VIVEKANANDHA

COLLEGE OF ENGINEERING FOR WOMEN

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

CURRICULUM & SYLLABI – 2023

FOR

UNDER GRADUATE(UG)

B.TECH. – INFORMATION TECHNOLOGY

REGULATION 2023

(After 16th BoS)

CHOICE BASED CREDIT SYSTEM

(Applicable to the students admitted from the academic year 2023-2024 onwards)

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

B.TECH. INFORMATION TECHNOLOGY

Regulations - 2023

CHOICE BASED CREDIT SYSTEM

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

Providing quality education to transform students into technically competent skilled women to excel in IT profession, innovation and entrepreneurship

DEPARTMENT MISSION

- To empower knowledge on cutting-edge technologies in the field of Information Technology to develop innovative solutions for real-world problems
- To create a platform for innovation, research and new technology development
- To inculcate ethical practices, life-long learning and sense of societal responsibilities to support the career and personal development of the learner

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1: Graduates will have knowledge in various programming languages and continuous up-gradation in emerging IT technologies.

PEO 2: Graduates will be able to analyze and find solutions for current industrial needs.

PEO 3: Graduates will contribute to the society by their ethical behavior and effective teamwork

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1	**Optimal Solution :** Graduates will be able to develop computer applications for the real life problem using suitable programming platform
PSO2	**Successful Career :** Graduates will be able to think innovatively and work on multi-disciplinary areas

PROGRAMME OUTCOMES (POs):

Undergraduate engineering programmes are designed to prepare graduates to attain the following program outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public

health and safety, and the cultural, societal, and environmental considerations

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of Program Educational Objectives with Program Outcomes

A broad relation between the program objective and the outcomes is given in the following table

Programme Educational Objectives	Programme Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	√	√	√		√	√		√	√			
II		√		√			√	√	√	√		
III		√	√		√		√		√	√	√	√

CURRICULUM BREAKDOWN STRUCTURE (Applicable to the Students admitted in the Academic Year 2023 -24)										
Summary of Credit Distribution										
Category	**Semester**								**Total No.of Credits**	**Curriculum Content (% of total number of credits of the program)**
	SEM1	**SEM 2**	**SEM3**	**SEM4**	**SEM5**	**SEM6**	**SEM 7**	**SEM 8**		
HSMC	4	4							8	5.0%
BSC	8	8	4	4					24	15%
ESC	7	8							15	9.4%
PCC			14	14	14	15	7		64	39.7%
PEC					3	3	6	6	18	11.2%
OEC					3	3	3		9	5.6%
EEC	1		2		1	1	3	8	16	10%
MC				2					3	3.1%
CTC				1	1	1	1		4	2.5%
Semester wise total	**20**	**20**	**20**	**21**	**22**	**23**	**20**	**14**	**160**	**100%**

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**B. Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

CURRICULUM

(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
THEORY									
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$	BSC	3	0	0	3	40	60	100
U23CS101	Programming for Problem Solving*	ESC	3	0	0	3	40	60	100
U23TA101	தமிழர் மரபு/Heritage of Tamils*	HSMC	1	0	0	1	40	60	100
THEORY INTEGRATED WITH PRACTICAL									
U23GE101	Engineering Graphics*	ESC	2	0	3	3	50	50	100
PRACTICAL INTEGRATED WITH THEORY									
U23GE102	Design Thinking*	EEC	1	0	2	1	50	50	100
PRACTICAL									
U23PH102	Physics Laboratory$	BSC	0	0	2	1	60	40	100
U23CS102	Programming for Problem Solving Laboratory*	ESC	0	0	2	1	60	40	100
MANDATORY COURSES									
-	Induction Programme*	3 Weeks				0	-	-	-
U23MCFY1	Environmental Science and Engineering$	MC	2	0	0	0	100	-	100
					Total	**20**	**520**	**480**	**1000**

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

*Common for all branches

$Common for CSE, CST, IT ,BT & AI & DS

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205								
Programme	**B.Tech.**	Programme Code	**104**	Regulation	**2023**				
Department	**INFORMATION TECHNOLOGY**			Semester	**II**				
CURRICULUM (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
THEORY									
U23MA202	Complex Analysis and Ordinary Differential Equations*	BSC	3	1	0	4	40	60	100
U23CH201	Engineering Chemistry$	BSC	3	0	0	3	40	60	100
U23EE201	Basic Electrical and Electronics Engineering#	ESC	3	0	0	3	40	60	100
U23TA202	தமிழரும் தொழில் நுட்பமும்/ Tamils and Technology*	HSMC	1	0	0	1	40	60	100
THEORY INTEGRATED WITH PRACTICAL									
U23CS204	Object Oriented Programming@	ESC	3	0	2	4	50	50	100
U23EN202	Professional Communication*	HSMC	2	0	3	3	50	50	100
PRACTICAL									
U23CH202	Chemistry Laboratory$	BSC	0	0	2	1	60	40	100
U23GE204	Engineering Practices Laboratory*	ESC	0	0	3	1	60	40	100
MANDATORY COURSES									
U23MCFY2	Indian Constitution$	MC	2	0	0	0	100	-	100
					Total	**20**	**480**	**420**	**900**

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Programme	**B.E. / B. Tech.**	Programme Code	**104**	Regulation	**2023**				
Department	**INFORMATION TECHNOLOGY**			Semester	**III**				
CURRICULUM (Applicable to the students admitted from the academic year 2023-2024onwards)									
Course Code	Course Name	Category	Periods/Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
THEORY									
U23MA304	Discrete Mathematics $	BSC	3	1	0	4	40	60	100
U23IT301	Digital Systems Design *	PCC	3	0	0	3	40	60	100
U23CS305	Computer Organization and Architecture$	PCC	3	0	0	3	40	60	100
U23IT302	Data Structures#	PCC	3	0	0	3	40	60	100
U23CTCP1	Verbal , Quantitative Aptitude and Reasoning - I	EEC	2	0	0	1	40	60	100
THEORY INTEGRATED WIH PRACTICAL									
U23CS306	Python Programming and Framework $	PCC	3	0	2	4	50	50	100
PRACTICAL									
U23IT303	Data Structures Laboratory#	PCC	0	0	2	1	60	40	100
U23CTCP2	Personality Development	EEC	1	0	2	1	60	40	100
					Total Credits	**20**	**370**	**430**	**800**

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, CSE, EEE, ECE, IT, BME & CST

*Common for CSE, IT

$ Common CSE ,IT & CST

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**B.E. / B. Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**INFORMATION TECHNOLOGY**			Semester	**IV**

CURRICULUM

(Applicable to the students admitted from the academic year 2023-2024onwards)

