight average method. Types of polymerizations: Addition, condensation and copolymerization. Mechanism of polymerization (Free radical). Preparation, properties and applications of PE, PMMA, PC, Nylon6, Nylon 6 6, Poly urethane, Poly isoprene and vulcanization of rubber, Teflon, PET, and Bakelite.			
Unit – III	<b>NANO CHEMISTRY</b>	Periods	9
Basics- distinction between molecules, nanoparticles and bulk materials; size dependent properties. Nanoparticles: nanocluster, nanorod, nanotube (CNT) and nanowires. Synthesis: Top down process- Laser ablation, Spray Pyrolysis, Chemical Vapour deposition, Electro deposition. Bottom up process- Precipitation, Sol-gel, Thermolysis – hydrothermal, solvothermal –Properties and applications of nano materials in medical and electronic devices.			
Unit – IV	<b>ENERGY RESOURCES AND STORAGE DEVICES</b>	Periods	9
Nonrenewable energy – Nuclear energy, nuclear reaction and its types, nuclear power plant and its working (Light water nuclear power plant & Breeder reactor).Renewable energy and its sources – Solar Energy – Photo voltaic cells, Importance of Solar cells – p-n junctions in Solar cells – Working of Photovoltaic cell, Recent advances in solar cell materials, Wind energy – Types of Wind Power Plants (WPPs), Components and working of WPPs. Batteries and fuel cells: Types of batteries –Alkaline battery, lead storage battery, Ni-Cd battery, lithium battery, Fuel cell – H <sub>2</sub> -O <sub>2</sub> fuel cell-applications.			
Unit – V	<b>CORROSION AND ITS CONTROL</b>	Periods	9
Introduction, Types of corrosion – chemical and electrochemical corrosion, mechanism, Pilling –Bedworth rule, Types of electrochemical corrosion – Galvanic corrosion, Pitting corrosion, Crevice corrosion, Corrosion on wire fence and Pipeline corrosion, Factors influencing rate of corrosion, corrosion control methods – Sacrificial anode and impressed cathodic current. Protective coatings – Paints: constituents and functions, Metallic coatings – steps involved in cleaning the surface for Electroplating, Electroplating (Au), Electro less plating (Ni).			
<b>Total Periods</b>			<b>45</b>
<b>Text Books:</b>			
1.	O.G.Palanna, “Engineering Chemistry” Tata Mc GrawHill PVT,Ltd. Second Edition -2017		
2.	Dr.S.Mageswari, Dr.K.Balachandran, M.S.Viswaksenan, “Engineering Chemistry”, RK publication, First Edition-2022		


  
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<b>References:</b>	
1.	Engineering Chemistry: Jain & Jain, Dhanpat Rai Publishing Company Edition- 16- 2015.
2.	Arun Bahl, B.S. Bahl, G.D. Tuli, Essentials of Physical Chemistry, Published by S. Chand & Company Ltd, 2014.
3.	Engineering Chemistry: Sashi Chawla, Dhanpat Rai & Co (pvt.)ltd. Edition- 5- 2013.
4.	Dr.S.Vairam ,Dr.Suba Ramesh, Engineering Chemistry: First Edition, Wiley publication,Reprint-2016
<b>E-Resources.</b>	
1	<a href="https://www.who.int/water_sanitation_health/dwq/arsenicun6.pdf">https://www.who.int/water_sanitation_health/dwq/arsenicun6.pdf</a>
2	<a href="https://www.schandpublishing.com/books/tech-professional/applied-science/a-textbook-polymer-chemistry/9788121941129/#.XdZ214MzY2w">https://www.schandpublishing.com/books/tech-professional/applied-science/a-textbook-polymer-chemistry/9788121941129/#.XdZ214MzY2w</a>
3	<a href="https://www.elsevier.com/books/nanochemistry/klabunde/978-0-444-59397-9">https://www.elsevier.com/books/nanochemistry/klabunde/978-0-444-59397-9</a>

  
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Programme	<b>B.E</b>	Programme Code	103	Regulation	<b>2023</b>										
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>I</b>										
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23CS101</b>	<b>Programming for Problem Solving</b>	3	0	0	3	40	60	100							
<b>Course Objective</b>	The main objective of this course is to: <ul style="list-style-type: none"> <li>Learn the fundamentals of computers, languages, number systems and acquire problem solving skills in C Programming</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,						Knowledge Level								
	<b>CO1:</b> Examine number systems and to apply problem solving techniques						K3								
	<b>CO2:</b> Learn the basics of C programming with branching and looping statements						K2								
	<b>CO3:</b> Experiment the C programs using Arrays and Pointers for simple applications						K3								
	<b>CO4:</b> Solve C programs with the Functions and Strings						K3								
<b>CO5:</b> Apply Structures, Union and File concepts to solve simple real world problems						K3									
Pre-Requisites	<b>Nil</b>														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak													<b>CO/PSO Mapping</b>		
Programme Outcomes (POs)													PSOs		
<b>COs</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	3	2	1	1	2							2	3	3	
<b>CO 2</b>	2	1	1		2							2	2	2	
<b>CO 3</b>	3	2	1	1	2							2	3	3	
<b>CO 4</b>	3	2	1	1	2							2	3	3	
<b>CO 5</b>	3	2	1	1	2							2	3	3	
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignment / Quiz / Seminar															
3. End-Semester examination															
<b>Indirect</b>															
1. Course - end survey															
<b>Content of the syllabus</b>															
<b>Unit – I</b>	<b>INTRODUCTION TO PROBLEM SOLVING</b>										Periods	<b>9</b>			

  
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Basic organization of Computer - Programming languages - Compilers - Interpreter - Flowchart - Pseudocode - Algorithm.			
<b>Number Systems</b> - Decimal, Binary, Octal and Hexadecimal conversions			
<b>Unit - II</b>	<b>BASICS OF C PROGRAMMING</b>	Periods	<b>9</b>
Introduction to C - Features - Data Types - Constants - Variables - I/O Statement - Operators - Expressions - Decision Making and Branching - Looping Statements - Break, Go to, Continue.			
<b>Unit - III</b>	<b>ARRAYS AND POINTERS</b>	Periods	<b>9</b>
<b>Arrays:</b> Concepts - Need - one dimensional array - array declaration - features - array initialization - Two- Dimensional Arrays- Multidimensional Arrays.			
<b>Pointers:</b> Introduction, pointer declaration-accessing variable through pointer- Pointers and Arrays, Pointers and strings - Pointers structures - Pointer Arithmetic - Array of Pointers - dynamic memory allocation - malloc, realloc, free.			
<b>Unit - IV</b>	<b>FUNCTIONS AND STRINGS</b>	Periods	<b>9</b>
<b>Functions:</b> Introduction, function declaration, defining and accessing functions, User-defined Functions- storage classes-function prototypes-parameter passing methods-recursion.			
<b>Strings:</b> Concepts - Strings manipulation - String Input / Output Functions- Strings standard functions - Arrays of Strings.			
<b>Unit - V</b>	<b>STRUCTURES, UNIONS AND FILE SYSTEMS</b>	Periods	<b>9</b>
<b>Structures:</b> Introduction- nested structures- Arrays of Structures - Structures and Functions - Pointers to Structures - Unions.			
<b>File:</b> opening, defining, closing, File Modes, File Types , Writing contents into a file, Reading file contents, Appending an existing file, File permissions and rights, Changing permissions and rights.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	S.Kuppuswami, S.Maliga, C. S. Kanimozhi and K.Kousalya, "Problem Solving and Programming", Tata McGraw Hill, 2019.		
2.	E. Balagurusamy, "Programming in ANSI C", 8 <sup>th</sup> Edition, Mc Graw Hill, 2019.		
<b>References</b>			
1.	Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition, 2017		
2.	Kernighan BW and Ritchie DM, "The C Programming Language", 2 <sup>nd</sup> Edition, Prentice Hall of India, 2017.		
3.	Dr.V.Rameshbabu, Dr.R.Samyutha, M.Muni Rathnan, "Computer Programming", VRB Publishers Pvt.Ltd, 2016.		
<b>Tools Required</b>			
	Codetandra/HackerRank/ HackerEarth / Any online Problem Solving Platforms		
<b>E-Resources</b>			
1.	<a href="https://www.geeksforgeeks.org/c-language-set-1-introduction/">https://www.geeksforgeeks.org/c-language-set-1-introduction/</a>		
2.	<a href="https://www.programiz.com/c-programming">https://www.programiz.com/c-programming</a>		
3.	<a href="https://www.cprogramming.com/">https://www.cprogramming.com/</a>		

  
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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>			
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>I</b>			
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
<b>U23TA101</b>	<b>தமிழர்மரபு /Heritage of Tamils</b>	1	0	0	1	40	60	100
<b>Content of the syllabus</b>								
அலகு 1	மொழி மற்றும் இலக்கியம்				<b>Periods</b>	<b>3</b>		
இந்தியமொழிக் குடும்பங்கள் - திராவிடமொழிகள் - தமிழ் ஒருசெம்மொழி-தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்றதன்மை-சங்க இலக்கியத்தில் பகிர்தல் அறம் திருக்குறளில் மேலாண்மைக் கருத்துக்கள் தமிழ்க் காப்பியங்கள் தமிழகத்தில் சமணபௌத்தசமயங்களின் தாக்கம் - பக்தி இலக்கியம்,ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கியவளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.								
அலகு 2	மரபு-பாறைஓவியங்கள் முதல் நவீனஓவியங்கள் வரை-சிற்பக் கலை				<b>Periods</b>	<b>3</b>		
நடுகல் முதல் நவீனசிற்பங்கள் வரை-ஐம்பொன் சிலைகள் பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள்,பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளூர் சிலை - இசைக் கருவிகள் - மிருதங்கம்,பறை,வீணை. யாழ்,நாதஸ்வரம் - தமிழர்களின் சமூகபொருளாதாரவாழ்வில் கோவல்களின் பங்கு.								
அலகு 3	நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள்:				<b>Periods</b>	<b>3</b>		
தெருக்கூத்து,கரகாட்டம்,வில்லுப்பாட்டு,கணியான் கூத்து,ஓயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.								
அலகு 4	தமிழர்களின் திணைக் கோட்பாடுகள்:				<b>Periods</b>	<b>3</b>		
தமிழகத்தின் தாவரங்களும்,விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றியஅறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும்,கல்வியும் - சங்ககாலநகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதிமற்றும் இறக்குமதி-கடல்கடந்தநாடுகளில் சோழர்களின் வெற்றி.								
அலகு 5	இந்தியதேசிய இயக்கம் மற்றும் இந்தியபண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:				<b>Periods</b>	<b>3</b>		
இந்தியவிடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்தியமருத்துவத்தில்,சித்தமருத்துவத்தின் பங்கு- கல்வெட்டுகள்,கையெழுத்துப்படிக்கல்கள் - தமிழ்ப் புத்தகங்களின் அச்சுவரலாறு.								
					<b>Total Periods</b>	<b>15</b>		

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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>			
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>I</b>			
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
<b>U23TA101</b>	<b>தமிழர்மரபு /Heritage of Tamils</b>	1	0	0	1	40	60	100
<b>Content of the syllabus</b>								
<b>UNIT I</b>	<b>LANGUAGE AND LITERATURE</b>				<b>Periods</b>	<b>3</b>		
Language Families in India- Dravidian Languages– Tamil as a Classical Language-Classical Literature in Tamil– secular Nature of Sangam Literature– Distributive Justice in Sangam Literature- management Principles in Thirukural-Tamil Epics and Impact of Buddhism & Jainism in Tamil and-Bakthi Literature Azhwarsand Nayanmars- Forms of minor Poetry- Development of Modern literature in Tamil-Contribution of Bharathiyar and Bharathidhasan.								
<b>UNIT II</b>	<b>HERITAGE-ROCK ART PAINTINGS TO MODERN ART-SCULPTURE</b>				<b>Periods</b>	<b>3</b>		
Hero stone to modern sculpture -Bronzeicons- Tribe sandtheir hand crafts- Artof templecar making– Massive Terracotta sculptures Village deities, Thiruvalluvar Statueat Kanyakumari ,Making of musicalinstruments- Mridhangam ,Parai Veenai, Yazhand Nadhaswaram-Roleof Temple sin Social and Economic Life of Tamils.								
<b>UNIT III</b>	<b>FOLK AND MARTIAL ARTS</b>				<b>Periods</b>	<b>3</b>		
Therukoothu, Karagattam, VilluPattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tigerdance –Sportsand Games of Tamils.								
<b>UNIT IV</b>	<b>THINAI CONCEPT OF TAMILS</b>				<b>Periods</b>	<b>3</b>		
Flora and Fauna of Tamils &Ahamand Puram Concept from Tholkappiyamand Sangam Literature- Aram Concept of Tamils –Educationand Literacy during Sangam Age –Ancient Cities and Ports of Sangam Age-Exportand Importduring Sangam Age- Over seas Conquestof Cholas.								
<b>UNIT V</b>	<b>CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE</b>				<b>Periods</b>	<b>3</b>		
Contribution of amils to Indian Freedom Struggle –The Cultural Influence of Tamils over theother parts of India –Self –Respect Movement- Role of Siddha Medicine in Indigenous Systems of Medicine–Inscriptions &Manuscripts–Print History of Tamil Books.								


**Total Period: 15**




**TEXT-CUM-REFERENCE BOOKS**


1	தமிழக வரலாறும் – மக்களும்பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ் நாடு பாட நூல் மற்றும் கல்வியியல்பணிகள்கழகம்).
2	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3	கீழடி – வைகை நதிக்கரையில் சங்க நகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
4	பொருறை - ஆற்றங்கரைநாகரிகம். (தொல்லியல்வெளியீடு)
5	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)

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7	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

  
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Programme	<b>B.E</b>	Programme Code			<b>103</b>	Regulation			<b>2023</b>						
Department	<b>Electronics and Communication Engineering</b>					Semester			<b>I</b>						
Course Code	Course Name				Periods Per Week			Credit	Maximum Marks						
					L	T	P		C	CA	ESE	Total			
<b>U23GE101</b>	<b>Engineering Graphics</b>				2	0	3	3	50	50	100				
<b>Course Objective</b>	<b>The main objective of this course is to:</b>														
	<ul style="list-style-type: none"> <li>Develop skills to enhance their ability to know the concept of engineering graphics and to draw the points kept in various positions, lines and planes.</li> <li>Project the drawing of various solids.</li> <li>Sketch sectioned views of solids.</li> <li>Draw the development of surfaces.</li> <li>Draw the isometric and orthographic projections for any given object to the required standard.</li> </ul>														
<b>Course Outcomes</b>	At the end of the course, the student should be able to										Knowledge Level				
	<b>CO1:</b> Construct plane curves and develop projection of points , lines and plane surfaces										K2				
	<b>CO2:</b> Construct projection of solids with various conditions.										K4				
	<b>CO3:</b> Design the section of solids and analyze the true shape of the section										K3				
	<b>CO4:</b> Design and develop the different solid surfaces.										K2				
<b>Pre - requisites</b>	Nil										<b>CO5:</b> Construct isometric and orthographic projection of different solids.	K1			
	<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak												<b>CO/PSO Mapping</b>		
<b>COs</b>	<b>Programme Outcomes (POs)</b>												<b>PSOs</b>		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	3	3	3	3	3	-	-	-	-	-	-	-	2	2	-
<b>CO 2</b>	3	3	2	2	2	-	-	-	-	-	-	-	2	-	-
<b>CO 3</b>	3	2	2	2	3	-	-	-	-	-	-	-	2	3	-
<b>CO 4</b>	3	2	3	3	2	-	-	-	-	-	-	-	3	-	-
<b>CO 5</b>	3	3	2	3	3	-	-	-	-	-	-	-	3	2	-
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignment															
3. End-Semester examination															
<b>Indirect</b>															
1. Course - end survey															


  
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<b>Content of the Syllabus</b>			
<b>Concepts &amp; Conventions (Not for Examination)</b>	Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.	<b>Periods</b>	<b>1</b>
<b>Unit - I</b>	<b>PROJECTION OF POINTS, LINES AND PLANE SURFACES</b>	<b>Periods</b>	<b>3+8</b>
Introduction to Plane curves, Orthographic projection – principles – projection of points, straight lines (only first angle projections) and plane surfaces (polygonal and circular).			
<b>Unit - II</b>	<b>PROJECTION OF SOLIDS</b>	<b>Periods</b>	<b>3+8</b>
Projections of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane.			
<b>Unit - III</b>	<b>SECTION OF SOLIDS</b>	<b>Periods</b>	<b>3+8</b>
Sectioning of solids - prisms, pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other - Obtaining true shape of section.			
<b>Unit - IV</b>	<b>DEVELOPMENT OF SURFACES</b>	<b>Periods</b>	<b>3+8</b>
Development of lateral surfaces of simple solids like prisms, pyramids, cylinders and cones – development of simple truncated solids involving prisms, pyramids, cylinders and cones.			
<b>Unit - V</b>	<b>ISOMETRIC PROJECTIONS, ORTHOGRAPHIC VIEWS FROM PICTORIAL VIEWS</b>	<b>Periods</b>	<b>5+10</b>
<b>Isometric Projection and Introduction to AutoCAD / Solid Edge:</b> Principles of isometric projection - Isometric scale -Isometric projections of simple solids like prisms, pyramids, cylinders and cones & orthographic views from pictorial views.			
<b>Demonstration only:</b>			
<b>Computer Aided Drafting (Auto CAD / Solid Edge):</b> Introduction to drafting packages and demonstration of their use.			
<b>Total Periods</b>			<b>60</b>
<b>Text Books:</b>			
T1.	Basant Agrawal and C.M Agrawal ,“Engineering Drawing ”,Tata McGraw Hill ,Third Edition,2019		
T2	Jain and Gautam ,“Engineering Graphics & Design ”,Khanna Publishing House, 2018		
<b>Reference Books :</b>			
R1.	Dr.P.Kannan and Dr.J.Bensam Raj, “Engineering Graphics”, JBR Tri Sea Publishers Pvt. Ltd, 2018.		
R2.	K.V Natarajan, "Engineering Drawing and Graphics", M/s. N.Dhanalakshmi, Chennai, 2014.		
R3.	K.Venugopal and V. Prabhu Raja, “Engineering Graphics”New Age International Publishers, 2011.		
R4.	N.S Parthasarathy and Velamurali, “ Engineering Graphics”, Oxford University, New Delhi,2015		
R5.	Bhatt N.D and Panchal V.M, “Engineering Drawing”, Charotar Publishing House,50 <sup>th</sup> Edition,2010		
<b>e-RESOURCES:</b>			
E1.	<a href="http://nptel.ac.in/courses/105104148">http://nptel.ac.in/courses/105104148</a> , “Engineering Graphics” - Dr. Nihar Ranjan Patra , IIT Kanpur		
E2.	<a href="http://cf.annauniv.edu/webcontent.htm">http://cf.annauniv.edu/webcontent.htm</a> , “Engineering Graphics” - Dr.Velamurali		
E3.	<a href="http://link.springer.com/">http://link.springer.com/</a> “Engineering Graphics”-Springer Nature.		


