



# **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**

(An Autonomous Institution Affiliated to Anna University-Chennai)

Approved by AICTE, New Delhi, Accredited by NAAC and NBA (Tier –I)

Elayampalayam, Tiruchengode – 637 205, Namakkal District, Tamilnadu.

## **CURRICULUM & SYLLABUS**

### **FOR**

## **B.E. COMPUTER SCIENCE AND ENGINEERING**

## **REGULATION 2023**

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

Curriculum and Syllabus (Semester I to IV)  
(Applicable to the students admitted from the academic year 2023 - 2024 onwards)



**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**  
**(Autonomous)**  
**Elayampalayam, Tiruchengode – 637205.**



**B.E. COMPUTER SCIENCE AND ENGINEERING**  
**REGULATION – 2023**

**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 empower women technocrats in the field of Computer Science and Engineering and prepare them for globalized high-tech society to orient them towards serving the dynamic needs of our nation.

**DEPARTMENT MISSION**

- To foster and strengthen the core competence of Computer Science by adopting innovative methods.
- To elevate the research, entrepreneurial and employability skills in women technocrats through quality education.
- To induce values of professional ethics and spirit of social commitment among the students.

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):**

### **PEO 1**

Graduates will have successful careers with strong fundamental and technical skills in industry that meet the needs of Indian and multinational companies.

### **PEO 2**

Graduates will become successful entrepreneurs with determination, development, self-reliance, leadership, ethic and moral values to exploit employability.

### **PEO 3**

Graduates will pursue higher education and engage in lifelong learning to foster personal and organizational growth.

## **PROGRAMME OUTCOMES (POs):**

Graduates of Computer Science and Engineering can able to:

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

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

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

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

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

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

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

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

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

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

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

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

**PROGRAM SPECIFIC OUTCOMES (PSOs)**

Graduates of Computer Science and Engineering can able to

**PSO1:** Develop computational solution to complex real world problems with modern programming tools



**PSO2:** Demonstrate basic knowledge of computer applications and apply standard practices in developing feasible solutions for IT enabled services

**MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES (PEO) WITH PROGRAMME OUTCOMES (PO)**

PEO	PROGRAMME OUTCOMES											
	Po1	Po2	Po3	Po4	Po5	Po6	Po7	Po8	Po9	Po10	Po11	Po12
<b>1</b>	√	√	√	√	√					√		√
<b>2</b>	√				√	√	√	√	√	√	√	√
<b>3</b>					√	√	√	√		√		√

### Credit Distribution – R2023

S.No	Category	Credit Per Semester								Total Credits
		1	2	3	4	5	6	7	8	
1.	<b>HSMC</b>	4	4							<b>8</b>
2.	<b>BSC</b>	8	8	4	4					<b>24</b>
3.	<b>ESC</b>	7	8							<b>15</b>
4.	<b>PCC</b>			15	17	14	14	7		<b>67</b>
5.	<b>PEC</b>					3	3	6	6	<b>18</b>
6.	<b>OEC</b>					3	3	3		<b>9</b>
7.	<b>EEC</b>	1		2	2	1	1	4	8	<b>19</b>
8.	<b>MC</b>									
9.	<b>CTC</b>				1	1	1			<b>3</b>
<b>Total</b>		<b>20</b>	<b>20</b>	<b>21</b>	<b>24</b>	<b>22</b>	<b>22</b>	<b>20</b>	<b>14</b>	<b>163</b>



	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205								
Programme	<b>B.E.</b>	Programme Code	101	Regulation	<b>2023</b>				
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>I</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>									
U23MA101	Matrices and Calculus*	BSC	3	1	0	4	40	60	100
U23EN101	English For Communication*	HSMC	3	0	0	3	40	60	100
U23PH101	Engineering Physics <sup>§</sup>	BSC	3	0	0	3	40	60	100
U23CS101	Programming for Problem Solving*	ESC	3	0	0	3	40	60	100
U23TA101	<b>தமிழர் மரபு</b> / 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>									
U23PH102	Physics Laboratory <sup>§</sup>	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	-	-	-
U23MCFY1	Environmental Science and Engineering <sup>§</sup>	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

<sup>§</sup> Common for CSE, CST, IT & BT

Signature of BoS Chairperson

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Programme	<b>B.E.</b>	Programme Code	101	Regulation	<b>2023</b>				
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>II</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>									
U23MA202	Complex Analysis and Ordinary Differential Equations*	BSC	3	1	0	4	40	60	100
U23CH201	Engineering Chemistry <sup>\$</sup>	BSC	3	0	0	3	40	60	100
U23EE201	Basic Electrical and Electronics Engineering <sup>#</sup>	ESC	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>									
U23CS204	Object Oriented Programming <sup>@</sup>	ESC	3	0	2	4	50	50	100
U23EN202	Professional Communication*	HSMC	2	0	3	3	50	50	100
<b>PRACTICAL</b>									
U23CH202	Chemistry Laboratory <sup>\$</sup>	BSC	0	0	2	1	60	40	100
U23GE204	Engineering Practices Laboratory*	ESC	0	0	3	1	60	40	100
<b>MANDATORY COURSES</b>									
U23MCFY2	Indian Constitution <sup>\$</sup>	MC	2	0	0	0	100	-	100
<b>Total</b>						<b>20</b>	<b>480</b>	<b>420</b>	<b>900</b>

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

\*Common for all branches



#Common for BT, CSE, CST & IT

@Common for CSE, IT & CST

<sup>\$</sup> Common for CSE, CST, IT & BT

U23CS203 – Python Programming (EEE, ECE, BT, BME)

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Programme	<b>B. E.</b>	Programme Code	101	Regulation	<b>2023</b>					
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>III</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	Total
<b>THEORY</b>										
U23MA304	Discrete Mathematics <sup>\$</sup>	BSC	3	1	0	4	40	60	100	
U23IT302	Data Structures <sup>#</sup>	PCC	3	0	0	3	40	60	100	
U23IT404	Database Management Systems <sup>\$</sup>	PCC	3	0	0	3	40	60	100	
U23CS305	Computer Organization and Architecture <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>										
U23CS306	Python Programming and Frameworks <sup>*</sup>	PCC	3	0	2	4	50	50	100	
<b>PRACTICAL</b>										
U23IT303	Data Structures Laboratory <sup>#</sup>	PCC	0	0	2	1	60	40	100	
U23IT406	Database Management Systems Laboratory <sup>\$</sup>	PCC	0	0	2	1	60	40	100	
U23CTCP2	Personality Development	EEC	1	0	2	1	60	40	100	
<b>Total</b>						<b>21</b>	<b>430</b>	<b>470</b>	<b>900</b>	



<sup>\$</sup> Common for CSE, IT & CST

<sup>\*</sup> Common for CSE, IT

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



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Programme	<b>B. E.</b>	Programme Code	101	Regulation	<b>2023</b>					
Department	<b>COMPUTER SCIENCE AND 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	Total
<b>THEORY</b>										
U23MA405	Probability and Statistics <sup>\$</sup>	BSC	3	1	0	4	40	60	100	
U23CS407	Theory of Computation	PCC	3	0	0	3	40	60	100	
U23CS408	Design and Analysis of Algorithms*	PCC	3	0	0	3	40	60	100	
U23IT301	Digital Systems Design*	PCC	3	0	0	3	40	60	100	
U23CS409	Web Technology	PCC	3	0	0	3	40	60	100	
U23ADL01	Additional Language	EEC	3	0	0	2	40	60	100	
<b>THEORY INTEGRATED WITH PRACTICAL</b>										
U23CT406	Operating Systems <sup>\$</sup>	PCC	3	0	2	4	50	50	100	
<b>PRACTICAL</b>										
U23CS410	Web Technology Laboratory	PCC	0	0	2	1	60	40	100	
<b>CAREER TRACK COURSE</b>										
	Career Track Course - I	CTC	2/0	0	0/2	1	40/60	60/40	100	
<b>Total</b>						<b>24</b>	<b>390/ 410</b>	<b>510/ 490</b>	<b>900</b>	

<sup>\$</sup> Common for CSE, IT & CST



\* Common for CSE, IT

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Programme	<b>B. E.</b>	Programme Code	101	Regulation	<b>2023</b>					
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>V</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	Total
<b>THEORY</b>										
U23CS511	Artificial Intelligence <sup>\$</sup>	PCC	3	0	0	3	40	60	100	
U23CT406	Computer Networks <sup>\$</sup>	PCC	3	0	0	3	40	60	100	
U23CS512	Compiler Design <sup>\$</sup>	PCC	3	0	0	3	40	60	100	
U23CS513	Microprocessor and Embedded System <sup>\$</sup>	PCC	3	0	0	3	40	60	100	
	Professional Elective – I	PEC	3	0	0	3	40	60	100	
	Open Elective -I	OEC	3	0	0	3	40	60	100	
<b>PRACTICAL</b>										
U23CT407	Computer Networks Laboratory <sup>\$</sup>	PCC	0	0	2	1	60	40	100	
U23CS514	Microprocessor and Embedded System Laboratory*	PCC	0	0	2	1	60	40	100	
U23CS515	Mini Project – I	EEC	0	0	2	1	100	-	100	
<b>CAREER TRACK COURSE</b>										
	Career Track Course - II	CTC	2	0	0	1	40	60	100	
<b>Total</b>						<b>22</b>	<b>500</b>	<b>500</b>	<b>1000</b>	

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Programme	<b>B. E.</b>	Programme Code	101	Regulation		<b>2023</b>			
Department	<b>COMPUTER SCIENCE AND 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>									
U23CS616	Cloud Computing	PCC	3	0	0	3	40	60	100
U23CT508	Machine Learning <sup>\$</sup>	PCC	3	0	0	3	40	60	100
U23CT715	Internet of Things <sup>\$</sup>	PCC	3	0	0	3	40	60	100
U23IT405	Agile Software Engineering*	PCC	3	0	0	3	40	60	100
	Professional Elective – II	PEC	3	0	0	3	40	60	100
	Open Elective -II	OEC	3	0	0	3	40	60	100
<b>PRACTICAL</b>									
U23CT717	Internet of Things Laboratory <sup>\$</sup>	PCC	0	0	2	1	60	40	100
U23CT509	Machine Learning Laboratory <sup>\$</sup>	PCC	0	0	2	1	60	40	100
U23CS617	Mini Project – II	EEC	0	0	2	1	100	-	100
<b>CAREER TRACK COURSE</b>									
	Career Track Course - III	CTC	2	0	0	1	40	60	100
<b>Total</b>						<b>22</b>	<b>500</b>	<b>500</b>	<b>1000</b>

<sup>\$</sup> Common for CSE, IT & CST

\* Common for CSE, IT

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Programme	<b>B. E.</b>	Programme Code	101	Regulation	<b>2023</b>				
Department	<b>COMPUTER SCIENCE AND 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>									
U23CS718	Cyber Security	PCC	3	0	0	3	40	60	100
U23IT712	Big Data Analytics*	PCC	3	0	0	3	40	60	100
	Professional Elective – III	PEC	3	0	0	3	40	60	100
	Professional Elective – IV	PEC	3	0	0	3	40	60	100
	Open Elective –III	OEC	3	0	0	3	40	60	100
<b>PRACTICAL</b>									
U23CS719	Data Analytics Laboratory	PCC	0	0	2	1	60	40	100
U23CS720	Project Phase - I	EEC	0	0	4	2	60	40	100
U23CS721	Internship Training	EEC	0	0	4	2	100	-	100
<b>Total</b>						<b>20</b>	<b>460</b>	<b>380</b>	<b>840</b>

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Programme	<b>B. E.</b>	Programme Code	101	Regulation	<b>2023</b>				
Department	<b>COMPUTER SCIENCE AND 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>THEORY</b>									
	Professional Elective – V	PEC	3	0	0	3	40	60	100
	Professional Elective – VI	PEC	3	0	0	3	40	60	100
<b>PRACTICAL</b>									
U23CS822	Project Phase - II	EEC	0	0	16	8	60	40	100
<b>Total</b>						<b>14</b>	<b>140</b>	<b>160</b>	<b>300</b>

Total Credits: 163

**LIST OF CAREER TRACKS COURSES**

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

# **Semester – I**

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205														
Programme	<b>B.E.</b>	Programme Code			<b>101</b>	Regulation		<b>2023</b>							
Department	<b>COMPUTER SCIENCE AND 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>	<p>The Main Objective of the course is</p> <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>														
<b>Course Outcome</b>	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.							K3							
	<b>CO2:</b> Apply differential calculus tools in solving various application problems.							K4							
	<b>CO3:</b> Able to use differential calculus ideas on several variable functions.							K5							
	<b>CO4:</b> Apply different methods of integration in solving practical problems.							K5							
<b>CO5:</b> Apply multiple integral ideas in solving areas, volumes and other practical problems.							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>	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		
CO 2	3	3	2		1								2		
CO 3	3		2	1									2		
CO 4	3	2	2	1	1								2		
CO 5	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>			
<b>Unit – I</b>	<b>MATRICES</b>	Periods	<b>9+3</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>9+3</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>9+3</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>9+3</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 on $\int_0^{\frac{\pi}{2}} \cos^n x dx$ , $\int_0^{\frac{\pi}{2}} \sin^n x dx$ .			
<b>Unit - V</b>	<b>MUTIPLE INTEGRALS</b>	Periods	<b>9+3</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>45+15=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, 45 <sup>th</sup> Edition, 2024.		
<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, 7th Edition, 2009.		
3.	Thomas. G. B., Hass. J, and Weir. M.D, “Thomas Calculus “, 14th Edition, Pearson India, 2018.		
4.	Anton H, Calculus: Early Transcendentals, 10th 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>		



**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**

(Autonomous Institution, Affiliated to Anna University, Chennai)  
Elayampalayam, Tiruchengode – 637 205



Programme	<b>B.E.</b>	Programme Code	<b>101</b>	Regulation	<b>2023</b>				
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>I</b>				
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	
<b>Course Objective</b>	<p>The main objective of this course is to:</p> <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>								
<b>Course Outcome</b>	At the end of the course, the student should be able 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>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>	
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
<b>CO 1</b>						2			3	3		3		
<b>CO 2</b>						2			3	3		3		
<b>CO 3</b>						2			3	3		3		
<b>CO 4</b>						2			3	3		3		
<b>CO 5</b>						2			3	3		3		

**Course Assessment Methods**

**Direct**



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

**Indirect**



1. Course - end survey

Signature of BoS Chairperson



Content of the syllabus			
<b>Unit – I</b>		Periods	<b>9</b>
<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).			
<b>Unit – II</b>		Periods	<b>9</b>
<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			
<b>Unit – III</b>		Periods	<b>9</b>
<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& lengthy e-mails with emphasis on Brevity, Clarity, Coherence and Cohesion), <b>Focus on Language</b> -Sequential Connectives, Impersonal Passive			
<b>Unit – IV</b>		Periods	<b>9</b>
<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.			
<b>Unit – V</b>		Periods	<b>9</b>
<b>Listening</b> - Listening to understand Modulation, Listening to Welcome Speeches, <b>Speaking</b> - Delivering Welcome Address, Understanding Segmental and Supra-segmental 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.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	Dr. S. R. Kannan & Faculty from the Department of English -English for Communication, Karun Printers Pvt. Ltd, 2023.		
2.	Sokkaalingam, S.R.M., The Art Of Speaking, English Versatile Publishing House, 2019.		
<b>References</b>			
1.	Dr. Padma Ravindran, Poorvadevi, M. Y. Abdur Razack- English for life, English for work, 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-chemist/summary.html">http://www.sparknotes.com/lit/the-chemist/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>		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E.</b>	Programme Code			<b>101</b>	Regulation		<b>2023</b>						
Department	<b>Computer Science and Engineering</b>				Semester		<b>I</b>							
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks								
		L	T	P	C	CA	ESE	Total						
<b>U23PH101</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					
<ul style="list-style-type: none"> <li>learn the optical properties of materials and its uses</li> </ul>								K3						
<b>Pre-requisites</b>	---													
<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	PSO1	PSO 2
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
<b>Course Assessment Methods</b>														
<b>Direct</b>														
1. Continuous Assessment Test I, II & III 2. Assignments and Mind map 3. End-Semester examinations														
<b>Indirect</b>														
Course - end survey														
<b>Content of the syllabus</b>														