Course Code	Course Name	Category	Periods/Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
THEORY									
U23MA405	Probability and Statistics [$]	BSC	3	1	0	4	40	60	100
U23IT404	Database Management Systems[$]	PCC	3	0	0	3	40	60	100
U23IT405	Agile Software Engineering*	PCC	3	0	0	3	40	60	100
U23CS408	Design and Analysis of Algorithms*	PCC	3	0	0	3	40	60	100
U23ADL01	Additional Language	EEC	3	0	0	2	40	60	100
THEORY INTEGRATED WIH PRACTICAL									
U23CT406	Operating Systems[$]	PCC	3	0	2	4	50	50	100
PRACTICAL									
U23IT406	Database Management Systems Laboratory[$]	PCC	0	0	2	1	60	40	100
CAREER TRACK COURSES									
	Career Track Course – I	EEC	2 / 0	0	0 / 2	1	40 / 60	60 / 40	100
					Total Credits	**21**	**350 / 370**	**450/ 430**	**800**

CA - Continuous Assessment, ESE - End Semester Examination, BSC - Basic Science Courses, ESC - Engineering Science Courses, PCC – Professional Core Courses, MC- Mandatory courses, CTC –Career Track Course

[$] Common for CSE, IT & CST

* Common for CSE, IT

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**B.E. / B. Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**INFORMATION TECHNOLOGY**			Semester	**V**

CURRICULUM

(Applicable to the students admitted from the academic year 2023-2024onwards)

Course Code	Course Name	Category	Periods/Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
THEORY									
U23CS407	Theory of Computation *	PCC	3	0	0	3	40	60	100
U23CT302	Artificial Intelligence $	PCC	3	0	0	3	40	60	100
U23CS513	Microprocessor and Embedded System $	PCC	3	0	0	3	40	60	100
U23CT406	Computer Networks$	PCC	3	0	0	3	40	60	100
	Professional Elective-1	PEC	3	0	0	3	40	60	100
	Open Elective-1	OEC	3	0	0	3	40	60	100
PRACTICAL									
U23CT407	Computer Networks Laboratory$	PCC	0	0	2	1	60	40	100
U23CS514	Microprocessor and Embedded System laboratory*	PCC	0	0	2	1	60	40	100
U23IT507	Mini Project - I	EEC	0	0	2	1	100	-	100
CAREER TRACK COURSES									
-	Career Track Course - II	EEC	2 / 0	0	0 / 2	1	40 / 60	60 / 40	100
					Total	**22**	**500 / 520**	**500 / 480**	**1000**

CA - Continuous Assessment, ESE - End Semester Examination, BSC - Basic Science Courses, ESC - Engineering Science Courses, PCC – Professional Core Courses, HSC - Humanities and Social Science Courses, MC- Mandatory courses , EEC- Employability Enhancement Courses, PROJ-IT-Project, CA- Continuous Assessment, ESE - End Semester Examination, CTC –Career Track Course

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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205								
Programme	**B.E. / B. Tech.**	Programme Code	**104**	Regulation	**2023**				
Department	**INFORMATION TECHNOLOGY**			Semester	**VI**				
CURRICULUM (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
THEORY									
U23CS512	Compiler Design[$]	PCC	3	0	0	3	40	60	100
U19IT608	Internet Programming*	PCC	3	0	0	3	40	60	100
U23CT508	Machine Learning[$]	PCC	3	0	0	3	40	60	100
-	Professional Elective-2	PEC	3	0	0	3	40	60	100
-	Open Elective-2	OEC	3	0	0	3	40	60	100
THEORY INTERGRATAED PRACTICAL									
U23IT609	Mobile Application Development Laboratory	PCC	3	0	2	4	50	50	100
PRACTICAL									
U23CT509	Machine Learning Laboratory[$]	PCC	0	0	2	1	60	40	100
U23IT610	Internet Programming Laboratory*	PCC	0	0	2	1	60	40	100
U23IT611	Mini Project - II	EEC	0	0	2	1	100	-	100
CAREER TRACK COURSES									
-	Career Track Course -III	EEC	2	0	0 / 2	1	40 / 60	60 / 40	100
					Total	**23**	**510 / 530**	**490 / 470**	**800**

CA - Continuous Assessment, ESE - End Semester Examination, BSC - Basic Science Courses, ESC - Engineering Science Courses, PCC – Professional Core Courses, HSC - Humanities and Social Science Courses, MC- Mandatory courses , EEC- Employability Enhancement Courses, PROJ-IT-Project, CA- Continuous Assessment, ESE - End Semester Examination, CTC –Career Track Course

$ Common for CSE, IT & CST

* Common to CST & IT

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode– 637205					
Programme	**B.E. / B. Tech.**	Programme Code	**104**	Regulation	**2023**	
Department	**INFORMATION TECHNOLOGY**			Semester	**VII**	

CURRICULUM

(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
THEORY									
U23CT715	Internet of Things[$]	PCC	3	0	0	3	40	60	100
U23IT712	Big Data Analytics*	PCC	3	0	0	3	40	60	100
-	Professional Elective-3	PEC	3	0	0	3	40	60	100
-	Professional Elective-4	PEC	3	0	0	3	40	60	100
-	Open Elective-3	OEC	3	0	0	3	40	60	100
PRACTICAL									
U23CT717	Internet of Things Laboratory[$]	PCC	3	0	2	1	60	40	100
U23IT713	Internship Training	EEC	0	0	2	2	100	-	100
U23IT714	Project Phase –I	EEC	0	0	4	2	60	40	100
					Total	**20**	**480**	**420**	**900**

CA - Continuous Assessment, ESE - End Semester Examination, PCC – Professional Core Courses, EEC- Employability Enhancement Courses, PROJ-IT-Project, CA- Continuous Assessment, ESE - End Semester Examination, CTC –Career Track Course

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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode– 637205				
Programme	**B.E. / B. Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**INFORMATION TECHNOLOGY**			Semester	**VIII**

CURRICULUM

(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
THEORY									
-	Professional Elective-5	PEC	3	0	0	3	40	60	100
-	Professional Elective-6	PEC	3	0	0	3	40	60	100
PRACTICAL									
U23IT815	Project Phase - II	EEC	0	0	16	8	60	40	100
					Total	**14**	**140**	**160**	**300**

Cumulative Credits: 160

CA - Continuous Assessment, ESE - End Semester Examination, , PCC – Professional Core Courses, EEC-Employability Enhancement Courses, PROJ-IT-Project.