  
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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>										
Department	<b>Electronics and Communication Engineering</b>		Semester		<b>I</b>										
Course Code	Course name	Periods per week			Credit	Maximum Marks									
<b>U23GE102</b>	<b>Design Thinking</b>	L	T	P	C	CA	ESE	Total							
		1	0	2	1	50	50	100							
<b>Course Objective</b>	The student should be made to, <ul style="list-style-type: none"> <li>familiarize with design thinking concepts and principles</li> <li>practice the methods, processes and tools of design thinking.</li> <li>apply the design thinking approach and have ability to model real world situations.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,							<b>KL</b>							
	<b>CO1:</b> Understand and apply the concept of team building activity							K2							
	<b>CO2:</b> Understand Design Thinking and apply the design thinking approach to empathize situations in real world							K3							
	<b>CO3:</b> Identify various methods of empathy and define the problem							K3							
	<b>CO4:</b> Develop creative ideas through design thinking							K4							
<b>CO5:</b> Understand benefits of learning through observation, experience and application							K5								
<b>Pre-requisites</b>	-														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak												<b>CO/PSO Mapping</b>			
<b>COs</b>	Programme Outcomes (POs)												PSOs		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	2	3	3	3	3	2	2	3	3	3	2	2	3	3	2
<b>CO 2</b>	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3
<b>CO 3</b>	3	3	1	2	2	2	2	1	2	1			2	2	3
<b>CO 4</b>	3	3	3	3	3	2	2	2	2	2	2	1	2	2	3
<b>CO 5</b>	3	3	3	3	1	2	2	2	1	2	2	1	2	2	3
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test through activities, assignment & Quiz															
2. Models (Chart/paper/3D)															
3. Prototype & Presentation															
<b>Indirect</b>															
1. Course - end survey															
<b>Content of the syllabus</b>															
<b>SESSION-I</b>												Periods	<b>6</b>		
Introduction – Team Building - Types – 4 C's of Team Building – Levels of Team Building – Benefits of Team Work – Team Building Activity.															
<b>SESSION II</b>												Periods	<b>9</b>		

  
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Introduction to Design Thinking – Purpose of Design Thinking – Design Thinking Framework, Empathy and related case studies		
<b>SESSION III</b>		Periods
		<b>6</b>
Define : Examine and Reflect on the problem.		
<b>SESSION IV</b>		Periods
		<b>12</b>
Generating Ideas – Identifying ideas – Bundling the ideas and create concepts – Rapid Prototyping – Idea Refinement.		
<b>SESSION V</b>		Periods
		<b>12</b>
Importance & testing the design with people - Retest and redefine results		
<b>Total Periods</b>		<b>45</b>
<b>Textbooks</b>		
1.	Solving Problems with Design Thinking - Ten Stories of What Works by Jeanne Liedtka 2013.	
2.	Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013.	
3.	Yousef Haik and Tamer M. Shahin, "Engineering Design Process", Cengage Learning, 2 <sup>nd</sup> edition, 2011	
4.	Design of Business: Why Design Thinking is the Next Competitive Advantage by Roger L. Martin 2009.	
5.	Change by Design: How Design thinking transforms organizations and empires Innovation, 2009, Harper Business, Brown, Tim and Berry.	
<b>References</b>		
1.	Design thinking toolbox by Michael Lewick, Wiley 2020	
2.	Design thinking playbook by Michael Lewrick, Wiley 2019	
3.	Creative Confidence: Unleashing the Creative Potential Within Us All by Tom Kelley 2014	
4.	The Design of Everyday Things: by Don Norman 2013	
<b>E-Resources</b>		
1.	<a href="https://www.collectivecampus.io/blog/6-resources-to-help-you-learn-design-thinking">https://www.collectivecampus.io/blog/6-resources-to-help-you-learn-design-thinking</a>	
2.	<a href="https://thisisdesignthinking.net/on-design-thinking/design-thinking-resources/">https://thisisdesignthinking.net/on-design-thinking/design-thinking-resources/</a>	
3.	<a href="http://hs.griet.ac.in/pdf/studymaterialsgr20/Design%20Thinking%20Lab%202020-21.pdf">http://hs.griet.ac.in/pdf/studymaterialsgr20/Design%20Thinking%20Lab%202020-21.pdf</a>	
4.	<a href="https://www.mindtools.com/brainstm.html">https://www.mindtools.com/brainstm.html</a>	
5.	<a href="https://www.quicksprout.com/. /how-to-reverse-engineer-your-competit">https://www.quicksprout.com/. /how-to-reverse-engineer-your-competit</a>	
6.	<a href="https://www.youtube.com/watch?v=2mjSDIBaUIM">https://www.youtube.com/watch?v=2mjSDIBaUIM</a>	
7.	<a href="http://thevirtualinstructor.com/foreshortening.html">thevirtualinstructor.com/foreshortening.html</a>	
<b>Activity Based Learning/Practical Based Learning</b>		
<a href="http://dschool.stanford.edu/dgift/">http://dschool.stanford.edu/dgift/</a>		
<b>Online Course</b>		
1.	<a href="https://onlinecourses.nptel.ac.in/noc19_mg60/preview">https://onlinecourses.nptel.ac.in/noc19_mg60/preview</a>	
2.	<a href="https://www.ibm.com/design/thinking/page/badges/core-skills">https://www.ibm.com/design/thinking/page/badges/core-skills</a>	


  
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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>											
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>I</b>											
Course code	Course name	Periods per week			Credit	Maximum Marks										
		L	T	P	C	CA	ESE	Total								
<b>U23CH102</b>	<b>CHEMISTRY LABORATORY</b>	0	0	2	1	60	40	100								
<b>Objective</b>	The main objective of this course is to:															
	<ul style="list-style-type: none"> <li>Gather basic simple acid-base reactions and study the mechanism of acid mixture with base.</li> <li>Learn pH and potential of hydrogen in a sample solution.</li> <li>Study the redox reaction through potential difference.</li> <li>Infer iron forms complex with thiocyanate.</li> <li>Gather knowledge on hardness producing salts and removal of hardness through estimation.</li> <li>Collect data required for dissolved oxygen present in water sample.</li> <li>Understand alkalinity and available chlorine present in water sample.</li> </ul>															
<b>Outcomes</b>	The students who complete this course successfully are expected to:						Knowledge Level									
	<b>CO1:</b> Infer knowledge on neutralization reaction between acid, acid mixture with base and identify the concentrations.						K3									
	<b>CO2:</b> Identify the concentration of sample using pH.						K3									
	<b>CO3:</b> Spot the concentration of sample solution through redox reaction by potentiometric method						K4									
	<b>CO4:</b> Estimate Iron by complexation reaction spectrometric ally.						K4									
<b>CO5:</b> Determine hardness and dissolved oxygen present in domestic water supply and Identify alkalinity and available chlorine present in the given sample.						K4										
<b>Pre-requisites</b>	Nil															
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak												<b>CO/PSO Mapping</b>				
<b>COs</b>		<b>Programme Outcomes (POs)</b>											<b>PSOs</b>			
		<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>		3	3		2	2	1	1						2	2	2
<b>CO 2</b>		3	3		2	2	2	2						2	1	2
<b>CO 3</b>		3	3		2	2	1							1	2	2
<b>CO 4</b>		3	3	1	2	2	1							2	2	
<b>CO 5</b>		2	3	1	2		2	3						2	2	
<b>Course Assessment Methods</b>																
<b>Direct</b>																


  
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1. Pre lab and Post lab Test 2. Execution of Experiment and Viva-voce 3. End semester examination		
<b>Indirect</b>		
Course - end survey		
<b>S.No</b>	<b>Name of the Experiment</b>	<b>Course Outcome</b>
1.	Estimation of HCl using NaOH by Conductometric titration	CO1
2.	Estimation of Mixture of acid using NaOH by Conductometric titration.	CO1
3.	Estimation of Barium Chloride using Sodium Sulphate by Conductometric precipitation titration	CO1
4.	Determination of HCl using NaOH by pH metry	CO2
5.	Estimation of Ferrous iron by Potentiometric titration.	CO3
6.	Estimation of Ferric ion by Spectrophotometry	CO4
7.	Determination of Total, Temporary and Permanent hardness of water by EDTA method.	CO5
8.	Estimation of Dissolved Oxygen content in water by Winkler's method	CO5
9.	Estimation of Alkalinity in water sample.	CO5
10.	Estimation of available Chlorine in bleaching powder.	CO5
<b>Total Periods</b>		<b>30</b>


<b>Lab Manuals suggested:</b>	
1.	Chemistry laboratory I & II by Dr.A.Ravikrishnan,Sri Krishna Pub,Revised Edition-2017
2.	Chemistry laboratory Manual by Dr.Veeraiyan, Revised Edition-2017

  
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Programme	<b>B.E.</b>	Programme Code	<b>103</b>	Regulation	<b>2023</b>										
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>I</b>										
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23CS102</b>	<b>Programming for Problem Solving Laboratory</b>	0	0	2	1	60	40	100							
<b>Course Objective</b>	The main objective of the course is to <ul style="list-style-type: none"> <li>Develop simple C programs to illustrate the applications of User Defined and Derived Data Types such as Arrays, Pointers, Structures, and Functions.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,						Knowledge Level								
	<b>CO1:</b> Develop C programs for computer based solution of simple real world problems using Conditional and Looping statements						K3								
	<b>CO2:</b> Implement simple C Programs using Strings and Arrays						K3								
	<b>CO3:</b> Implement C program for simple applications using Pointers						K3								
	<b>CO4:</b> Write C programs that perform operations on File						K4								
<b>CO5:</b> Demonstrate C Programs using Structures						K3									
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak													<b>CO/PSO Mapping</b>		
<b>COs</b>	Programme Outcomes (POs)												PSOs		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	3	2	1	1	2							2	3	3	
<b>CO 2</b>	3	2	1	1	2							2	3	3	
<b>CO 3</b>	3	2	1	1	2							2	3	3	
<b>CO 4</b>	3	2	1	1	2							2	3	3	
<b>CO 5</b>	3	2	1	1	2							2	3	3	
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Pre lab and post lab test															
2. End-Semester examination															
<b>Indirect</b>															
1. Course - end survey															
<b>List of Experiments</b>														<b>CO's</b>	
1. Write a C program that accepts an employee's ID, total worked hours in a month and the amount he received per hour. Print the ID and salary (with two decimal places) of the employee for a particular month.														CO1	
2. Write a program in C to calculate the sum of three numbers with input on one line separated by a comma.														CO1	
3. Write a program in C to find the sum of the series $[x - x^3 + x^5 + \dots]$ .														CO1	
4. Write a program in C to find the number and sum of all integers between 100 and 200 which are divisible by 9.														CO1	
5. Write a program in C to count the total number of duplicate elements in an array.														CO2	



  
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<p>6. You are given an input string 'S'. Your task is to find and return all possible permutations of the input string.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. The input string may contain the same characters, so there will also be the same permutations.</li> <li>2. The order of permutation does not matter.</li> </ol> <p><b>Sample Input</b> xyz</p> <p>sample Output xyz, xzy, yxz, yzx, zxy, zyx</p> <p><b>Sample Output :</b> All the possible permutations for string "XYZ" will be "XYZ", "XZY", "YXZ", "YZX", "ZXY" and "ZYX".</p>	CO2
<p>7. Find the Smallest and Largest Element in an Array</p> <p><b>Method 1:</b> Traverse the array iteratively and keep track of the smallest and largest element until the end of the array.</p> <p><b>Method 2:</b> Traverse the array recursively and keep track of the smallest and largest element until the end of the array.</p> <p><b>Method 3:</b> Sort the array using STL and return the first element as the smallest element and the last element as the largest element.</p> <p><b>For example, consider the array.</b> arr = {1, 2, 3, 4, 5}</p> <p><b>Sample output:</b> Smallest element: 1 Largest element: 5</p>	CO2
<p>8. Write a C program to find the sum of all the multiples of 3 and 5 below 100 using pointers. We have to find the number of numbers which are multiples of both 3 and 5 in the first 100 natural numbers. Multiples of both 3 and 5 in the first 100 natural numbers are the multiples of LCM of 3 and 5.</p> <p>LCM of 3 and 5 = <math>3 \times 5 = 15</math></p> <p><b>Sample output:</b> Multiples of 15 below 100 are 15, 30, 45, 60, 75 and 90.</p>	CO3
<p>9. Write a C program to count number of characters, words and lines in a text file. Logic to count characters, words and lines in a file in C program. How to count total characters, words and lines in a text file in C programming.</p> <p><b>Example Source file</b> I love programming. Working with files in C programming is fun. I am learning C programming at VCEW.</p> <p><b>Sample output</b> Total characters = 100 Total words = 18 Total lines = 3</p>	CO4
<p>10. Write a C program to implement Student database using Structure</p> <p><b>Sample output:</b> <b>Enter details of student:</b> Name :abi RollNo:101 Percentage :89.7</p> <p><b>Entered details:</b> Name: abi RollNo: 101 Percentage: 89.70</p>	CO5
<b>Total Periods</b>	<b>30</b>

  
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<b>Tools Required</b>	
Codetandra / HackerRank / HackerEarth / Any online Problem Solving Platforms	
<b>E-Resources</b>	
1.	<a href="https://www.programiz.com/c-programming">https://www.programiz.com/c-programming</a>
2.	<a href="https://www.cprogramming.com/">https://www.cprogramming.com/</a>
3.	<a href="https://beginnersbook.com/2015/02/simple-c-programs/">https://beginnersbook.com/2015/02/simple-c-programs/</a>


  
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Programme	<b>B.E</b>	Programme Code				<b>103</b>	Regulation			<b>2023</b>					
Department	<b>Electronics and Communication Engineering</b>					Semester			<b>I</b>						
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P		C	CA	ESE	Total						
<b>U23MCFY2</b>	<b>Indian Constitution</b>	2	0	0	0	100	NA	100							
<b>Course Objective</b>	The main objective of this course is to: i) To know about the basic structure of Indian constitution. ii) To know about our Central government Executive system of India iii) To know about our State government Executive system of India iv) To learn the Election system, Amendments and Emergency Provisions given by the constitution. v) To know about the Special Constitutional Provisions in India														
<b>Outcome Course</b>	At the end of the course, the student should be able to,								Knowledge level						
	• Understand the functions of the Indian government								K1						
	• Know about our Central Government, political structure & codes, procedures								K1						
	• Understand our State Executive & Elections system of India.								K1						
	• Remember the Election system, Amendments and Emergency Provisions given by the constitution.								K2						
• Understand our Special Constitutional Provisions in India								K2							
<b>Pre-requisites</b>	---														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak													<b>CO/PSO Mapping</b>		
Programme Outcomes (POs)													PSOs		
<b>COs</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PS O1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>						3		3	2						
<b>CO 2</b>						3		3	3						
<b>CO 3</b>						3		3	2						
<b>CO 4</b>						3		3	3						
<b>CO 5</b>						3		3	3						
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III 2. Assignment															
<b>Indirect</b>															
Course - end survey															


  
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<b>Content of the syllabus</b>			
<b>Unit - I</b>	<b>INTRODUCTION</b>	Periods	<b>6</b>
Historical Background – Constituent Assembly of India – Fundamental Rights – Citizenship – Constitutional Remedies for citizens			
<b>Unit - II</b>	<b>STRUCTURE AND FUNCTION OF CENTRAL</b>	Periods	<b>6</b>
Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India			
<b>Unit - III</b>	<b>STRUCTURE AND FUNCTION OF STATE</b>	Periods	<b>6</b>
State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts			
<b>Unit - IV</b>	<b>ELECTION PROVISIONS, EMERGENCY PROVISIONS, AMENDMENT OF THE CONSTITUTION</b>	Periods	<b>6</b>
Election Commission of India-composition, powers and functions and electoral process. Types of emergency-grounds, procedure, duration and effects. Amendment of the constitution- meaning, procedure and limitations.			
<b>Unit - V</b>	<b>SPECIAL CONSTITUTIONAL PROVISIONS</b>	Periods	<b>6</b>
Directive Principles of State Policy: Importance and its relevance. Special Constitutional Provisions for Schedule Castes, Schedule Tribes & Other Backward Classes, Women & Children.			
<b>Total Periods</b>			<b>30</b>
<b>Text Books</b>			
1.	Durga Das Basu, "Introduction to the Constitution of India", Prentice Hall of India, New Delhi.		
<b>References</b>			
1.	R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi		
2.	Indian polity, M.Laksmikanth, Tata Mcgrawhill publications		
<b>E-Resources</b>			
1.	<a href="https://mhrd.gov.in/">https://mhrd.gov.in/</a>		
2.	<a href="https://niti.gov.in/content/niti-aayog-library">https://niti.gov.in/content/niti-aayog-library</a>		
3.	<a href="http://www.drishitias.com/">www.drishitias.com/</a>		

  
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Programme	<b>B.E</b>	Programme Code			<b>103</b>	Regulation	<b>2023</b>								
Department	<b>Electronics and Communication Engineering</b>				Semester			<b>II</b>							
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P		C	CA	ESE	Total						
<b>U23MA202</b>	<b>Complex Analysis and Ordinary Differential Equations</b>	3	1	0	4	40	60	100							
<b>Course Objective</b>	The Main Objective of the course is to <ul style="list-style-type: none"> <li>Understand the Analytic functions and Bilinear transformations.</li> <li>Proficiently understand the Complex Integration.</li> <li>Demonstrate Vector Differentiation and Integration..</li> <li>To know about the Ordinary Differential Equations.</li> <li>Identify the Laplace Transform of Derivatives and Integrals.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,						Knowledge level								
	<b>CO1:</b> Analyze the construction of analytic functions.						K3, K4								
	<b>CO2:</b> Apply the concepts of cauchy's integral theorem and residue theorem in evaluation of complex integrals.						K2, K3								
	<b>CO3:</b> Apply Green's, Stoke's and Gauss Divergence theorems.						K1, K5								
	<b>CO4:</b> Understand the concepts of solving second order differential equations.						K2, K5								
<b>Pre-requisites</b>	-														
<b>CO / PO Mapping</b>											<b>CO/PSO Mapping</b>				
(3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak															
<b>COs</b>	Programme Outcomes (POs)												PSOs		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	3		2	1	1								2		
<b>CO 2</b>	3	2	1	1									2		
<b>CO 3</b>	3	2		1									2		
<b>CO 4</b>	3	2		1	1								2		
<b>CO 5</b>	3	2	1	1									2		
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III 2. Assignment. 3. End-Semester examinations															
<b>Indirect</b>															
1. Course - end survey															

  
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<b>Content of the syllabus</b>			
<b>Unit – I</b>	<b>ANALYTIC FUNCTIONS</b>	Periods	<b>12</b>
Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions $c+z$ , $cz$ , $1/z$ and Bilinear transformation.			
<b>Unit – II</b>	<b>COMPLEX INTEGRATION</b>	Periods	<b>12</b>
Problem solving using Cauchy's integral theorem and integral formula- Taylor's and Laurent's expansions- Residues- Cauchy's residue theorem- Application: Contour integration over unit circle.			
<b>Unit – III</b>	<b>VECTOR DIFFERENTIATION &amp; INTEGRATION</b>	Periods	<b>12</b>
Vector Differentiation: Vector and Scalar Functions- Derivatives- Curves, Gradient of a Scalar Field-Directional Derivative -Divergence of a Vector Field - Curl of a Vector Field – Line, Surface and Volume integrals (concepts only), Green's theorem in a plane(excluding proof), Gauss Divergence theorem(excluding proof), Stoke's theorem (Excluding proof).			
<b>Unit – IV</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS</b>	Periods	<b>12</b>
Second order Linear ordinary differential equations with constant coefficients, Cauchy's - Euler equations (excluding proof)- Legendre's Linear differential equations(excluding proof) - Method of variation of parameters.			
<b>Unit – V</b>	<b>LAPLACE TRANSFORMS</b>	Periods	<b>12</b>
Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems(excluding proof) -Transforms of derivatives and integrals – Initial and final value theorems(excluding proof) – Inverse transforms – Convolution theorem(excluding proof) – Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.			
<b>Total Periods</b>			<b>60</b>
<b>Text Books</b>			
1.	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.		
2.	Ravish R Sing , Mukul Bhatt, "Engineering Mathematics", Mc Graw Hill Education Pvt. Ltd-2018		
3.	Sivaramakrishna Das. P, Vijayakumari.C, " Engineering Mathematics – II", Pearson India Education Pvt. Ltd-2022.		
<b>References</b>			
1.	Wylie, R.C. and Barrett, L.C., "Advanced Engineering Mathematics" , Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.		
2.	Kreyszig, E., Advanced Engineering Mathematics (10th Edition), John Wiley (2015).		
3.	Alan Jefferis , Advanced Engineering Mathematics, Academic Press- New Delhi-2003		
4.	Yunus A.Cengel, William J.Palm III," Differential equations for Engineers & Scientists", Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.		
5.	John Bird, Higher Engineering Mathematics, Anuradha Agencies(2004)		
<b>E-Resources</b>			
1.	<a href="https://en.wikipedia.org/wiki/Ordinary_differential_equation">https://en.wikipedia.org/wiki/Ordinary_differential_equation</a>		
2.	<a href="http://www.learnerstv.com/Free-engineering-Video-lectures">www.learnerstv.com/Free-engineering-Video-lectures</a>		
3.	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>		