Unit – I	PROPERTIES OF MATTER	Periods	9
<p><b>Elasticity:</b> Types of moduli of elasticity - Poisson's ratio - Stress - Strain Diagram – uses - Hooke's law. Young's modulus: Uniform bending (qualitative) Experimental determination by non-uniform bending - Twisting couple on a wire – Application: I shape girders, Torsional pendulum.</p> <p><b>Viscosity:</b> Co-efficient of viscosity - Poiseuille's formula - Experimental determination – uses.</p>			
Unit - II	ELECTRICAL PROPERTIES OF METALS	Periods	9
<p><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.</p> <p><b>Quantum theory:</b> de Broglie's hypothesis - Schrodinger's time independent and time dependent wave equations - Fermi – Dirac Statistics - Density of energy states (Qualitative).</p>			
Unit – III	CRYSTAL PHYSICS AND ULTRASONICS	Periods	9
<p><b>Crystallography:</b> 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 - Crystal defects – point and line defects (qualitative).</p> <p><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.</p>			
Unit - IV	SEMICONDUCTING & MODERN ENGINEERING MATERIALS	Periods	9
<p><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.</p> <p><b>Metallic glasses:</b> preparation, properties and applications - Shape memory alloys (SMA): Characteristics and applications of NiTi alloy.</p>			
Unit – V	LASER AND FIBER OPTICS	Periods	9
<p><b>Laser:</b> Interactions of Radiations with matters - Characteristics of laser – Derivation of Einstein's A and B coefficients. Types: CO<sub>2</sub> laser - Semiconductor laser: Homo junction - Applications.</p> <p><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.</p>			
<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.		
3.	Dr.A.Panneerselvam and Dr.P.Mani, "Engineering Physics", Dhanam publisher, Chennai – 600 042. (2024)		
<b>References</b>			
1.	B.K. Pandey, S. Chaturvedi. "Engineering Physics", 1 <sup>st</sup> Edition, Cengage Learning India Pvt Ltd, (2012).		
2.	David Halliday, Robert Resnick Jearl Walker, Fundamentals Of Physics Extended 8/Ed 8th Edition, 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.	physics.cu.ac.bd		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E./B.Tech.</b>	Programme Code				Regulation		<b>2023</b>						
Department	<b>All Branches</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							
<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	PSO1	PSO 2
<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 examinations														
<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>					
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.Malliga, C. S. Kanimozhi and K.Kousalya, “Problem Solving and Programming”, 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>			
1.	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>		

	<b>VIVEKANANDHACOLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University Chennai) Elayampalayam, Tiruchengode – 637 205								
Programme	B.E	Programme code		101	Regulation		2023		
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester			I		
Course code	Course name	Periods per week			Credit	Maximum Marks			
		L	T	P		C	CA	ESE	Total
U23TA101	Heritage of Tamils / தமிழர் மரபு	1	0	0	1	40	60	100	
<b>Content of the syllabus</b>									
அலகு 1	மொழி மற்றும் இலக்கியம்				Periods	3			
இந்திய மொழிக்குடும்பங்கள் – திராவிடமொழிகள் – தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் – சங்க இலக்கியத்தின் சமயச் சார்பற்றத்தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் திருக்குறளில் மேலாண்மைக்கருத்துக்கள் – தமிழ்க்காப்பியங்கள் – தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் – பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசனின் பங்களிப்பு.									
அலகு 2	மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக்கலை				Periods	3			
நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன்சிலைகள் – பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப்பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறதெய்வங்கள் – குமரிமுனையில் திருவள்ளூர் சிலை – இசைக்கருவிகள் – மிருதங்கம், பறை, யாழ், வீணை, நாதஸ்வரம் – தமிழர்களின் பொருளாதார வாழ்வில் கோவில்களின் பங்கு.									
அலகு 3	நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுக்கள்				Periods	3			
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஓயிலாட்டம் ,தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம் , தமிழர்களின் விளையாட்டுக்கள்.									
அலகு 4	தமிழர்களின் திணைக்கோட்பாடுகள்				Periods	3			
தமிழகத்தின் தாவரங்களும் விலங்குகளும்– தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடுகள் – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவு, கல்வியறிவு – சங்ககால நகரங்களும் துறைமுகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.									
அலகு 5	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்கு				Periods	3			
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப்பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில் சித்தமருத்துவத்தின் பங்கு – கல்வெட்டுகள் கையெழுத்துப்புகள் – தமிழ்ப்புத்தகங்களின் அச்சுவரலாறு.									
					<b>Total Periods:</b>	<b>15</b>			



	<b>VIVEKANANDHACOLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	B.E	Programme code	101	Regulation	2023			
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	I			
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA101	Heritage of Tamils / தமிழர் மரபு	1	0	0	1	40	60	100
	Content of the syllabus							
UNIT I	<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 Azhwars and Nayanmars – Forms of minor Poetry– Development of Modern literature in Tamil–Contribution of Bharathiyar and Bharathidhasan.								
UNIT II	<b>HERITAGE-ROCK ART PAINTINGS TO MODERN ART–SCULPTURE</b>				<b>Periods</b>	<b>3</b>		
Herostone to modern sculpture - Bronzeicons- Tribes and their handicrafts- Art of temple car making—Massive Terracotta sculptures Villagedeties , Thiruvalluvar Statue at Kanyakumari, Making of musical instruments-Mridhangan,Parai Veenai,Yazhand Nadhaswaram – Role of Temples in Social and Economic Life of Tamils .								
UNIT III	<b>FOLK AND MARTIAL ARTS</b>				<b>Periods</b>	<b>3</b>		
Therukoothu, Karagattam, VilluPattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance- Sports and Games of Tamils.								
UNIT IV	<b>THINAI CONCEPT OF TAMILS</b>				<b>Periods</b>	<b>3</b>		
Flora and Fauna of Tamils & Ahamand Piram Concept from Tholkappiyam and Sangam Literature- Aram Concept of Tamils- Education and Literacy during Sangam Age- Ancient Cities and Portso Sangam Age-Export and Import during Sangam Age- Overseas Conques to Cholas.								
UNIT V	<b>CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE</b>				<b>Periods</b>	<b>3</b>		
Contribution of tamils to Indian Freedom Struggle-The Cultural Influence of Tamils over the other parts of India-Self-Respect Movement- Role of Siddha Medicine in Indigenous Systems of Medicine–Inscriptions & Manuscripts— Print History of Tamil Books.								
					<b>Total Periods</b>	<b>15</b>		

TEXT-CUM-REFERENCE BOOKS

1	தமிழக வரலாறும் - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3	கீழுடி - வைகை நதிக்கரையில் சங்க நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4	பொருதை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் வெளியீடு)
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.Singaraveln) (Published by: International Institute of Tamil Studies)
7	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirumavukkarasu) (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) (Publishedby: 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>101</b>	Regulation	<b>2023</b>									
Department	<b>Computer Science and 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>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>CO 1</b>	3	3	3	3	3	-	-	-	-	-	-	-	3	2
<b>CO 2</b>	3	3	2	2	2	-	-	-	-	-	-	-	2	-
<b>CO 3</b>	3	2	2	2	3	-	-	-	-	-	-	-	2	2
<b>CO 4</b>	3	2	3	3	2	-	-	-	-	-	-	-	3	3
<b>CO 5</b>	3	3	2	3	3	-	-	-	-	-	-	-	2	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														

<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 Book:</b>			
1.	Basant Agrawal and C.M Agrawal ,“Engineering Drawing ”,Tata McGraw Hill ,2019		
2.	Jain and Gautam ,“Engineering Graphics & Design ”,Khanna Publishing House, 2020		
<b>Reference Book :</b>			
1.	Dr.P.Kannan and Dr.J.Bensam Raj, “Engineering Graphics”, JBR Tri Sea Publishers Pvt. Ltd,2024		
2.	K.V Natarajan, "Engineering Drawing and Graphics", M/s. N.Dhanalakshmi, Chennai,2020		
3.	K.Venugopal and V. Prabhu Raja, “Engineering Graphics”New Age International Publishers,2016		
4.	N.S Parthasarathy and Velamurali, “ Engineering Graphics”, Oxford University, New Delhi,2015		
5.	Bhatt N.D and Panchal V.M, “Engineering Drawing”, Charotar Publishing House,2014		
<b>e-RESOURCES:</b>			
1.	<a href="http://nptel.ac.in/courses/105104148">http://nptel.ac.in/courses/105104148</a> , “Engineering Graphics” - Dr. Nihar Ranjan Patra , IIT Kanpur		
2.	<a href="http://cf.annauniv.edu/webcontent.htm">http://cf.annauniv.edu/webcontent.htm</a> , “Engineering Graphics” - Dr.Velamurali		
3.	<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>101</b>	Regulation	<b>2023</b>			
Department	<b>Computer Science and 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>	-							

COs	<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	
	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
<b>CO 1</b>	2	3	3	3	3	2	2	3	3	3	2	2	3	3
<b>CO 2</b>	3	3	3	3	3	3	3	3	3	3	3	3	2	2
<b>CO 3</b>	3	3	1	2	2	2	2	1	2	1	-	-	2	2
<b>CO 4</b>	3	3	3	3	3	2	2	2	2	2	2	1	2	2
<b>CO 5</b>	3	3	3	3	1	2	2	2	1	2	2	1	2	2



**Course Assessment Methods**

<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

**Content of the Syllabus**

<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>
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 Lewrick, Wiley 2020	
2.	Design thinking playbook by Michael Lewrick, Wiley 2019	
3.	Creative Confidence: Unleashing the Creative Potential Within Us All by Tom 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>101</b>	Regulation	<b>2023</b>									
Department	<b>Computer Science and Engineering (CSE)</b>			Semester	<b>I</b>									
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks								
		L	T	P		C	CA	ESE	Total					
<b>U23PH102</b>	<b>PHYSICS LABORATORY</b>	0	0	3	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>Pre-requisites</b>	<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>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	

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

1. Prelab and post lab test
2. Execution of experiment and Viva-Voce
3. End-Semester examinations

**Indirect**

Course - end survey



**Content of the syllabus****PHYSICS LABORATORY**

<b>S.No</b>	<b>Experiments</b>	<b>CO</b>
1.	Determination of Young's modulus of the material - Uniform bending method	<b>CO1</b>
2.	Determination of Young's modulus of the material - Non uniform bending method	<b>CO1</b>
3.	Determination of Rigidity modulus – Torsion pendulum	<b>CO1</b>
4.	Determination of Coefficient of viscosity of a liquid – Poiseuille's method	<b>CO2</b>
5.	Determination of thickness of a thin material – Air wedge method	<b>CO2</b>
6.	Determination of wavelength of mercury spectrum – spectrometer grating	<b>CO3</b>
7.	Determination of Dispersive power of a prism – Spectrometer	<b>CO3</b>
8.	Determination of thermal conductivity of metallic glass using Lee's Disc Method	<b>CO4</b>
9.	Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer	<b>CO4</b>
10.	Determination of Wavelength and particle size using Laser	<b>CO5</b>
<b>Total Periods</b>		<b>30</b>



**Lab Manual**

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.
3.	Dr.P.Mani, "Physics laboratory manual ", Dhanam publisher, Chennai – 600 042. (2024)
4.	Dr.G.Senthil Kumar, "Physics laboratory manual", VRB Publishers Private Limited, Chennai. 2024.





	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E. / B.Tech.,</b>	Programme Code			Regulation		<b>2023</b>							
Department	<b>All Branches</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		
	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
<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	
6. You are given an input string 'S'. Your task is to find and return all possible permutations of the input string. <b>Note:</b> 1. The input string may contain the same characters, so there will also be the same permutations.													CO2	

<p>2. The order of permutation does not matter.</p> <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>	
<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. LCM of 3 and 5 = 3×5=15</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>45</b>
<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		101	Regulation		<b>2023</b>						
Department	<b>Computer Science and Engineering</b>				Semester		<b>I</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					
<b>Course Objective</b>	<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.</li> </ul> <p>Summarize population growth, human rights and Environment</p>												
<b>Course Outcome</b>	At the end of the course, the student should be able 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						
<b>Pre-requisites</b>	<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>CO 1</b>	1	2	2			2	3				2	2	
<b>CO 2</b>	3	2	2		1	2	3				1	3	3
<b>CO 3</b>	3	2	2		1	3	3				1	2	3
<b>CO 4</b>	1	1	1			2	3				1	2	2
<b>CO 5</b>	1	2	1			2	2				1	3	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>													
<b>Unit – I</b>	<b>INTRODUCTION TO ENVIRONMENTAL SCIENCE AND ENGINEERING</b>										Periods	<b>6</b>	
Nature and scope of environmental education- natural resources – (forest, water, food,& land resources) problems and remedial measures. Ecosystem-Structure, characteristics and functions of ecosystem . Biodiversity – definition – conservation of biodiversity (in-situ and Ex-situ)-environmental awareness and sustainable development.													