Type of Courses

PCC	:	Professional Core Courses
PEC	:	Professional Elective Courses
OEC	:	Open Elective Courses
EEC	:	Employability Enhancement Course
MC	:	Mandatory Courses
HSC	:	Humanities And Sciences Courses
ESC	:	Engineering Sciences Courses
BSC	:	Basic Sciences Courses
CTC	:	Career Track Courses

Career Track Courses										
Sem	**Course Code**	**Course Name**	**Category**	**Periods/Week**			**Credit**	**Maximum Marks**		
				L	**T**	**P**	**C**	**CA**	**ESE**	**Total**
Track 1 - Entrepreneurship										
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
Track 2 - Competitive Examination										
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
Track 3 - Higher Studies										
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
Track 4 - Placement										
IV	U23CTCP3	Verbal , Quantitative Aptitude and Reasoning -II	EEC	2	-	-	1	40	60	100
V	U23CTCP4	Leveraging Arithmetic and Codes Snippet	EEC	2	-	-	1	40	60	100
VI	U23CTCP5	Integrated Reasoning and Pseudo Code	EEC	2	-	-	1	40	60	100

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Elayampalayam, Tiruchengode – 637 205

Programme	**B.TECH**	Programme Code	**104**	Regulation	**2023**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23MA101	**Matrices and Calculus***	3	1	0	4	40	60	100

Course Objective

The Main Objective of the course is to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications
- Familiarize the students with differential calculus
- Familiarize the student with functions of several variables. This is needed in many branches of engineering
- Make the students understand various techniques of integration
- Acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications

Course Outcome

At the end of the course the students will be able to	Knowledge level
CO1: Use the matrix algebra methods for solving practical problems	K3
CO2: Apply differential calculus tools in solving various application problems	K4
CO3: Able to use differential calculus ideas on several variable functions	K5
CO4: Apply different methods of integration in solving practical problems	K5
CO5: Apply multiple integral ideas in solving areas, volumes and other practical problems	K3

Pre-requisites -

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**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		

Course Assessment Methods

Direct

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

Indirect

Content of the syllabus

Unit – I	**MATRICES**	Periods	**9+3**

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.			
Unit - II	**DIFFERENTIAL CALCULUS**	Periods	**9+3**
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.			
Unit – III	**FUNCTIONS OF SEVERAL VARIABLES**	Periods	**9+3**
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.			
Unit - IV	**INTEGRAL CALCULUS**	Periods	**9+3**
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 $\int_0^{\frac{\pi}{2}} \cos^n x dx$, $\int_0^{\frac{\pi}{2}} \sin^n x dx$.			
Unit - V	**MUTIPLE INTEGRALS**	Periods	**9+3**
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.			
		Total Periods	**45+15=60**
Text Books			
1.	Stewart, J. , "Calculus: Early Transcendentals", Cengage Learning, 8th Edition, 2015		
2.	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2024		
References			
1.	Kreyszig E, "Advanced Engineering Mathematics", John Wiley, 10th Edition (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", 10th Edition, Wiley (2016).		
5.	B V Ramana, "Higher Engineering Mathematics", Tata McGraw Hill Education Pvt Ltd., New Delhi (2016)		
E-Resources			
1.	https://freevideolectures.com › All Courses › Calculus › UCLA		
2.	www.learnerstv.com/Free-engineering-Video-lectures		
3.	www.nptel.ac.in		

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.Tech.**	Programme Code		**104**	Regulation		**2023**	
Department	**INFORMATION TECHNOLOGY**				Semester		**I**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23EN101	**English for Communication***	3	0	0	3	40	60	100

Course Objective	The main objective of this course is to: • Improve the communicative ability of learners. • Make learners read widely in order to practice writing • Make learners develop vocabulary and strengthen grammatical understanding • Assist students in the development of intellectual flexibility, creativity, and cultural literacy so that they may engage in life-long learning. • Identify and begin to apply the language features of academic and professional writing and speaking	
Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Use appropriate vocabulary in a professional context	K1
	CO2: Write appropriately based on the knowledge gained through reading of a variety of materials	K1
	CO3: Use language through their grammatical acquisition	K2
	CO4: Read and infer meanings of technical texts	K2
	CO5: Comprehend and retain the contextual and syntax understanding from reading	K3

Pre-requisites :Nil

CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak													**CO/PSO Mapping**	
Cos	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO 1						2			3	3		3		1
CO 2						2			3	3		3		1
CO 3						2			3	3		3		1
CO 4						2			3	3		3		1
CO 5						2			3	3		3		1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment 3. End-Semester examinations
Indirect
1. Course - end survey

Content of the syllabus

Unit – I		Periods	**9**
Listening-Introduction to Different Types of Listening, Listening to Casual Conversations, **Speaking-** Introduction to develop the Art of Speaking, Giving Self Introduction, **Reading**–Understanding the Basics of Reading Skills, Reading Instructions and Technical Manuals, **Writing**- Introduction to writing strategies, Writing Definitions, **Focus on Language** - -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).			
Unit – II		Periods	**9**
Listening- Listening to lectures, listening to description of equipment, **Speaking-** Strategies for Developing Conversational Skills, Short Conversations through Role Play Activities, **Reading**– Reading Comprehension, Reading e-mails, Reading Headlines, Predicting the Content, **Writing**- Note making, Writing Descriptions, **Focus on Language**–Collocations, One word substitution, Subject - verb agreement			
Unit – III		Periods	**9**
Listening- Listening to different kinds of interviews (Face - to - face, radio, TV and telephone interviews), **Speaking-**Describing an Object, Asking Questions, Participating in Discussions **Reading**– Intensive reading, Reading passages for gist. **Writing**- Writing short& lengthy e-mails with emphasis on Brevity, Clarity, Coherence and Cohesion), **Focus on Language**–Sequential Connectives, Impersonal Passive			
Unit – IV		Periods	**9**
Listening-Note Taking, **Speaking-** Improving Fluency through Narration. **Reading**–Reading passages for specific information- Phone messages, Reading and Transferring Information. **Writing**- Effective writing strategies, Informal writing, Writing a Memo, **Focus on Language**– Cause and Effect, Conditional Statements (if - clauses and types), Usage of Modal Verbs.			
Unit – V		Periods	**9**
Listening- Listening to understand Modulation, Listening to Welcome Speeches, **Speaking-** Delivering Welcome Address, Understanding Segmental and Supra-segmental Features-Practicing Stress, Pause and Intonation, **Reading**– Reading for a purpose, Reading Business Documents, Interpreting Charts and Graphs. **Writing**- Describing a Process. **Focus on Language** -Synonyms and Antonyms, Common Errors in English.			
		Total Periods	**45**

Text Books	
1.	Dr. S. R. Kannan & Faculty from the Department of English -English for Communication, Karun Printers Pvt. Ltd, 2023.
2.	Sokkaalingam, S.RM., The Art Of Speaking, English Versatile Publishing House, 2019.
References	
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.
E-Resources	
1.	http://www.sparknotes.com/lit/the-alchemist/summary.html
2.	https://www.stephencovey.com/7habits/7habits.php
3.	http://en.wikipedia.org/wiki/The_Seven_Habits_of_Highly_Effective_People