  
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		L	T	P		C	CA	ESE	Total																																																																																																																																																
<b>U23PH201</b>	<b>ENGINEERING PHYSICS</b>	3	0	0	3	40	60	100																																																																																																																																																	
<b>Course Objective</b>	<p>The student should be made to,</p> <ul style="list-style-type: none"> <li>understand the basic concepts of properties of matter</li> <li>gain knowledge about the conduction properties of metals</li> <li>Identify the different types of crystal structures and crystal growth techniques. Study the production and applications of ultrasonics.</li> <li>Correlate better understanding the carrier concentration and its variations with temperature in a semiconductor. Study the properties of modern engineering materials and its uses</li> <li>categorize the types of laser and fiber optics</li> </ul>																																																																																																																																																								
<b>Course Outcome</b>	At the end of the course, the student will be able to							Knowledge Level																																																																																																																																																	
	<ul style="list-style-type: none"> <li>understand the elastic properties of the materials</li> </ul>							K2																																																																																																																																																	
	<ul style="list-style-type: none"> <li>gain knowledge about the conduction properties of metals</li> </ul>							K3																																																																																																																																																	
	<ul style="list-style-type: none"> <li>determine packing factor for various unit cells and understand different types of crystal imperfections and learn the engineering, medical applications.</li> </ul>							K1																																																																																																																																																	
	<ul style="list-style-type: none"> <li>discuss the basic idea of semiconducting materials and realize the function of modern engineering materials</li> </ul>							K1																																																																																																																																																	
<b>Pre-requisites</b>	---																																																																																																																																																								
<table border="1"> <thead> <tr> <th colspan="12">CO / PO Mapping</th> <th colspan="3">CO/PSO Mapping</th> </tr> <tr> <th colspan="15">(3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak</th> </tr> <tr> <th rowspan="2">COs</th> <th colspan="12">Programme Outcomes (POs)</th> <th colspan="3">PSOs</th> </tr> <tr> <th>PO 1</th> <th>PO 2</th> <th>PO 3</th> <th>PO 4</th> <th>PO 5</th> <th>PO 6</th> <th>PO 7</th> <th>PO 8</th> <th>PO 9</th> <th>PO 10</th> <th>PO 11</th> <th>PO 12</th> <th>PS O1</th> <th>PSO 2</th> <th>PSO 3</th> </tr> </thead> <tbody> <tr> <td>CO 1</td> <td>3</td> <td>2</td> <td>3</td> <td>1</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>CO 2</td> <td>3</td> <td>2</td> <td>3</td> <td>3</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CO 3</td> <td>3</td> <td>3</td> <td></td> <td>3</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>CO 4</td> <td>3</td> <td></td> <td>2</td> <td>1</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>2</td> <td></td> </tr> <tr> <td>CO 5</td> <td>3</td> <td></td> <td></td> <td>1</td> <td>2</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td></td> </tr> </tbody> </table>													CO / PO Mapping												CO/PSO Mapping			(3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak															COs	Programme Outcomes (POs)												PSOs			PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2	PSO 3	CO 1	3	2	3	1	2									2		CO 2	3	2	3	3	1											CO 3	3	3		3	1									2		CO 4	3		2	1	1								3	2		CO 5	3			1	2	2								2	
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2. Assignments and Mind map			
3. End-Semester examinations			
<b>Indirect</b>			
Course - end survey			
<b>Content of the syllabus</b>			
<b>Unit - I</b>	<b>PROPERTIES OF MATTER</b>	Periods	<b>9</b>
<b>Elasticity:</b> Types of moduli of elasticity - Stress - Strain Diagram – uses. Young’s modulus: Uniform bending (qualitative) Experimental determination by non-uniform bending - Twisting couple on a wire – Application: Torsional pendulum.			
<b>Viscosity:</b> Co-efficient of viscosity . - Poiseuilles' formula - Experimental determination – uses.			
<b>Unit - II</b>	<b>ELECTRICAL PROPERTIES OF METALS</b>	Periods	<b>9</b>
<b>Classical theory:</b> Classical free electron theory of metals- Expressions for electrical conductivity and Thermal Conductivity of metals – Wiedemann-Franz law (Qualitative) - Success and failures.			
<b>Quantum theory:</b> de Broglie’s hypothesis - Schrodinger’s time independent and time dependent wave equations (Qualitative) - Particle in a one-dimensional box - Fermi – Dirac Statistics - Density of energy states (Qualitative).			
<b>Unit - III</b>	<b>CRYSTAL PHYSICS AND ULTRASONICS</b>	Periods	<b>9</b>
Crystallography - Unit cell - Crystal systems - Bravais lattices- Lattice planes - Miller indices - Inter-planar spacing in cubic lattice- Calculation of number of atoms per unit cell- Atomic radius – Coordination number- Packing Factor for HCP structures.			
<b>Ultrasonics:</b> Introduction - Properties and Generation of Ultrasonics – Magnetostriction and Piezoelectric Oscillator methods – Applications: Sound Navigation and Ranging (SONAR), Non – Destructive Testing (NDT) and Sonogram.			
<b>Unit - IV</b>	<b>SEMICONDUCTING &amp; MODERN ENGINEERING MATERIALS</b>	Periods	<b>9</b>
<b>Semiconductors:</b> Elemental and Compound semiconductors - Intrinsic semiconductor: (Qualitative only) – Carrier concentration – Fermi level – Electrical conductivity - Band gap determination. Extrinsic semiconductors: Carrier concentration in n – type and p – type semiconductor (Qualitative) – Variation of Fermi level with temperature. Application; Construction and working of LED.			
<b>Metallic glasses:</b> preparation, properties and applications - Shape memory alloys (SMA): Characteristics and applications of NiTi alloy.			
<b>Unit - V</b>	<b>LASER AND FIBER OPTICS</b>	Periods	<b>9</b>
<b>Laser:</b> Interactions of Radiations with matters - Characteristics of laser – Derivation of Einstein’s A and B coefficients. Types: CO2 laser - Semiconductor laser: Homo junction - Applications.			
<b>Optical fiber:</b> Principle of propagation of light through optical fiber - Numerical aperture and acceptance angle (Qualitative) -Types of optical fibers -Fiber optical communication system (block diagram) - Application: Temperature sensor.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	R.K. Gaur and Gupta. S.L, Engineering Physics, Dhanpat Rai Publishers, 2017.		
2.	S.O Pillai., Solid state physics, New Age International Private Limited.		

  
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3.	Dr.P.Mani, "Engineering Physics", Shri Dhanam publisher, Chennai – 600 042
<b>References</b>	
1.	B.K. Pandey, S. Chaturvedi. "Engineering Physics", 1 <sup>st</sup> Edition, Cengage Learning India Pvt Ltd, (2012).
2.	Fundamentals Of Physics Extended 8/Ed 8th Edition, David Halliday, Robert ResnickJearl Walker, Wiley India Pvt Ltd, 2008.
3.	Lawrence H.Vanvlack, "Elements of materials Science Engineering, 6 <sup>th</sup> Edition, Pearson Publication.
4.	S.O.Pillai, "Solid State Physics", New Age International Publishers
5.	Dr.V.Rajendran, "Engineering Physics", Tata McGraw Hill Education Private Limited, New Delhi
<b>E-Resources</b>	
1.	<a href="http://www.e-booksdirectory.com">www.e-booksdirectory.com</a>
2.	<a href="http://Home.iitk.ac.in">Home.iitk.ac.in</a>
3.	<a href="http://physics.cu.ac.bd/">physics.cu.ac.bd/</a>

  
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Programme	<b>B.E.</b>	Programme Code	<b>103</b>	Regulation	2023										
Department	<b>Electronics and Communication Engineering</b>		Semester		<b>II</b>										
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23EC201</b>	<b>Semiconductor Devices for Modern Electronics</b>	3	0	0	3	40	60	100							
<b>Course Objectives</b>	<p>The main objective of the course is to</p> <ul style="list-style-type: none"> <li>• Know about the basics of semiconductors and PN junction devices</li> <li>• Familiarize the transistors BJT and FET.</li> <li>• Learn about MOSFET Devices in detail.</li> <li>• Familiarization of opto and power electronic devices.</li> <li>• Gain knowledge on high frequency semiconductor devices.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,						Knowledge Level								
	CO1: Understand the theory of Semiconductors and various diodes						K3								
	CO2: know the operation of Bipolar Junction Transistor and FET						K3								
	CO3: Demonstrate the operation of JFET and MOSFET and their characteristics.						K3								
	CO4: Extend the Optoelectronic and power electronic Devices						K2								
CO5: understand the HF Semiconductor devices.						K2									
<b>Pre-requisites</b>	Basic Electrical and Electronics Engineering														
<b>CO / PO Mapping</b>												<b>CO/PSO Mapping</b>			
(3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak															
<b>COs</b>	<b>Programme Outcomes (POs)</b>												<b>PSOs</b>		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	3	3	2	2								1	3		1
<b>CO 2</b>	3	3	2	2								1	3		1
<b>CO 3</b>	3	3	2	2								1	3		1
<b>CO 4</b>	3	2	2	2	1							1	3		1
<b>CO 5</b>	3	2	2	2	1		1					1	3		1
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignment															
3. End-Semester examinations															
<b>Indirect</b>															
1. Course-end Survey															

  
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<b>Content of the syllabus</b>			
<b>Unit – I</b>	<b>Semiconductor Device physics and pn junction Devices</b>	Periods	<b>9</b>
Semiconductor Materials- Charge Carriers in Semiconductors- Carrier Concentrations- Conductivity and Mobility- The Hall Effect, p-n Junctions- Forward- and Reverse-Biased Junctions- Reverse-Bias Breakdown. The p-n Junction Diode- The Zener diode- Applications.			
<b>Unit – II</b>	<b>Bipolar Junction Transistors and Field-Effect Transistors</b>	Periods	<b>9</b>
Fundamentals of BJT Operation- Amplification with BJTs- Generalized Biasing-VI characteristics of CE, CB and CC configurations- Switching- Frequency Limitations of Transistors. Field-Effect Transistors- Transistor Operation- The Load Line- Amplification and Switching- The Junction FET- Pinch-off and Saturation- Gate Control- Current-Voltage Characteristics.			
<b>Unit – III</b>	<b>Metal-Oxide Semiconductor Field-Effect Transistors (MOSFET)</b>	Periods	<b>9</b>
The Basic MOSFET Operation - MOSFET Structures – Concepts of Current-Voltage Relationships: Output Characteristics- Transfer Characteristics- Mobility Models- Short Channel MOSFET. Introduction to CMOS technology.			
<b>Unit – IV</b>	<b>Optoelectronic and power electronic Devices</b>	Periods	<b>9</b>
Photodiodes- Phototransistors- Solar Cells – Photo detectors- Light-Emitting Diodes- Lasers- UJT –Types and applications. Various types of Thyristor devices and its applications ( <b>Qualitative Treatment only</b> ).			
<b>Unit – V</b>	<b>HF Semiconductor devices</b>	Periods	<b>9</b>
Tunnel Diodes. Pin diode-Crystal diode-Schotky barrier diode-Varactor diode, IMPATT Diode- Gunn Diode- p-n-p-n Diode. ( <b>Qualitative Treatment only</b> ).			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	Jacob Millman and Christos C Halkias, Electronic Devices and Circuits, 4th edition, McGraw Hill Education, 2015.		
2.	BenG Streetman and Sanjay Banerjee , “Solid State Electronic Devices, 7th edition Pearson Prentice Hall, 2015		
3.	Donald A. Neamen, -Semiconductor Physics and Devices ,Tata McGraw Hill, Third Edition,2012		
<b>References</b>			
1.	S. M. Sze, -Semiconductor Devices: Physics and Technology, Wiley, Second Edition,2008		
2.	Adel S. Sedra, Kenneth C. Smith and Arun N. Chandorkar, "Microelectronic Circuits", 7th Edition, Oxford University Press, New York, 2017.		
3.	Yang, – Fundamental of Semiconductor devices, Tata McGraw Hill, International Edition,2007		
<b>E-Resources</b>			
1.	<a href="https://www.electronics-tutorials.ws/diode/diode_2.html">https://www.electronics-tutorials.ws/diode/diode_2.html</a>		
2.	<a href="https://nptel.ac.in/courses/117102061/">https://nptel.ac.in/courses/117102061/</a>		
3.	<a href="https://www.sciencedirect.com/topics/physics-and-astronomy/optical-device">https://www.sciencedirect.com/topics/physics-and-astronomy/optical-device</a>		

  
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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>			
Department	<b>Electronics and Communication Engineering</b>		Semester		<b>II</b>			
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
<b>U23TN202</b>	<b>தமிழரும் தொழில்நுட்பமும் / Tamils and Technology*</b>	1	0	0	1	40	60	100
<b>Content of the syllabus</b>								
அலகு 1	<b>நெசவு மற்றும் பாணைத்தொழில்நுட்பம்</b>				<b>Periods</b>	<b>3</b>		
சங்ககாலத்தில் நெசவுத்தொழில் - பாணைத்தொழில்நுட்பம் - கருப்புசிவப்புபாண்டங்கள் - பாண்டங்களில் கீறல்குறியீடுகள்.								
அலகு 2	<b>வடிவமைப்பு மற்றும் கட்டிடத்தொழில்நுட்பம்</b>				<b>Periods</b>	<b>3</b>		
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்ககாலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு- சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்-மாமல்லபுரச்சிற்பங்களும், கோவில்களும் - சோழர்காலத்துப்பெருங்கோயில்கள் மற்றும் பிறவழி பாட்டுத்தலங்கள் -நாயக்கர் காலக்கோயில்கள்-மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால்-செட்டிநாட்டு வீடுகள்- பிரிட்டிஷ்காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக்கட்டிடக்கலை.								
அலகு 3	<b>உற்பத்தித்தொழில்நுட்பம்</b>				<b>Periods</b>	<b>3</b>		
கப்பல் கட்டும்கலை - உலோகவியல் - இரும்புத்தொழிற்சாலை - இரும்பை உருக்குதல் ,எஃகு - வரலாற்றுச்சான்றுகளாக-செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல்சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.								
அலகு 4	<b>வேளாண்மைமற்றும்நீர்ப்பாசனத்தொழில்நுட்பம்</b>				<b>Periods</b>	<b>3</b>		
அணை, ஏரி, குளங்கள் ,மதகு - சோழர்காலக்குழுவித்தாம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச்சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.								
அலகு 5	<b>அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்</b>				<b>Periods</b>	<b>3</b>		
அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மின் பொருட்கள் உருவாக்கம் - தமிழ் இணையக்கல்விக் கழகம் - தமிழ் மின்நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்க்குவைத்திட்டம்.								
<b>Total Periods</b>						<b>15</b>		


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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>			
Department	<b>Electronics and Communication Engineering</b>		Semester		<b>II</b>			
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
<b>U23TA202</b>	TAMILS AND TECHNOLOGY	1	0	0	1	40	60	100
<b>Content of the syllabus</b>								
<b>UNIT I</b>	<b>WEAVING AND CERAMIC TECHNOLOGY</b>				<b>Periods</b>	<b>3</b>		
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) –Graffiti on Potteries								
<b>UNIT II</b>	<b>DESIGN AND CONSTRUCTION TECHNOLOGY</b>				<b>Periods</b>	<b>3</b>		
Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- ThirumalaiNayakarMahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.								
<b>UNIT III</b>	<b>MANUFACTURING TECHNOLOGY</b>				<b>Periods</b>	<b>3</b>		
Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.								
<b>UNIT IV</b>	<b>AGRICULTURE AND IRRIGATION TECHNOLOG</b>				<b>Periods</b>	<b>3</b>		
Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.								
<b>UNIT V</b>	<b>SCIENTIFIC TAMIL &amp; TAMIL COMPUTING</b>				<b>Periods</b>	<b>3</b>		
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.								
<b>Total Periods</b>						<b>15</b>		


  
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**TEXT-CUM-REFERENCE BOOKS**


1	தமிழகவரலாறும் - மக்களும்பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாட நூல்மற்றும் கல்வியியல்பணிகள்கழகம்).
2	கணினித்தமிழ் - முனைவர்இல. சுந்தரம். (விகடன் பிரசுரம்).
3	கீழடி - வைகை நதிக்கரையில் சங்க நகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
4	பொருதை - ஆற்றங்கரை நாகரிகம். (தொல்லியல்வெளியீடு)
5	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.

  
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Programme	<b>B.E.</b>			Programme Code			<b>103</b>		Regulation		<b>2023</b>				
Department	<b>Electronics and Communication Engineering</b>							Semester		<b>II</b>					
Course Code	Course Name				Periods Per Week			Credit		Maximum Marks					
					L	T	P	C	CA	ESE	Total				
<b>U23CS203</b>	<b>Python Programming</b>				3	0	2	4	50	50	100				
<b>Course Objective</b>	The student should be made to,														
	<ul style="list-style-type: none"> <li>• Understand the fundamentals of Python programming</li> <li>• Handle list, tuples, sets and Dictionaries data types</li> <li>• Learn function prototypes and string functions.</li> <li>• Use files and modules for data processing</li> <li>• Understand packages in Python and data visualization</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,										Knowledge Level				
	<b>CO1:</b> Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.										K3				
	<b>CO2:</b> Perform operations on list, tuples, sets and Dictionaries using python.										K3				
	<b>CO3:</b> Implement function prototypes and string functions.										K3				
	<b>CO4:</b> Apply files and modules and perform operations on CSV files.										K3				
<b>CO5:</b> Perform data visualization and apply Python packages for CSV files										K3					
<b>Pre-requisites</b>	Nil														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak												<b>CO/PSO Mapping</b>			
<b>COs</b>		<b>Programme Outcomes (POs)</b>											<b>PSOs</b>		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	3	2	1	-	1	-	-	-	-	-	-	2	3	2	
<b>CO 2</b>	3	3	1	1	2	-	-	-	-	-	-	2	3	2	
<b>CO 3</b>	3	3	1	2	2	-	-	-	-	-	-	2	3	2	
<b>CO 4</b>	3	3	1	2	2	-	-	-	-	-	-	2	3	2	
<b>CO 5</b>	3	3	1	2	2	-	-	-	-	-	-	2	3	2	
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignments / Quiz															
3. End-Semester examinations															
<b>Indirect</b>															
1. Course - End survey															
<b>Content of the syllabus</b>															
<b>Unit – I</b>		<b>INTRODUCTION TO PYTHON</b>										Periods		<b>9</b>	
Introduction to Python, features, installing Python, writing and executing Python program – native data types, comments, constants, variables, operators, expression, conditional															

  
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statements, control statements, continue, pass, break.			
<b>Unit - II</b>	<b>LISTS, TUPLES, SETS AND DICTIONARIES</b>	Periods	<b>9</b>
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Sets: methods and operators, Dictionaries: operations and methods.			
<b>Unit - III</b>	<b>FUNCTIONS AND STRINGS</b>	Periods	<b>9</b>
Functions definition, declaration, arguments, parameters – formal and local, parameter passing methods - function prototypes, recursion; Strings: string slices, immutability, string functions and methods, string module, regular expressions.			
<b>Unit - IV</b>	<b>FILES AND MODULES</b>	Periods	<b>9</b>
Files and exception: Text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, accessing CSV file.			
<b>Unit - V</b>	<b>PACKAGES AND DATA VISUALIZATION</b>	Periods	<b>9</b>
Text processing, Numerical processing: numpy package – mean, median and mode, pandas package – vector, dataframe, data visualization: matplotlib, Time operations.			
<b>Total Period</b>			<b>45</b>
<b>Suggested List of Experiments</b>			
<b>List of Experiments</b>			<b>CO's</b>
1. Write a program to demonstrate different number data types in Python.			CO1
2. Write a program to perform different Arithmetic Operations on numbers in Python.			CO1
3. Write a program to create, append and remove lists and demonstrate the tuples in python.			CO2
4. Write a program to demonstrate working with dictionaries in python.			CO2
5. Write a program to create, concatenate and print a string and accessing sub-string from a given string.			CO3
6. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.			CO3
7. Write a program to compute the number of characters, words and lines in a file.			CO4
8. To write a Python program to find the most frequent words in a text read from a file.			CO4
9. Find mean, median, mode for the given set of numbers in a list.			CO5
10. Draw a horizontal bar chart with Matplotlib			CO5
<b>Lecture:45, Practical:30, Total:75</b>			
<b>Text Books</b>			
1.	Anurag Gupta,G.P BISWAS ,” Python Programming – Problem solving, packages and Libraries, Edition 1, Tata McGraw Hill, 2019		
2.	E Balagurusamy, “Problem Solving and Python Programming”, Edition1, Tata McGraw Hill, 2018		
3.	ReemaThareja, “Python Programming using Problem Solving Approach”, OXFORD University Press, 2017.		
<b>References</b>			
1.	Allen B. Downey, “Think Python: How to Think Like a Computer Scientist“, 2nd edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016.		
2.	John V Guttag, –Introduction to Computation and Programming Using Python“, Revised and expanded Edition, MIT Press , 2021		

  
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3.	Guido van Rossum (Author), The Python Development Team (Author),An Introduction to Python Tutorial and What's New ,2022,Shroff Publishers first edition
<b>E-Resources</b>	
1.	<a href="http://greenteapress.com/wp/think-python/">http://greenteapress.com/wp/think-python/</a>
2.	<a href="https://www.python.org/about/gettingstarted/">https://www.python.org/about/gettingstarted/</a>
3.	<a href="https://beginnersbook.com/2018/03/python-tutorial-learn-programming/">https://beginnersbook.com/2018/03/python-tutorial-learn-programming/</a>
4.	<a href="https://www.tutorialspoint.com/python/index.htm">https://www.tutorialspoint.com/python/index.htm</a>
5.	<a href="https://www.learnpython.org/">https://www.learnpython.org/</a>
6.	<a href="https://www.udemy.com/topic/python/free">https://www.udemy.com/topic/python/free</a>


  
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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>										
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>II</b>										
Course code	Course name	Periods per week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23EN202</b>	<b>Professional Communication</b>	2	0	3	3	50	50	100							
<b>Objective</b>	The main objective of this course is to:														
	<ul style="list-style-type: none"> <li>• Provide suitable reading &amp; writing tasks to develop communicative ability for academic and professional progress</li> <li>• Inculcate channelized reading to make learners proficient in the chosen professional writing contexts.</li> <li>• Improve learners' vocabulary and grammar to supplement their language use at professional contexts</li> <li>• Assist students in the development of intellectual flexibility, creativity, and cultural literacy so that they may engage in life-long learning.</li> </ul> Identify and begin to apply the language features of academic and professional writing and speaking														
<b>Outcomes</b>	The students who complete this course successfully are expected to:						Knowledge Level								
	<b>CO1:</b> Acquire sufficient command over language to speak at an academic or professional context						K1								
	<b>CO2:</b> Write technically well at professional contexts through exposing them to similar readings.						K1								
	<b>CO3:</b> Use language at length at technical and professional situations through enrichment of vocabulary and strengthening of grammatical knowledge.						K2								
	<b>CO4:</b> Ethically gather, understand, evaluate and synthesize information from a variety of written and electronic sources.						K2								
<b>CO5:</b> Be proficient in oral communication and writing.						K3									
<b>Pre-requisites</b>	<b>Nil</b>														
<b>CO / PO Mapping</b>													<b>CO/PSO Mapping</b>		
(3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak															
<b>COs</b>	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2	PSO 3
CO 1					2			3	3		3				2
CO 2					2			3	3		3				2
CO 3					2			3	3		3				2
CO 4					2			3	3		3				2
CO 5					2			3	3		3				2