<b>Unit – II</b>	<b>ENVIRONMENTAL POLLUTION AND ITS CONTROL</b>	Periods	<b>6</b>
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).			
<b>Unit – III</b>	<b>SOCIAL ISSUES AND SUSTAINABILITY</b>	Periods	<b>6</b>
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.			
<b>Unit – IV</b>	<b>SUSTAINABILITY PRACTICES AND ENVIRONMENTAL LEGISLATION</b>	Periods	<b>6</b>
Zero waste and R-concept-circular economy, material life cycle assessment- energy efficiency and management-environmental legislation-air act, water act-wildlife protection act-environmental protection act.			
<b>Unit – V</b>	<b>Human population and the environment</b>	Periods	<b>6</b>
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, GeographicalInformation System (GIS), Environmental impact Analysis (EIA) and human health.			
<b>Total Periods</b>			<b>30</b>
<b>Text Books</b>			
1.	Dr.S. Vairam - “Environment Science and Engineering” Gems publication. Edition 2018		
2.	Gilbert.M.Masters-“Environmental Science”-Pearson education. Edition-2-2013		
3.	Dr.S.Mageswari, Dr.G.Vijayakumar, Ms. A. Preethi-“Environment Science and Engineering” RK Publication. Edition 2022.		
<b>References</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.	Cunnighum and cooper-“Environmental Science”-Jaico Publ, House Edition-4-2007		
<b>E-Resources</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>		

# **Semester – II**



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Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>II</b>																																																																																																																																																	
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<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>• 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.						K4																																																																																																																																															
	<b>CO2:</b> Understand the concepts of cauchy's integral theorem and residue theorem in evaluation of complex integrals.						K3																																																																																																																																															
	<b>CO3:</b> Explore the concepts of Green's , Stoke's and Gauss Divergence theorems in real life problems.						K5																																																																																																																																															
	<b>CO4:</b> Understand the concepts of solving second order differential equations.						K5																																																																																																																																															
<b>CO5:</b> Apply the concepts of Laplace transform in solving ODE.						K3																																																																																																																																																
<b>Pre-requisites</b>	-																																																																																																																																																					
<table border="1"> <thead> <tr> <th colspan="13">CO / PO Mapping</th> <th colspan="3">CO/PSO Mapping</th> </tr> <tr> <th colspan="16">(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>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>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td></td> <td></td> </tr> <tr> <td>CO 2</td> <td>3</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></td> <td>2</td> <td></td> <td></td> </tr> <tr> <td>CO 3</td> <td>3</td> <td>2</td> <td></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> <td></td> </tr> <tr> <td>CO 4</td> <td>3</td> <td>2</td> <td></td> <td>1</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td></td> <td></td> </tr> <tr> <td>CO 5</td> <td>3</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></td> <td>2</td> <td></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	PSO 1	PSO 2	PSO 3	CO 1	3	2	1	1	1								2			CO 2	3	2	1	1									2			CO 3	3	2		1									2			CO 4	3	2		1	1								2			CO 5	3	2	1	1									2		
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<b>Unit – I</b>	<b>ANALYTIC FUNCTIONS</b>	<b>Periods</b>	<b>9+3</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>	<b>Periods</b>	<b>9+3</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>	<b>Periods</b>	<b>9+3</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>	<b>Periods</b>	<b>9+3</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>	<b>Periods</b>	<b>9+3</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>45+15=60</b>
<b>Text Books</b>			
1.	Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 45 <sup>th</sup> Edition, 2024.		
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 &gt; wiki &gt; Ordinary_differential_equation</a>		
2.	www.learnerstv.com/Free-engineering-Video-lectures		
3.	www.nptel.ac.in		



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Programme	<b>B.E</b>		Programme Code				<b>101</b>		Regulation		<b>2023</b>			
Department	<b>Computer Science and Engineering</b>						Semester		<b>II</b>					
Course Code	Course Name			Periods Per Week			Credit	Maximum Marks						
				L	T	P		C	CA	ESE	Total			
<b>U23CH201</b>	<b>Engineering Chemistry</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>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> </ul> Gain knowledge in destruction and protection of metals for engineering applications.													
<b>Course Outcome</b>	The students who complete this course successfully are expected to:										Know ledge 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			
<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														
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
CO 1	3	3	3	2	1	2	2	2					1	1
CO 2	3	2	2	2		2	2	1					2	2
CO 3	3	2	2	3	2	1	2	1					2	1
CO 4	3	3	2	2	1	1	3	2					3	2
CO 5	3	3	3	2	1	2	2	1					2	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														
<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, 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, Electrodialysis. 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 (Factors influencing 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, nylon6, nylon 66, 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
Non renewable 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-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), and electro less plating (Ni).			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	Dr.S.Mageswari, Dr.K.Balachandran, M.S.Viswaksenan, Engineering Chemistry : First Edition, RK publication, Edition-2022.		
2.	O.G.Palanna, “Engineering Chemistry “Tata Mc GrawHill PVT,Ltd. Second Edition -2017		
<b>References</b>			
1.	P. C. Jain and Monica Jain, “Engineering Chemistry”, 17th Edition, DhanpatRai Publishing company (P) Ltd, New Delhi, 2018.		
2.	Arun Bahl, B.S. Bahl, G.D. Tuli, “Essentials of Physical Chemistry” Published by S. Chand & Company Ltd, 2014		
3.	Sashi Chawla, Dhanpat Rai & Co (pvt.)Ltd.”Engineering Chemistry” 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>		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205														
Programme	<b>B.E./B.Tech</b>	Programme Code				Regulation		<b>2023</b>							
Department	<b>CSE</b>				Semester		<b>II</b>								
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23EE201</b>	<b>Basic Electrical and Electronics Engineering</b>	3	0	0	3	40	60	100							
<b>Course Objective</b>	The students should made to <ul style="list-style-type: none"> <li>• Introduce the basics of electric circuits and analysis</li> <li>• Impart knowledge in the basics of working principles and application of electrical machines</li> <li>• Learn the electrical wiring methods</li> <li>• Analyze the characteristics of Semiconductor devices</li> <li>• Educate on the fundamental concepts of digital electronics and introduce the functional elements and working of measuring instruments</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 basics of electric circuits and type of the connection							K2							
	<b>CO2:</b> Understand the basics of electromagnetic laws and basic working principle of DC and AC machines.							K2							
	<b>CO3:</b> Understand the concepts of tariff, energy saving, illumination, electric lamps and safety measures.							K2							
	<b>CO4:</b> Understand the basic operating characteristics of semiconductor devices.							K2							
	<b>CO5:</b> Understand the fundamentals of digital logics and measuring instruments							K2							
<b>Pre-requisites</b>	Basic concepts and understanding of magnetic fields														
<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	PSO1	PSO 2	
CO 1	3	2	1					1				3	3		
CO 2	3	2	1					1				3	3		
CO 3	3	1	1					1				3	3		
CO 4	3	2	1					1				3	3		
CO 5	3	2	1					1				3	3		
<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>															
<b>Unit – I</b>	<b>INTRODUCTION OF ELECTRICAL CIRCUITS</b>											Periods	<b>9</b>		
Definition of Voltage, Current, Power, Energy, Power factor, Circuit parameters, Ohm’s law, Kirchoff’s law Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Real power, Reactive															



power and Apparent power, Power factor. Introduction to three phase systems - types of connections Concept of DC circuits.			
<b>Unit - II</b>	<b>ELECTRICAL MACHINES AND ITS APPLICATIONS</b>	Periods	<b>9</b>
Faraday's laws of electromagnetic induction - Lens law - Fleming's left hand rule and Right hand rule. Working principle and construction of AC and DC machines - Construction, Working principle and Applications of single phase Transformer. Motor used for domestic applications.			
<b>Unit – III</b>	<b>WIRING AND ILLUMINATION</b>	Periods	<b>9</b>
Types of wiring-staircase and corridor wiring - wiring accessories. Different types of safety measures - Earthing. Electrical tariff -Energy conservation. Simple layout of power system-various energy resources, The Laws of Illumination- Different types of electrical lamps.			
<b>Unit - IV</b>	<b>SEMICONDUCTOR DEVICES</b>	Periods	<b>9</b>
PN junction diodes - Zener diodes - characteristics. Transistors: PNP and NPN transistors - Theory of operation - Transistor configurations -characteristics - comparison. Special semiconductor devices: FET - SCR - LED – V-I characteristics – Rectifier and Inverters -UPS – SMPS.			
<b>Unit – V</b>	<b>DIGITAL FUNDAMENTALS AND MEASUREMENTS</b>	Periods	<b>9</b>
Number systems - Boolean Theorems – DeMorgan's Theorem - Logic gates -Implementation of Boolean Expression using Gates - SOP and POS forms- Functional elements of an instrument, Standards and calibration, Operating Principle of Ammeters and Voltmeters.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	S.K.Bhattacharya, “Basic Electrical and Electronics Engineering”, Pearson,2017		
2.	D.P. Kotharti and I.J Nagarath, “Basic Electrical and Electronics Engineering”, Mc Graw Hill, Third Edition, 2020.		
<b>References</b>			
1.	S.B. Lal Seksena and Kaustuv Dasgupta, “Fundaments of Electrical Engineering”, Cambridge, 2016		
2.	Mittle,Mittal, Basic Electrical Engineering, 2nd Edition, Tata McGraw-Hill Edition, 2016.		
3.	T.K. Nagsarkar and M.S. Sukhija, “Basic Electrical Engineering”, Oxford, 2017.		
4.	John Bird, “Electrical and Electronic Principles and Technology”, Fourth Edition, Elsevier, 2010.		
5.	K MurugeshKumar, “Elements of Electrical Engineering”, Vikas Publishing House Pvt. Ltd.2011.		
<b>E-Resources</b>			
1.	<a href="https://nptel.ac.in/courses">https://nptel.ac.in/courses</a>		
2.	<a href="https://www.electrical4u.com/electrical-engineering-articles/illumination-engineering/">https://www.electrical4u.com/electrical-engineering-articles/illumination-engineering/</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>		
4.	<a href="https://www.google.co.in/books/edition/_/4nJROSC7iK8C?hl=en&amp;gbpv=1">https://www.google.co.in/books/edition/_/4nJROSC7iK8C?hl=en&amp;gbpv=1</a>		

 <b>VIVEKANANDHACOLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University Chennai) Elayampalayam, Tiruchengode – 637 205											
Programme	B.E	Programme code	101	Regulation	2023						
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	II						
Course code	Course name	Periods per week			Credit	Maximum Marks					
		L	T	P		C	CA	ESE	Total		
U23TA202	தமிழரும் தொழில் நுட்பமும்/ TAMILS AND TECHNOLOGY	1	0	0	1	40	60	100			
<b>Content of the syllabus</b>											
அலகு 1	நெசவு மற்றும் பாளைத்தொழில்நுட்பம்				Periods	3					
சங்ககாலத்தில் நெசவுத்தொழில்- பாளைத்தொழில்நுட்பம் - கருப்புசிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.											
அலகு 2	வடிவமைப்பு மற்றும் கட்டிடத்தொழில்நுட்பம்				Periods	3					
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்- மாமல்லபுரச்சிற்பங்களும் கோவில்களும் - சோழர்காலத்துப் பெருங்கோயில்கள் மற்றும் பிறவழிபாட்டுத்தலங்கள் - நாயக்கர்காலக்கோயில்கள்-மாதிரிகட்டமைப்புகள் பற்றி அறிதல் மீளாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இத்தோ-சாரோசெளிக்கட்டிடக்கலை.											
அலகு 3	உற்பத்தித் தொழில்நுட்பம்				Periods	3					
கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத்தொழிற்சாலை - இரும்பை உருக்குதல் எஃகு - வரலாற்றுச்சான்றுகளாக - செம்பு மற்றும் தங்கநாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடிமணிகள் - சுடுமண்மணிகள் - சங்குமணிகள் - எலும்புத்துண்டுகள் - தொல்லியல்சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.											
அலகு 4	வேளாண்மை மற்றும் நீர்ப்பாசனத்தொழில்நுட்பம்				Periods	3					
அணை, ஏரி, குளங்கள் ,மதகு - சோழர்காலக்குழுழித்தூம் பின் முக்கியத்துவம் - கால்நடைபராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச்சார்ந்த செயல்பாடுகள் - கடல்சார்அறிவு - மீன்வளம் - முத்துமற்றும்முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார்சமூகம்.											
அலகு 5	அறிவியல் தமிழ் மற்றும் கணிணித்தமிழ்				Periods	3					
அறிவியல் தமிழின் வளர்ச்சி - கணிணித்தமிழ் வளர்ச்சி - தமிழ்நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மின் பொருட்கள் உருவாக்கம் - தமிழ் இணையக்கல்விக்கழகம் - தமிழ் மின்நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்க்குவைத்திட்டம்.											
					<b>Total Periods</b>	<b>15</b>					


Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA202	TAMILS AND TECHNOLOGY	1	0	0	1	40	60	100
<b>Content of the syllabus</b>								
UNIT I	WEAVING AND CERAMIC TECHNOLOGY				<b>Periods</b>	<b>3</b>		
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) –Graffiti on Potteries								
UNIT II	DESIGN AND CONSTRUCTION TECHNOLOGY				<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)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.								
UNIT III	MANUFACTURING TECHNOLOGY				<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 beads - Archeological evidences - Gem stone types described in Silappathikaram.								
UNIT IV	AGRICULTURE AND IRRIGATION TECHNOLOGY				<b>Periods</b>	<b>3</b>		
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.								
UNIT V	SCIENTIFIC TAMIL & TAMIL COMPUTING				<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>		

TEXT-CUM-REFERENCE BOOKS



1	தமிழகவரலாறும் – மக்களும்பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு): தமிழ்நாடுபாடநூல்மற்றும் கல்வியியல்பணிகள்கழகம்).
2	கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன்பிரசுரம்).
3	கீழடி – வைகைநதிக்கரையில் சங்கநகரநாகரிகம் (தொல்லியல்துறை வெளியீடு)
4	பொருதை - ஆற்றங்கரைநாகரிகம். (தொல்லியல் வெளியீடு)
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. Thirumavukkarasu) (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.

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E. / BT.ech.</b>		Programme Code			Regulation		<b>2023</b>						
Department	<b>CSE, IT &amp; CST</b>					Semester		<b>II</b>						
Course Code	Course Name		Periods Per Week			Credit	Maximum Marks							
			L	T	P		C	CA	ESE	Total				
<b>U23CS204</b>	<b>OBJECT ORIENTED PROGRAMMING</b>		3	0	2	4	50	50	100					
Course Objective	The main objective of the course is to, <ul style="list-style-type: none"> <li>• Provide the concepts of object oriented programming with a comprehensive introduction to C++.</li> <li>• Learn Java programming and its basic packages including GUI programming.</li> </ul>													
Course Outcome	At the end of the course, the student should be able to,							Knowledge Level						
	<b>CO1:</b> apply the concepts of classes and objects to solve simple problems using C++							K3						
	<b>CO2:</b> develop simple applications using basic Java constructs							K3						
	<b>CO3:</b> build applications making use of packages, interfaces and exception handling in Java							K3						
	<b>CO4:</b> make use of multithreading and I/O streams							K3						
	<b>CO5:</b> develop simple event-based GUI applications in Java using AWT classes and controls							K3						
Pre-requisites	Nil													
<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	PSO 2
CO 1	3	2	1	1									3	3
CO 2	3	2	1	1									3	3
CO 3	3	2	1	1									3	3
CO 4	3	2	1	1									3	3
CO 5	3	2	1	1									3	3
<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>														
Unit – I	<b>INTRODUCTION TO OOP AND C++</b>							Periods	<b>9</b>					
Object Oriented Programming - Features – Merits & Demerits- Applications – Difference –Structure of C++ - Input and Output statements- Classes and Objects– Constructors – Destructors														
Unit - II	<b>INTRODUCTION TO JAVA</b>							Periods	<b>9</b>					
Structure of Java - Data Types - Variables – control statements - Arrays –Classes – Fundamentals – Declaring Objects - Assigning Object Reference Variables - Methods –Constructors - this keyword - Overloading Methods - Access Control – Static – Inheritance – Basics – Super keyword														



Signature of BoS Chairperson

<b>Unit – III</b>	<b>PACKAGES, INTERFACES AND EXCEPTION HANDLING</b>	Periods	<b>9</b>
Abstract Classes - final with Inheritance. Packages - Access Protection - Importing Packages – Interfaces - Exception Handling basics – Multiple catch Clauses- Nested try Statements – Java’s Built-in Exceptions – User defined Exception			
<b>Unit - IV</b>	<b>MULTITHREADING AND I/O</b>	Periods	<b>9</b>
Java Thread Model - Creating a Thread –Creating Multiple Threads – Synchronization – Enumerations –Type Wrappers - Auto Boxing. I/O Basics - Reading and Writing Console I/O – Reading and Writing Files.			
<b>Unit – V</b>	<b>STRINGS AND EVENT HANDLING</b>	Periods	<b>9</b>
String Class – operations – String Buffer Class. Event Handling – Mechanisms -- Event Classes – Action Event - Action Listener. AWT Classes - Window Fundamentals - Frame Windows – AWT Controls - Layout Managers.			
<b>Total Periods</b>			<b>45</b>
<b>Suggested List of Experiments</b>			<b>CO’s</b>
1.	Develop a simple C++ application using operator overloading and function overloading		CO1
2.	Develop simple Java programs using control statements and arrays		CO2
3.	Demonstrate polymorphism using Java programs		CO3
4.	Develop Java applications using interfaces and packages		CO3
5.	Demonstrate exception handling in Java		CO3
6.	Develop multithreaded applications in Java		CO4
7.	Develop programs in Java using java.io packages		CO4
8.	Demonstrate string manipulation in Java		CO5
9.	Develop applications in Java using collections classes		CO5
10.	Design a GUI based simple application using AWT classes		CO5
<b>Lecture 45: Practical 30; Total: 75</b>			
<b>Text Books</b>			
1.	Reema Thareja, ”Object Oriented Programming with C++”, Third Edition, Oxford University Press, New Delhi,2018 (UNIT 1)		
2.	Herbert Schildt, “Java: The Complete Reference”, 12 <sup>th</sup> Edition, McGraw Hill Education, New Delhi, 2022.(UNIT 2 to 5)		
<b>References</b>			
1.	Buyya Rajkumar, ThamaraiSelvi S. and Xingchen Chu, “Object Oriented Programming with Java Essentials andApplications”, 1 <sup>st</sup> Edition, McGraw Hill, New Delhi, 2009.		
2.	Cay S. Horstmann, “Core Java: Volume I Fundamentals”, 11 <sup>th</sup> Edition, Addison Wesley, New Delhi, 2019.		
3.	Deitel Paul and Deitel Harvey, “Java How to Program”, 11 <sup>th</sup> Edition, Pearson Education, New Delhi, 2018.		
<b>Tools Required</b>			
1.	Codetandra / HackerRank / HackerEarth / Any online Problem Solving Platforms		
<b>E-Resources</b>			
1.	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>		
2.	<a href="https://www.javatpoint.com/cpp-oops-concepts">https://www.javatpoint.com/cpp-oops-concepts</a>		
3.	<a href="https://www.javatpoint.com/java-tutorial">https://www.javatpoint.com/java-tutorial</a>		