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Programme	**B.Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**Information Technology**			Semester	**I**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23PH101	**Engineering Physics[$]**	3	0	0	3	40	60	100

Course Objective

The student should be made to,
- Understand the basic concepts of properties of matter
- Gain knowledge about the conduction properties of metals
- Identify the different types of crystal structures and crystal growth techniques. Study the production and applications of ultrasonics.
- Correlate better understanding the carrier concentration and its variations with temperature in a semiconductor. Study the properties of modern engineering materials and its uses
- Categorize the types of laser and fiber optics

Course Outcome	At the end of the course, the student will be able to	Knowledge Level
	• Understand the elastic properties of the materials	K2
	• Gain knowledge about the conduction properties of metals	K3
	• Determine packing factor for various unit cells and understand different types of crystal imperfections and learn the engineering, medical applications.	K1
	• Discuss the basic idea of semiconducting materials and realize the function of modern engineering materials	K1
	• Learn the optical properties of materials and its uses	K3

Pre-requisites ---

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**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

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III
2. Assignments and Mind map
3. End-Semester examinations

Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**PROPERTIES OF MATTER**	Periods	**9**

Elasticity: 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.

Viscosity: Co-efficient of viscosity - Poiseuilles' formula - Experimental determination – uses.			
Unit - II	**ELECTRICAL PROPERTIES OF METALS**	Periods	**9**
Classical theory: Classical free electron theory of metals- Expressions for electrical conductivity and Thermal Conductivity of metals – Wiedemann-Franz law (Qualitative) - Success and failures. **Quantum theory:** de Broglie's hypothesis - Schrodinger's time independent and time dependent wave equations - Fermi – Dirac Statistics - Density of energy states (Qualitative).			
Unit – III	**CRYSTAL PHYSICS AND ULTRASONICS**	Periods	**9**
Crystallography: Unit cell - Crystal systems - Bravais lattices- Lattice planes - Miller indices - Inter-planar spacing in cubic lattice- Calculation of number of atoms per unit cell- Atomic radius – Coordination number- Packing Factor for HCP structures - Crystal defects – point and line defects (qualitative). **Ultrasonics:** Introduction - Properties and Generation of Ultrasonics – Magnetostriction and Piezoelectric Oscillator methods – Applications: Sound Navigation and Ranging (SONAR), Non – Destructive Testing (NDT) and Sonogram.			
Unit - IV	**SEMICONDUCTING & MODERN ENGINEERING MATERIALS**	Periods	**9**
Semiconductors: 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. **Metallic glasses:** preparation, properties and applications - Shape memory alloys (SMA): Characteristics and applications of NiTi alloy.			
Unit – V	**LASER AND FIBER OPTICS**	Periods	**9**
Laser: Interactions of Radiations with matters - Characteristics of laser – Derivation of Einstein's A and B coefficients. Types: CO_2 laser - Semiconductor laser: Homo junction - Applications. **Optical fiber:** 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.			
		Total Periods	**45**

Text Books	
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.	A.Panneerselvam and Dr.P.Mani, "Engineering Physics", Dhanam publisher, Chennai – 600 042. (2024)
References	
1.	B.K. Pandey, S. Chaturvedi. "Engineering Physics", 1st 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, 6th 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
E-Resources	
1.	www.e-booksdirectory.com
2.	Home.iitk.ac.in
3.	physics.cu.ac.bd

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Programme	**B.E./B.Tech.**	Programme Code			Regulation	**2023**		
Department	**CSE, EEE, ECE, IT, BT, CST & BME**				Semester	**I**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CS101	**Programming for Problem Solving**	3	0	0	3	40	60	100

Course Objective	The main objective of this course is to: • Learn the fundamentals of computers, languages, number systems and acquire problem solving skills in C Programming	
Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Examine number systems and to apply problem solving techniques	K3
	CO2: Learn the basics of C programming with branching and looping statements	K2
	CO3: Experiment the C programs using Arrays and Pointers for simple applications	K3
	CO4: Solve C programs with the Functions and Strings	K3
	CO5: Apply Structures, Union and File concepts to solve simple real world problems	K3

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**	**PSO 2**
CO 1	3	2	1	1	2							2	3	3
CO 2	2	1	1		2							2	2	2
CO 3	3	2	1	1	2							2	3	3
CO 4	3	2	1	1	2							2	3	3
CO 5	3	2	1	1	2							2	3	3

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment / Quiz / Seminar 3. End-Semester examination
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**INTRODUCTION TO PROBLEM SOLVING**	Periods	**9**

Basic organization of Computer - Programming languages - Compilers – Interpreter - Flowchart – Pseudocode – Algorithm.
Number Systems – Decimal, Binary, Octal and Hexadecimal conversions

Unit - II	**BASICS OF C PROGRAMMING**	Periods	**9**

Introduction to C – Features - Data Types – Constants – Variables - I/O Statement - Operators –Expressions - Decision Making and Branching – Looping Statements - Break, Go to, Continue.			
Unit – III	**ARRAYS AND POINTERS**	Periods	**9**
Arrays: Concepts – Need – one dimensional array – array declaration – features – array initialization - Two-Dimensional Arrays- Multidimensional Arrays. **Pointers**: Introduction, pointer declaration-accessing variable through pointer- Pointers and Arrays, Pointers and strings – Pointers structures - Pointer Arithmetic - Array of Pointers – dynamic memory allocation - mallaoc, realloc, free.			
Unit - IV	**FUNCTIONS AND STRINGS**	Periods	**9**
Functions: Introduction, function declaration, defining and accessing functions, User-defined Functions-storage classes-function prototypes-parameter passing methods-recursion. **Strings**: Concepts – Strings manipulation - String Input / Output Functions- Strings standard functions - Arrays of Strings.			
Unit – V	**STRUCTURES, UNIONS AND FILE SYSTEMS**	Periods	**9**
Structures: Introduction- nested structures- Arrays of Structures - Structures and Functions - Pointers to Structures – Unions. **File**: 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.			
		Total Periods	**45**

Text Books	
1.	S.Kuppuswami, S.Maliga, C. S. Kanimozhi and K.Kousalya, "Problem Solving and Programming", Tata McGraw Hill, 2019.
2.	E. Balagurusamy, "Programming in ANSI C", 8th Edition, Mc Graw Hill, 2019.
References	
1.	Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition, 2017
2.	Kernighan BW and Ritchie DM, "The C Programming Language", 2nd Edition, Prentice Hall of India, 2017.
3.	Dr.V.Rameshbabu, Dr.R.Samyutha, M.Muni Rathnan, "Computer Programming", VRB Publishers Pvt.Ltd, 2016.
Tools Required	
1.	Codetandra/HackerRank/ HackerEarth / Any online Problem Solving Platforms
E-Resources	
1.	https://www.geeksforgeeks.org/c-language-set-1-introduction/
2.	https://www.programiz.com/c-programming
3.	https://www.cprogramming.com/

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Programme	B.TECH	Programme code		104	Regulation		2023	
Department	INFORMATION TECHNOLOGY			Semester			I	
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA101	Heritage of Tamils*	1	0	0	1	40	60	100

Content of the syllabus

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 திருவள்ளுவர் சிலை – இசைக்கருவிகள் – மிருதங்கம், பறை,யாழ்,வீணை,நாதஸ்வரம் – தமிழர்களின் பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு 3	**நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுக்கள்**	**Periods**	**3**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம் ,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 கையெழுத்துப்படிகள் – தமிழ்ப்புத்தகங்களின் அச்சுவரலாறு.