  
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Course Assessment Methods			
		<b>Direct</b>	
		1.Continuous Assessment Test I & II	
		2.Continuous Assessment Test III in the Communication Skills Lab	
		3.Assignments	
		4.End-Semester examinations	
		<b>Indirect</b>	
		1.Course – end survey	
Content of the syllabus			
<b>Unit - I</b>		Periods	<b>15</b>
<b>Listening-</b> Listening for Cultural Awareness, Listening to Professional Conversations, Talks, Interviews and Lectures <b>Speaking-</b> Developing Confidence to get rid of Fear on the Dias, Discussion at a Corporate Context. <b>Reading-</b> Inferential Reading, Reading Short Messages and Technical Articles, <b>Writing-</b> Introduction to Letter Writing, Writing Formal and Informal Letters, Thanking Letters, Letters Calling for Quotations, Letters Placing an Order, Seeking clarification, Letters of Complaint. <b>Focus on Language-</b> Adjectives and Degrees of Comparisons			
<b>Unit - II</b>		Periods	<b>15</b>
<b>Listening-</b> Listening to specific information relating to technical content, Listening for statistical information <b>Speaking-</b> Expressing opinions, Formal Discussions, Describing Role Play at Business Context and Consolidating Ideas. <b>Reading-</b> Reading Technical Articles in Journals and Comparing Articles. <b>Writing-</b> Letter seeking permission to undergo practical training and to undertake project work. <b>Focus on Language-</b> Simple, compound and complex sentences and Transformation of Sentences.			
<b>Unit - III</b>		Periods	<b>15</b>
<b>Listening-</b> Listening to understand the overall meaning, Listening to Interviews and Presentations. <b>Speaking-</b> Giving Instructions and Showing Directions and Rephrasing Instructions. <b>Reading-</b> Skimming and Scanning, Reading Job Advertisements. <b>Writing-</b> Applying for a Job, Writing a CV. <b>Group Discussion:</b> Introduction – Topic Analysis – Thematic Expressions-Objective and content of discussion.			
<b>Unit - IV</b>		Periods	<b>15</b>
<b>Listening-</b> Listening and retrieving Information. <b>Speaking-</b> Developing fluency and Coherence, Accent Neutralization, Voice Modulation, and Intonation, Improving Voice Quality. <b>Reading-</b> Reading and understanding Advertisements. <b>Writing-</b> Letters to the Editor, Letter of Complaint, Various kinds of Reports, Permission to go for Industrial visits. <b>Presentation skills:</b> Making Self Introduction effectively-Elements of effective presentation – Structure of presentation – Presentation tools – Voice Modulation – Audience analysis - Body language – Accents analysis – Stylistics.			
<b>Unit - V</b>		Periods	<b>15</b>
<b>Listening-</b> Listening to Fragmented Texts and Filling in the Blanks. <b>Speaking-</b> Mind Mapping, Developing Coherence and Self-Expression, Making presentations, Paralinguistic and Extra linguistic Features (body language), <b>Reading-</b> Predicting content, Interpreting Reports. <b>Writing-</b> Writing Proposals, Agenda, Minutes of the Meeting. <b>Soft Skills:</b> Introduction - Change in Today's Workplace: Soft Skills as a Competitive Weapon - Antiquity of Soft Skills - Classification of Soft skills - Ability to work as a team.			
			<b>Total Periods</b>
			<b>75</b>
Text books			
1.	Sumant.S,Pereira Joyce, English for Communication, Vijay Nicole Imprints Pvt.Ltd., 2014.		
2.	Sokkaalingam, S.RM., The Art Of Speaking English Versatile Publishing House,2018.		
Reference books			
1.	Norman Whitby - Business Benchmark Pre-Intermediate to Intermediate, Students Book,		


  
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	Cambridge University Press, 2008. , 1997.
2.	Dutt, Rajeevan, Prakash .A Course in Communication Skills (Anna University, Coimbatore edition) ∴ Cambridge University Press India Pvt.Ltd, 2007.
3.	Meenakshi Raman and Sangeeta Sharma-'Technical Communication English Skills for Engineers'; Oxford University Press, 2008.
4.	S.P. Dhanavel, English and Communication Skills for Students of Science and Engineering, Orient Blackswan Pvt, Ltd, 2009.
5.	Technical English – I & II, Sonaversity, Sona College of Technology, Salem, First Edition, 2012.
<b>E-Resources</b>	
1.	<a href="http://www.kalevleetaru.com/Publish/Book_Review_Who_Moved_My_Cheese.pdf">http://www.kalevleetaru.com/Publish/Book_Review_Who_Moved_My_Cheese.pdf</a>
2.	<a href="http://www.bookbrowse.com/reviews/index.cfm/book_number/304/who-moved-my-cheese">http://www.bookbrowse.com/reviews/index.cfm/book_number/304/who-moved-my-cheese</a>
3.	<a href="http://www.imdb.com/title/tt0482629/plotsummary">http://www.imdb.com/title/tt0482629/plotsummary</a>



  
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Programme	<b>B.E.</b>	Programme Code				<b>103</b>	Regulation		<b>2023</b>						
Department	<b>Electronics and Communication Engineering</b>					Semester			<b>II</b>						
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P		C	CA	ESE	Total						
<b>U23PH202</b>	<b>PHYSICS LABORATORY</b>	0	0	2	1	60	40	100							
<b>Course Objective</b>	<ul style="list-style-type: none"> <li>➤ Understand elastic behavior of Materials</li> <li>➤ Predict viscous force in liquids.</li> <li>➤ Gain knowledge in measuring the lowest thickness materials</li> <li>➤ To Identify wavelengths of prominent lines using polychromatic lamp</li> <li>➤ Observe heat conduction in bad conductor</li> <li>➤ Understand the principle of interferometer</li> <li>➤ To learn about the characteristics of Lasers</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student will be able to											Knowledge Level			
	<b>CO1:</b> Measure the young's modulus of the materials, Rigidity modulus – Torsion pendulum											K3			
	<b>CO2:</b> Calculate Coefficient of viscosity of liquid and thickness of thin wire using Air wedge											K3			
	<b>CO3:</b> Observe and measure the different wavelengths of mercury Spectrum and dispersive power of a prism											K3			
	<b>CO4:</b> Illustrate the conductivity of bad conductors. To know how to determine the velocity of ultrasonic waves in liquid											K3			
	<b>CO5:</b> To understand the importance of laser beam compared to ordinary light											K2			
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak													<b>CO/PSO Mapping</b>		
<b>COs</b>	<b>Programme Outcomes (POs)</b>												<b>PSOs</b>		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PS O1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	3	1											2		
<b>CO 2</b>	3	3	1	2	2								2		
<b>CO 3</b>	3	2			2								3		
<b>CO 4</b>	3	3		1									1		
<b>CO 5</b>	3	1	1		1								2		
<b>Course Assessment Methods</b>															
<b>Direct</b>															

  
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1. Prelab and post lab test 2. Execution of experiment and Viva-Voce 3. End-Semester examinations		
<b>Indirect</b>		
Course - end survey		
<b>Content of the syllabus</b>		
PHYSICS		
<b>S.No.</b>	<b>Experiments</b>	<b>CO</b>
1.	Determination of Young's modulus of the material - Uniform bending	CO1
2.	Determination of Young's modulus of the material - Non uniform bending	CO1
3.	Determination of Rigidity modulus – Torsion pendulum	CO1
4.	Determination of Coefficient of viscosity of a liquid – Poiseuille's method	CO2
5.	Determination of thickness of a thin material – Air wedge method	CO2
6.	Determination of wavelength of mercury spectrum – spectrometer grating	CO3
7.	Determination of Dispersive power of a prism – Spectrometer	CO3
8.	Determination of thermal conductivity of metallic glass using Lee's Disc Method	CO4
9.	Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer	CO4
10.	Determination of Wavelength and particle size using Laser	CO5
<b>Total Periods</b>		<b>30</b>
<b>Lab Manual</b>		
1.	R. Jayaraman, Engineering Physics Laboratory Manual, Pearson Pub, Edition-2021.	
2.	A.K. Katiyar & C.K. Pandey Engineering Physics: Theory and Practical, Wiley Pub, 2nd Edition.	

  
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Programme	<b>B.E</b>	Programme Code			<b>103</b>	Regulation			<b>2023</b>						
Department	<b>Electronics and Communication Engineering</b>					Semester			<b>II</b>						
Course Code	Course Name	Periods Per Week			Credit			Maximum Marks							
		L	T	P	C	CA	ESE	Total							
<b>U23GE204</b>	<b>Engineering Practices Laboratory</b>	0	0	3	1	60	40	100							
<b>Course Objective</b>	The students should made to 1. Know the plumbing line assemblies. 2. Weld lap joint, butt joint and T-joint. 3. Learn the assembling and dismantling methodology of home appliances. 4. Learn the resistor value identification through colors coated on resistor. 5. Learn the basics of signal generation in CRO. 6. Learn the soldering techniques in PCB board for designing the projects.														
<b>Course Outcomes</b>	At the end of the course, the student should be able to,										Knowledge Level				
	<b>CO1:</b> Perform basic machining operations and finish the job to the requirements and quantify the accuracy.										K2				
	<b>CO2:</b> Make various joints such as cross lap joint and Tee lap joint in the carpentry.										K2				
	<b>CO3:</b> Understand the basics of house wiring techniques and the measurements of basic electrical quantities.										K2				
	<b>CO4:</b> Understand the resistor value identification through colors coated on resistor.										K2				
<b>CO5:</b> Understand the soldering techniques in PCB board for designing the projects.										K2					
<b>Pre - requisites</b>	Nil														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak													<b>CO/PSO Mapping</b>		
<b>COs</b>	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
<b>CO 1</b>	3	2	3	2	2	-	-	-	2	-	-	-	2	2	-
<b>CO 2</b>	3	2	3	2	2	-	-	-	2	-	-	-	3	2	-
<b>CO 3</b>	3	2	2	3	2	2	-	-	2	-	-	-	2	-	-
<b>CO 4</b>	3	2	2	3	2	2	-	-	2	-	-	-	2	-	-
<b>CO 5</b>	3	2	3	3	2	2	-	-	2	-	-	-	3	3	-
<b>Course Assessment Method</b>															
<b>Direct</b>															
1.Pre lab and Post lab test 2. Record mark 3.End- Semester Examinations															
<b>Indirect</b>															
1.Course -End survey															
<b>Content of the Syllabus</b>															

  
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<b>GROUP A (CIVIL &amp; MECHANICAL ENGINEERING)</b>	
<b>(CIVIL ENGINEERING PRACTICE)</b>	
<b>1.Plumbing :</b> a) Single Tap G.I / PVC pipe connection involving the fitting like valves, taps & bends. b) Two Tap G.I / PVC pipe connection involving the fitting like valves, taps & bends.	CO2
<b>2.Carpentry:</b> a) To make a Cross Lap Joint from the given work piece. b) Preparation of ' T' Lap Joint from the given work piece.	CO2
<b>MECHANICAL ENGINEERING PRACTICE</b>	
<b>3.Welding:</b> a) To join the metal plates by a Butt Joint in arc welding machine. b) To join the metal plates by a Lap Joint in arc welding machine.	CO1
<b>4.Basic Machining:</b> a) To perform simple facing & turning operation. b) To perform of step turning operation.	CO1
<b>5.Sheet Metal Work:</b> a) To make a rectangular tray from the given sheet metal. b) To make a basket from the given sheet metal.	CO1
<b>6.Special Laboratory</b> a) Study of 3D Printing machine and its applications. b) Study of CO <sub>2</sub> Laser engraving & cutting machine and its applications. c) Study of Wood routing machine and its applications.	CO1
<b>GROUP B (ELECTRICAL &amp; ELECTRONICS ENGINEERING)</b>	
<b>ELECTRICAL ENGINEERING PRACTICE</b>	
1. Residential house wiring and stair case wiring using switches, fuse, indicator & lamp.	CO3
2. LED lamp assembly.	CO3
3. Measurement of voltage, current, power & power factor using R-Load.	CO3
4. Measurement of energy using single phase meter.	CO3
5. Measurement of resistance to earth of electrical equipment.	CO3
6. Measurement of illumination in different lamps.	CO3
7. Study of batteries.	CO3
<b>ELECTRONICS ENGINEERING PRACTICE</b>	
1. Study of Electronic components and equipments –Resistor, color coding, Inductor, Capacitor and CRO	CO4
2. Logic gates AND, OR, NOR, NAND and NOT.	CO4
3. Generation of Clock Signal.	CO4
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB	CO5
<b>Total Period:45</b>	
<b>Reference Books:</b>	
<b>R1</b>	Dr.P.Kannan, Mr.T.Satheeskumar & Mr.K.Rajasekar, "Engineering Practices Laboratory" Manual. First Edition, 2017.
<b>R2</b>	Mr.T.Jeyapooan, Mr.M.Saravana Pandian, "Engineering Practices Lab" Manual, Vikas Publishing House Pvt Ltd, 2017.


  
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Programme	<b>B.E</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>										
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>II</b>										
Course code	Course name	Periods per week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23MCFY1</b>	<b>Environmental Science and Engineering</b>	2	0	0	0	100	0	100							
Objective	<p>The main objective of this course is to:</p> <ul style="list-style-type: none"> <li>• Familiarize basics of ecosystem and creating environmental awareness.</li> <li>• Congregate about environmental pollution.</li> <li>• Contrast on solid waste and social issues.</li> <li>• Acquire knowledge in environmental legislation and protection. Summarize population growth, human rights and Environment.</li> </ul>														
Outcomes	The students who complete this course successfully are expected to:						Knowledge Level								
	<b>CO1:</b> Acquire knowledge about Eco-system, Natural resources and Bio- diversity.						K1								
	<b>CO2:</b> Be aware of Environmental Pollution and its control.						K3								
	<b>CO3:</b> Infer and express Solid waste management and Social issues.						K3								
	<b>CO4:</b> Acquire Knowledge about Environmental legislation and protection.						K3								
	<b>CO5:</b> Awareness about population growth, human rights and Environment						K2								
Pre-requisites	<b>Nil</b>														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak													<b>CO/PSO Mapping</b>		
<b>COs</b>		<b>Programme Outcomes (POs)</b>											<b>PSOs</b>		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	1	2	2			2	3					2	2		
<b>CO 2</b>	3	2	2		1	2	3				1	3	3		2
<b>CO 3</b>	3	2	2		1	3	3				1	2	3		2
<b>CO 4</b>	1	1	1			2	3				1	2	2		1
<b>CO 5</b>	1	2	1			2	2				1	3	1		1
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1.Continuous Assessment Test I, II & III															
2.Assignment															
<b>Indirect</b>															
1. Course - end survey															
<b>Content of the syllabus</b>															
Unit - I	<b>INTRODUCTION TO ENVIRONMENTAL SCIENCE AND</b>												Periods	6	

  
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<b>ENGINEERING</b>			
Nature and scope of environmental education- Natural Resources – (Forest, Water, Food,& Land Resources) problems and remedial measures, Ecosystem and Biodiversity- Ecosystem-Structure, Characteristics and functions of ecosystem - Biodiversity – Definition – Conservation of Biodiversity (in-situ and Ex-situ)-Values and Threats of Biodiversity Environmental awareness and sustainable development.			
Unit - II	<b>ENVIRONMENTAL POLLUTION AND ITS CONTROL</b>	Periods	6
Water pollution-causes, effects and control measures of water pollution- Waste water treatment process (Secondary-BOD,COD) - Air Pollution – Types of Air pollutants-CO <sub>2</sub> , SO <sub>2</sub> , NO <sub>2</sub> , PAN-Sources- control measures (Electro static precipitator, Bag house filter, Wet Scrubber and cyclone separator).			
Unit - III	<b>SOCIAL ISSUES AND SUSTAINABILITY</b>	Periods	6
Solid waste Management-Types (E-Waste, Hazardous waste, Bio-waste)-Disposal method. Sustainability-Definition-Sustainable development Goals-Environmental issues-global warming and Ozone depletion, Climate change, Acid rain, Carbon foot print-Possible solutions to Environmental issues			
Unit - IV	<b>SUSTAINABILITY PRACTICES AND ENVIRONMENTAL LEGISLATION</b>	Periods	6
Zero waste and R-Concept-Circular economy, Material life cycle assessment-EIA, Energy efficiency and management-Environmental Legislation-Air act, Water Act-Wildlife protection act-Environmental protection act.			
Unit - V	<b>HUMAN POPULATION AND THE ENVIRONMENT</b>	Periods	6
Population growth, Human rights, Value education, environment and Human health, Family welfare Program, Women and Child welfare, Role of information technology in environment – Satellite, Data base, Geographical Information System (GIA), Environmental impact Analysis (EIA) and Human health			
			Total Periods
			30
<b>Text books</b>			
1.	Dr.S. Vairam - “Environment Science and Engineering” Gems publication. Edition 2018		
2.	Dr.S.Mageswari, Dr.G.Vijayakumar, Ms.A.Preethi, Environmental Science and Engineering, RK Publications, Revised Edition 2022.		
<b>Reference books</b>			
1.	Linda Williams- “Environmental Science”-Tata McGRAW – Hill Edition. Edition-I-2008		
2.	T.G.Miller Jr-“Environmental Science”-Wadsworth publishing Co. Edition -10-2004		
3.	William P. Cunningham, Barbara Woodworth Saigo- Tata McGraw Hill.Edition-4-2011		
4.	NPTEL Course Notes		
5.	Cunnigham and cooper-“Environmental Science”-Jaico Publ, House Edition-4-2007		
<b>E-Resourses</b>			
1	<a href="https://libraries.ou.edu/">https://libraries.ou.edu/</a>		
2	<a href="https://libguides.reading.ac.uk/">https://libguides.reading.ac.uk/</a>		
3	<a href="https://www.loc.gov/">https://www.loc.gov/</a> , <a href="https://rdl.lib.uconn.edu/">https://rdl.lib.uconn.edu/</a>		


  
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Programme	<b>B.E</b>	Programme Code			<b>103</b>	Regulation		<b>2023</b>							
Department	<b>ELECTRONICS AND COMMUNICATION ENGINEERING</b>				Semester		<b>III</b>								
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P		C	CA	ESE	Total						
<b>U23MA303</b>	<b>Transforms and Partial Differential Equations</b>	3	1	0	4	40	60	100							
<b>Course Objective</b>	The Main Objective of the course is														
	<ul style="list-style-type: none"> <li>To solve boundary value problems by using Fourier series.</li> <li>To introduce the basic concepts of PDE for solving standard partial differential equations.</li> <li>To acquaint the student with Fourier series techniques in solving heat flow problems used in various situations.</li> <li>To acquaint the student with Fourier transform techniques used in wide variety of situations.</li> <li>To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,						Knowledge level								
	<b>CO1:</b> Understand the concepts of Fourier series which plays a vital role in engineering applications.						K4								
	<b>CO2:</b> Understand how to solve the given standard partial differential equations.						K4								
	<b>CO3:</b> Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.						K5								
	<b>CO4:</b> Understand the mathematical principles on transforms which will provide them the ability to formulate and solve some of the physical problems of engineering.						K5								
<b>CO5:</b> Use Z transform techniques for analyzing discrete time systems.						K3									
<b>Pre-requisites</b>	-														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak															
<b>COs</b>	<b>Programme Outcomes (POs)</b>												<b>CO/PSO Mapping</b>		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2		1	1								2		
CO 2	3	2	1	1									2		
CO 3	3	2	1		1								2		
CO 4	3	2	1	1									2		
CO 5	3	2	1	1	1								2		
<b>Course Assessment Methods</b>															
<b>Direct</b>															
4. Continuous Assessment Test I, II & III															
5. Assignment															


  
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6. End-Semester examinations			
<b>Indirect</b>			
2. Course - end survey			
<b>Content of the syllabus</b>			
<b>Unit – I</b>	<b>FOURIER SERIES</b>	Periods	<b>9+3</b>
Dirichlet's conditions – General Fourier series – Change of interval – Odd and even functions – Half range Sine series – Half range Cosine series – Harmonic analysis.			
<b>Unit - II</b>	<b>PARTIAL DIFFERENTIAL EQUATIONS</b>	Periods	<b>9+3</b>
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of Standard types of first order partial differential equations -Lagrange's linear equation – Solution of homogeneous linear partial differential equations of higher order with constant coefficients.			
<b>Unit – III</b>	<b>APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS</b>	Periods	<b>9+3</b>
Classification of second order quasi linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation – Steady state solution of two dimensional heat equation (excluding insulated edges).			
<b>Unit - IV</b>	<b>FOURIER TRANSFORM</b>	Periods	<b>9+3</b>
Fourier Integral theorem (without proof) – Fourier transform pair – Properties (without proof) – Transforms of simple functions – Fourier Sine and Cosine transforms – Properties (without proof) – Convolution theorem and Parseval's identity (Statement and applications only).			
<b>Unit – V</b>	<b>Z –TRANSFORM</b>	Periods	<b>9+3</b>
Definition – Z-transform of some basic functions – Elementary properties – Inverse Z-transform: Partial fraction method –Initial and Final value theorem- Convolution theorem – Applications of Z-transforms: Solution of difference equations.			
<b>Total Periods</b>			<b>45+15=60</b>
<b>Text Books</b>			
3.	Grewal B.S., "Higher Engineering Mathematics", 45 <sup>th</sup> Edition, Khanna Publishers, Delhi, 2024.		
4.	Churchill, R.V. and Brown, J. W., Fourier series and boundary value problems.(8 <sup>th</sup> Edition), McGraw-Hill, 2011.		
<b>References</b>			
6.	Veerarajan T, Engineering Mathematics, McGraw Hill Education, 2013.		
7.	Kreyszig, E., Advanced Engineering Mathematics (10th Edition), John Wiley (2015).		
8.	Ramana.B.V., " Higher Engineering Mathematics" , Tata Mc Graw Hill Publishing Company Limited, New Delhi, 2008.		
9.	P.R.Vittal, " Differential equations Fourier and Laplace Transforms", Margham Publishers, 2nd Edition, 1999.		
10.	Ray Wylie. C and Barrett.C, " Advanced Engineering Mathematics " Tata Mc Graw Hill Education Pvt Ltd, Sixth Edition ,New Delhi 2012.		
<b>E-Resources</b>			
4.	<a href="https://learnengineering.in">https://learnengineering.in</a>		
5.	<a href="http://www.learnerstv.com/Free-engineering-Video-lectures">www.learnerstv.com/Free-engineering-Video-lectures</a>		
6.	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>		