	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205												
Programme	<b>B.E.</b>	Programme Code			<b>101</b>	Regulation		<b>2023</b>					
Department	<b>COMPUTER SCIENCE AND 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>Course 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> <li>• Identify and begin to apply the language features of academic and professional writing and speaking</li> </ul>												
<b>Course Outcome</b>	At the end of the course, the student should be able 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>Pre-requisites</b>	Nil												
<b>CO / PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak													
<b>Cos</b>	Programme Outcomes (POs)											<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
<b>CO 1</b>					2			3	3		3		
<b>CO 2</b>					2			3	3		3		
<b>CO 3</b>					2			3	3		3		
<b>CO 4</b>					2			3	3		3		
<b>CO 5</b>					2			3	3		3		
<b>Course Assessment Methods</b>													
<b>Direct</b>													
<ol style="list-style-type: none"> <li>1. Continuous Assessment Test I &amp; II</li> <li>2. Continuous Assessment Test III in the Communication Skills Lab</li> <li>3. Assignments</li> <li>4. End-Semester examinations</li> </ol>													
<b>Indirect</b>													
<ol style="list-style-type: none"> <li>1. Course - end survey</li> </ol>													
<b>Content of the syllabus</b>													



<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>
<b>Text Books</b>			
1.	Dr. S. R. Kannan, Sumant. S, Pereira Joyce, Professional Communication, Vijay Nicole Imprints Pvt. Ltd., 2023.		
2.	Sokkaalingam, S.R.M., The Art Of Speaking, English Versatile Publishing House, 2019.		
<b>References</b>			
1.	Norman Whitby - Business Benchmark Pre-Intermediate to Intermediate, Students Book, 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.kalevleataru.com/Publish/Book_Review_Who_Moved_My_Cheese.pdf">http://www.kalevleataru.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>		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E</b>		Programme Code				<b>101</b>		Regulation		<b>2023</b>			
Department	<b>Computer Science and Engineering</b>						Semester		<b>II</b>					
Course Code	Course Name			Periods Per Week			Credit	Maximum Marks						
	L	T	P	C	CA	ESE	Total							
<b>U23CH202</b>	<b>CHEMISTRY LABORATORY</b>			0	0	2	1	60	40	100				
Course Objective	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>													
Course Outcome	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					
Pre-requisites	Nil													
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	PSO1	PSO 2
CO 1	3	3		2	2	1	1						2	2
CO 2	3	3		2	2	2	2						2	1
CO 3	3	3		2	2	1							1	2
CO 4	3	3	1	2	2	1							2	2
CO 5	2	3	1	2		2	3						2	2
Course Assessment Methods														
Direct														
1. Pre lab and Post lab Test 2. Execution of Experiment and Viva-voce 3. End semester examination														
Indirect														
Course - end survey														

<b>Content of the syllabus</b>		
<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 [ standard HCl+ unknown CH <sub>3</sub> COOH] 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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<b>Programme</b>	<b>B.E</b>	Programme Code			<b>101</b>	Regulation			<b>2023</b>						
<b>Department</b>	<b>Computer Science and Engineering</b>					Semester			<b>II</b>						
<b>Course Code</b>	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>	<b>The main objective of this course is to:</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 Outcome</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		
	<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>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 Methods</b>															
<b>Direct</b>															
1.Pre lab and Post lab 2.Record mark 3.End- Semester Examinations															
<b>Indirect</b>															
1.Course –End survey															



<b>Content of the Syllabus</b>	
<b><u>GROUP A</u></b> <b><u>(CIVIL &amp; MECHANICAL ENGINEERING)</u></b>	
<b><u>CIVIL ENGINEERING PRACTICE:</u></b>	<b>COs</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><u>MECHANICAL ENGINEERING PRACTICE:</u></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:</b> a) To make a rectangular tray from the given sheet metal. b) To make a basket from the given sheet metal.	CO1
<b><u>STUDY EXPERIMENT:</u></b> 6. Study of 3D Printing machine and its applications. 7. Study of CO2 Laser engraving & cutting machine and its applications. 8. Study of Wood routing machine and its applications.	CO1
<b><u>GROUP B</u></b> <b><u>(ELECTRICAL &amp; ELECTRONICS ENGINEERING)</u></b>	
<b><u>ELECTRICAL ENGINEERING PRACTICE</u></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
<b><u>ELECTRONICS ENGINEERING PRACTICE</u></b>	
1. Study of Electronic components and equipment’s – 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 Periods</b>	<b>45</b>
<b>Reference Book :</b>	
1.	Dr.P.Kannan, Mr.T.Satheeskumar & Mr.K.Rajasekar, “Engineering Practices Laboratory” Manual. First Edition, 2017.
2.	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>101</b>	Regulation	<b>2023</b>								
Department	<b>Computer Science and Engineering</b>					Semester		<b>II</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>Course Outcome</b>	At the end of the course, the student should be able to,										Knowledge level				
	<ul style="list-style-type: none"> <li>Understand the functions of the Indian government</li> </ul>										K1				
	<ul style="list-style-type: none"> <li>Know about our Central Government, political structure &amp; codes, procedures</li> </ul>										K1				
	<ul style="list-style-type: none"> <li>Understand our State Executive &amp; Elections system of India.</li> </ul>										K1				
	<ul style="list-style-type: none"> <li>Remember the Election system, Amendments and Emergency Provisions given by the constitution.</li> </ul>										K2				
	<ul style="list-style-type: none"> <li>Understand our Special Constitutional Provisions in India</li> </ul>										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>		
<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						
<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															



<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 FUCTION 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.		
2.	The Constitution of India (Coat Pocket Edition) by Gopal Sankaranarayanan - 17th Edition. (2024)		
<b>References</b>			
1.	R.C.Agarwal, (1997) “Indian Political System”, S.Chand and Company, New Delhi.		
2.	M.Laksmikanth, Indian polity, Tata mchraw hill 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.	www.drishtiiias.com/		




# **Semester – III**

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205														
Programme	<b>B.E</b>	Programme Code	<b>101</b>	Regulation	<b>2023</b>										
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>III</b>										
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P		C	CA	ESE	Total						
<b>U23MA304</b>	<b>DISCRETE MATHEMATICS</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>• Introduce basic tools and techniques in Discrete Mathematical Structure.</li> <li>• Provide information about the concepts needed to test the logic of a program and Theory of inference.</li> <li>• Recognize the connection between set, operations and logic.</li> <li>• Identify the domain and range of a relation.</li> <li>• Recognize the concepts of groups.</li> </ul>														
	At the end of the course, the student should be able to,							Knowledge level							
	<b>CO1:</b> Demonstrate the mathematical reasoning and logics							K2							
	<b>CO2:</b> Reformulate statements from common language to formal language							K5							
<b>CO3:</b> Posses knowledge in relations and lattices.							K3								
<b>CO4:</b> Solve recurrence relations by applying appropriate function.							K5								
<b>CO5:</b> Understand the concepts various algebraic Structures.							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>	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	
CO 2	3	2		1	1								2	1	
CO 3	3	2	1	1									2	1	
CO 4	3	2	1		1								2	1	
CO 5	3	2	1	1	1								2	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>															
3. Course - end survey															
<b>Content of the syllabus</b>															
<b>Unit – I</b>	<b>PROPOSITIONAL CALCULUS</b>										Periods	<b>9+3</b>			
Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan’s Laws – Normal forms – Principal conjunctive normal form and Principal disjunctive normal form – Rules of inference – Arguments – Validity of arguments.															

<b>Unit - II</b>	<b>PREDICATE CALCULUS</b>	Periods	<b>9+3</b>
Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – Rules of universal specification and generalization – Validity of arguments.			
<b>Unit – III</b>	<b>SET THEORY</b>	Periods	<b>9+3</b>
<b>Set Theory:</b> Cartesian product of sets – Relations on sets – Types of relations and their properties – Matrix representation of a relation - Graph of a relation – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices – Properties of lattices.			
<b>Unit - IV</b>	<b>FUNCTIONS</b>	Periods	<b>9+3</b>
Definition – Classification of functions – Composition of functions – Inverse functions – Characteristic function of a set – Recurrence relations – Solution of recurrence relations – Generating Functions – Solving recurrence relation by generating functions.			
<b>Unit – V</b>	<b>GROUP THEORY</b>	Periods	<b>9+3</b>
Algebraic systems – Definitions – Examples – Properties – Semi groups – Monoids – Sub semi groups and Sub monoids - Groups and Subgroups – Homomorphism – Cosets – Lagrange’s theorem – Normal subgroups – Normal algebraic system with two binary operations.			
<b>Total Periods</b>			<b>45+15=60</b>
<b>Text Books</b>			
1.	Tremblay J P and Manohar R., Discrete Mathematical Structures with Applications to Computer Science, TMH, New Delhi – 2008.		
2.	Rosen K H, “Discrete Mathematics and its Applications”, Sixth Edition, Tata McGraw-Hill Pub.co. Ltd., Delhi, 2006.		
<b>References</b>			
1.	Kenneth H. Rosen, “Discrete Mathematics and its Applications”, 7 <sup>th</sup> Edition, Tata McGraw Hill Publishing Company, 2012		
2.	Singh S.B., Jai Kishore and Ekata, “Discrete Structures”, 3 <sup>rd</sup> Edition, Khanna Book Publishing, Delhi, 2017		
3.	Seymour Lipschutz, Marclars Lipson, “Discrete Mathematics”, Tata McGraw Hill.,New Delhi.		
4.	Bernard Kolman, Robert Busby, Sharon C.Ross,” Discrete Mathematical Structures”, Pearson Education, Delhi, 6 <sup>th</sup> Edition, 2015.		
5.	D.S.Malik, “Discrete Mathematical Structures Theory and Applications”, Thomson Publishers, 2004.		
<b>E-Resources</b>			
1.	<a href="https://en.wikipedia.org › wiki › Discrete_mathematics">https://en.wikipedia.org › wiki › Discrete_mathematics</a>		
2.	www.learnerstv.com/Free-engineering-Video-lectures		
3.	www.nptel.ac.in		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E /B.Tech.</b>	Programme Code			Regulation			<b>2023</b>						
Department	<b>IT,CSE,CST,BME,ECE,EEE</b>				Semester			<b>III / IV</b>						
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks								
		L	T	P	C	CA	ESE	Total						
<b>U23IT302</b>	<b>Data Structures</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>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>													
<b>Course Outcome</b>	At the end of the course, the student should be able to,							Knowledge level						
	<b>CO1:</b> Implement List ADT and its types.							<b>K1</b>						
	<b>CO2:</b> Implement Stack ADT, Queue ADT, Priority Queue and Parsing the Arithmetic Expression in C							<b>K2</b>						
	<b>CO3:</b> Implement Tree ADT, Binary search tree, AVL and Splay tree in C							<b>K3</b>						
	<b>CO4:</b> Develop C Programs to Implement the concept of Topological ordering and Minimum spanning Tree of a Graph ADT							<b>K4</b>						
<b>Pre-requisites</b>	-													
<b>CO /PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs)												CO/PSO Mapping		
COs	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
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>														
<b>Unit – I</b>	<b>INTRODUCTION</b>										Periods	<b>9</b>		
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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<b>U23IT404</b>	<b>Database Management Systems</b>	3	0	0	3	40	60	100																																																																																																																												
<b>Course Objective</b>	<p>The Main Objective of the course is to,</p> <ul style="list-style-type: none"> <li>Learn the fundamentals of data models, relational algebra and SQL</li> <li>Understand a database system using ER diagrams and to learn normalization techniques</li> <li>Understand the fundamental concepts of transaction, concurrency control and recovery</li> <li>Analyze how the internal storage structures using different file and indexing techniques which will help in physical DB design</li> <li>Learn the concepts of Distributed databases, Database Security and NoSQL</li> </ul>																																																																																																																																			
<b>Course Outcome</b>	At the end of the course, the student should be able to,							<b>KL</b>																																																																																																																												
	<b>CO1:</b> Construct SQL Queries using relational algebra							<b>K1</b>																																																																																																																												
	<b>CO2:</b> Design database using ER model and normalize the database							<b>K3</b>																																																																																																																												
	<b>CO3:</b> Understand how to handle transactions and maintain consistency of the database							<b>K2</b>																																																																																																																												
	<b>CO4:</b> Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database							<b>K2</b>																																																																																																																												
<b>Pre-requisites</b>	<b>CO5:</b> Understand the concepts of Distributed databases, Database Security and NoSQL							<b>K2</b>																																																																																																																												
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<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="2">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>PSO1</th> <th>PSO2</th> </tr> </thead> <tbody> <tr> <td>CO 1</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>2</td> </tr> <tr> <td>CO 2</td> <td>3</td> <td>2</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>3</td> <td>2</td> </tr> <tr> <td>CO 3</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>2</td> </tr> <tr> <td>CO 4</td> <td>3</td> <td>2</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>3</td> <td>2</td> </tr> <tr> <td>CO 5</td> <td>3</td> <td>2</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>3</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		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	CO 1	3	2	2	2	2								3	2	CO 2	3	2	2	1	2								3	2	CO 3	3	2	2	2	2								3	2	CO 4	3	2	2	1	2								3	2	CO 5	3	2	2	1	2								3	2
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<b>Unit – I</b>	<b>Relational Databases</b>	Periods	<b>10</b>
Purpose of Database System – Views of data – Data Models – Database System Architecture – Relational Algebra Introduction to relational databases – Relational Model – Keys – Entity-Relationship model -SQL fundamentals – DML - DDL – DCL – TCL – DQL - Procedures, Functions, Triggers and Views			
<b>Unit – II</b>	<b>Database Design</b>	Periods	<b>8</b>
E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Join Dependencies and fifth Normal Form			
<b>Unit – III</b>	<b>Transactions</b>	Periods	<b>9</b>
Transaction Concepts – ACID Properties – Schedules – Serializability - Need for Concurrency – Concurrency control –Two Phase Locking- Timestamp – Multiversion – Validation and Snapshot isolation – Multiple Granularity locking – Deadlock Handling – Recovery Concepts – Shadow Paging – ARIES Algorithm			
<b>Unit – IV</b>	<b>Implementation Techniques</b>	Periods	<b>9</b>
RAID – File Organization – Organization of Records in Files – Data Dictionary Storage – Column Oriented Storage– Indexing and Hashing – Ordered Indices -Static Hashing – Dynamic Hashing – Query Optimization – Cost Estimation			
<b>Unit – V</b>	<b>Advanced Topics</b>	Periods	<b>9</b>
Distributed Databases: Architecture - Data Storage - Transaction Processing- Query processing – Database Security: Authentication – Authorization and Access Control – SQL Injection - Introduction to NoSQL: CAP Theorem – Sharding - MongoDB Implementation			
<b>Total Periods</b>			<b>45</b>
<b>TEXT BOOKS:</b>			
1.	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 7 <sup>th</sup> Edition, McGraw Hill, 2021.		
2.	M. Tamer Özsu Patrick Valduriez, “Principles of Distributed Database Systems“, 4 <sup>th</sup> Edition, Springer , 2020.		
3.	Michael Kaufmann, SQL and NoSQL Databases: Modeling, Languages, Security and Architectures for Big Data Management, 2 <sup>nd</sup> Edition ,Springer 2023.		
<b>REFERENCE BOOKS:</b>			
1.	C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, 8 <sup>th</sup> Edition, Pearson Education, 2006.		
2.	Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, 7 <sup>th</sup> Edition, Pearson Education, 2017		
<b>E-RESOURCES:</b>			
1.	<a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a>		
2.	<a href="https://archive.nptel.ac.in/courses/106/105/106105175/">https://archive.nptel.ac.in/courses/106/105/106105175/</a>		
3.	<a href="https://www.khoury.northeastern.edu/home/kathleen/classes/cs3200/20-NoSQLMongoDB.pdf">https://www.khoury.northeastern.edu/home/kathleen/classes/cs3200/20-NoSQLMongoDB.pdf</a>		




## VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN



(Autonomous Institution Affiliated to Anna University, Chennai)  
Elayampalayam, Tiruchengode – 637 205



	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E. /B.Tech.</b>			Programme code			Regulation			<b>2023</b>				
Department	<b>CSE, IT &amp; CST</b>						Semester			<b>III</b>				
Course code	Course name						Periods per week			Credit	Maximum Marks			
							L	T	P	C	CA	ESE	Total	
<b>U23CS305</b>	<b>Computer Organization and Architecture</b>						3	0	0	3	40	60	100	
<b>Course Objective</b>	The student should be made to, <ul style="list-style-type: none"> <li>Discuss the basic concepts and structure of computers</li> <li>Understand concepts of computer processing units and addressing modes</li> <li>Know the logic and arithmetic operations</li> <li>Explain different types of I/O and memory organization.</li> <li>know about the Parallelism concepts in Programming</li> </ul>													
<b>Course Outcome</b>	At the end of the course, the students will be able to,											<b>KL</b>		
	<b>CO1:</b> Examine various concepts of basics of computer organization and architecture											K2		
	<b>CO2:</b> Identify the difference between RISC and CISC architectures											K2		
	<b>CO3:</b> Demonstrate various arithmetic operations											K3		
	<b>CO4:</b> Analyze the various performance measures for memory and I/O organization											K3		
<b>Pre-requisites</b>	-											K3		
	<b>CO5:</b> Interpret performance of different pipelined processors and multi core architectures.											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		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO1	PSO2
<b>CO 1</b>	3	2	2							1		1	3	2
<b>CO 2</b>	2	3	1	2						1			2	2
<b>CO 3</b>	2	2	1	2				2		1			2	2
<b>CO 4</b>	2	2	2							1		2	3	2
<b>CO 5</b>	2	2	1		2			1		1		1	3	2
<b>Course Assessment Methods</b> <p><b>Direct</b></p> <ol style="list-style-type: none"> <li>1. Continuous Assessment Test I, II &amp; III</li> <li>2. Assignments / Seminar/Quiz</li> <li>3. End-Semester examinations</li> </ol> <p><b>Indirect</b></p> <ol style="list-style-type: none"> <li>1. Course - end survey</li> </ol>														
<b>Content of the syllabus</b>														
<b>Unit - I</b>	<b>BASIC STRUCTURE OF COMPUTERS</b>										Periods	<b>9</b>		
<b>Digital Computers:</b> Definition of Computer Organization - Computer Design and Computer Architecture - Bus and memory transfers.														
<b>Basic Computer Organization and Design:</b> Instruction codes- Computer Registers - Computer instructions - Timing and Control - Instruction cycle - Memory Reference Instructions- Input – Output and Interrupt.														






<b>Unit – II</b>	<b>BASIC PROCESSING UNIT</b>	Periods	<b>9</b>
<b>Central Processing Unit:</b> General Register Organization - Instruction Formats-Addressing modes- Data Transfer and Manipulation - Program Control			
<b>Reduced Instruction Set Computer:</b> CISC Characteristics -RISC Characteristics			
<b>Unit – III</b>	<b>ARITHMETIC FOR COMPUTERS</b>	Periods	<b>9</b>
Signed and Unsigned number representations - <b>Arithmetic operations:</b> Addition and Subtraction – Fast Adders – Binary Multiplication – Booth algorithm-Binary Division – Floating Point Numbers – <b>Representation and operations:</b> Arithmetic Micro operations- logic micro operations- shift micro operations- Arithmetic logic shift unit.			
<b>Unit – IV</b>	<b>I/O AND MEMORY ORGANIZATION</b>	Periods	<b>9</b>
<b>Input-Output Organization:</b> Input-Output Interface- Asynchronous data transfer- Modes of Transfer- Priority Interrupt - Direct memory Access.			
<b>Memory Organization:</b> Memory Hierarchy -Main Memory - Auxiliary memory - Associate Memory- Cache Memory.			
<b>Unit - V</b>	<b>PIPELINING AND MULTI CORE ARCHITECTURE</b>	Periods	<b>9</b>
<b>Pipeline and Vector Processing:</b> Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.			
<b>Multi core architecture:</b> Introduction to Multi-core Processors- Multi-core Processor Architecture- Multi-core Processor Machines - Applications of using Multi-core Processors			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	M. Morris Mano and Rajib Mall, “Computer System Architecture”, Pearson Education, Revised third edition, 2017		
2.	Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, McGraw Hill Education, 2017.		
<b>References</b>			
1.	William Stallings, “Computer Organization and Architecture – Designing for Performance”, 10 <sup>th</sup> Edition, Pearson Education, 2022.		
2.	John L. Hennessey and David A. Patterson, “Computer Architecture – A Quantitative Approach”, Morgan Kaufmann / Elsevier Publishers, 6 <sup>th</sup> Edition, 2017.		
3.	John P. Hayes, “Computer Architecture and Organization”, Third Edition, McGraw Hill, 2017		
4.	V.P. Heuring, H.F. Jordan, “Computer Systems Design and Architecture”, Second Edition, Pearson Education, 2003.		
5.	Shyamala Devi M, “Multi-Core Architectures and Programming”, Vijay Nicole Imprints, 2018.		
<b>E-Resources</b>			
			
1.	<a href="https://www.javatpoint.com/computer-organization-and-architecture-tutorial">https://www.javatpoint.com/computer-organization-and-architecture-tutorial</a>		
2.	<a href="https://www.studytonight.com/computer-architecture/memory-organization">https://www.studytonight.com/computer-architecture/memory-organization</a>		
3.	<a href="http://home.ustc.edu.cn/~louwenqi/reference_books_tools/Computer%20Organization%20and%20Architecture%2010th%20-%20William%20Stallings.pdf">http://home.ustc.edu.cn/~louwenqi/reference_books_tools/Computer%20Organization%20and%20Architecture%2010th%20-%20William%20Stallings.pdf</a>		
4.	<a href="https://medium.com/@adityasinghz/multi-core-processor-architecture-7580bc347042">https://medium.com/@adityasinghz/multi-core-processor-architecture-7580bc347042</a>		
5.	<a href="https://www.mbit.edu.in/wp-content/uploads/2020/05/computer-systems-Architecture.pdf">https://www.mbit.edu.in/wp-content/uploads/2020/05/computer-systems-Architecture.pdf</a>		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode- 637205													
Programme	<b>B.E.</b>		Programme code			Regulation		<b>2023</b>						
Department	<b>Computer Science and 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>													
	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			
<b>Course Outcome</b>	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>												<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>PSO2</b>
<b>CO 1</b>		2		3	2					3		3	1	1
<b>CO 2</b>	3	3		2	2					3		3	2	2
<b>CO 3</b>	3	3		3	2					3		3	3	1
<b>CO 4</b>	3	3		2	3					2		2	3	1
<b>CO 5</b>		2		2	2					2		2	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>														
<b>Unit -I</b>	<b>VERBAL ABILITY ( ERROR SPOTTING )</b>										Periods	<b>5</b>		
<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)														



<b>CONDITIONAL CLAUSES:</b> Errors on Zero condition, Errors on first condition of If clauses, Errors on second condition of If clauses, Errors on third condition of If clauses			
<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			
<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			
<b>DETERMINERS:</b> Definite Article, Indefinite Article, Quantifying Article – few, many, Possessive Article, (my, your, his, her, its, our, your, their....)			
<b>NOUNS:</b> Pronoun, Common Noun, Collective Noun, Abstract Noun, Material Noun			
<b>SUBJECT – VERB AGREEMENT:</b> 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			
<b>Unit-II</b>	<b>NUMBER SYSTEMS</b>	Periods	<b>6</b>
<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)			
<b>Unit – III</b>	<b>AVERAGE AND LCM &amp; HCF PROBLEMS</b>	Periods	<b>8</b>
<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)			
<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			
<b>Unit-IV</b>	<b>RATIO AND PROPORTION</b>	Periods	<b>5</b>
<b>RATIO</b> ( Zig Zag Model, Finding The Individual Component, Coins & Values Based Ratios, Number Based Ratios, Increment/Decrement Based Ratios, Miscellaneous)- <b>PROPORTION</b> ( Continuous, Third, Fourth, Mean)			
<b>Unit-V</b>	<b>LOGICAL REASONING</b>	Periods	<b>6</b>
<b>CODING-DECODING-</b> Types of Coding and Decoding (Letter Coding, Conditional Coding, Crypt arithmetic –Addition, Crypt arithmetic – Subtraction)			
<b>BLOOD RELATION</b> (Type 1: Pointing or Introducing, Type 2: Family Tree or Relational Puzzle, Type 3: Coded Relation)			
<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)			
<b>SYLLOGISM</b> (Type 1: BASIC SYLLOGISM, Type 2: Either or Neither nor, Type 3: Only – Only a few)			
<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.	<u>Jaikishan</u> and <u>Premkishan</u> , “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.Tech.</b>			Programme code			Regulation			<b>2023</b>				
Department	<b>CSE, IT</b>						Semester			<b>III</b>				
Course code	Course name						Periods per week			Credit	Maximum Marks			
							L	T	P	C	CA	ESE	Total	
<b>U23CS306</b>	<b>Python Programming and Frameworks</b>						3	0	2	4	50	50	100	
Course Objective	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 of OOPS and CRUD Operations</li> <li>• Learn Data Manipulation in NumPy</li> <li>• Understand Data Manipulation with pandas and data visualization</li> </ul>													
Course Outcome	At the end of the course, the student should be able to,											<b>KL</b>		
	<b>CO1:</b> Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements											K2		
	<b>CO2:</b> Perform operations on list, tuples, sets and Dictionaries using python.											K2		
	<b>CO3:</b> Implement the OOPS concept and CRUD Operations.											K3		
	<b>CO4:</b> Apply Numpy for Data Manipulation and perform operations on CSV files.											K3		
Pre-requisites	NIL													
<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	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	1	-	1	-	-	-	-	-	-	2	3	2
CO 2	3	3	1	1	2	-	-	-	-	-	-	2	3	2
CO 3	3	3	1	2	2	-	-	-	-	-	-	2	3	2
CO 4	3	3	1	2	2	-	-	-	-	-	-	2	3	2
CO 5	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 / Seminar/Quiz /Model Lab 3. End-Semester examinations														
<b>Indirect</b>														
1.Course –end survey														
<b>Content of the syllabus</b>														
Unit –I	<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 statements, control statements, continue, pass, break, Mutable vs Immutable data types – Strings – String slices – Searching – Looping and Counting – String methods – String Comparison.														
Unit–II	<b>Data Structures, File Operations and Exception</b>										Periods	<b>9</b>		
Lists – List operations – slices and methods – Dictionaries – Dictionaries as set of Counters – Looping and Dictionaries – Dictionaries and Lists – Tuples – Tuples Basics – Lists and Tuples – Dictionaries and Tuples – Sequences of sequences – Sets – Sets Basics – Set Operations – Files – Basic File Operations – File names and paths – Exception Handling.														

<b>Unit – III</b>	<b>Object Oriented Programming &amp; Python Database Integration</b>	Periods	<b>9</b>
Classes and Objects – Classes and Functions – Classes and methods – Object-oriented features – <code>__init__()</code> method – <code>__str__()</code> method – Operator Overloading – Functions – Conditionals and recursion – Fruitful Functions – return values, parameters, local and global scope, function composition, recursion – Type-based dispatch – Polymorphism – Inheritance – Aggregation and Association – Need for database programming – Connect Database – CRUD operations – Cursor Attributes			
<b>Unit– IV</b>	<b>Data Manipulation with NumPy Arrays</b>	Periods	<b>9</b>
Python Environment & Frameworks: Anaconda – Jupyter notebook – NumPy: The Basics of NumPy Arrays – Computation on NumPy Arrays – Aggregations – Computation on Arrays: Broadcasting – Comparisons, Masks and Boolean Logic – Fancy Indexing – Sorting Arrays – Structured Arrays.			
<b>Unit-V</b>	<b>Data Manipulation with Pandas and Matplotlib</b>	Periods	<b>9</b>
Data Manipulation with Pandas: Pandas Objects – Data Indexing and Selection – Operating on data – Handling missing data – Hierarchical Indexing – Concat and Append – Merge and Join – Aggregation and Grouping – Data Visualization with Matplotlib: Line plots: Line Colors and Styles – Axes Limits – Labeling Plots			
<b>Total Periods</b>			<b>45</b>
<b>Suggested List of Experiments</b>			
<b>List of Experiments</b>			<b>CO's</b>
1. Implement basic programs in python (finding factorial of n, generating Fibonacci series, exchange the values of two variables, calculating student grade, sum and average of n elements, linear search, printing a pattern).			CO1
2. Demonstrate the various string manipulation functions			CO1
3. Demonstrate the various operations on List, Tuple, Dictionary, and Sets			CO2
4. Implement the different file operations and exception handling			CO2
5. a) Implement user-defined functions with different types of argument passing methods b) Implement the concept of constructors and different types of inheritance			CO3
6. Implement the concept of Aggregation, Association, and Polymorphism			CO3
7. Develop an application to illustrate CRUD operations using Python and MySQL			CO4
8. Develop an application to illustrate Array indexing, slicing, reshaping, and sorting using NumPy			CO4
9. Demonstrate Data Manipulation with Pandas			CO5
10. Demonstrate Data Visualization using line plots and histograms in Matplotlib			CO5
<b>Lecture 45: Practical 30; Total: 75</b>			
<b>Text Books</b>			
1.	Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 1 <sup>st</sup> Edition, O’Reilly Publishers, 2016 for Units I,II,III		
2.	Jake Vander Plas, “Python Data Science Handbook Essential Tools for Working with Data”, 1 <sup>st</sup> Edition, O’Reilly Publishers, 2019 for Units IV,V		
<b>Reference</b>			
1.	Martin C Brown, “Python: The Complete Reference”, 4 <sup>th</sup> Edition, McGraw Hill Education, 2018		
<b>E-Resources</b>			
			