Total Periods	**15**

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Programme	B.TECH	Programme code	104	Regulation	2023
Department	**INFORMATION TECHNOLOGY**		Semester		I

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA101	**Heritage of Tamils***	1	0	0	1	40	60	100

Content of the syllabus

UNIT I	**LANGUAGE AND LITERATURE**	**Periods**	**3**

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

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

Herostone to modern sculpture - Bronzeicons- Tribes and their handicrafts- Art of temple car making—Massive Terracotta sculptures Villagedeities , Thiruvalluvar Statue at Kanyakumari, Making of musical instruments-Mridhangam,Parai Veenai,Yazhand Nadhaswaram – Role of Temples in Social and Economic Life of Tamils.

UNIT III	**FOLK AND MARTIAL ARTS**	**Periods**	**3**

Therukoothu, Karagattam, VilluPattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance- Sports and Games of Tamils.

UNIT IV	**THINAI CONCEPT OF TAMILS**	**Periods**	**3**

Flora and Fauna of Tamils & Ahamand Puram 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	**CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE**	**Periods**	**3**

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

	Total Periods	**15**

TEXT-CUM-REFERENCE BOOKS

1	தமிழக வரலாறும் – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன் பிரசுரம்).
3	கீழடி – வைகை நதிக்கரையில் சங்க நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4	பொருநை – 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.Singaravelu) (Published by: International Institute of Tamil Studies
7	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (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.

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous Institution, Affiliated to Anna University, Chennai)
Elayampalayam, Tiruchengode – 637 205

Programme	**B.Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**Information Technology**			Semester	**I**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23GE101	**Engineering Graphics***	2	0	3	3	50	50	100

Course Objective

The main objective of this course is to:

- 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.
- Project the drawing of various solids.
- Sketch sectioned views of solids.
- Draw the development of surfaces.
- Draw the isometric and orthographic projections for any given object to the required standard.

Course Outcomes

At the end of the course, the student should be able to	Knowledge Level
CO1: Construct plane curves and develop projection of points , lines and plane surfaces	K2
CO2: Construct projection of solids with various conditions.	K4
CO3: Design the section of solids and analyze the true shape of the section	K3
CO4: Design and develop the different solid surfaces.	K2
CO5: Construct isometric and orthographic projection of different solids.	K2

Pre-requisites Nil

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

Cos	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO 1	3	3	3	3	3	-	-	-	-	-	-	-	3	-
CO 2	3	3	2	2	2	-	-	-	-	-	-	-	2	2
CO 3	3	2	2	2	3	-	-	-	-	-	-	-	2	-
CO 4	3	2	3	3	2	-	-	-	-	-	-	-	2	2
CO 5	3	3	2	3	3	-	-	-	-	-	-	-	3	-

Course Assessment Methods

Direct

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

Indirect

1. Course - end survey

Content of the Syllabus

Concepts & Conventions (Not for Examination)	Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.	**Periods**	**1**
Unit – I	**PROJECTION OF POINTS, LINES AND PLANE SURFACES**	**Periods**	**3+8**
Introduction to Plane curves, Orthographic projection – principles – projection of points, straight lines (only first angle projections) and plane surfaces (polygonal and circular).			
Unit - II	**PROJECTION OF SOLIDS**	**Periods**	**3+8**
Projections of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane.			
Unit - III	**SECTION OF SOLIDS**	**Periods**	**3+8**
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.			
Unit - IV	**DEVELOPMENT OF SURFACES**	**Periods**	**3+8**
Development of lateral surfaces of simple solids like prisms, pyramids, cylinders and cones – development of simple truncated solids involving prisms, pyramids, cylinders and cones.			
Unit - V	**ISOMETRIC PROJECTIONS, ORTHOGRAPHIC VIEWS FROM PICTORIAL VIEWS**	**Periods**	**5+10**
Isometric Projection and Introduction to AutoCAD / Solid Edge: Principles of isometric projection - Isometric scale -Isometric projections of simple solids like prisms, pyramids, cylinders and cones & orthographic views from pictorial views.			
Demonstration only: **Computer Aided Drafting (Auto CAD / Solid Edge):** Introduction to drafting packages and demonstration of their use.			
		Total Periods	**60**

Text Book:

1.	Basant Agrawal and C.M Agrawal ,"Engineering Drawing ",Tata McGraw Hill ,2019
2.	Jain and Gautam ,"Engineering Graphics & Design ",Khanna Publishing House, 2020

Reference Book :

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

E-RESOURCES:

1.	http://nptel.ac.in/courses/105104148, "Engineering Graphics" - Dr. Nihar Ranjan Patra , IIT Kanpur
2.	http://cfd.annauniv.edu/webcontent.htm, "Engineering Graphics" - Dr.Velamurali
3.	http://link.springer.com/ "Engineering Graphics"-Springer Nature.

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Elayampalayam, Tiruchengode – 637 205

Programme	**B.Tech.**	Programme code	**104**	Regulation	**2023**
Department	**Information Technology**		Semester		**I**

Course Code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23GE102	**Design Thinking***	1	0	2	1	50	50	100

Course Objective

The student should be made to,

- Familiarize with design thinking concepts and principles
- Practice the methods, processes and tools of design thinking.
- Apply the design thinking approach and have ability to model real world situations.