  
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		L	T	P		C	CA	ESE	Total																																																																																																																																	
<b>U23EC301</b>	<b>Circuit Analysis</b>	3	0	0	3	40	60	100																																																																																																																																		
<b>Course Objective</b>	The students should made <ul style="list-style-type: none"> <li>To introduce electric circuits and its analysis</li> <li>To Impart knowledge on solving circuits using network theorems</li> <li>To know the phenomenon of resonance and coupled circuits.</li> <li>To study the transient response of circuits for various inputs</li> <li>To learn about two port networks and its parameters.</li> </ul>																																																																																																																																									
<b>Course Outcome</b>	At the end of the course, the student should be able to,						<b>Knowledge Level</b>																																																																																																																																			
	<b>CO1:</b> Understand the basic laws & network theorems and its applications to solving networks for DC inputs.						K1																																																																																																																																			
	<b>CO2:</b> Explain the basic network theorems and its applications to solving networks for AC inputs.						K2																																																																																																																																			
	<b>CO3:</b> Illustrate the concepts of Transient Circuits.						K2																																																																																																																																			
	<b>CO4:</b> Observe the concepts of series & parallel resonance and coupled circuits.						K3																																																																																																																																			
<b>CO5:</b> Classify the two-port networks, parameters and its interconnections.						K2																																																																																																																																				
<b>Pre-requisites</b>	Basic concepts of physics, particularly about Electricity and Magnetism.																																																																																																																																									
<table border="1"> <thead> <tr> <th colspan="12">CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak</th> <th colspan="3">CO/PSO Mapping</th> </tr> <tr> <th rowspan="2">COs</th> <th colspan="12">Programme Outcomes (POs)</th> <th colspan="3">PSOs</th> </tr> <tr> <th>P O 1</th> <th>P O 2</th> <th>P O 3</th> <th>P O 4</th> <th>P O 5</th> <th>P O 6</th> <th>PO 7</th> <th>PO 8</th> <th>P O 9</th> <th>P O 10</th> <th>P O 11</th> <th>PO 12</th> <th>PSO1</th> <th>PS O 2</th> <th>PSO 3</th> </tr> </thead> <tbody> <tr> <td>CO 1</td> <td>3</td> <td>2</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>3</td> <td></td> <td>2</td> </tr> <tr> <td>CO 2</td> <td>3</td> <td>2</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>3</td> <td></td> <td>2</td> </tr> <tr> <td>CO 3</td> <td>3</td> <td></td> <td>1</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>3</td> <td></td> <td>3</td> </tr> <tr> <td>CO 4</td> <td>3</td> <td>2</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>3</td> <td></td> <td>2</td> </tr> <tr> <td>CO 5</td> <td>3</td> <td>2</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>3</td> <td></td> <td>2</td> </tr> </tbody> </table>													CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak												CO/PSO Mapping			COs	Programme Outcomes (POs)												PSOs			P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	PO 7	PO 8	P O 9	P O 10	P O 11	PO 12	PSO1	PS O 2	PSO 3	CO 1	3	2	1									3	3		2	CO 2	3	2	1									3	3		2	CO 3	3		1		1							3	3		3	CO 4	3	2	1									3	3		2	CO 5	3	2	1									3	3		2
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<b>Content of the Course</b>			
<b>Unit – I</b>	<b>DC Circuits</b>	<b>Periods</b>	<b>9</b>
Fundamentals of DC circuits and basic Kirchoff's Laws- Star-Delta Transformation -Mesh Analysis-Nodal Analysis - Superposition Theorem-Thevenin Theorem, Norton Theorem-Maximum Power Transfer Theorem.			
<b>Unit - II</b>	<b>AC Circuits</b>	<b>Periods</b>	<b>9</b>
Fundamentals of AC circuits -Mesh Analysis-Nodal Analysis – Star-Delta Transformation-Superposition Theorem-Thevenin Theorem, Norton Theorem-Maximum Power Transfer Theorem			
<b>Unit – III</b>	<b>Transient Analysis</b>	<b>Periods</b>	<b>9</b>
DC response of RL, RC and RLC Circuits – Sinusoidal response of RL, RC and RLC circuits-Impulse response of RL, RC and RLC circuits.			
<b>Unit - IV</b>	<b>Resonance and Coupled Circuits</b>	<b>Periods</b>	<b>9</b>
Series Resonance-Impedance, resonant frequency, Quality Factor (Q), Bandwidth, power dissipation and half power frequency. Parallel Resonance-Impedance, resonant frequency, Quality Factor (Q), Bandwidth, power dissipation and half power frequency. Self and Mutual Inductances, Coefficient of coupling.			
<b>Unit – V</b>	<b>Two Port Network</b>	<b>Periods</b>	<b>9</b>
Two-port Network-Open-Circuit Impedance (Z) Parameters-Short-Circuit Admittance (Y) Parameters-Transmission (ABCD) Parameters-Hybrid (H) Parameters, Relationship between two port parameters, interconnections of Two port networks			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	Charles K. Alexander, Matthew N. O. Sadiku, 'Fundamentals of Electric Circuits', McGraw-Hill Publications, Reprint 2022.		
2.	Sudhakar A. and Shyammohan S. Palli, "Circuits and Networks Analysis and Synthesis", 5th Edition, McGraw-Hill Education, New Delhi, 2017.		
<b>References</b>			
1.	Hayt W.H., Kemmerly J.E., Durbin S.M., "Engineering Circuit Analysis", 9th Edition, Tata McGraw-Hill, New Delhi, 2020.		
2.	Ravish R. Singh, "Network Analysis and Synthesis", McGraw-Hill Education, New Delhi, 2017.		
<b>E-Resources</b>			
1.	<a href="https://nptel.ac.in/courses/117106108/">https://nptel.ac.in/courses/117106108/</a>		
2.	<a href="http://www.ee.iitm.ac.in/videlectures/doku.php?id=ec1010_2014nk:start">http://www.ee.iitm.ac.in/videlectures/doku.php?id=ec1010_2014nk:start</a>		
3.	<a href="https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/lecture-notes">https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/lecture-notes</a>		

  
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Programme	<b>B.E</b>	Programme Code	<b>103</b>	Regulation	<b>2023</b>										
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>III</b>										
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23EC302</b>	<b>Signals and Systems</b>	3	0	0	3	40	60	100							
<b>Course Objective</b>	The main objective of the course is to , <ul style="list-style-type: none"> <li>• Introduce the classifications of continuous time and discrete time signals and systems</li> <li>• Study continuous-time signals frequency domain characteristics.</li> <li>• Comprehend continuous-time system analysis and implementation.</li> <li>• Learn sampling process and discrete-time signals frequency domain characteristics.</li> <li>• Know discrete -time system analysis and implementation.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,						Knowledge Level								
	<b>CO1:</b> Classify the signal as continuous/discrete, periodic/apperiodic, energy/power and system as linear/nonlinear.						K2								
	<b>CO2:</b> Observe continuous-time signals using Fourier and Laplace Transform.						K3								
	<b>CO3:</b> Implement continuous-time systems and analyze using Fourier and Laplace Transform						K3								
	<b>CO4:</b> Examine discrete-time signals using DTFT and Z Transform.						K3								
<b>CO5:</b> Implement discrete-time systems and analyze using DTFT and Z Transform						K3									
<b>Pre-requisites</b>	-														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak												<b>CO/PSO Mapping</b>			
<b>COs</b>	<b>Programme Outcomes (POs)</b>											<b>PSOs</b>			
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>
3	CO 1	3	3	2	1								1	3	3
3	CO 2	3	3	2	1								1	3	3
3	CO 3	3	3	2	1								1	3	3
3	CO 4	3	3	2	1								1	3	3
3	CO 5	3	3	2	1								1	3	3

  
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**Course Assessment Methods****Direct**

1. Continuous Assessment Test I, II & III
2. Assignment: Simulation using tool
3. End-Semester examinations

**Indirect**

1. Course - end survey

**Content of the syllabus**

Unit – I	CLASSIFICATION OF SIGNALS AND SYSTEMS	Periods	9
Continuous Time Signals(CT Signals) -Discrete Time Signals(DT Signals) – Unit (Step ,Ramp, impulse), Exponential, Sine, Cosine signal- Classifications of CT and DT Signals- Classifications of CT Systems and DT Systems -Basic System Properties.			
Unit - II	ANALYSIS OF CONTINUOUS TIME SIGNALS	Periods	9
Fourier Series Analysis – Spectrum of Continuous Time Signals - Fourier Transform and Properties - Laplace Transform and Properties.			
Unit – III	LINEAR TIME INVARIANT -CONTINUOUS TIME SYSTEMS	Periods	9
CT system Characterized by Differential Equation - Block diagram representation -Impulse Response - Convolution integral - Frequency Response - Analysis of LTI-CT system using Fourier and Laplace Transforms.			
Unit - IV	ANALYSIS OF DISCRETE TIME SIGNALS	Periods	9
Sampling of CT Signals and Aliasing - DTFT and Properties - Z-Transform and Properties.			
Unit – V	LINEAR TIME INVARIANT – DISCRETE TIME SYSTEMS	Periods	9
DT system Characterized by Difference Equations - Block Diagram Representation - Impulse Response - Convolution Sum - Analysis of LTI-DT Systems using DTFT and Z-Transforms .			
<b>Total Periods</b>			<b>45</b>

**Text Books**


1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, Signals and Systems, Pearson Education, 2012.
2. Simon Haykins and Barry Van Veen, Signals and Systems John Wiley & sons, Inc, 2004.



**References**


1. Robert A. Gabel and Richard A.Roberts, “Signals & Linear Systems”, John Wiley, 3rd Edition, 2009.
2. Rodger E. Ziemer, William H. Tranter, D. Ronald Fannin. “Signals & systems”, 4th Edition, PearsonEducation, 2002.
3. Edward W Kamen & Bonnie’s Heck, “Fundamentals of Signals and Systems”, Pearson Education, 2007.
4. B. P. Lathi, "Principles of Linear Systems and Signals", Oxford, 2nd Edition, 2009.

**E-Resources**


1. <https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/lecture-notes/>
2. <https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/assignments/>


  
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Programme	B.E	Programme Code				Regulation		2023							
Department	<b>Electronics and Communication Engineering</b>				Semester		III								
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
U23IT302	Data Structures	3	0	0	3	40	60	100							
Course Objective	<p>The main objective of this course is to:</p> <ul style="list-style-type: none"> <li>Understand the significance of Data structures and List ADTs.</li> <li>Learn the concepts and applications of Stacks, Queues</li> <li>Understand the Tree ADT and types of balancing the tree</li> <li>Learn the fundamentals of Graph ADT, various Traversal algorithms, Types and finding the Minimum spanning Tree</li> <li>Learn the different types of Sorting and Searching Techniques and Hashing</li> </ul>														
Course Outcome	At the end of the course, the student should be able to,							Knowledge level							
	CO1: Implement List ADT and its types.							K1							
	CO2: Implement Stack ADT, Queue ADT, Priority Queue and Parsing the Arithmetic Expression in C							K2							
	CO3: Implement Tree ADT, Binary search tree, AVL and Splay tree in C							K3							
	CO4: Develop C Programs to Implement the concept of Topological ordering and Minimum spanning Tree of a Graph ADT							K4							
CO5: Implement various sorting and searching algorithms in C							K4								
Pre-requisites	-														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak													<b>CO/PSO Mapping</b>		
COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	3	2	1				2	2	3	3	
CO 2	3	3	3	3	3	2	1				2	2	3	3	
CO 3	3	3	3	3	3	2	1				2	2	3	3	
CO 4	3	3	3	3	3	2	1				2	2	3	3	
CO 5	3	3	3	3	3	2	1				2	2	3	3	
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignment / Quiz / Seminar															
3. End-Semester examinations															
<b>Indirect</b>															
1. Course - end survey															
<b>Content of the syllabus</b>															
Unit – I	INTRODUCTION										Periods	9			

  
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Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Doubly-linked lists - Circularly linked lists – Applications of lists – Polynomial ADT			
<b>Unit - II</b>	<b>STACKS, QUEUES AND DEQUEUES</b>	Periods	<b>9</b>
Stack ADT – Array based implementation – List based implementation – Balancing Symbols – Evaluating arithmetic expressions - Infix to Postfix conversion – Queue ADT – Array based implementation – List based implementation – Circular Queue ADT – Priority Queue- Double Ended Queue.			
<b>Unit – III</b>	<b>TREES</b>	Periods	<b>9</b>
Tree ADT – Binary Trees – Binary Search Tree - Tree- Traversal Algorithms -Search Trees : AVL Tree – Splay Tree- Balancing Tree- B+.			
<b>Unit - IV</b>	<b>GRAPHS</b>	Periods	<b>9</b>
Graph ADT –Types of Graphs – Graph Traversals – Topological Ordering – Dijkstra’s Algorithm – Minimum Spanning Tree – Prims Algorithm – Kruskal’s Algorithm.			
<b>Unit – V</b>	<b>SORTING, SEARCHING AND HASHING</b>	Periods	<b>9</b>
Types of Sorting - Bubble Sort – Selection Sort – Insertion Sort – Shell Sort – Quick Sort – Radix Sort – Merge Sort- Linear Search – Binary Search- Heap Search -. Hashing – Open Addressing – Separate Chaining –Hash Functions.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books:</b>			
1.	Reema Thareja ,” Data structure using c “,Oxford University Press , Second Edition ,2023.		
2.	Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Pearson India , Second Edition ,2002.		
<b>REFERENCE BOOKS:</b>			
1.	Charles E. Leiserson, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein ,”Introduction to Algorithms “, Fourth Edition , MIT Press , 2022.		
2.	Narasimha Karumanchi - Data structures and algorithms made easy, 1 <sup>st</sup> Edition ,2016.		
3.	R. Venkatesan and S. Lovelyn Rose,”Data Structures “,2nd Edition, Wiley Publications,2019.		
4.	Robert Sedgewick and Kevin Wayne, “Algorithms”,4 <sup>th</sup> Edition, Addison-Wesley, 2011.		
5.	Peter Brass, “Advanced Data Structures”, 1 <sup>st</sup> Edition, Cambridge,2008.		
<b>E-Resources:</b>			
1.	<a href="https://www.javatpoint.com/data-structure-tutorial">https://www.javatpoint.com/data-structure-tutorial</a>		
2.	<a href="https://www.geeksforgeeks.org/data-structures">https://www.geeksforgeeks.org/data-structures</a>		
3.	<a href="https://www.udemy.com/course/data-structures-and-algorithms-deep-dive-using-java">https://www.udemy.com/course/data-structures-and-algorithms-deep-dive-using-java</a>		
4.	<a href="https://dl.ebooksworld.ir/books/Introduction.to.Algorithms.4th.Leiserson.Stein.Rivest.Cormen.MIT.Press.9780262046305.EBooksWorld.ir.pdf">https://dl.ebooksworld.ir/books/Introduction.to.Algorithms.4th.Leiserson.Stein.Rivest.Cormen.MIT.Press.9780262046305.EBooksWorld.ir.pdf</a>		


  
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Programme	<b>B.E.</b>		Programme code		<b>103</b>		Regulation		<b>2023</b>						
Department	<b>Electronics and Communication Engineering</b>					Semester				<b>III</b>					
Course Code	Course Name					Periods per week			Credit	Maximum Marks					
	L	T	P	C	CA	ESE	Total								
<b>U23CTCP1</b>	<b>Verbal, Quantitative Aptitude and Reasoning - I</b>					2	0	0	1	40	60	100			
<b>Course Objective</b>	The student should be made to, <ul style="list-style-type: none"> <li>Identify and begin to apply the language features</li> <li>Understand the mathematical techniques for solving the real life problems</li> <li>Use number theory arguments to justify relationships involving divisors, multiples and factoring</li> <li>Help in preparation of competitive exams</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,										<b>Knowledge Level</b>				
	CO1: Use language through acquisition of grammar rules										K2				
	CO2: Demonstrate the use of mathematical reasoning by justifying the patterns and relationships										K2				
	CO3: Face external competitive exams										K3				
	CO4: Solve a question in a fraction of minute using shortcut methods										K3				
CO5: Enhance their problem solving skills and logical Skills										K4					
<b>Pre-Requisites</b>	-														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak													<b>CO/PSO Mapping</b>		
COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
<b>CO 1</b>		2		3	2					3		3	1	1	3
<b>CO 2</b>	3	3		2	2					3		3	3	3	3
<b>CO 3</b>	3	3		3	2					3		3	2	2	2
<b>CO 4</b>	3	3		2	3					2		2	3	2	3
<b>CO 5</b>		2		2	2					2		2	3	3	3
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignment/Quiz															
3. End-Semester Examination															
<b>Indirect</b>															
1. Course -end survey															
<b>Content of the syllabus</b>															


  
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Unit -I	VERBAL ABILITY ( ERROR SPOTTING )	Periods	5
<p><b>CONJUNCTIONS: Error on coordinative conjunction:</b> The seven coordinating conjunctions are (<b>fan boys</b>): <b>for, and, nor, but, or, yet, so, Errors on Subordinate Conjunction</b> After, although, as soon as, because, before, by the time, in case, now that, since, unless, when, whether or not, while, yet...., <b>Errors on correlative conjunction</b> (Either.....or, neither.....nor, not only.... but also, as....as, both....and, whether.... or, so....as, such...that, the)</p> <p><b>CONDITIONAL CLAUSES:</b> Errors on Zero condition, Errors on first condition of If clauses, Errors on second condition of If clauses, Errors on three condition of If clauses</p> <p><b>ADVERBS:</b> Errors on conjunctive adverb, Errors on adverbs of frequency, Errors on adverbs of time, Errors on adverbs of manner, Errors on adverbs of place, Errors on adverbs of degree</p> <p><b>ADJECTIVES:</b> Errors on descriptive adjectives, Errors on demonstration adjectives, Errors on distributive adjectives, Errors on interrogative adjectives, Errors on numeral, Errors on quantitative adjectives, Errors on proper adjectives, Errors on possessive adjectives</p> <p><b>DETERMINERS:</b> Definite Article, Indefinite Article, Quantifying Article – few, many, Possessive Article, (my, your, his, her, its, our, your, their....)</p> <p><b>NOUNS:</b> Pronoun, Common Noun, Collective Noun, Abstract Noun, Material Noun</p> <p><b>SUBJECT – VERB AGREEMENT:</b></p> <p>Singular Subjects and Singular Verbs, Errors on plural subjects with plural verbs, Errors on indefinite pronouns, Errors on compound subjects, Errors on collective noun, Errors on singular or plural verb</p>			
Unit-II	NUMBER SYSTEMS	Periods	6
<p><b>NUMBER SYSTEMS</b> (Divisibility Rule, Unit Digit, Remainder Theorem( 1 Or -1, Cancellation, Wilson, Fermets), Progressions( Arithmetic, Geometric, Harmonic), Log, Surds And Indices, Simplification)</p>			
Unit – III	AVERAGE AND LCM & HCF PROBLEMS	Periods	8
<p><b>AVERAGE</b> (Basic Model, Partial Average, 3. Overall Average, Inclusion/Exclusion of A Value in a Group, Increased or Included or Added or More and Replaced, Substituted, Cricket Based Model, Misread Model, Allegation and Mixture, Mean, Median and Mode, Miscellaneous)</p> <p><b>LCM and HCF</b> (Find The LCM, HCF and Its fractions, Product of Two Numbers Model, LCM, HCF with Remainders Model, Smallest/Largest Based Model, Tolling Together Model, HCF Related Questions (Keyword: Distinct, Divided, Equal Number of Rows (Distributed Equally)), Mensuration Related Questions, No. of Pairs Model, LCM, HCF With Ratios Model, Algebraic Expressions Model, Reduce To Lowest Terms</p>			
Unit- IV	RATIO AND PROPORTION	Periods	5
<p><b>RATIO</b> ( Zig Zag Model, Finding The Individual Component, Coins &amp; Values Based Ratios, Number Based Ratios, Increment/Decrement Based Ratios, Miscellaneous)- <b>PROPORTION</b> ( Continuous, Third, Fourth, Mean)</p>			