1.	<a href="https://www.dataquest.io/blog/data-structures-in-python/">https://www.dataquest.io/blog/data-structures-in-python/</a>		
2.	<a href="https://docs.python.org/3/library/stdtypes.html">https://docs.python.org/3/library/stdtypes.html</a>		
3.	<a href="https://www.geeksforgeeks.org/difference-between-association-and-aggregation/">https://www.geeksforgeeks.org/difference-between-association-and-aggregation/</a>		
4.	<a href="https://www.i2tutorials.com/crud-operations-with-mysql-database-using-python/">https://www.i2tutorials.com/crud-operations-with-mysql-database-using-python/</a>		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E./B.Tech.</b>	Programme Code			Regulation			<b>2023</b>						
Department	<b>IT,CSE,CST,BME,ECE,EEE</b>				Semester			<b>III / IV</b>						
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks								
		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>	<p>The Main Objective of the course is to</p> <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>Pre-requisites</b>	<b>CO5:</b> Implement various sorting and searching algorithms in C.							<b>K3</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>PSO2</b>
<b>CO 1</b>	3	2	1	1	2			1	1	1	1	1	1	1
<b>CO 2</b>	3	2	1	1	2			1	1	1	1	1	1	1
<b>CO 3</b>	3	2	1	1	2			1	1	1	1	1	1	1
<b>CO 4</b>	3	2	1	1	2			1	1	1	1	1	1	1
<b>CO 5</b>	3	2	1	1	2			1	1	1	1	1	1	1
<b>Course Assessment Methods</b>														
<b>Direct</b>														
1. Prelab and Post Lab / Viva Questions														
2. Record														
3. End-Semester Examination														
<b>Indirect</b>														
1. Course - end survey														
<b>Suggested List of Experiments</b>													<b>CO's</b>	
1. 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 singly linked list. Create following functions for the employee list.													<b>CO1</b>	
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.	<b>C01</b>
3. Write a C program to implement different operations on Stack and Queue using Arrays.	<b>C02</b>
4. Write a C program that implements push(), pop(), display(), isEmpty() and peek() functions of Stack using Linked List.	<b>C02</b>
5. Write a C program that implements enqueue(), dequeue(), size(), isEmpty() and display() functions of Queue using Linked List.	<b>C02</b>
6. Write a C program to convert an Infix expression : $a + b * c + (d * e + f) * g$ into the Postfix expression.	<b>C02</b>
Write a C program to perform the following BST Operations - Creating node, insertion, in-order traversal and pre-order traversal.	<b>C03</b>
8. Write a C program which results the implementation of Insertion, Deletion and Search operations in AVL Tree.	<b>C03</b>
9. Write a C program to perform Depth First Search and Breadth First Search traversal on a graph.	<b>C04</b>
10. Write a C program for constructing a minimum cost spanning tree of a graph using Prim's Algorithm.	<b>C04</b>
11. Write a C program to Search an element using Linear Search process and Sort given elements using Insertion sort.	<b>C05</b>
12. Write a C program to implement Linear Probing and Separate Chaining Collision resolution technique.	<b>C05</b>
<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.Tech.</b>	Programme Code				Regulation	<b>2023</b>									
Department	<b>CSE,IT &amp; CST</b>			Semester		<b>III / IV</b>										
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks										
		L	T	P	C	CA	ESE	Total								
<b>U23IT406</b>	<b>Database Management Systems Laboratory</b>	0	0	2	1	60	40	100								
<b>Course Objective</b>	The student should be made to, <ul style="list-style-type: none"> <li>Learn and implement important commands in SQL.</li> <li>Learn the usage of nested and joint queries.</li> <li>Understand functions, procedures and procedural extensions of databases.</li> <li>Understand design and implementation of typical database applications.</li> <li>Familiar with the use of a front end tool for GUI based application development.</li> </ul>															
<b>Course Outcome</b>	At the end of the course, the student should be able to,							<b>KL</b>								
	<b>CO1:</b> Create databases with different types of key constraints.							<b>K3</b>								
	<b>CO2:</b> Construct simple and complex SQL queries using DML and DCL commands.							<b>K4</b>								
	<b>CO3:</b> Use advanced features such as stored procedures and triggers and incorporate in GUI based application development							<b>K4</b>								
	<b>CO4:</b> Create and manipulate data using NoSQL database							<b>K3</b>								
<b>CO5:</b> Create a Simple Projects using real life database applications							<b>K3</b>									
<b>Pre-requisites</b>	-															
<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	PSO1	PSO2		
CO 1	3	3	3	3	2				2	1		3	2			
CO 2	3	3	3	3	2				2	1		1	1			
CO 3	3	2	2	3	2				2	1		3	1			
CO 4	2	2	2	2	2				2	1		1	1			
CO 5	3	3	2	2	2				2	1		2	2			
<b>Course Assessment Methods</b>																
<b>Direct</b>																
1. Prelab and Post Lab / Viva Questions 2. Record 3. End-Semester Examination																
<b>Indirect</b>																
1. Course - end survey																
<b>Suggested List of Experiments</b>												<b>CO's</b>				
1.	Create a table called Employee with the following structure.												<b>CO1</b>			
	<b>Name</b>		<b>Type</b>													
	Empno		Number													
	Ename		Varchar2(10)													
	Job		Varchar2(10)													
Mgr		Number														





	<ul style="list-style-type: none"> <li>a. Add a column commission with domain to the Employee table.</li> <li>b. Insert any five records into the table.</li> <li>c. Update the column details of job</li> <li>d. Rename the column of Employ table using alter command.</li> <li>e. Delete the employee whose Empno is 105.</li> </ul>																																				
2.	<ul style="list-style-type: none"> <li>a. Create a user and grant all permissions to the user.</li> <li>b. Insert the any three records in the employee table and use rollback. Check the result.</li> <li>c. Add primary key constraint and not null constraint to the employee table.</li> <li>d. Insert null values to the employee table and verify the result.</li> </ul>	<b>CO1</b>																																			
3.	Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.	<b>CO2</b>																																			
4.	<p>Create a row level trigger for the customers table that would fire for INSERT or UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between the old values and new values:</p> <table border="1"> <thead> <tr> <th>ID</th> <th>NAME</th> <th>AGE</th> <th>ADDRESS</th> <th>SALARY</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Alive</td> <td>24</td> <td>Khammam</td> <td>2000</td> </tr> <tr> <td>2</td> <td>Bob</td> <td>27</td> <td>Kadappa</td> <td>3000</td> </tr> <tr> <td>3</td> <td>Catri</td> <td>25</td> <td>Guntur</td> <td>4000</td> </tr> <tr> <td>4</td> <td>Dena</td> <td>28</td> <td>Hyderabad</td> <td>5000</td> </tr> <tr> <td>5</td> <td>Eeshwar</td> <td>27</td> <td>Kurnool</td> <td>6000</td> </tr> <tr> <td>6</td> <td>Farooq</td> <td>28</td> <td>Nellur</td> <td>7000</td> </tr> </tbody> </table>	ID	NAME	AGE	ADDRESS	SALARY	1	Alive	24	Khammam	2000	2	Bob	27	Kadappa	3000	3	Catri	25	Guntur	4000	4	Dena	28	Hyderabad	5000	5	Eeshwar	27	Kurnool	6000	6	Farooq	28	Nellur	7000	<b>CO2</b>
ID	NAME	AGE	ADDRESS	SALARY																																	
1	Alive	24	Khammam	2000																																	
2	Bob	27	Kadappa	3000																																	
3	Catri	25	Guntur	4000																																	
4	Dena	28	Hyderabad	5000																																	
5	Eeshwar	27	Kurnool	6000																																	
6	Farooq	28	Nellur	7000																																	
5.	Write user defined functions and stored procedures in SQL.	<b>CO3</b>																																			
6.	Execute complex transactions and realize DCL and TCL commands.	<b>CO3</b>																																			
7.	Create Document, column and graph based data using NoSQL database tools.	<b>CO4</b>																																			
8.	<p>Case Study using any of the real life database applications from the following list</p> <ul style="list-style-type: none"> <li>1) Inventory Management for a EMart Grocery Shop</li> <li>2) Society Financial Management</li> <li>3) Cop Friendly App – E-seva</li> <li>4) Property Management – e-Mall</li> <li>5) Star Small and Medium Banking and Finance</li> </ul> <ul style="list-style-type: none"> <li>i) Build Entity Model diagram. The diagram should align with the business and functional goals stated in the application. Apply Normalization rules in designing the tables in scope.</li> <li>ii ) Prepared applicable views, triggers (for auditing purposes), functions for enabling enterprise grade features.</li> <li>iii ) Build PL SQL / Stored Procedures for Complex Functionalities, ex EOD Batch Processing for calculating the EMI for Gold Loan for each eligible Customer.</li> <li>iv) Ability to showcase ACID Properties with sample queries with appropriate settings</li> </ul>	<b>CO5</b>																																			
<b>Total Periods</b>		<b>30</b>																																			
<b>E-RESOURCES</b>																																					
1.	<a href="https://www.javatpoint.com/">https://www.javatpoint.com/</a>																																				
2.	<a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a>																																				



	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode– 637205													
Programme	<b>B.E.</b>			Programme code		<b>101</b>		Regulation		<b>2023</b>				
Department	<b>Computer Science and 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> (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak														
<b>COs</b>	Programme Outcomes (POs)												<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	PSO1
CO 1						2			2	2		2	1	2
CO 2						2			2	2		2	2	3
CO 3						2			1	2		2	2	3
CO 4						2			2	1		2	3	3
CO 5						2			2	1		2	1	1
<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 Satisfaction Scale	CO3
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, 2011		
<b>E-Resources</b>		
1. <a href="https://scales.arabpsychology.com">https://scales.arabpsychology.com</a>		
2. <a href="http://DOMWebserver.Hitchcock.org/mbti/">http://DOMWebserver.Hitchcock.org/mbti/</a>		
3. <a href="https://www.assessmentday.com/free/deductive-reasoning-1/DeductiveFreeTest-Solutions.pdf">https://www.assessmentday.com/free/deductive-reasoning-1/DeductiveFreeTest-Solutions.pdf</a>		
4. <a href="http://www.prepinsta.com">www.prepinsta.com</a>		

# **Semester - IV**



	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205														
Programme	<b>B.E</b>	Programme Code	<b>101</b>	Regulation	<b>2023</b>										
Department	<b>COMPUTER SCIENCE AND ENGINEERING</b>			Semester	<b>IV</b>										
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks									
		L	T	P	C	CA	ESE	Total							
<b>U23MA405</b>	<b>Probability and Statistics</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>Proficiently understand the expected value, variance, and higher-order moments of random variables (for both discrete and continuous types).</li> <li>Analyze and interpret statistical data using appropriate probability distribution</li> <li>Identify testing of hypothesis for all size of samples.</li> <li>Acquaint the knowledge of analysis of variance, this plays an important role in real life problems.</li> <li>Introduce the basic concepts of statistical quality control.</li> </ul>														
<b>Course Outcome</b>	At the end of the course, the student should be able to,						Knowledge level								
	<b>CO1:</b> Translate the density and distribution functions for discrete and continuous variables.						K3								
	<b>CO2:</b> Enable to identify various probability distributions.						K3								
	<b>CO3:</b> Ability to test the hypothesis using suitable statistical test.						K5								
	<b>CO4:</b> Apply the basic concepts of classifications of design of experiments in the field of agriculture and computer science.						K4								
	<b>CO5:</b> Have the notion of sampling distributions and statistical techniques used in engineering and management problems.						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>	<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	2	1		1								2	1	
<b>CO 2</b>	3	2	1	1									2	1	
<b>CO 3</b>	3	2	1		1								2	1	
<b>CO 4</b>	3	2		1									2	1	
<b>CO 5</b>	3	2	1	1	1								2	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															
<b>Content of the syllabus</b>															
<b>Unit – I</b>	<b>INTRODUCTION TO PROBABILITY</b>										Periods	<b>9+3</b>			
Introduction to Probability, Axioms of Probability: Sample spaces and events, axioms of Probability, sample spaces having equally likely outcomes – Conditional Probability and independence- Baye’s theorem (without proof) and its applications.															

<b>Unit - II</b>	<b>RANDOM VARIABLES AND SPECIAL DISTRIBUTIONS</b>	Periods	<b>9+3</b>
Random variables-Probability mass function- Probability generating function-moments-moment generating functions. Special discrete and continuous distributions: Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.			
<b>Unit – III</b>	<b>TESTING OF HYPOTHESIS</b>	Periods	<b>9+3</b>
Basic Definitions – Testing of Hypothesis: Large sample tests based on Normal distribution for single mean and difference of means -Tests based on t, Chi-square and F distributions for mean, variance and proportion - Test for Independence of Attributes & Goodness of Fit.			
<b>Unit - IV</b>	<b>DESIGN OF EXPERIMENTS</b>	Periods	<b>9+3</b>
One way and two way classifications - Completely Randomized design – Randomized block design – Latin square design – 2 <sup>2</sup> factorial design.			
<b>Unit – V</b>	<b>STATISTICAL QUALITY CONTROL</b>	Periods	<b>9+3</b>
Control charts for measurements ( $\bar{X}$ and R charts)- Control charts for attributes (p,c and np charts) – Tolerance limits – Acceptance sampling.			
<b>Total Periods</b>			<b>45+15=60</b>
<b>Text Books</b>			
1.	Montgomery, D.C. and Runger, C.G., Applied Statistics and Probability for Engineers, 7 <sup>th</sup> Edition, Wiley Students Edition, Wiley, 2020.		
2.	Ravichandran, J., Probability and statistics for Engineers, 1 <sup>st</sup> Edition, Wiley India Ltd, 2012.		
<b>References</b>			
1.	Gupta S.C. and Kapoor V.K, Fundamentals of Mathematical Statistics, 12 <sup>th</sup> Edition, Sultan an Sons, 2020.		
2.	Devore, J.L., Probability and Statistics for Engineering and the Sciences, 8 <sup>th</sup> Edition, Cengage Learning, 2014.		
3.	Johnson, R.A., Miller, I. and Freund, J., Miller & Freund's Probability and Statistics for Engineers 9 <sup>th</sup> Edition, Pearson Education, 2016.		
4.	Ronald E.Walpole; Raymond H.M.yers; Stiaron L. Myers,"Probability and Statistics for Engineering and the Scientists",Pearson Publishers, 9 <sup>th</sup> Edition,2010.		
5.	Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 5th Edition, Elsevier, 2004.		
<b>E-Resources</b>			
1.	<a href="https://online.stanford.edu">https://online.stanford.edu</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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Programme	<b>B.E. / B.Tech.</b>			Programme code			Regulation			<b>2023</b>				
Department	<b>CSE &amp; IT</b>						Semester			<b>III</b>				
Course code	Course name						Periods per week			Credit	Maximum Marks			
							L	T	P	C	CA	ESE	Total	
<b>U23CS407</b>	<b>Theory of Computation</b>						3	0	0	3	40	60	100	
<b>Course Objective</b>	The student should be made to, <ul style="list-style-type: none"> <li>• understand foundations of computation including automata theory</li> <li>• construct models of regular expressions and languages.</li> <li>• design context free grammar and push down automata</li> <li>• understand Turing machines and their capability</li> <li>• understand Undecidability and NP class problems</li> </ul>													
<b>Course Outcome</b>	At the end of the course, the students will be able to,											<b>KL</b>		
	<b>CO1:</b> Construct Automata for the given language											K1		
	<b>CO2:</b> Write Regular Expression for the given language											K3		
	<b>CO3:</b> Describe the Pushdown Automata and pumping lemma for CFL											K3		
	<b>CO4:</b> Design normal forms and Turing machines for the given problem											K5		
<b>Pre-requisites</b>	<b>CO5:</b> Find whether the given problem is decidable or not and NP class problems											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	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	3	3	2	3					3	3	3	3
CO 2	3	2	3	3	2	3					3	3	3	3
CO 3	3	2	2	2	2	3					3	3	3	2
CO 4	3	3	2	2	2	3					3	3	3	2
CO 5	3	3	2	2	3	2					2	2	2	2
<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>FINITE AUTOMATA</b>										Periods	<b>9</b>		
Introduction- Basic Mathematical Notation and techniques- Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Equivalence between NFA and DFA – Finite Automata with Epsilon transitions – Equivalence of NFA and DFA- Equivalence of NFAs with and without $\epsilon$ -moves-Conversion of NFA into DFA.														