Course Outcome	At the end of the course, the student should be able to,	**KL**
	CO1: Understand and apply the concept of team building activity	K2
	CO2: Understand Design Thinking and apply the design thinking approach to empathize situations in real world	K3
	CO3: Identify various methods of empathy and define the problem	K3
	CO4: Develop creative ideas through design thinking	K4
	CO5: Understand benefits of learning through observation, experience and application	K5

Pre-requisites -

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO 1	2	3	3	3	3	2	2	3	3	3	2	2	3	3
CO 2	3	3	3	3	3	3	3	3	3	3	3	3	2	2
CO 3	3	3	1	2	2	2	2	1	2	1	-	-	2	2
CO 4	3	3	3	3	3	2	2	2	2	2	2	1	2	2
CO 5	3	3	3	3	1	2	2	2	1	2	2	1	2	2

Course Assessment Methods

Direct
1. Continuous Assessment Test through activities, assignment & Quiz 2. Models (Chart/paper/3D) 3. Prototype & Presentation
Indirect
1. Course - end survey

Content of the Syllabus

SESSION - I	Periods	**6**
Introduction – Team Building - Types – 4 C's of Team Building – Levels of Team Building – Benefits of Team Work – Team Building Activity.		
SESSION - II	Periods	**9**
Introduction to Design Thinking – Purpose of Design Thinking – Design Thinking Framework, Empathy and related case studies		

SESSION - III	Periods	**6**
Define: Examine and Reflect on the problem.		
SESSION - IV	Periods	**12**
Generating Ideas – Identifying ideas – Bundling the ideas and create concepts – Rapid Prototyping – Idea Refinement.		
SESSION - V	Periods	**12**
Importance & testing the design with people - Retest and redefine results		
	Total Periods	**45**

Textbooks	
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, 2nd edition, 2011
4.	Design of Business: Why Design Thinking is the Next Competitive Advant age by Roger L. Martin 2009.
5.	Change by Design: How Design thinking transforms organizations and empires Innovation, 2009, Harper Business, Brown, Tim and Berry.
References	
1.	Design thinking toolbox by Michael Lewick, Wily 2020
2.	Design thinking playbook by Michael Lewrick , Wily 2019
3.	Creative Confidence: Unleashing the Creative Potential Within Us All by by Tom 2014
4.	The Design of Everyday Things: by Don Norman 2013
E-Resources	
1.	https://www.collectivecampus.io/blog/6-resources-to-help-you-learn-design-thinking
2.	https://thisisdesignthinking.net/on-design-thinking/design-thinking-resources/
3.	http://hs.griet.ac.in/pdf/studymaterialsgr20/Design%20Thinking%20Lab%202020-21.pdf
4.	https://www.mindtools.com/brainstm.html
5.	https://www.quicksprout.com/. /how-to-reverse-engineer-your-competit
6.	https://www.youtube.com/watch?v=2mjSDIBaUlM
7.	thevirtualinstructor.com/foreshortening.html
Activity Based Learning/Practical Based Learning	
http://dschool.stanford.edu/dgift/	
Online Course	
1	https://onlinecourses.nptel.ac.in/noc19_mg60/preview
2	https://www.ibm.com/design/thinking/page/badges/core-skills

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Programme	**B.Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**Information Technology**			Semester	**I**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23PH102	**Physics Laboratory$**	0	0	3	1	60	40	100

Course Objective

The main objective of this course is to:

- Understand elastic behavior of Materials
- Predict viscous force in liquids.
- Gain knowledge in measuring the lowest thickness materials
- To Identify wavelengths of prominent lines using polychromatic lamp
- Observe heat conduction in bad conductor
- Understand the principle of interferometer
- Learn about the characteristics of Lasers

Course Outcome

At the end of the course, the student will be able to	Knowledge Level
CO1: Measure the young's modulus of the materials, Rigidity modulus – Torsion pendulum	K3
CO2: Calculate Coefficient of viscosity of liquid and thickness of thin wire using Air wedge	K3
CO3: Observe and measure the different wavelengths of mercury Spectrum and dispersive power of a prism	K3
CO4: Illustrate the conductivity of bad conductors. To know how to determine the velocity of ultrasonic waves in liquid	K3
CO5: Understand the importance of laser beam compared to ordinary light	K2

Pre-requisites **Nil**

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

COs	Programme Outcomes (POs)												**CO/PSO Mapping** 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	1											2	
CO 2	3	3	1	2	2								2	
CO 3	3	2			2								3	
CO 4	3	3		1									1	
CO 5	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

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

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

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.E. / B.Tech.,**	Programme Code			Regulation		**2023**	
Department	**CSE, EEE, ECE, IT, BT, CST & BME**				Semester		**I**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CS102	**Programming for Problem Solving Laboratory**	0	0	2	1	60	40	100
Course Objective	The main objective of the course is to • Develop simple C programs to illustrate the applications of User Defined and Derived Data Types such as Arrays, Pointers, Structures, and Functions.							

Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Develop C programs for computer based solution of simple real world problems using Conditional and Looping statements	K3
	CO2: Implement simple C Programs using Strings and Arrays	K3
	CO3: Implement C program for simple applications using Pointers	K3
	CO4: Write C programs that perform operations on File	K4
	CO5: Demonstrate C Programs using Structures	K3

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**	**PSO 2**
CO 1	3	2	1	1	2							2	3	3
CO 2	3	2	1	1	2							2	3	3
CO 3	3	2	1	1	2							2	3	3
CO 4	3	2	1	1	2							2	3	3
CO 5	3	2	1	1	2							2	3	3

Course Assessment Methods

Direct
1. Pre lab and post lab test 2. End-Semester examination
Indirect
1. Course - end survey

List of Experiments	**CO's**
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 + ...].	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. **Note:** 1. The input string may contain the same characters, so there will also be the same permutations. 2. The order of permutation does not matter. **Sample Input** xyz sample Output xyz, xzy, yxz, yzx, zxy, zyx **Sample Output :** All the possible permutations for string "XYZ" will be "XYZ", "XZY", "YXZ", "YZX", "ZXY" and "ZYX".	CO2
7.	Find the Smallest and Largest Element in an Array **Method 1:** Traverse the array iteratively and keep track of the smallest and largest element until the end of the array. **Method 2:** Traverse the array recursively and keep track of the smallest and largest element until the end of the array. **Method 3:** Sort the array using STL and return the first element as the smallest element and the last element as the largest element. **For example, consider the array.** arr = {1, 2, 3, 4, 5} **Sample output:** Smallest element: 1 Largest element: 5	CO2
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 **Sample output:** Multiples of 15 below 100 are 15, 30, 45, 60, 75 and 90.	CO3
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. **Example Source file** I love programming. Working with files in C programming is fun. I am learning C programming at VCEW. **Sample output** Total characters = 100 Total words = 18 Total lines = 3	CO4
10.	Write a C program to implement Student database using Structure **Sample output:** **Enter details of student:** Name :abi	CO5

RollNo:101 Percentage :89.7 **Entered details:** Name: abi RollNo: 101 Percentage: 89.70	
Total Periods	**45**

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

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.TECH**	Programme Code		**104**	Regulation		**2023**	
Department	**Information Technology**				Semester		I	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23MCFY1	**Environmental Science and Engineering$**	2	0	0	0	100	0	100

Course Objective

The main objective of this course is to:

- Familiarize basics of ecosystem and creating environmental awareness.
- Congregate about environmental pollution.
- Contrast on solid waste and social issues.
- Acquire knowledge in environmental legislation and protection.
- Summarize population growth, human rights and Environment

Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Acquire knowledge about Eco-system, Natural resources and Bio-diversity.	K1
	CO2: Be aware of Environmental Pollution and its control.	K3
	CO3: Infer and express Solid waste management and Social issues.	K3
	CO4: Acquire Knowledge about Environmental legislation and protection.	K3
	CO5: Awareness about population growth, human rights and Environment	K2

Pre-requisites NIL

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

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**INTRODUCTION TO ENVIRONMENTAL SCIENCE AND ENGINEERING**	Periods	**6**

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.