  
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Unit-V	LOGICAL REASONING	Periods	6
<p><b>CODING-DECODING-</b> Types of Coding and Decoding (Letter Coding, Conditional Coding, Crypt arithmetic – Addition, Crypt arithmetic – Subtraction)</p> <p><b>BLOOD RELATION</b> (Type 1: Pointing or Introducing, Type 2: Family Tree or Relational Puzzle, Type 3: Coded Relation)</p> <p><b>NUMBER SERIES</b> (Pattern 1: Perfect Square Series, Pattern 2: Perfect Cube Series, Pattern 3: Geometric Series, Pattern 4: Ratio series, Pattern 5: Multi Stage Series)</p> <p><b>SYLLOGISM</b> (Type 1: BASIC SYLLOGISM, Type 2: Either or Neither nor, Type 3: Only – Only a few)</p>			
		<b>Total Periods</b>	<b>30</b>
<b>Text books</b>			
1.	Rajeev Varma, “Fast Track Objective Arithmetics”, Arihant Publications, 2024		
2.	R.S. Aggarwal, “Modern Approach to Logical Reasoning”, S Chand Publishing, 2022		
3.	SP Bakshi, “Objective General English”, Arihant Publications, 2024		
<b>References</b>			
1.	R.S. Aggarwal, “Quantitative Aptitude for Competitive Examinations”, S Chand Publishing, 2013		
2.	Dinesh Khattar, “The Pearson guide to Quantitative Aptitude for Competitive Examinations”, 3 <sup>rd</sup> edition, 2016		
3.	Arun Sharma, “How to Prepare for Logical reasoning for CAT”, McGraw Hill Education, 2014		
4.	Jaikishan and Premkishan, “How to Crack Test of Reasoning”, Arihant Publications, 2016		
5.	R.S. Agarwal, “A modern Approach to verbal and non-verbal reasoning”, S Chand Publishing, 2018		
<b>E-Resources</b>			
1.	Aptitude: <a href="https://www.indiabix.com">https://www.indiabix.com</a>		
2.	Reasoning: <a href="https://placement.freshersworld.com">https://placement.freshersworld.com</a>		
3.	Verbal: <a href="https://testbook.com">https://testbook.com</a>		

  
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	Programme	<b>B.E.</b>	Programme code	<b>103</b>			Regulation	<b>2023</b>
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>III</b>			
Course code	Course Name	Periods /Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
<b>U23EC303</b>	<b>Digital Logic Circuit Design</b>	3	0	1	4	50	50	100
<b>Course Objective</b>	The student should be made to,							
	<ul style="list-style-type: none"> <li>Learn about basic postulates of Boolean algebra and simplification of Boolean expressions to deduce optimal digital Circuits.</li> <li>Gain the knowledge of Karnaugh Map Minimization procedures for the analysis and design of combinational circuits and sequential circuits</li> <li>Implant the functions and extremity of Sequential Circuits in digital design.</li> <li>Inculcate the concept of memories and programmable logic devices and</li> <li>Learn the concepts of modeling using VERILOG</li> </ul>							
<b>Course Outcome</b>	At the end of the course, the student should be able to,							Knowledge Level
	<b>CO1:</b> Simplify the Boolean functions and Boolean expression for logic minimization							K4
	<b>CO2:</b> Construct the combinational circuits using Logic Gates							K3
	<b>CO3:</b> Construct the synchronous sequential circuits using Flip Flops							K3
	<b>CO4:</b> Analyze the characteristics and structure of different memory systems and Programmable Logic Devices							K4
	<b>CO5:</b> Analyze the combinational circuits with different levels of modeling using HDL							K4
<b>Pre-requisites</b>	-							

COs	CO/PO Mapping											CO/PSO Mapping		
	Program Outcomes (POs)											PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	3	2	2			/					2	3	2	
<b>CO2</b>	3	2	2	2					2		2	3	2	
<b>CO3</b>	3	2	2		2						2	3	2	
<b>CO4</b>	3	2	2	3					3		2	3	2	
<b>CO5</b>	3	2	2								2	3	2	

#### Course Assessment Methods

##### Direct

1. Continuous Assessment Test I, II & III
2. Assignment: Case Studies, Real Time Applications
3. End-Semester examinations

##### Indirect

1. Course - end survey

  
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**Content of the syllabus**

<b>Unit – I</b>	<b>NUMBER SYSTEM &amp; MINIMIZATION TECHNIQUES</b>	<b>Periods</b>	<b>9</b>
Number Systems and Conversion –Complements-Signed Binary Numbers – Logic Gates- NAND-NOR Implementation- Implementation of Logic Function Using Gates & Universal Gates - Boolean Postulates and Laws – De-Morgan's Theorem – Principle of Duality – Boolean Expression – Minimization of Boolean Expression - Sum of Products(SOP) – Product of sums(POS) – Karnaugh Map Minimization – Don't Care Conditions – Quine McClusky Method of Minimization			
<b>Unit – II</b>	<b>DESIGN OF COMBINATIONAL CIRCUITS</b>	<b>Periods</b>	<b>9</b>
Design Procedure –Design of Adder, Subtractor, Parallel binary adder and subtractor – Carry look ahead adder-BCD adder- Multiplexer /Demultiplexer-Decoder, Encoder- Parity Checker, Parity Generators- Code Converters, Magnitude Comparator.			
<b>Unit – III</b>	<b>SYNCHRONOUS SEQUENTIAL CIRCUITS</b>	<b>Periods</b>	<b>9</b>
Sequential Logic Elements-Latches, Flip-Flops- Realization of One Flip-flop to other. Registers: Shift Registers, Universal Shift Register- Counters: Up-Counter, Down-Counter, Up-down Counter, Ripple and Ring Counter- State Diagram -State Table – State Minimization - State Assignment – Excitation Table and Maps – Design and Analysis of Synchronous Sequential Circuits			
<b>Unit – IV</b>	<b>ASYNCHRONOUS SEQUENTIAL CIRCUITS &amp; PROGRAMMABLE LOGIC DEVICES</b>	<b>Periods</b>	<b>9</b>
Introduction to asynchronous circuits -Cycles – Races –Hazards: Static Dynamic, Essential, Hazards elimination – Design of Hazard Free Switching Circuits. Classification of Memories – ROM – ROM Organization-Types – RAM Organization – Write Operation –Read Operation-Types- Programmable Logic Devices – Programmable Logic Array(PLA) – Programmable Array Logic (PAL) – Implementation of Combinational Logic Circuits Using PROM, PLA, PAL.			
<b>Unit – V</b>	<b>HARDWARE DESCRIPTION LANGUAGE</b>	<b>Periods</b>	<b>9</b>
Verilog Basics –Operators- Overview of Verilog HDL-Modules and ports-Gate level modeling- Data flow Modeling-Behavioral level Modeling-Design of combinational circuits (Adder, Subtractor, Multiplexer /Demultiplexer-Decoder, Encoder) and sequential circuits (Flip-flop, Registers, Ripple Counter)using Verilog HDL.			
<b>Total Periods</b>			<b>45</b>

**TEXT BOOKS:**

1. M.MorrisMano, Digital Design, 5th Edition, Prentice Hall of India Pvt.Ltd.,2003/ Pearson Education (Singapore) Pvt.Ltd., NewDelhi, 2018.
2. Palnitkar Samir, "Verilog HDL: Guide to Digital Design and Synthesis", 2nd Edition, Pearson Education, New Delhi, 2017 for Unit III
3. JohnF.Wakerly, Digital Design,Fourth Edition,Pearson /PHI,2016

**REFERENCES:**

- 1 Salivahanan S. & Arivazhagan S., "Digital Circuits and Design", 5th Edition, Oxford University Press, New Delhi, 2018.
- 2 Floyd T L, "Digital Fundamentals", 11th Edition, Pearson Education, New Delhi, 2015.
- 3 Charles H.Roth. Fundamentals of Logic Design, Thomson Learning, 2004.

**WEB REFERENCES:**


- 1 <https://nptel.ac.in/courses/117106086/>

  
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2	<a href="https://nptel.ac.in/content/syllabus_pdf/108105113.pdf">https://nptel.ac.in/content/syllabus_pdf/108105113.pdf</a>
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**Total Period:15**

<b>LIST OF EXPERIMENTS / EXERCISES:</b>	
1	Design and Verification of digital logic gates
2	Design of Combinational Circuits (Adder, Subtractor).
3	Design of Code Converters (Gray to Binary & Binary to Gray).
4	Design of Multiplexer and De-multiplexer.
5	Design of Encoder and Decoder using logic gates.
6	Design and implementation of flip flops using basic gates.
7	Design of Synchronous and ripple counter using logic gates.
8	Design of adders, Encoders & Decoders, MUX/DEMUX using MODELSIM
9	Design of Registers using MODELSIM
<b>REFERENCES/ MANUAL /SOFTWARE:</b>	
1. Laboratory Manual	
2. Modelsim	


  
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Programme	<b>B.E.</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>											
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>III</b>											
Course code	Course Name	Periods/Week			Credit	Maximum Marks										
		L	T	P	C	CA	ESE	Total								
<b>U23EC304</b>	<b>Devices and Circuits Laboratory</b>	0	0	2	1	60	40	100								
<b>Course Objective</b>	The student should be made															
	<ul style="list-style-type: none"> <li>To know the characteristics Diode</li> <li>To learn the characteristics of Transistors.</li> <li>To construct characteristics of power electronic devices</li> <li>To understand Kirchhoff's laws and Network Theorems</li> <li>To simulate various electronic circuits using P-SPICE software</li> </ul>															
	At the end of the course, the students should be able to,						Knowledge Level									
	<b>CO1:</b> Demonstrate V-I characteristics of PN junction diode , Zener diode						K2									
	<b>CO2:</b> Explain the characteristics of BJT and FET						K3									
<b>CO3:</b> Analyze the characteristics of power electronic devices						K4										
<b>CO4:</b> Illustrate kirchoff's law and network theorems.						K2										
<b>CO5:</b> Apply P-spice & Develop a working model of an electronic circuit						K3										
<b>Pre-requisites</b>	Engineering Practices Lab															
<b>CO/PO Mapping</b>												<b>CO/PSO Mapping</b>				
<b>COs</b>		<b>Program Outcomes (POs)</b>										<b>PSOs</b>				
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	1	2										2	1	
CO2		2	1	2										2	1	
CO3		2	1	2										2	1	
CO4		2	1	2										2	1	
CO5		2	1	2										2	1	
<b>Course Assessment Methods</b>																
<b>Direct</b>																
1. Prelab and Postlab																
2. Assignment																
3. End-Semester Examinations																
<b>Indirect</b>																
1. Course-end survey																
<b>List of Experiments</b>															<b>Course Outcome</b>	
1.	Characteristics of PN Junction Diode and Zener Diode.														CO1	
2.	Input and Output Characteristics of BJT -Common Emitter configuration														CO2	
3.	FET Characteristics														CO2	

  
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4.	Characteristics of photodiode and photo transistor.	CO3
5.	Characteristics of UJT.	CO3
6.	Experimental verification of Kirchhoff's voltage and current laws.	CO4
7.	Experimental verification of Thevenin's and Norton theorem.	CO4
8.	Experimental verification of Superposition Theorem.	CO4
9.	Frequency Response of CE and CC amplifier using Pspice	CO5
10.	Pspice simulation of MOSFET amplifiers	CO5
<b>Total Periods</b>		<b>45</b>
<b>REFERENCES/ MANUAL /SOFTWARE:</b>		
1. Laboratory Manual		
2. Pspice		


  
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		L	T	P	C	CA	ESE	Total																																																																																																																																				
<b>U23IT303</b>	<b>Data Structures Laboratory</b>	0	0	2	1	60	40	100																																																																																																																																				
<b>Course Objective</b>	The Main Objective of the course is to <ul style="list-style-type: none"> <li>Familiarize the operations on Linear Data Structures and Nonlinear Data Structures</li> <li>Understand the concepts of various Searching and Sorting Techniques</li> <li>Understand the basic operations on Search Trees</li> <li>Known to the basics of various graph Traversal methods.</li> </ul>																																																																																																																																											
<b>Course Outcome</b>	At the end of the course, the student should be able to,							<b>KL</b>																																																																																																																																				
	<b>CO1:</b> Implement List based and Array based Linear and Nonlinear Data Structures							<b>K3</b>																																																																																																																																				
	<b>CO2:</b> Implement Stack ADT, Queue ADT, and Parsing the Arithmetic Expression in C							<b>K3</b>																																																																																																																																				
	<b>CO3:</b> Suggest appropriate Search Tree for solving a given problem							<b>K4</b>																																																																																																																																				
	<b>CO4:</b> Appropriately use the various graph Traversal for a given problem							<b>K4</b>																																																																																																																																				
	<b>CO5:</b> Implement various sorting and searching algorithms in C.							<b>K3</b>																																																																																																																																				
<b>Pre-requisites</b>	-																																																																																																																																											
<table border="1"> <thead> <tr> <th colspan="13">CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak</th> <th colspan="2">CO/PSO Mapping</th> </tr> <tr> <th rowspan="2">COs</th> <th colspan="12">Programme Outcomes (POs)</th> <th colspan="3">PSOs</th> </tr> <tr> <th>PO 1</th> <th>PO 2</th> <th>PO 3</th> <th>PO 4</th> <th>PO 5</th> <th>PO 6</th> <th>PO 7</th> <th>PO 8</th> <th>PO 9</th> <th>PO 10</th> <th>PO 11</th> <th>PO 12</th> <th>PSO 1</th> <th>PSO 2</th> <th>PSO 3</th> </tr> </thead> <tbody> <tr> <td>CO 1</td> <td>3</td> <td>2</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> <tr> <td>CO 2</td> <td>3</td> <td>2</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> <tr> <td>CO 3</td> <td>3</td> <td>2</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> <tr> <td>CO 4</td> <td>3</td> <td>2</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> <tr> <td>CO 5</td> <td>3</td> <td>2</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> </tbody> </table>															CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak													CO/PSO Mapping		COs	Programme Outcomes (POs)												PSOs			PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	CO 1	3	2	1	1	2			1	1	1	1	1	1	1		CO 2	3	2	1	1	2			1	1	1	1	1	1	1		CO 3	3	2	1	1	2			1	1	1	1	1	1	1		CO 4	3	2	1	1	2			1	1	1	1	1	1	1		CO 5	3	2	1	1	2			1	1	1	1	1	1	1	
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CO 3	3	2	1	1	2			1	1	1	1	1	1	1																																																																																																																														
CO 4	3	2	1	1	2			1	1	1	1	1	1	1																																																																																																																														
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<b>Suggested List of Experiments</b>													<b>CO's</b>																																																																																																																															
<ol style="list-style-type: none"> <li>Consider a scenario where a firm wants to maintain the data of its employees. The data containing employee number, name, and salary and department are saved in a</li> </ol>													<b>CO1</b>																																																																																																																															


  
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singly linked list. Create following functions for the employee list. i. Insert at Front: Insertion of a record at the front. ii. Insert at End: Insertion of a record at the end. iii. Delete First: Deletion of first record. iv. Delete Last: Deletion of last record. v. Search: Searching any record based on employee number and dept no. vi. Display: Displaying all records.	
2. Write a C program to add two polynomials using Linked List.	CO1
3. Write a C program to implement different operations on Stack and Queue using Arrays.	CO2
4. Write a C program that implements push(), pop(), display(), isEmpty() and peek() functions of Stack using Linked List.	CO2
5. Write a C program that implements enqueue(), dequeue(), size(), isEmpty() and display() functions of Queue using Linked List.	CO2
6. Write a C program to convert an Infix expression : $a + b * c + (d * e + f) * g$ into the Postfix expression.	CO2
7. Write a C program to perform the following BST Operations - Creating node, insertion, in-order traversal and pre-order traversal.	CO3
8. Write a C program which results the implementation of Insertion, Deletion and Search operations in AVL Tree.	CO3
9. Write a C program to perform Depth First Search and Breadth First Search traversal on a graph.	CO4
10. Write a C program for constructing a minimum cost spanning tree of a graph using Prim's Algorithm.	CO4
11. Write a C program to Search an element using Linear Search process and Sort given elements using Insertion sort.	CO5
12. Write a C program to implement Linear Probing and Separate Chaining Collision resolution technique.	CO5
<b>Total Periods</b>	<b>45</b>
<b>E-Resources:</b>	
1.	<a href="https://www.programiz.com/c-programming">https://www.programiz.com/c-programming</a>
2.	<a href="https://www.cprogramming.com/">https://www.cprogramming.com/</a>
3.	<a href="https://beginnersbook.com/2015/02/simple-c-programs/">https://beginnersbook.com/2015/02/simple-c-programs/</a>
<b>Tools / Software Required:</b>	
1.	Codetandra / HackerRank / HackerEarth / Any online Problem Solving Platforms



  
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Programme	<b>B.E.</b>			Programme code	<b>103</b>		Regulation						<b>2023</b>		
Department	<b>Electronics and Communication Engineering</b>						Semester			<b>III</b>					
Course code	Course name				Periods per week			Credit	Maximum Marks						
					L	T	P		C	CA	ESE	Total			
<b>U23CTCP2</b>	<b>Personality Development</b>				1	0	2	1	60	40	100				
<b>Course Objective</b>	The student should be made to,														
	<ul style="list-style-type: none"> <li>Equip comprehensive understanding of various psychological and cognitive assessment tools</li> <li>Analyze, interpret, and apply these tools to improve personal and professional development</li> <li>Enhance communication</li> <li>Manage stress effectively</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,										<b>Knowledge Level</b>				
	<b>CO1: Enhance Self-Awareness</b>										K2				
	<b>CO2: Improve Communication Skills</b>										K1				
	<b>CO3: Acquire Better Academic and Life Satisfaction</b>										K2				
	<b>CO4: Enhance Problem-Solving Abilities</b>										K3				
<b>CO5: Effective Stress Management</b>										K3					
<b>Pre-requisites</b>	-														
<b>CO / PO Mapping</b>												<b>CO/PSO Mapping</b>			
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2	PSO3
CO 1						2			2	2		2	1	1	2
CO 2						2			2	2		2	3	3	3
CO 3						2			1	2		2	3	3	3
CO 4						2			2	1		2	3	3	3
CO 5						2			2	1		2	2	2	3
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Self-Assessment															
2. Viva-Voce															
3. End-Semester Examination															
<b>Indirect</b>															
1. Course-end survey															
<b>Content of the Syllabus</b>															
	<b>S. No.</b>	<b>List of Experiments</b>												<b>CO</b>	
	1.	Rosenberg's and Hare's Self Esteem tool												CO1	
	2.	Myers Brigg's 16 types of Personality												CO1	
	3.	Social Functioning scale												CO3	
	4.	Huebner, Laughlin, Ash, & Gilman's Multidimensional Students Life												CO3	

  
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	Satisfaction Scale	
5.	Body language Assessment	CO2
6.	Fleming's VARK Learning Theory, bloom's taxonomy based on learners' queries	CO2
7.	Alexi's Presentation Secrets Assessment	CO2
8.	Deductive and inductive logical reasoning assessment	CO4
9.	Procter and Gamble Assessment Gamified Tests	CO4
10.	Psychometric Test	CO3
11.	Stress buster Assessment	CO5
<b>Total Periods : 30</b>		
<b>References</b>		
1.	Allan Pease, "Body language – how to read other's thoughts by their gestures", Sheldon press, London publication, Tenth Impression 1988	
2.	Alexei Kapterev, "Presentation Secrets", John Wiley and Sons, 2024	
<b>E-Resources</b>		
1.	<a href="https://scales.arabpsychology.com">https://scales.arabpsychology.com</a>	
2.	<a href="https://DOMWebserver.Hitchcock.org/mbti/">https://DOMWebserver.Hitchcock.org/mbti/</a>	
3.	<a href="https://www.assessmentday.com/free/deductive-reasoning-I/DeductiveFreeTest-Solutions.pdf">https://www.assessmentday.com/free/deductive-reasoning-I/DeductiveFreeTest-Solutions.pdf</a>	
4.	<a href="http://www.prepinsta.com">www.prepinsta.com</a>	




  
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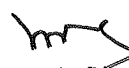
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Programme	<b>B.E.</b>	Programme Code		<b>103</b>	Regulation	<b>2023</b>									
Department	<b>Electronics and Communication Engineering</b>				Semester	<b>IV</b>									
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23MA406</b>	<b>Probability and Random Processes</b>	3	1	0	4	40	60	100							
<b>Course Objective</b>	<p>The main objective of the course is to</p> <ul style="list-style-type: none"> <li>• Know and differentiate between discrete and continuous random variables.</li> <li>• Proficiently understand the expected value, variance, and higher-order moments of random variables (for both discrete and continuous types).</li> <li>• Understand means, correlations/ covariances of random processes.</li> <li>• Identify relationship between wiener-Khintchine relation and spectral densities.</li> <li>• Evaluate the response of a linear system to stationary processes.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,					Knowledge level									
	<b>CO1:</b> Understand the density and distribution functions for discrete and continuous variables.					K3									
	<b>CO2:</b> Use the central limit theorem to compute probabilities.					K3									
	<b>CO3:</b> Recognize the Random processes is WSS and whether the two random processes are jointly WSS.					K5									
	<b>CO4:</b> Compute the autocorrelation function and the power spectral density function of a wide-sense stationary process.					K4									
<b>Pre-requisites</b>	<b>CO5:</b> Analyze the response of random inputs to linear time invariant systems.					K4									
<b>CO / PO Mapping</b>													<b>CO/PSO Mapping</b>		
(3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak															
<b>COs</b>	<b>Programme Outcomes (POs)</b>												<b>PSOs</b>		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
<b>CO 1</b>	3	2	1	1	1								2		
<b>CO 2</b>	3	2		1									2		
<b>CO 3</b>	3	2	1		1								2		
<b>CO 4</b>	3	2	1	1									2		
<b>CO 5</b>	3	2	1	1									2		
<b>Course Assessment Methods</b>															
<b>Direct</b>															
7. Continuous Assessment Test I, II & III															
8. Assignment.															
9. End-Semester examinations															
<b>Indirect</b>															
3. Course - end survey															