<b>Unit – II</b>	<b>REGULAR EXPRESSIONS AND LANGUAGES</b>	Periods	<b>9</b>
Regular expression – Regular Languages- Equivalence of Finite Automata and regular expressions – Kleene’s Theorem. Closure properties of regular languages. Criterion for Regularity- Minimal Finite Automata-Pumping Lemma for Regular Languages– Problems based on Pumping Lemma			
<b>Unit – III</b>	<b>CONTEXT-FREE GRAMMAR AND PUSH-DOWN AUTOMATA</b>	Periods	<b>9</b>
Types of Grammar – Chomsky’s hierarchy of languages -Context-Free Grammar (CFG) and Languages – Derivations and Parse trees-Simplification of Context-free Grammar – Definition of the Pushdown Automata – Languages of a Pushdown Automata – Equivalence of Pushdown Automata and CFG– Pumping Lemma for CFL-Deterministic Pushdown Automata			
<b>Unit – IV</b>	<b>NORMAL FORMS AND TURING MACHINES</b>	Periods	<b>9</b>
Normal forms for CFG – Simplification of CFG- Chomsky Normal Form (CNF) and Greibach Normal Form (GNF) -Turing Machines – Language of a Turing Machine – Turing Machine as a Computing Device - Techniques for TM-Multi head and Multi Tape Turing Machines-The Halting problem– Problems about Turing machine			
<b>Unit - V</b>	<b>UNDECIDABILITY</b>	Periods	<b>9</b>
Non Recursive Enumerable (RE) Language – An Undecidable Problem with RE – Undecidable Problems about Turing Machine – Rice Theorem for Recursive and Recursively Enumerable Languages – Post’s Correspondence Problem (PCP) – Modified Post Correspondence Problem-The Class P and NP.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	John C. Martin “Introduction to languages and the theory of computation”, Third edition, Mc Graw Hil, 2015		
2.	John E Hopcroft, Rajeev Motwani, Jeffrey D Ullman, “Introduction to Automata Theory, Languages and Computation”, Third Edition, Pearson, 2013.		
<b>References</b>			
1.	Michael Sipser, “Introduction to Theory of Computation”, Third Edition, Cengage learning, 2013		
			
<b>E-Resources</b>			
1.	<a href="https://neuraldump.net/2017/11/nfa-and-dfa-equivalence-theorem-proof-and-example/">https://neuraldump.net/2017/11/nfa-and-dfa-equivalence-theorem-proof-and-example/</a>		
2.	<a href="https://www.javatpoint.com/automata-greibach-normal-form">https://www.javatpoint.com/automata-greibach-normal-form</a>		
3.	<a href="https://ocw.mit.edu/courses/18-404j-theory-of-computation-fall-2020/resources/pushdown-automata-cfg-2194-pda/">https://ocw.mit.edu/courses/18-404j-theory-of-computation-fall-2020/resources/pushdown-automata-cfg-2194-pda/</a>		
4.	<a href="https://web.stanford.edu/class/archive/cs/cs103/cs103.1134/lectures/20/Small20.pdf">https://web.stanford.edu/class/archive/cs/cs103/cs103.1134/lectures/20/Small20.pdf</a>		





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Programme	<b>B.E. /B.Tech.</b>			Programme code				Regulation		<b>2023</b>					
Department	<b>CSE &amp; IT</b>					Semester			<b>IV</b>						
Course code	Course name					Periods per week			Credit	Maximum Marks					
						L	T	P	C	CA	ESE	Total			
<b>U23CS408</b>	<b>Design and Analysis of Algorithms</b>					3	0	0	3	40	60	100			
Course Objective	The student should be made to, <ul style="list-style-type: none"> <li>Analyze the asymptotic performance of algorithms.</li> <li>Apply the concept of Divide and conquer and greedy algorithms</li> <li>Demonstrate a familiarity of Dynamic Programming.</li> <li>Apply important concept of Backtracking.</li> <li>Synthesize efficient algorithms for NP Problems</li> </ul>														
Course Outcome	At the end of the course, the student should be able to,										<b>KL</b>				
	<b>CO1:</b> Analysis algorithm techniques and analyze asymptotic runtime complexity of algorithms.										K2				
	<b>CO2:</b> Apply the algorithms and design techniques to solve problems using divide and conquer and Greedy algorithm.										K3				
	<b>CO3:</b> Understand and design algorithms using dynamic programming										K3				
	<b>CO4:</b> Apply concepts of Back tracking										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	PO10	PO11	PO12	PSO1	PSO2	
CO 1	1	3	3	2									1	2	
CO 2	2	2	2	3									2	2	
CO 3	2	2	3	2									3	2	
CO 4	2	3	2	3									2	3	
CO 5	2	3	2	3									3	3	
Course Assessment Methods															
Direct															
<ol style="list-style-type: none"> <li>Continuous Assessment Test I, II &amp; III</li> <li>Assignments / Seminar/Quiz</li> <li>End-Semester examination</li> </ol>															
Indirect															
<ol style="list-style-type: none"> <li>Course - end survey</li> </ol>															
Content of the syllabus															
Unit - I	<b>ALGORITHM ANALYSIS AND RECURRENCE EQUATION</b>										Periods	<b>9</b>			
Models of computation- algorithm analysis- time and space complexity- average and worst case analysis- lower bounds- Recurrence Equations-Solving recurrence equations – Analysis of linear search.															

<b>Unit – II</b>	<b>DIVIDE AND CONQUER &amp; GREEDY ALGORITHMS</b>	Periods	<b>9</b>
Divide And Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort.- Quick sort. Greedy Algorithms: Prim’s algorithm - Kruskal’s Algorithm - Dijkstra’s Algorithm– Knapsack Problem – Huffman trees and codes			
<b>Unit – III</b>	<b>DYNAMIC PROGRAMMING</b>	Periods	<b>9</b>
General Method – Multistage Graphs – Warshall’s and Floyd’s algorithm – Optimal binary search trees – 0/1 Knapsack – Traveling salesperson problem.			
<b>Unit – IV</b>	<b>BACKTRACKING &amp; BRANCH AND BOUND</b>	Periods	<b>9</b>
n - Queens problem – Subset Sum Problem – graph coloring - Hamiltonian Circuit problem – knapsack problem. Branch and Bound: LIFO and FIFO search – assignment problem			
<b>Unit - V</b>	<b>PROBLEM CLASSES</b>	Periods	<b>9</b>
NP-Completeness: Polynomial Time, Polynomial-time verification, NP Completeness and reducibility, NP - Completeness Proofs, NP Complete Problems.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	T.H.Cormen, C.E.Leiserson, R.L.Rivest, C.Stein, -Introduction to Algorithms, 4 <sup>th</sup> Edition, Prentice- Hall India, 2022.		
2.	Anany Levitin, “Introduction to the Design and Analysis of Algorithms, 3rd Edition, Pearson Education, 2017		
<b>References</b>			
1.	Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms 2nd Edition, 2008.		
2.	J. Kleinberg and E. Tardos, -Algorithm Design, Pearson International Edition, 2005.		
<b>E-Resources</b>			
1.	<a href="https://edutechlearners.com/download/Introduction_to_algorithms-3rd%20Edition.pdf">https://edutechlearners.com/download/Introduction_to_algorithms-3rd%20Edition.pdf</a>		
2.	<a href="http://www.cs.sjtu.edu.cn/~jiangli/teaching/CS222/files/materials/Algorithm%20Design.pdf">http://www.cs.sjtu.edu.cn/~jiangli/teaching/CS222/files/materials/Algorithm%20Design.pdf</a>		
3.	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E / B.Tech.</b>	Programme Code			Regulation			<b>2023</b>						
Department	<b>CSE,IT</b>			Semester			<b>III / IV</b>							
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks								
		L	T	P	C	CA	ESE	Total						
<b>U23IT301</b>	<b>Digital Systems Design</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>Understand common forms of number representation, Boolean laws and logic minimization using Karnaugh Map.</li> <li>Understand the concepts of combinational logic circuits.</li> <li>Understand the concepts of sequential logic circuits.</li> <li>Understand the concepts of Asynchronous sequential circuits.</li> <li>Learn basic of digital memories and fundamental concepts used in programmable logic.</li> </ul>													
	At the end of the course, the student should be able to,							Knowledge level						
	<b>CO1:</b> Realize the number representation, Different forms of Boolean law and logic minimization using K Maps.							K2						
	<b>CO2:</b> Analyze and Reproduce the combinational logic circuits.							K3						
<b>CO3:</b> Analyze and Reproduce sequential logic circuits.							K3							
<b>CO4:</b> Understand the analysis and design procedures for asynchronous sequential circuits.							K3							
<b>CO5:</b> Characterize Boolean functions using programmable logics.							K2							
<b>Pre-requisites</b>	-													
<b>CO /PO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs)												CO/PSO Mapping		
COs	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
CO 1	3	3	2										3	2
CO 2	3	2	2						1				3	2
CO 3	3	3	2	1					1				2	2
CO 4	3	2	2	1									3	2
CO 5	2	2	1	1									2	1
<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>Number Systems, Boolean Algebra and Minimization Techniques</b>										Periods	<b>9</b>		
<b>Number Systems &amp; Boolean Algebra:</b> Number systems review: Decimal– Binary– Octal– Hexadecimal, 1s and 2s Complements, Boolean postulates and laws – De-Morgan’s theorem – Principle of Duality.														
<b>Logic Gates &amp; Minimization of Boolean functions:</b> Logic Gates – Universal Gates - Karnaugh map minimization: Three, Four variables with Don’t Care Entries -Implementations of logic functions using logic gates.														

<b>Unit - II</b>	<b>Combinational Logic Circuits</b>	Periods	<b>9</b>
Half Adder – Full Adder – Half Subtractor – Full Subtractor -Magnitude Comparator: 2 bit– Code Conversion: Gray to Binary, Binary to Gray, Binary to BCD, BCD to Excess 3 code, BCD to Gray, Binary to Excess 3 code definition – Multiplexers, Demultiplexers– Encoders, Decoders – Parity checker and generator			
<b>Unit – III</b>	<b>Sequential Logic Circuits</b>	Periods	<b>9</b>
Basic Architectural Distinctions between Combinational and Sequential circuits – Latch – Definitions of Level and Edge triggering – Flip flops: SR, JK, D and T – Counters: up counter, down counter, up-down counter, ripple counter – Registers: Shift registers, Universal shift register			
<b>Unit - IV</b>	<b>Asynchronous Sequential Logics</b>	Periods	<b>9</b>
Analysis and Design Procedure of Asynchronous Sequential Circuits — Reduction of State and Primitive Flow Tables — Race-free State Assignment — Hazards: Static Hazard, Dynamic Hazard, Essential Hazard.			
<b>Unit – V</b>	<b>Memory and Programmable Devices</b>	Periods	<b>9</b>
Introduction to basic memories: ROM – PROM – EPROM – EEPROM, RAM: Static and dynamic RAM – Programmable Logic Array (PLA) – Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) – Characteristics of Digital integrated circuits: propagation delay, fan-out and fan-in.			
<b>Total Periods</b>			<b>45</b>
<b>Text Books:</b>			
1.	M. Morris R. Mano, Michael D. Ciletti, “Digital Design: With an Introduction to the Verilog HDL, VHDL, and SystemVerilog”, 6th Edition, Pearson Education, 2021.		
2.	Charles H.Roth. "Fundamentals of Logic Design",6th Edition, Thomson Learning, 2013		
<b>REFERENCE BOOKS:</b>			
1.	Digital Electronics - A Conceptual Approach [Print Replica] Kindle Edition, Technical Publication by D.A.GodseA.P.Godse, 2014		
2.	G. K. Kharate, Digital Electronics, Oxford University Press, 2010		
3.	John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, Pearson Education, 2017.		
4.	Charles H. Roth Jr, Larry L. Kinney, Fundamentals of Logic Design, Sixth Edition, CENGAGE Learning, 2013		
<b>E-Resources:</b>			
1.	<a href="https://byjus.com/gate/sequential-circuitsnotes/#:~:text=A%20sequential%20circuit%20refers%20to,form%20of%20the%20present%20state.">https://byjus.com/gate/sequential-circuitsnotes/#:~:text=A%20sequential%20circuit%20refers%20to,form%20of%20the%20present%20state.</a>		
2.	<a href="https://www.youtube.com/watch?v=Wj01JfGEQT8">https://www.youtube.com/watch?v=Wj01JfGEQT8</a>		
3.	<a href="https://www.tutorialspoint.com/digital_circuits/digital_circuits_sequential_circuits.html">https://www.tutorialspoint.com/digital_circuits/digital_circuits_sequential_circuits.html</a>		



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Programme	<b>B.E.</b>			Programme code		<b>101</b>		Regulation		<b>2023</b>			
Department	<b>Computer Science and Engineering</b>					Semester			<b>IV</b>				
Course code	Course name					Periods per week			Credit	Maximum Marks			
						L	T	P	C	CA	ESE	Total	
<b>U23CS409</b>	<b>Web technology</b>					3	0	0	3	40	60	100	
<b>Course Objective</b>	The student should be made to, <ul style="list-style-type: none"> <li>Describe the various steps in designing a creative and dynamic website.</li> <li>Create web pages using html, JavaScript, CSS and PHP.</li> <li>Design dynamic and interactive web pages by embedding Script code such as NodeJS</li> </ul>												
<b>Course Outcome</b>	At the end of the course, the student should be able to,											<b>KL</b>	
	<b>CO1:</b> Develop a static webpage by the use of HTML.											K4	
	<b>CO2:</b> Design a well formed web page using CSS & basics of bootstrap											K4	
	<b>CO3:</b> Implement client side scripting using JavaScript											K4	
	<b>CO4:</b> Develop PHP application for implementing session management and database connectivity.											K4	
<b>CO5:</b> Develop application using frontend framework NodeJS and backend framework with Mongo DB											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	PSO1	PSO2
CO 1	3	2	3		3							2	3
CO 2	3		3	2	3							2	3
CO 3	3		3		3							2	2
CO 4	3		3	2	3							2	2
CO 5	3		3		2							2	3
<b>Course Assessment Methods</b> <b>Direct</b> <ol style="list-style-type: none"> <li>Continuous Assessment Test I, II &amp; III</li> <li>Assignments / Seminar/Quiz</li> <li>End-Semester examinations</li> </ol> <b>Indirect</b> <ol style="list-style-type: none"> <li>Course -end survey</li> </ol>													
<b>Content of the syllabus</b>													
<b>Unit -I</b>	<b>HYPER TEXT MARKUP LANGUAGE</b>									Periods	<b>9</b>		
The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers. Markup Languages: HTML- An Introduction to HTML History-Versions-Basic HTML Syntax and Semantics- Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-Creating HTML Documents.													