Unit – II	ENVIRONMENTAL POLLUTION AND ITS CONTROL	Periods	6
Water pollution-causes, effects and control measures of water pollution- waste water treatment process (secondary-BOD,COD) . Air Pollution – types of air pollutants-CO_2, SO_2, NO_2, PAN-sources- control measures (electro static precipitator, bag house filter, wet scrubber and cyclone separator).			
Unit – III	**SOCIAL ISSUES AND SUSTAINABILITY**	Periods	**6**
Solid waste Management-Types (E-Waste, Hazardous waste, Bio-waste)-Disposal method. Sustainability-Definition-Sustainable development Goals-Environmental issues-global warming and Ozone depletion, Climate change, Acid rain, Carbon foot print-Possible solutions to Environmental issues.			
Unit – IV	**SUSTAINABILITY PRACTICES AND ENVIRONMENTAL LEGISLATION**	Periods	**6**
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.			
Unit – V	**HUMAN POPULATION AND THE ENVIRONMENT**	Periods	**6**
Population growth, human rights, value education, environment and human health, family welfare program, women and child welfare, role of information technology in environment – satellite, data base, Geographical Information System (GIS), Environmental impact Analysis (EIA) and human health.			
		Total Periods	**30**

Text Books	
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.
References	
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
E-Resources	
1.	https://libraries.ou.edu/
2.	https://libguides.reading.ac.uk/
3.	https://www.loc.gov/, https://rdl.lib.uconn.edu/

SEMESTER - II

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.TECH**	Programme Code		**104**	Regulation		**2023**	
Department	**INFORMATION TECHNOLOGY**				Semester		**II**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23MA202	**Complex Analysis and Ordinary Differential Equations***	3	1	0	4	40	60	100

Course Objective	The Main Objective of the course is to • Understand the Analytic functions and Bilinear transformations. • Proficiently understand the Complex Integration. • Demonstrate Vector Differentiation and Integration. • Know about the Ordinary Differential Equations. • Identify the Laplace Transform of Derivatives and Integrals.	
Course Outcome	At the end of the course, the student should be able to,	Knowledge level
	CO1: Analyze the construction of analytic functions.	K4
	CO2: Understand the concepts of cauchy's integral theorem and residue theorem in evaluation of complex integrals.	K3
	CO3: Explore the concepts of Green's , Stoke's and Gauss Divergence theorems in real life problems.	K5
	CO4: Understand the concepts of solving second order differential equations.	K5
	CO5: Apply the concepts of Laplace transform in solving ODE.	K3
Pre-requisites	-	

CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak													**CO/PSO Mapping**		
COs	Programme Outcomes (POs)												PSOs		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**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		

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment. 3. End-Semester examinations
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	ANALYTIC FUNCTIONS	Periods	9+3
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.			
Unit - II	**COMPLEX INTEGRATION**	Periods	**9+3**
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.			
Unit – III	**VECTOR DIFFERETIATION & INTEGRATION**	Periods	**9+3**
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).			
Unit - IV	**ORDINARY DIFFERENTIAL EQUATIONS**	Periods	**9+3**
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.			
Unit – V	**LAPLACE TRANSFORMS**	Periods	**9+3**
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.			
		Total Periods	**45+15=60**

Text Books	
1.	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th 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.
References	
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)
E-Resources	
1.	https://en.wikipedia.org › wiki › Ordinary_differential_equation
2.	www.learnerstv.com/Free-engineering-Video-lectures
3.	www.nptel.ac.in

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.TECH**	Programme Code		**104**	Regulation		**2023**	
Department	**Information Technology**				Semester		**II**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CH201	**Engineering Chemistry$**	3	0	0	3	40	60	100

Course Objective

The main objective of this course is to:

- Recognize the basic technology requirements in water treatment
- Gain knowledge in basics and preparations, properties and applications of Polymers.
- Enrich the Knowledge of the students with the basics of Nano materials, their properties and applications.
- Familiarize about the Non renewable, renewable energy and different types of storage devices in the engineering application.
- Gain knowledge in destruction and protection of metals for engineering applications.

Course Outcome	The students who complete this course successfully are expected to:	Knowledge Level
	CO1: Implement innovative solutions in wastewater treatment process.	K3
	CO2: Familiarize with the applications of polymers in the field of engineering.	K3
	CO3: Identify the synthesis methods of Nanoparticles and their industrial applications	K2
	CO4: Recognize the renewable, non renewable energy and storage devices for domestic and industrial applications.	K3
	CO5: Categorize the metal corrosion in different environment and find out appropriate control techniques to avoid corrosion	K3

Pre-requisites

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO 1	**CO 1**	3	3	3	2	1	2	2					1	1
CO 2	**CO 2**	3	2	2	2		2	2					2	2
CO 3	**CO 3**	3	2	2	3	2	1	2					2	2
CO 4	**CO 4**	3	3	2	2	1	1	3					3	3
CO 5	**CO 5**	3	3	3	2	1	2	2					2	2

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment 3. End-Semester examinations
Indirect
1. Course - end survey

Content of the syllabus

Unit - I	**WATER TECHNOLOGY**	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	**POLYMER CHEMISTRY**	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	**NANO CHEMISTRY**	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	**ENERGY RESOURCES AND STORAGE DEVICES**	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_2-O_2 fuel cell-applications.			
Unit - V	**CORROSION AND ITS CONTROL**	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).			
		Total Periods	**45**

Text Books	
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
References	
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
E-Resources	
1.	https://www.who.int/water_sanitation_health/dwq/arsenicun6.pdf
2.	https://www.schandpublishing.com/books/tech-professional/applied-science/a-textbook-polymer-chemistry/9788121941129/#.XdZ214MzY2w
3.	https://www.elsevier.com/books/nanochemistry/klabunde/978-0-444-59397-9

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.E./B.Tech**	Programme Code	104		Regulation	**2023**		
Department	**Information Technology**				Semester	**II**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23EE201	**Basic Electrical and Electronics Engineering**	3	0	0	3	40	60	100