  
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Content of the syllabus			
<b>Unit – I</b>	<b>RANDOM VARIABLES</b>	Periods	<b>9+3</b>
Discrete and continuous random variables – Moments - Moment generating functions and their properties. Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.			
<b>Unit - II</b>	<b>TWO DIMENSIONAL RANDOM VARIABLES</b>	Periods	<b>9+3</b>
Joint distributions - Marginal and conditional distributions – Covariance - Correlation and Regression - Central limit theorem.			
<b>Unit – III</b>	<b>CLASSIFICATION OF RANDOM PROCESSES</b>	Periods	<b>9+3</b>
Definition and examples - first order, second order, strictly stationary, auto correlation and its properties, wide-sense stationary and ergodic processes - Markov process - Poisson and Normal processes.			
<b>Unit - IV</b>	<b>CORRELATION AND SPECTRAL DENSITIES</b>	Periods	<b>9+3</b>
Cross correlation - Properties – Power spectral density – Cross spectral density - Properties – Wiener-Khinchine relation – Relationship between cross power spectrum and cross correlation function.			
<b>Unit – V</b>	<b>LINEAR SYSTEMS WITH RANDOM INPUTS</b>	Periods	<b>9+3</b>
Linear time invariant system - System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.			
<b>Total Periods</b>			<b>45+15=60</b>
<b>Text Books</b>			
5.	Ibe, O.C., Fundamentals of Applied probability and Random processes, Elsevier, 2007		
6.	Peebles Jr. P.Z., Probability Random Variables and Random Signal Principles, Tata McGraw-Hill Publishers, Fourth Edition, New Delhi, 2015.		
<b>References</b>			
11.	Miller, S.L and Childers, S.L, Probability and Random Processes with applications to Signal Processing and Communications, Elsevier Inc., First Indian Reprint 2007.		
12.	Stark, H. and Woods, J.W., Probability and Random Processes with Applications to Signal Processing, Pearson Education (Asia), 3 <sup>rd</sup> Edition, 2009.		
13.	Papoulis, A. and Pillai, S.U., Probability, Random Variables and Stochastic Processes, 4 <sup>th</sup> Edition, McGraw Hill, 2002.		
14.	Hwei Hsu, H. "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw-Hill edition, New Delhi, 2012.		
15.	Leon-Garcia, A, "Probability and Random Processes for Electrical Engineering", Pearson Education Asia, Second Edition, 2011.		
<b>E-Resources</b>			
7.	<a href="https://www.maths.ed.ac.uk">https://www.maths.ed.ac.uk</a>		
8.	<a href="http://www.learnerstv.com/Free-engineering-Video-lectures">www.learnerstv.com/Free-engineering-Video-lectures</a>		
9.	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>		



  
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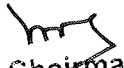
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<b>U23EC401</b>	<b>Electromagnetics and Transmission Lines</b>		3	0	0	3	40	60	100																																																																																																																																																
Course Objective	The main objective of this course is <ul style="list-style-type: none"> <li>To understand the basic concepts of Static electric fields</li> <li>To study the steady magnetic fields concepts and Maxwell's equations</li> <li>To apply Maxwell's equations to describe the Propagation of EM waves.</li> <li>To learn about the two conductors transmission lines in general.</li> <li>To describe the RF transmission lines using general transmission line concepts.</li> </ul>																																																																																																																																																								
Course Outcome	At the end of the course, the student will be able to,								Knowledge Level																																																																																																																																																
	<b>CO1:</b> Describe the concepts of Electrostatics, basic laws and theorems.								K2																																																																																																																																																
	<b>CO2:</b> Explain the concepts of Steady magnetic fields, basic laws and theorems to derive Maxwell's equations.								K2																																																																																																																																																
	<b>CO3:</b> Analyze the Maxwell's equations and apply for the study of Electromagnetic wave propagation in different mediums.								K4																																																																																																																																																
	<b>CO4:</b> Apply the general transmission line theory of two conductor transmission lines and matching networks								K3																																																																																																																																																
Pre-requisites	Vector algebra, Differential and Integral calculus																																																																																																																																																								
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="12">CO / PO Mapping</th> <th colspan="3">CO/PSO Mapping</th> </tr> <tr> <th colspan="15">(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak</th> </tr> <tr> <th rowspan="2">COs</th> <th colspan="12">Programme Outcomes (POs)</th> <th colspan="3">PSOs</th> </tr> <tr> <th>PO 1</th> <th>PO 2</th> <th>PO 3</th> <th>PO 4</th> <th>PO 5</th> <th>PO 6</th> <th>PO 7</th> <th>PO 8</th> <th>PO 9</th> <th>PO 10</th> <th>PO 11</th> <th>PO 12</th> <th>PS O1</th> <th>PSO 2</th> <th>PS O 3</th> </tr> </thead> <tbody> <tr> <td>CO 1</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>1</td> <td>2</td> </tr> <tr> <td>CO 2</td> <td>3</td> <td>3</td> <td>2</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>1</td> <td>2</td> </tr> <tr> <td>CO 3</td> <td>3</td> <td>3</td> <td>2</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>1</td> <td>2</td> </tr> <tr> <td>CO 4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>1</td> <td>2</td> </tr> <tr> <td>CO 5</td> <td>3</td> <td>2</td> <td>1</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td>1</td> <td>2</td> </tr> </tbody> </table>													CO / PO Mapping												CO/PSO Mapping			(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak															COs	Programme Outcomes (POs)												PSOs			PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2	PS O 3	CO 1	3	3	3	3									3	1	2	CO 2	3	3	2	3									3	1	2	CO 3	3	3	2	3									3	1	2	CO 4	3	2	2	2	2								3	1	2	CO 5	3	2	1	2									3	1	2
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<b>Content of the syllabus</b>			
<b>Unit –I</b>	<b>ELECTROSTATICS</b>	Periods	<b>9</b>
Co-ordinate systems-Gradient, Divergence and Curl and its physical interpretation-, -Fundamental relations of the Electrostatic fields.-Gauss's Law –Potential Function-Field due to various charge distributions-- Divergence theorem- Energy stored in electric field- Poisson's and Laplace's Equations			
<b>Unit-II</b>	<b>STEADY MAGNETIC FIELD AND MAXWELL's EQUATIONS</b>	Periods	<b>9</b>
Biot- Savart's Law-Faraday's Law-Magnetic flux density-Magnetic field strength-Ampere's Law in differential vector form-permeability-Energy stored in magnetic field-Magnetic Vector potential-The Equation of continuity for time varying fields-Inconsistency of Ampere's law-Maxwell's equations-Boundary conditions.			
<b>Unit –III</b>	<b>ELECTROMAGNETIC WAVES</b>	Periods	<b>9</b>
Solution for free space conditions-Uniform plane wave propagation-Wave equation for conducting medium-Sinusoidal time variations-Wave propagation in Conductors and Dielectrics-Poynting vector and the flow of power.			
<b>Unit-IV</b>	<b>TRANSMISSION LINE THEORY</b>	Periods	<b>9</b>
A line of cascaded T-Sections-Transmission lines –General Solution -Physical significance of the equations-infinite line – wavelength, velocity of propagation , Distortion less line – Reflection on a line not terminated in Zo- Reflection coefficient – Line Calculation-Open and short circuited lines.			
<b>Unit –V</b>	<b>RF TRANSMISSION LINES</b>	Periods	<b>9</b>
Voltage and currents on the dissipation less line –Standing waves, Nodes, Standing wave ratio –input impedance of the dissipation less line–input impedance of open and short circuited lines – The quarter wave line –The Smith chart and its applications– single stub matching with the Smith chart-Problem solving using Smith chart.			
<b>Total Periods</b>			<b>45</b>
<b>TextBooks</b>			
1.	Jordan,E.C. and Balmain,K.G.,—Electromagnetic Waves and Radiating Systems,2ndEdition,Pearson education / Prentice-Hall of India.2015.		
2.	J.D.Ryder,- Networks,Lines and Fields, PHI, New Delhi, 2 <sup>nd</sup> edition 2010.		
<b>References</b>			
1.	Mathew N.O. Sadiku, Principles of Electromagnetics, 4th Edition, Oxford University Press. Fourth edition 2015.		
2.	Hayt,W.H.and Buck,J.A.,—Engineering Electromagnetics,7thEdition,TataMcGraw-Hill. 2012.		
3.	Kraus,J.D .and Fleisch, D.A.,-Electromagnetics with Applications,McGraw-Hill.2010.		
4.	Anand K.Verma,-,Introduction to Modern Planar Transmission Lines: Physical, Analytical, and Circuit Models Approach, Wiley – IEEE press , 2021		
<b>E-Resources</b>			
1.	<a href="http://en.wikipedia.org/wiki/Electrostatics">http://en.wikipedia.org/wiki/Electrostatics</a> .		
2.	<a href="http://www.Maxwells-equations.com/density/electric-flux.php">http://www.Maxwells-equations.com/density/electric-flux.php</a> .		


  
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Programme	<b>B.E.</b>	Programme Code				<b>103</b>	Regulation		<b>2023</b>						
Department	<b>Electronics and Communication Engineering</b>					Semester		<b>IV</b>							
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P		C	CA	ESE	Total						
<b>U23EC402</b>	<b>Electronic Circuits</b>	3	0	0	3	40	60	100							
<b>Course Objective</b>	The students should made <ul style="list-style-type: none"> <li>To understand the various types of biasing in BJT/JFET/MOSFET</li> <li>To study the operation and characteristics of Small signal amplifiers</li> <li>To understand frequency response of BJT and FET amplifiers at various frequencies.</li> <li>To learn the design and analysis of Feedback and Oscillator circuits</li> <li>To apply power amplifier circuits in different modes of operation to analog circuits</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,							<b>Knowledge Level</b>							
	<b>CO1:</b> Design various biasing circuits of BJT/JFET/MOSFET							K2							
	<b>CO2:</b> Understand the concept of small signal Amplifiers							K2							
	<b>CO3:</b> Analyze the BJT amplifiers at low and high frequencies							K2							
	<b>CO4:</b> Interpret the performance of amplifiers using feedback concepts							K2							
<b>CO5:</b> Construct oscillator power amplifier circuits							K2								
<b>Pre-requisites</b>	Semiconductor Devices for Modern Electronics														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak															
<b>CO/PSO Mapping</b>															
<b>COs</b>	<b>Programme Outcomes (POs)</b>												<b>PSOs</b>		
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>	<b>PSO1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO 1</b>	2	3	3	3		2							3		2
<b>CO 2</b>	2	3	3	3		2							3		2
<b>CO 3</b>	2	3	3	3		2							3		2
<b>CO 4</b>	2	3	3	3		2							3		2
<b>CO 5</b>	2	3	3	3		2							3		2
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1. Continuous Assessment Test I, II & III															
2. Assignment and Quiz															
3. End-Semester examinations															
<b>Indirect</b>															
1. Course - end Survey															
<b>Content of the Course</b>															
<b>Unit – I</b>	<b>BIASING OF BJT AND JFET/MOSFET</b>											<b>Periods</b>	<b>9</b>		
Need for biasing - Method of Transistor biasing: fixed bias, voltage divider bias - Biasing of JFET: self bias, voltage divider bias-Biasing of MOSFET.															
<b>Unit - II</b>	<b>SMALL SIGNAL AMPLIFIERS</b>											<b>Periods</b>	<b>9</b>		


  
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BJT amplifiers-Single stage amplifiers-Analysis of single stage amplifiers-Distortion in amplifiers-Millers theorem-FET amplifiers-Analysis of FET and MOSFET amplifiers-Cascade Connection.			
<b>Unit – III</b>	<b>BJT AND JFET FREQUENCY RESPONSE</b>	<b>Periods</b>	<b>9</b>
Logarithms-Decibels-Low frequency response of BJT Amplifier-Low frequency response of FET Amplifier-Miller effect capacitance –High frequency response of BJT Amplifier-High frequency response of FET Amplifier- Multistage Frequency Effects.			
<b>Unit - IV</b>	<b>FEEDBACK AND OSCILLATOR CIRCUITS</b>	<b>Periods</b>	<b>9</b>
Feedback concepts-Feedback connection-types (Negative feedback) -Practical feedback circuits-Oscillator operation-Phase shift oscillator-Wein bridge oscillator- LC oscillator-Crystal oscillator-UJT Oscillator.			
<b>Unit – V</b>	<b>POWER AMPLIFIERS</b>	<b>Periods</b>	<b>9</b>
Definition and amplifier types-Direct coupled Class A amplifier-Transformer coupled class A amplifier-Class B amplifier operation and circuits, Amplifier distortion-Class C and Class D amplifiers-Thermal stability and heat sink.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	S.Salivahanan, N.Suresh Kumar, “Electronic Devices and Circuits”, 5th Edition, McGraw-Hill Education, New Delhi, 2023.		
2.	Robert L. Boylestad and Louis Nashelsky, “Electronics devices and Circuit theory”, 11th Edition, Pearson, 2015.		
<b>References</b>			
1.	J.Millman&C.C.Halkias,”Integrated Electronics”, 2nd Edition, TMH, 2010.		
2.	Adel S. Sedra and Kenneth C. Smith, “Micro Electronic Circuits Theory And Application,” 5th Edition		
<b>E-Resources</b>			
1.	<a href="https://onlinecourses.nptel.ac.in/noc23_ee77/preview">https://onlinecourses.nptel.ac.in/noc23_ee77/preview</a>		
2.	<a href="https://www.it.iitb.ac.in/nmeict/workshopsConducted.html">https://www.it.iitb.ac.in/nmeict/workshopsConducted.html</a>		
3.	<a href="https://www.coursera.org/">https://www.coursera.org/</a>		

  
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Programme	<b>B.E</b>		Programme Code		<b>103</b>		Regulation		<b>2023</b>						
Department	<b>Electronics and Communication Engineering</b>						Semester		<b>IV</b>						
Course Code	Course Name			Periods Per Week			Credit	Maximum Marks							
				L	T	P		C	CA	ESE	Total				
<b>U23EC403</b>	<b>Analog Integrated Circuits</b>			3	0	0	3	40	60	100					
Course Objective	The student should be made to, <ul style="list-style-type: none"> <li>• Illustrate the various configurations &amp; characteristics Operational Amplifier.</li> <li>• Interpret the linear &amp; nonlinear applications of Op-amp.</li> <li>• Understand the functions of filters, rectifiers and voltage regulators.</li> <li>• Categorize the types of data convertors with their applications.</li> <li>• Elaborate the concept of various waveform generators and some special ICs.</li> </ul>														
	Course Outcome	At the end of the course, the student should be able to,									Knowledge Level				
CO1: Describe about op-amp configurations and compare the AC and DC characteristics.									K2						
CO2: Demonstrate the various applications of Op-amp.									K2						
CO3: Analyze the functional blocks of filters, rectifiers and regulators circuits.									K3						
CO4: Examine the operation of ADCs and DACs.									K3						
CO5: Analyze the internal circuits of waveform generators and Special function ICs									K4						
Pre-requisites	-														
CO/PO Mapping													CO/PSO Mapping		
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)									PSOs					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3			2	2	2	2			2		2	3	2	
CO2	2		2			2	2		2	2		2	2	2	
CO3	3		3			3	2		2	2			3		2
CO4	2			2		2	2		2	2		2	3		2
CO5	2		2			2	2		2	2		2	2	2	
Course Assessment Methods															
Direct															
1. Continuous Assessment Test I, II & III. 2. Assignment: Simulation using tool, Quiz and Seminar. 3. End-Semester examinations.															
Indirect															
1. Course-end survey.															
Content of the syllabus															
Unit- I	<b>OPERATIONAL AMPLIFIERS</b>									Periods	<b>9</b>				

  
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Introduction to Op-amp and Ideal Op-amp characteristics - Inverting and Non inverting amplifier configurations- General operational amplifier stages & Internal schematic of op-amp – Typical op-amp Parameters – DC and AC Performance characteristics - Open and Closed Loop configurations.			
<b>Unit– II</b>	<b>APPLICATIONS OF OPAMP</b>	<b>Periods</b>	<b>9</b>
Basic circuits of Op-amp: Voltage Follower, Scaling & averaging amplifier, Summing & Difference Amplifier - Linear applications: Instrumentation amplifier, Differentiator & Integrator- V to I & I to V converters –Non-linear applications: Log & antilog amplifier, Comparator & Schmitt trigger, Analog Multiplier & its applications.			
<b>Unit– III</b>	<b>FILTERS,RECTIFIERS &amp; REGULATORS</b>	<b>Periods</b>	<b>9</b>
Active filters : First Order Low Pass and High Pass Butterworth filters - Precision Diode & Precision rectifier, Half wave rectifier & Full wave rectifiers – Need for voltage regulation – Linear Voltage regulators , Monolithic Switching regulators– IC 723 General purpose voltage regulator.			
<b>Unit– IV</b>	<b>DATA CONVERSION DEVICES</b>	<b>Periods</b>	<b>9</b>
Digital to Analog conversion: Specifications, Weighted resistor type, R-2R Ladder type & Inverted R-2R ladder type - Analog to Digital conversion: Specifications, Flash type, Successive Approximation type-Single Slope & Dual Slope type – Sample & Hold circuits.			
<b>Unit– V</b>	<b>SIGNAL GENERATORS &amp; SPECIAL ICs</b>	<b>Periods</b>	<b>9</b>
Function generator ICL8038 - Sinewave generator, Sawtooth generator - IC 555 Timer : Functional block diagram , Astable & Monostable mode operation & Applications – Voltage controlled Oscillator –Phase Locked Loop IC 565 : Block diagram & applications - Audio Power amplifier - Video Amplifier - Optocouplers and Fiber optic IC.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	Sergio Franco - Design with Operational Amplifiers and Analog Integrated Circuits – 4th Edition McGraw-Hill Education, 2015		
2.	D.Roy Choudhry, Shail Jain, -Linear Integrated Circuits, New Age International Pvt. Ltd., 2022, Sixth Edition.		
<b>References</b>			
1.	S Salivahanan & V S Kanchana Bhaaskaran, Linear Integrated Circuits, McGraw Hill Education; Third edition (25 August 2018)		
2.	Ramakant A. Gayakwad, -Operational Amplifiers and Linear IC, 4th Edition, Prentice Hall / Pearson Education, 2015.		
3.	K.Lal Kishore,—OperationalAmplifierandLinearIntegratedCircuitsI,PearsonEducation;First edition,2012.		
<b>E-Resources</b>			
1.	<a href="https://www.tutorialspoint.com/linear_integrated_circuits_applications/basics_of_linear_integrated_circuits_applications.htm">https://www.tutorialspoint.com/linear_integrated_circuits_applications/basics_of_linear_integrated_circuits_applications.htm</a>		
2.	<a href="https://www.brainkart.com/subject/Linear-Integrated-Circuits_220/">https://www.brainkart.com/subject/Linear-Integrated-Circuits_220/</a>		
3.	<a href="https://unacademy.com/course/linear-integrated-circuits/P9EAB7F3">https://unacademy.com/course/linear-integrated-circuits/P9EAB7F3</a>		
4.	<a href="https://onlinecourses.nptel.ac.in/noc24_ee73/preview">https://onlinecourses.nptel.ac.in/noc24_ee73/preview</a>		

  
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Programme	B.E		Programme Code		103	Regulation	2023									
Department	Electronics and Communication Engineering				Semester		IV									
Course Code	Course Name			Periods Per Week		Credit	Maximum Marks									
U23EC404	Digital Signal Processing			L	T	P	C	CA	ESE	Total						
				3	0	1	4	50	50	100						
Course Objective	<p>The main objective of the course is to ,</p> <ul style="list-style-type: none"> <li>Learn the DFT &amp; FFT and its properties</li> <li>Identify the characteristics of FIR filters and methods to design FIR filters</li> <li>Know the characteristics of IIR filters and methods to design IIR filters</li> <li>Study the effects of finite word length effects &amp; Multirate Signal Processing</li> <li>Understand about Digital Signal Processor architecture and addressing modes</li> </ul>															
Course Outcome	At the end of the course, the student should be able to,									Knowledge Level						
	CO1: Apply DFT&FFT for the analysis of digital signals & systems									K3						
	CO2: Design and implement Finite Impulse Response filters for the given specifications									K6						
	CO3: Design and implement Infinite Impulse Response filters for the given specifications									K6						
	CO4: Analyze the effects of finite word length of infinite response & Multirate Signals.									K4						
	CO5: Interpret the architecture and addressing modes of DSP processor									K2						
Pre-requisites	Signal and Systems									K2						
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 - Medium, 1 - Weak																
COs	Programme Outcomes (POs)									CO/PSO Mapping						
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	
CO 1	3	3	3	1	1								1	3	2	2
CO 2	3	3	3	1	1								1	3	2	2
CO 3	3	3	3	1	1								1	3	2	2
CO 4	3	3	3	1	1								1	3	2	2
CO 5	3	3	3	1	1								1	3	2	2
<b>Direct</b> 1. Continuous Assessment Test I, II & III 2. Assignment: Simulation using tool 3. End-Semester examinations																
<b>Indirect</b> 1. Course - end survey																
<b>Content of the syllabus</b>																
Unit – I	DISCRETE FOURIER TRANSFORM							Periods	9							