<b>Unit-II</b>	<b>CSS &amp; BOOTSTRAP</b>	Periods	<b>9</b>
Introduction to Cascading Style Sheets-inline style-embedded style sheets-conflicting style-linking external style sheets-positioning elements- Selectors - Backgrounds and Borders-box model and text effects, bootstrap Introduction-bootstrap components-layouts-form-navigation-utilities			
<b>Unit – III</b>	<b>CLIENT-SIDE SCRIPTING</b>	Periods	<b>9</b>
JavaScript Introduction -Syntax-Variables and Data Types-Statements-Operators- Literals-Functions – Arrays, Built-in Objects, DOM- adding HTML elements, deleting HTML elements -Modifying Element Properties, Event handling: on change, on mouse over, on mouse out.			
<b>Unit- IV</b>	<b>SERVER SIDE SCRIPTING - PHP</b>	Periods	<b>9</b>
Introduction to PHP – Operators – Conditionals – Looping – Functions – Arrays- Date and Time Functions – String functions - File Handling - File Uploading – Email Basics - Email with attachments. Sessions- Cookies-MySQL Basics – Querying single and multiple MySQL Databases with PHP – PHP Data Objects.			
<b>Unit-V</b>	<b>APPLICATION DEVELOPMENT USING NODE JS</b>	Periods	<b>9</b>
Introduction to Node.js- Installing Node.js - Using Events, Listeners, Timers, and Callbacks in Node.js – Introduction to Mongo DB- Accessing MongoDB from Node.js			
<b>Total Periods</b>			<b>45</b>
<b>Text Books</b>			
1.	Brad Dayley, Brendan Dayley, and Caleb Dayley , Node.js, MongoDB and Angular Web Development: The definitive guide to using the MEAN stack to build web applications, 2 <sup>nd</sup> Edition, Pearson Education, 2018		
2.	Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India, 2014.		
<b>References</b>			
1.	Deitel and Deitel and Nieto, “Internet and World Wide Web - How to Program”, Prentice Hall, 5th Edition, 2011.		
<b>E-Resources</b>			
1.	<a href="https://www.w3schools.com/html/">https://www.w3schools.com/html/</a>		
2.	<a href="https://www.geeksforgeeks.org/html-tutorial/">https://www.geeksforgeeks.org/html-tutorial/</a>		
3.	<a href="https://www.w3schools.com/bootstrap5/bootstrap_spinners.php">https://www.w3schools.com/bootstrap5/bootstrap_spinners.php</a>		

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Programme	<b>B.E. / B.Tech.</b>	Programme Code			Regulation		<b>2023</b>							
Department	<b>CSE , IT &amp; CST</b>				Semester		<b>IV</b>							
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks								
		L	T	P		C	CA	ESE	Total					
<b>U23CT406</b>	<b>Operating Systems</b>	3	0	2	4	50	50	100						
<b>Course Objective</b>	<ul style="list-style-type: none"> <li>To understand the operating system structures.</li> <li>To learn Processes, Threads and analyze Scheduling algorithms.</li> <li>To have a basic understanding of Deadlocks and analyze memory management schemes.</li> <li>To be familiar with File system management.</li> <li>To be familiar with the basics of virtual machines</li> </ul>													
<b>Course Outcome</b>	At the end of the course, the student should be able to,							Knowledge Level						
	<b>CO1:</b> Gain knowledge on operating system structures.							K2						
	<b>CO2:</b> Analyze various scheduling algorithms and process synchronization.							K3						
	<b>CO3:</b> Investigate deadlock prevention and avoidance algorithms and compare various memory management schemes.							K3						
	<b>CO4:</b> Illustrate the functionality of file 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>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>CO 1</b>	3	1	1	1				1	1	1	2	2	2	
<b>CO 2</b>	2	3	1	3	1			3	2	2	3	2	2	
<b>CO 3</b>	2	2	3	3	2			3	1	1	2	2	1	
<b>CO 4</b>	2	2	1	2	1			1	3	2	1	2	1	
<b>CO 5</b>	2	3	3	2	1			3	1	2	1	2	2	
<b>Course Assessment Methods</b>														
<b>Direct</b>														
1. Continuous Assessment Test I, II & III														
2. Assignments /seminar/ Quiz/ Model Lab														
3. End-Semester examinations														
<b>Indirect</b>														
1. Course - End survey														
<b>Content of the syllabus</b>														
<b>Unit – I</b>	<b>INTRODUCTION AND OPERATING SYSTEM STRUCTURES</b>										Periods	<b>9</b>		
Introduction - Computer System organization - Computer-System Architecture- Operating-System Operations – Operating System Services - User Operating System Interface - System Calls – System Services - Operating-System Design and Implementation- Operating-System Structure.														
<b>Unit - II</b>	<b>PROCESS MANAGEMENT</b>										Periods	<b>9</b>		
Process Concept - Process Scheduling -Operations on Processes - Inter-process Communication; Threads -														



Multithread Models - Threading issues; CPU Scheduling -Basic Concepts - Scheduling Criteria - Scheduling Algorithms; Process Synchronization - Critical-Section Problem - Synchronization Hardware - Semaphores - Monitors -Classic problems of Synchronization.			
<b>Unit – III</b>	<b>DEADLOCKS AND MEMORY MANAGEMENT</b>	Periods	<b>9</b>
System Model - Deadlock Characterization -Methods for handling Deadlocks - Deadlock Prevention - Deadlock avoidance - Deadlock detection - Recovery from Deadlocks; Main Memory- Swapping - Contiguous Memory allocation - Paging - Structure of the Page Table - Intel 32- and 64-bit Architectures; Virtual Memory - Demand Paging - Page Replacement - Allocation of frames - Thrashing.			
<b>Unit - IV</b>	<b>FILE SYSTEM MANAGEMENT</b>	Periods	<b>9</b>
File-System Interface - File Concept - Access Methods - Directory Structure - File System Mounting - Protection; File System Implementation - Directory Implementation - Allocation Methods - Free-space Management.			
<b>Unit – V</b>	<b>STORAGE MENAGEMENT AND VIRTUALIZATION</b>	Periods	<b>9</b>
Mass-Storage Structure – Disk Scheduling and Management - Swap-Space Management; Virtual Machines – History - Benefits and Features - Building Blocks –Introduction to types of Virtual Machines and their implementations - Virtualization and Operating-System Components.			
<b>Total Periods</b>			<b>45</b>
<b>Suggested List of Experiments</b>			<b>CO's</b>
1. Installation of windows operating system			<b>CO1</b>
2. Illustrate Shell Programming			<b>CO1</b>
3. Process Management using System Calls : Fork, Exec, Getpid, Exit, Wait, Close			<b>CO1</b>
4. Simulation of CPU scheduling algorithms :FCFS, SJF, Priority and Round Robin			<b>CO2</b>
5. Implement process synchronization using semaphores			<b>CO2</b>
6. Simulation of Banker s algorithm to check whether the given system is in safe state or unsafe state			<b>CO3</b>
7. Implementation of Dynamic memory allocation algorithms: First-fit, Best-fit, Worst-fit			<b>CO3</b>
8. Implementation of Page Replacement Algorithms : FIFO, LRU and Optimal			<b>CO3</b>
9. Implement the following File Allocation Strategies : Sequential, Indexed, Linked			<b>CO4</b>
10. Install Linux operating system using VMware			<b>CO5</b>
<b>Lecture 45: Practical 30; Total: 75</b>			
<b>Text Books</b>			
1	Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition, 2022 New Delhi.		
2	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 10th Edition, John Wiley and Sons Inc., 2018		
<b>References</b>			
1.	William Stallings, "Operating Systems: Internals and Design Principles", 7th Edition,PrenticeHall, 2018.		
2.	Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach",TataMcGraw Hill Edition, 2010.		
<b>Tools Required</b>			
1.	PC, Linux / Windows OS, C Compiler, VMWare / VirtualBox		
<b>E-Resources</b>			
1.	<a href="https://www.geeksforgeeks.org/operating-systems">https://www.geeksforgeeks.org/operating-systems</a>		
2.	<a href="https://www.tutorialspoint.com/operating_system/index.htm">https://www.tutorialspoint.com/operating_system/index.htm</a>		
3.	<a href="youtube.com/playlist?list=PLDW872573QAb4bj0URobvQTD4IIV6gRkx">youtube.com/playlist?list=PLDW872573QAb4bj0URobvQTD4IIV6gRkx</a>		





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Programme	<b>B.E.</b>	Programme code	<b>101</b>	Regulation	<b>2023</b>									
Department	<b>Computer Science and Engineering</b>			Semester	<b>IV</b>									
Course code	Course name	Periods per week			Credit	Maximum Marks								
		L	T	P	C	CA	ESE	Total						
<b>U23CS410</b>	<b>Web Technology Laboratory</b>	0	0	2	1	60	40	100						
<b>Course Objective</b>	<p>The student should be made to,</p> <ul style="list-style-type: none"> <li>Understand the web technologies to create adaptive web pages for web application.</li> <li>Use CSS and Bootstrap to implement a variety of presentation effects to the web application.</li> <li>Gain the skills and project-based experience needed for entry into web application and development careers.</li> <li>Explore different web extensions and web services standards.</li> <li>Acquire knowledge and skills for creation of web site considering both client and server side programming.</li> </ul>													
<b>Course Outcome</b>	At the end of the course, the student should be able to,							<b>KL</b>						
	<b>CO1:</b> Create web pages using XHTML, Cascading Style Sheets and Bootstrap							<b>K3</b>						
	<b>CO2:</b> Develop a dynamic webpage by the use of java script and DHTML.							<b>K3</b>						
	<b>CO3:</b> Write a client side script to perform the Event Handling methods							<b>K3</b>						
	<b>CO4:</b> Develop PHP application to catch form data sent from client and store it on database.							<b>K4</b>						
<b>Pre-requisites</b>	<b>CO5:</b> Develop a dynamic webpage using Node JS and MongoDB.							<b>K4</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	PSO1	PSO 2
<b>CO 1</b>	3	3	3	2					1				3	2
<b>CO 2</b>	3	3	3	2					2				3	2
<b>CO 3</b>	3	3	3	2	1				2				3	2
<b>CO 4</b>	3	3	3	2	2				2				3	2
<b>CO 5</b>	3	3	3	2	2				2				3	2
<b>Course Assessment Methods</b>														
<b>Direct</b>														
1. Prelab and post lab test /Viva Questions														
2. End-Semester examinations														
<b>Indirect</b>														
1. Course - end survey														
<b>LIST OF EXPERIMENTS</b>													<b>Course Outcome</b>	

1. The catalogue page should contain the details of all the books available in the web. The details should contain the following: 1. Snap shot of Cover Page. 2. Author Name. 3. Publisher. 4. Price. 5. Add to cart button.	CO1
2. Create a —registration form —with the following fields 1) Name (Text field) 2) Password (password field) 3) E-mail id (text field) 4) Phone number (text field) 5) Sex (radio button) 6) Date of birth (3 select boxes) 7) Languages known (check boxes – English, Telugu, Hindi, Tamil) 8) Address (text area)	CO1
3. <b>HTML5 and JavaScript</b> : a) position in the string of the left-most vowel b) number with its digits in the reverse order c) Write an HTML page including any required JavaScript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show —out of rangel and if it is not a number, it should show —not a numberl message in the result box	CO3
4. Create a JavaScript array that holds a list of your favorite movies. Use built-in array methods to add, remove, and sort the movies. HTML and CSS:	CO3
5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS/Bootstrap to customize the properties of the font of the capital (color, bold and font size).	CO2
6. Design a web page using CSS (Cascading Style Sheets) and Bootstrap which includes the following: A. Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles	CO2
7. a) Assume four users user1, user2, user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a PHP for doing the following. 1. Create a Cookie and add these four user ID's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display —You are not an authenticated user"	CO4
8. Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page.	CO4
9. Install NodeJS and MongoDB on your local machine and start the MongoDB server. Verify the installation by creating a new database and inserting a simple document.	CO5 CO5
10. Write a Node.js script that connects to a MongoDB database and inserts a new document into a collection. Display a success message upon successful insertion.	
<b>Total Periods</b>	
<b>45</b>	
<b>E-Resources</b>	
1.	<a href="https://www.w3schools.com/html/">https://www.w3schools.com/html/</a>
2.	<a href="https://www.geeksforgeeks.org/html-tutorial/">https://www.geeksforgeeks.org/html-tutorial/</a>
3.	<a href="https://www.w3schools.com/bootstrap5/bootstrap_spinners.php">https://www.w3schools.com/bootstrap5/bootstrap_spinners.php</a>

# **CAREER TRACK COURSES**

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode- 637205														
Programme	<b>B.E.</b>			Programme code			<b>101</b>		Regulation		<b>2023</b>				
Department	<b>Computer Science and 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			
CO5: Enhance their problem solving skills and logical Skills											K4				
<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>PSO2</b>	<b>PSO3</b>
<b>CO 1</b>		2		3	2					3		3	1	1	
<b>CO 2</b>	3	3		2	2					3		3	2	2	
<b>CO 3</b>	3	3		3	2					3		3	3	1	
<b>CO 4</b>	3	3		2	3					2		2	3	1	
<b>CO 5</b>		2		2	2					2		2	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.			
<b>Unit-II</b>	<b>PROFIT AND LOSS</b>	Periods	<b>8</b>
<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.			
<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.			
<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>
<b>DIRECTION SENSE:</b> Direct yourself, based on Angle, Directional reference point, correct map based on wrong map, Direction in Clocks, Shadowing.			
<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.			
<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>		

	<b>VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN</b> (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205													
Programme	<b>B.E. / B.TECH</b>			Programme code			Regulation			<b>2023</b>				
Department							Semester			<b>4</b>				
Course code	Course Name						Periods per week			Credit	Maximum Marks			
							L	T	P		C	CA	ESE	Total
<b>U23CTCE1</b>	<b>Entrepreneurial Mindset and Business Model Canvas</b>						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,											<b>KL</b>		
	<b>CO1:</b> Explain the key traits and behaviors of successful entrepreneurs.											K2		
	<b>CO2:</b> Identify and describe the components of the Business Model Canvas.											K2		
	<b>CO3:</b> Design innovative business models tailored to specific customer needs and market conditions.											K6		
	<b>CO4:</b> Demonstrate the ability to write comprehensive business plans, incorporating elements such as market analysis, financial projections, and operational strategies.											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	PO10	PO11	PO12	PSO1	PSO2
CO 1	1	1	2	1	1			1	2	1	3	3		
CO 2	2	1	3	3	2			1	2	1	3	3		
CO 3	2	1	3	2	3			1	2	1	3	3		
CO 4	1	1	3	1	2			1	2	1	3	3		
CO 5	1	1	3	1	2			1	2	1	3	3		
Course Assessment Methods														
<b>Direct</b>														
1. Continuous Assessment through Reviews														
2. End Semester Examinations														
<b>Indirect</b>														
1. Course - end survey														
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>			
1	Khanka. S.S., “Entrepreneurial Development” S.Chand and Co. Ltd., New Delhi, 2011, Revised Edition		
2	Osterwalder, A., & Pigneur, Y. “Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers” John Wiley & Sons, Inc., 2010		
3.	R. Duane Ireland Bruce R. Barringer “Entrepreneurship: Successfully Launching New Ventures”, Pearson Education. 2020, 6 <sup>th</sup> Edition		
<b>References</b>			
1.	Donald F Kuratko, “Entrepreneurship – Theory, Process and Practice”, Cengage Learning, 2016. 10 <sup>th</sup> Edition		
2.	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>			
1.	<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>		
2.	<a href="https://online.bath.ac.uk/articles/business-models">https://online.bath.ac.uk/articles/business-models</a>		
3.	<a href="https://creately.com/guides/business-model-canvas-explained/">https://creately.com/guides/business-model-canvas-explained/</a>		