  
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Review of discrete-time signals & systems, Discrete Fourier Transform : Properties , Circular Convolution, Fast Fourier Transform: Radix-2 FFT, Decimation-in-time and Decimation-in-frequency algorithms & its applications			
<b>Unit - II</b>	<b>FINITE IMPULSE RESPONSE FILTERS</b>	Periods	<b>9</b>
Design of FIR filters -Symmetric and Anti-symmetric FIR filters - Design of linear phase FIR filters using windows (Rectangular, Hamming and Hanning window) - Design of linear phase FIR filters using Frequency sampling method –Structures of FIR Filter( Direct form structure, Cascade form Structure)			
<b>Unit – III</b>	<b>INFINITE IMPULSE RESPONSE FILTERS</b>	Periods	<b>9</b>
Characteristics of commonly used analog filters - Butterworth filters, Chebyshev filters, Design of IIR filters from analog filters(Approximation of derivatives, Impulse invariance method, Bilinear transformation) - Frequency transformation in the analog domain- Structure of IIR filter - direct form I, direct form II, Cascade. parallel realizations.			
<b>Unit - IV</b>	<b>FINITE WORD LENGTH EFFECTS &amp; MULTIRATE SIGNAL PROCESSING</b>	Periods	<b>9</b>
Representation of numbers- Quantization of filter coefficients - Round off effects in digital filters - Decimation by an factor D, Interpolation by an factor I, Sampling rate conversion by a rational factor I/D.			
<b>Unit – V</b>	<b>DIGITAL SIGNAL PROCESSORS</b>	Periods	<b>9</b>
Von Neumann Architecture, Harvard Architecture, Modified Harvard Architecture – Pipelining –On chip Peripherals - Architecture of TMS320C5X – Addressing modes.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	John G. Proakis & Dimitris G.Manolakis, —Digital Signal Processing – Principles, Algorithms & Applications, Fourth Edition, Pearson Education / Prentice Hall, 2007.(Unit I – IV)		
2.	B.Venkataramani & M. Bhaskar, “Digital Signal Processor Architecture, Programming and Application”, TMH 2002.(Unit V)		
<b>References</b>			
1.	Emmanuel C. Ifeachor & Barrie. W. Jervis, —Digital Signal ProcessingI, Second Edition, Pearson Education / Prentice Hall, 2002.		
2.	Alan V Oppenheim, Ronald W Schafer, John R Buck, “Discrete Time Signal Processing”, Pearson, 2009.		
3.	Sanjit K. Mitra, —Digital Signal Processing – A Computer Based ApproachI, Tata Mc Graw Hill, 2007.		
4.	Andreas Antoniou, —Digital Signal ProcessingI, Tata Mc Graw Hill, 2006.		
<b>E-Resources</b>			
1.	<a href="https://engineering.purdue.edu/~ee538/DSP_Text_3rdEdition.pdf">https://engineering.purdue.edu/~ee538/DSP_Text_3rdEdition.pdf</a>		
2.	<a href="https://www.scribd.com/doc/217906199/Digital-signal-processors-A-Venkatramani">https://www.scribd.com/doc/217906199/Digital-signal-processors-A-Venkatramani</a>		
3.	<a href="https://nptel.ac.in/courses/117102060/">https://nptel.ac.in/courses/117102060/</a>		


**Total Periods: 15**



**LIST OF EXPERIMENTS: MATLAB Experiments:**


1. Generation of different types of Signals.
2. Computation of DFT of signal input sequence.
3. Design and Implementation of Linear and Circular Convolution.
4. Design and Simulation of FIR (LPF, HPF, BPF&BSF) filters.
5. Design and Simulation of IIR (LPF, HPF, BPF&BSF) filters.

**DSP PROCESSOR Experiments:**


6. Generation of Signals.
7. Computation of a DFT of a signal.
8. Design and Implementation of Linear and Circular Convolution.
9. Design and Implementation of FIR filters.
10. Design and Implementation of FIR filters.



  
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Programme	<b>B.E.</b>	Programme code	<b>103</b>	Regulation	<b>2023</b>										
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>IV</b>										
Course code	Course Name	Periods/Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23EC405</b>	<b>Electronic Circuits Laboratory</b>	0	0	2	1	60	40	100							
<b>Course Objective</b>	The students should made to <ul style="list-style-type: none"> <li>To learn the amplifier and feedback amplifiers</li> <li>To design and analyze of oscillators and large signal amplifiers</li> <li>To design and simulate the Mini project using P-SPICE software</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the students should be able to,						Knowledge Level								
	<b>CO1:</b> Realize the amplifiers and Feedback amplifiers from various parameters						K2								
	<b>CO2:</b> Design of oscillators and large signal amplifiers						K2								
	<b>CO3:</b> Apply P-spice & Develop a working model of an electronic circuit						K3								
<b>Pre-requisites</b>	Basic Electrical and Electronics Engineering														
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak															
<b>COs</b>		<b>Programme Outcomes (POs)</b>										<b>CO/PSO Mapping</b>			
		<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>P O 10</b>	<b>P O 11</b>	<b>P O 12</b>	<b>PS O 1</b>	<b>PS O 2</b>
<b>CO 1</b>	3	2			2			2	2	2			2		
<b>CO 2</b>	3	2			2			2	2	2			2		
<b>CO 3</b>	3	2			2			2	2	2			2		
<b>CO 4</b>	3	2			2			2	2	2			2		
<b>CO 5</b>	3	2			2			2	2	2			2		
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1.Pre lab and Postlab 2.Assignment 3.End-Semester examinations															
<b>Indirect</b>															
1. Course-end survey															
<b>List of Experiments</b>															
															<b>Course Outcome</b>
1.	Common Emitter amplifier														CO1
2.	Common Source amplifier														CO1
3.	Series feedback amplifiers: Frequency response, input and output Impedance calculation														CO2
4.	Shunt feedback amplifiers: Frequency response, input and output Impedance calculation														CO2
5.	Design of Wein bridge oscillator														CO3
6.	Design of transistor RC phase shift oscillator														CO3

  
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7.	Design of LC–Hartley and Colpitt oscillator	CO4
8.	Class A Power Amplifier	CO4
9.	Complementary symmetry Class B Power Amplifier	CO4
10.	Mini project (using BJT/JFET/MOSFET)	CO5
Total Periods		45
Suggested Lab Manuals:		
1. David A. Bell, —Laboratory manual for Electronic Devices and Circuits I, PHI, 4 <sup>th</sup> Edition, 2001		
<b>E-Resources</b>		
1.	<a href="https://www.electronics-tutorials.ws/">https://www.electronics-tutorials.ws/</a>	
2.	<a href="https://nptel.ac.in/courses/117102061/">https://nptel.ac.in/courses/117102061/</a>	
3.	<a href="https://www.sciencedirect.com/topics/physics-and-astronomy/optical-device">https://www.sciencedirect.com/topics/physics-and-astronomy/optical-device</a>	


  
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Programme	B.E	Programme Code			103	Regulation	2019			
Department	<b>Electronics and Communication Engineering</b>				Semester		IV			
Course Code	Course Name			Periods Per Week		Credit	Maximum Marks			
				L	T	P	C	CA	ESE	Total
U23EC406	<b>Analog Integrated Circuits Laboratory</b>			0	0	2	1	60	40	100
Course Objective	The student should be made to, <ul style="list-style-type: none"> <li>Analyze the performance characteristics of opamp.</li> <li>Design &amp; test mathematical operations and applications using OP-Amp.</li> <li>Illustrate characteristics and of filter and voltage regulators.</li> <li>Implement analog to digital &amp; digital to analog conversion techniques.</li> <li>Examine the operation of Timer IC &amp; PLL</li> </ul>									
Course Outcome	At the end of the course, the student should be able to,								Knowledge Level	
	CO1: Evaluate the characteristics and different modes of operation of opamp.								K2	
	CO2: Design and construct Integrator & differentiator circuits.								K2	
	CO3: Understand performance of filter and regulators								K3	
	CO4: Demonstrate the types of ADC & DAC.								K3	
	CO5: Examine the operation of PLL								K2	
Pre-requisites	-									

CO/PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													CO/PSO Mapping		
COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2			2			2	2	2			2	2	2
CO2	3	2			2			2	2	2			2	2	
CO3	2	2			2			2	2	2			3	2	2
CO4	3	2			2			2	2	2			2	2	
CO5	3	2			2			2	2	2			2		


Course Assessment Methods	
<b>Direct</b>	1. Prelab and Postlab 2. Assignment 3. End-Semester examinations
<b>Indirect</b>	1. Course-end survey

List of Experiments		Course Outcome
1.	Measurement of op-amp parameters: i) Input bias current ii) Input offset voltage	CO1
2.	Construction of Inverting and Non inverting amplifiers using Op-Amp.	CO1

  
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3.	Construction and simulation of Integrator and Differentiator using Op-Amp.	CO2
4.	Design and simulation of an Instrumentation Amplifier & Schmitt Trigger using op-amp.	CO2
5.	Design & simulation of first order & second order filter types.	CO3
6.	Construction of Voltage Regulator using 78XX/79XX series.	CO3
7.	Implementation & of Simulation 4bit D/A Converter using R-2R ladder network & 4bit A/D Converter using flash type.	CO4
8.	Construction & testing of sample & hold circuit.	CO4
9.	Construction and simulation of different modes of multivibrator using IC555 timer.	CO5
10.	Design and testing of Phase locked loop.	CO5
<b>Total Periods</b>		<b>45</b>
<b>Text Books</b>		
1.	D.Roy Choudhry, Shail Jain, -Linear Integrated Circuits, New Age International Pvt. Ltd., 2018, Fifth Edition.	
2.	Op-Amps and Linear Integrated Circuits, Ramakant A Gayakwad, 4th Edition, Pearson Education, 2018.	
<b>E-Resources</b>		
1.	<a href="https://www.electronics-tutorials.ws/opamp/opamp_1.html">https://www.electronics-tutorials.ws/opamp/opamp_1.html</a>	
2.	<a href="https://www.allaboutcircuits.com/video-tutorials/op-amp-basics-introduction-to-the-operational-amplifier/">https://www.allaboutcircuits.com/video-tutorials/op-amp-basics-introduction-to-the-operational-amplifier/</a>	
3.	<a href="https://www.circuitbread.com/tutorials?tuts=operational+amplifiers">https://www.circuitbread.com/tutorials?tuts=operational+amplifiers</a>	
4.	<a href="https://www.electroschematics.com/tag/741-circuits/">https://www.electroschematics.com/tag/741-circuits/</a>	



  
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## **CAREER TRACK COURSE – I**

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Programme	B.E.			Programme code	103			Regulation	2023							
Department	Electronics and Communication Engineering						Semester			IV						
Course code	Course Name				Periods per week			Credit	Maximum Marks							
	L	T	P	C	CA	ESE	Total									
U23CTCE1	Entrepreneurial Mindset and Business Model Canvas				0	0	2	1	60	40	100					
Course Objective	The student should be made to, <ul style="list-style-type: none"> <li>• Cultivate an entrepreneurial mindset that embraces innovation and risk-taking.</li> <li>• Learn the components of the Business Model Canvas and develop skills using the Business Model Canvas as a tool for business planning.</li> <li>• Design innovative business models based on customer needs and market opportunities.</li> <li>• Understand the process of transforming a business model into a comprehensive business plan.</li> <li>• Understand the application processes and legal implications of business licenses and permits.</li> </ul>															
Course Outcome	At the end of the course, the student should be able to,										KL					
	CO1: Explain the key traits and behaviors of successful entrepreneurs.										K2					
	CO2: Identify and describe the components of the Business Model Canvas.										K2					
	CO3: Design innovative business models tailored to specific customer needs and market conditions.										K6					
	CO4: Demonstrate the ability to write comprehensive business plans, incorporating elements such as market analysis, financial projections, and operational strategies.										K4					
Pre-requisites	-										K2					
CO / PO Mapping												CO/PSO Mapping				
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak																
COs	Programme Outcomes (POs)												PSOs			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PSO4
CO 1	1	1	2	1	1			1	2	1	3	3	1	1		1
CO 2	2	1	3	3	2			1	2	1	3	3	1	1	2	
CO 3	2	1	3	2	3			1	2	1	3	3				2
CO 4	1	1	3	1	2			1	2	1	3	3				2
CO 5	1	1	3	1	2			1	2	1	3	3	1	1		1
Course Assessment Methods																
<b>Direct</b>																
1. Continuous Assessment through Reviews																
2. End Semester Examinations																
<b>Indirect</b>																
1. Course - end survey																

  
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Content of the syllabus			
<b>Unit - I</b>	<b>Introduction to Entrepreneurial Mindset</b>	Periods	<b>6</b>
Introduction-Evolution of the Concept of Entrepreneur - Characteristics of Successful Entrepreneurs - The Charms of Becoming an Entrepreneur - The Entrepreneurial Decision Process –Need and types of Entrepreneur – Role of Entrepreneurship in Economic Development -Women Entrepreneurship and Rural Entrepreneurship – Case Study – Opportunities Identification and Selection			
<b>Unit – II</b>	<b>Understanding the Business Model Canvas</b>	Periods	<b>6</b>
Definition of a Business Model- Types of Business Models -Customer Segments - Value Propositions – Channels and Partners - Customer Relationships - Revenue Model and Streams			
<b>Unit – III</b>	<b>Designing and Testing Business Models</b>	Periods	<b>6</b>
Key Resources - Key Activities - Key Partnerships - Cost Structure - Prototyping Business Models - Evaluating Business Models			
<b>Unit – IV</b>	<b>Business Model to Business Plan</b>	Periods	<b>6</b>
Business Plan - reasons for writing a Business Plan - who reads a business plan and what they're looking for - guidelines for writing an effective business plan - business plan Outline - present a business plan to potential investors.			
<b>Unit - V</b>	<b>Licenses, Permits and Funding</b>	Periods	<b>6</b>
Ethical culture in the entrepreneurial ventures – Dealing Effectively with legal Issues - Obtaining business licenses and permits – forms of Business Organization – Creating new-venture team – Skill Profile – case study – Need for Funding –Sources of Personal Funding, equity funding, debt financing			
<b>Total Periods</b>			<b>30</b>
<b>Text Books</b>			
<b>1</b>	Khanka. S.S., “Entrepreneurial Development” S.Chand and Co. Ltd., New Delhi, 2011, Revised Edition		
<b>2</b>	Osterwalder, A., & Pigneur, Y. “Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers” John Wiley & Sons, Inc., 2010		
<b>3.</b>	R. Duane Ireland Bruce R. Barringer “Entrepreneurship: Successfully Launching New Ventures”, Pearson Education. 2020, 6 <sup>th</sup> Edition		
<b>References</b>			
<b>1.</b>	Donald F Kuratko, “Entrepreneurship – Theory, Process and Practice”, Cengage Learning, 2016. 10 <sup>th</sup> Edition		
<b>2.</b>	Ries, E.” The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses “ , Currency, 2017, 9th Edition		
<b>E-Resources</b>			
<b>1.</b>	<a href="https://fastercapital.com/content/Entrepreneurship-Education-via-Business-Model-Canvas.html">https://fastercapital.com/content/Entrepreneurship-Education-via-Business-Model-Canvas.html</a>		
<b>2.</b>	<a href="https://online.bath.ac.uk/articles/business-models">https://online.bath.ac.uk/articles/business-models</a>		
<b>3.</b>	<a href="https://creately.com/guides/business-model-canvas-explained/">https://creately.com/guides/business-model-canvas-explained/</a>		

  
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Programme	<b>B.E.</b>		Programme code	<b>103</b>	Regulation	<b>2023</b>									
Department	<b>Electronics and Communication Engineering</b>			Semester	<b>IV</b>										
Course Code	Course Name			Periods per week			Credit	Maximum Marks							
	L	T	P	C	CA	ESE	Total								
<b>U23CTCP3</b>	<b>Verbal, Quantitative Aptitude and Reasoning - II</b>			2	0	0	1	40	60	100					
<b>Course Objective</b>	The student should be made to, <ul style="list-style-type: none"> <li>Identify and begin to apply the language features</li> <li>Understand the mathematical techniques for solving the real life problems</li> <li>Use number theory arguments to justify relationships involving divisors, multiples and factoring</li> <li>Perform well in all competitive exams</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,								<b>Knowledge Level</b>						
	CO1: Use language through acquisition of grammar rules								K2						
	CO2: Demonstrate the use of mathematical reasoning by justifying the patterns and relationships								K2						
	CO3: Face external competitive exams								K3						
	CO4: Solve a question in a fraction of minute using shortcut methods								K3						
<b>Pre-requisites</b>	-								K4						
	CO5: Enhance their problem solving skills and logical Skills								K4						
<b>CO / PO Mapping</b>												<b>CO/PSO Mapping</b>			
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
<b>CO 1</b>		2		3	2					3		3	1	1	3
<b>CO 2</b>	3	3		2	2					3		3	3	3	3
<b>CO 3</b>	3	3		3	2					3		3	2	2	2
<b>CO 4</b>	3	3		2	3					2		2	3	2	3
<b>CO 5</b>		2		2	2					2		2	3	3	3
<b>Course Assessment Methods</b>															
<b>Direct</b>															
1.Continuous Assessment Test I, II & III															
2.Assignments / Seminar/Quiz															
3.End-Semester Examination															
<b>Indirect</b>															
1.Course -end survey															
<b>Content of the syllabus</b>															
<b>Unit -I</b>	<b>VERBAL ABILITY</b>											Periods	<b>4</b>		
Verbal Analogy, Sentence completion, Gen-Z lexis <b>STATEMENT ANALYSIS:</b> Statements and Conclusions, Statements and Assumptions, Statements and Agreements, Cause and effect, Making Judgements.															

  
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<b>Unit-II</b>	<b>PROFIT AND LOSS</b>	Periods	<b>8</b>
<p><b>PROBLEMS ON PROFIT AND LOSS PERCENTAGE:</b> Profit Percentage, Cost Price and Selling Price are equal, Cost Price and Selling Price are different, Selling Price alone, Selling Price same for two objects, Selling Price and Cost Price are compared, Mixture, Profit Percentage and Loss Percentage are equal, False rate, Problems on Cost Price, Selling Price. Profit, Discount, Successive Discount and Discount Percentage.</p> <p><b>SIMPLE AND COMPOUND INTEREST:</b> Simple Interest: Find Principal, Amount, Rate of Interest, Number of Years, Simple Interest based on lend into two parts, in case of instalments. Compound Interest: Find Principal, Amount, Rate of Interest, Number of Years, Compound Interest, Simple Interest in co-relation with Compound Interest, Instalments, Population, Present Worth.</p>			
<b>Unit - III</b>	<b>TIME AND WORK</b>	Periods	<b>6</b>
Chain Rule, Combination of people working together, Individuals working together, Joining and Relieving, Efficiency Ratio Model, Works and Wages, Pipes open together: Doubling, Efficiency Ratio Model, Pipes opening and Closing, Capacity based model.			
<b>Unit- IV</b>	<b>TIME, SPEED AND DISTANCE</b>	Periods	<b>6</b>
Basic models, Ratio based model, Average speed based model, Relative speed based model, Algebra based model, Problems on Trains, Boats and Streams, Race and Games. Circular Track, Game based model.			
<b>Unit-V</b>	<b>LOGICAL REASONING</b>	Periods	<b>6</b>
<p><b>DIRECTION SENSE:</b> Direct yourself, based on Angle, Directional reference point, correct map based on wrong map, Direction in Clocks, Shadowing.</p> <p><b>SEATING ARRANGEMENT:</b> Linear Seating Arrangement, Single row Uni-Directional and Bi-Directional, Dual row, Triple row, Square, Rectangular and Triangular Arrangement, Seating Arrangement in photograph, Circular Arrangement, Inside and Outside (Linear and Circular), Concentric Arrangement.</p>			
<b>Total Periods</b>			<b>30</b>
<b>Text books</b>			
1.	Rajeev Varma, "Fast Track Objective Arithmetics", Arihant Publications, 2024		
2.	R.S. Aggarwal, "Modern Approach to Logical Reasoning", S Chand Publishing, 2022		
3.	SP Bakshi, "Objective General English", Arihant Publications, 2024		
<b>References</b>			
1	R.S. Aggarwal, "Quantitative Aptitude for Competitive Examinations", S Chand Publishing, 2013		
2.	Dinesh Khattar, "The Pearson guide to Quantitative Aptitude for Competitive Examinations", 3 <sup>rd</sup> edition, 2016		
3.	Arun Sharma, "How to Prepare for Logical reasoning for CAT", McGraw Hill Education, 2014		
4.	Jaikishan and Premkishan, "How to Crack Test of Reasoning", Arihant Publications, 2016		
5.	R.S. Agarwal, "A modern Approach to verbal and non-verbal reasoning", S Chand Publishing, 2018		
<b>E-Resources</b>			
1.	Aptitude: <a href="https://www.indiabix.com">https://www.indiabix.com</a>		
2.	Reasoning: <a href="https://placement.freshersworld.com">https://placement.freshersworld.com</a>		
3.	Verbal: <a href="https://testbook.com">https://testbook.com</a>		

  
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