Course Objective	The students should made to • Introduce the basics of electric circuits and analysis • Impart knowledge in the basics of working principles and application of electrical machines • Learn the electrical wiring methods • Analyze the characteristics of Semiconductor devices • Educate on the fundamental concepts of digital electronics and introduce the functional elements and working of measuring instruments	
Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Understand the basics of electric circuits and type of the connection	K2
	CO2: Understand the basics of electromagnetic laws and basic working principle of DC and AC machines.	K2
	CO3: Understand the concepts of tariff, energy saving, illumination, electric lamps and safety measures.	K2
	CO4: Understand the basic operating characteristics of semiconductor devices.	K2
	CO5: Understand the fundamentals of digital logics and measuring instruments	K2
Pre-requisites	Basic concepts and understanding of magnetic fields	

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	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	

Course Assessment Methods

Direct

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

Indirect

1. Course –end Survey

Content of the syllabus

Unit – I	INTRODUCTION OF ELECTRICAL CIRCUITS	Periods	9
Definition of Voltage, Current, Power, Energy, Power factor, Circuit parameters, Ohm's law, Kirchhoff'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.			
Unit - II	**ELECTRICAL MACHINES AND ITS APPLICATIONS**	Periods	**9**
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.			
Unit – III	**WIRING AND ILLUMINATION**	Periods	**9**
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.			
Unit - IV	**SEMICONDUCTOR DEVICES**	Periods	**9**
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.			
Unit – V	**DIGITAL FUNDAMENTALS AND MEASUREMENTS**	Periods	**9**
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.			
		Total Periods	**45**

Text Books	
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.
References	
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.
E-Resources	
1.	https://nptel.ac.in/courses
2.	https://www.electrical4u.com/electrical-engineering-articles/illumination-engineering/
3.	https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/lecture-notes
4.	https://www.google.co.in/books/edition/_/4nJROSC7iK8C?hl=en&gbpv=1

VIVEKANANDHACOLLEGE OF ENGINEERING FOR WOMEN
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Elayampalayam, Tiruchengode – 637 205

Programme	B.TECH	Programme code	104	Regulation	2023
Department	**INFORMATION TECHNOLOGY**		Semester		II

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA202	**தமிழரும்தொழில்நுட்பமும் / Tamils and Technology***	1	0	0	1	40	60	100

Content of the syllabus

அலகு 1	**நெசவு மற்றும் பானைத்தொழில்நுட்பம்**	**Periods**	**3**

சங்ககாலத்தில் நெசவுத்தொழில்– பானைத்தொழில்நுட்பம் – 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 மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள் – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக்கட்டிடக்கலை.

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 – சோழர்காலக்குமுழித்தூம் பின் முக்கியத்துவம் – கால்நடைபராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச்சார்ந்த செயல்பாடுகள் – கடல்சார்அறிவு – மீன்வளம் – முத்துமற்றும்முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார்சமூகம்.

அலகு 5	**அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்**	**Periods**	**3**

அறிவியல் தமிழின் வளர்ச்சி – கணினித்தமிழ் வளர்ச்சி – தமிழ்நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மின் பொருட்கள் உருவாக்கம் – தமிழ் இணையக்கல்விக்கழகம் – தமிழ் மின்நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்க்குவைத்திட்டம்.

	Total Periods	**15**

	VIVEKANANDHACOLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	B.TECH	Programme code		104	Regulation			2023
Department	**INFORMATION TECHNOLOGY**				Semester			II
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA202	**தமிழரும்தொழில்நுட்பமும் / Tamils and Technology***	1	0	0	1	40	60	100

Content of the syllabus

UNIT I	WEAVING AND CERAMIC TECHNOLOGY	**Periods**	**3**

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

UNIT II	DESIGN AND CONSTRUCTION TECHNOLOGY	**Periods**	**3**

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)-Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III	MANUFACTURING TECHNOLOGY	**Periods**	**3**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting,steel - Copper and gold- Coins as source of history - Minting of Coins – Beads making - industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	**Periods**	**3**

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

UNIT V	SCIENTIFIC TAMIL & TAMIL COMPUTING	**Periods**	**3**

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.

	Total Periods	**15**

TEXT-CUM-REFERENCE BOOKS

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

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Elayampalayam, Tiruchengode – 637 205

Programme	**B.E. / BT.ech.**	Programme Code		Regulation	**2023**
Department	**CSE, IT & CST**			Semester	**II**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CS204	**OBJECT ORIENTED PROGRAMMING**	3	0	2	4	50	50	100

Course Objective

The main objective of the course is to,

- Provide the concepts of object oriented programming with a comprehensive introduction to C++.
- Learn Java programming and its basic packages including GUI programming.

Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Apply the concepts of classes and objects to solve simple problems using C++	K3
	CO2: Develop simple applications using basic Java constructs	K3
	CO3: Build applications making use of packages, interfaces and exception handling in Java	K3
	CO4: Make use of multithreading and I/O streams	K3
	CO5: Develop simple event-based GUI applications in Java using AWT classes and controls	K3

Pre-requisites: Nil

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak

Cos	Programme Outcomes (POs)												**CO/PSO Mapping** 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

Course Assessment Methods

Direct

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

Indirect

1. Course - End survey

Content of the syllabus

Unit – I	**INTRODUCTION TO OOP AND C++**	Periods	**9**

Object Oriented Programming - Features – Merits & Demerits- Applications – Difference –Structure ofC++ - Input and Output statements- Classes and Objects– Constructors – Destructors

Unit - II	**INTRODUCTION TO JAVA**	Periods	**9**

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			
Unit – III	**PACKAGES, INTERFACES AND EXCEPTION HANDLING**	Periods	**9**
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			
Unit - IV	**MULTITHREADING AND I/O**	Periods	**9**
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.			
Unit – V	**STRINGS AND EVENT HANDLING**	Periods	**9**
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.			
		Total Periods	**45**

	Suggested List of Experiments	**CO's**
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

Lecture 45: Practical 30; Total: 75

Text Books

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", 12th Edition, McGraw Hill Education, New Delhi, 2022.(UNIT 2 to 5)	

References

1.	Buyya Rajkumar, ThamaraiSelvi S. and Xingchen Chu, "Object Oriented Programming with Java Essentials andApplications", 1st Edition, McGraw Hill, New Delhi, 2009.
2.	Cay S. Horstmann, "Core Java: Volume I Fundamentals", 11th Edition, Addison Wesley, New Delhi, 2019.
3.	Deitel Paul and Deitel Harvey, "Java How to Program", 11th Edition, Pearson Education, New Delhi, 2018.

Tools Required

1.	Codetandra / HackerRank / HackerEarth / Any online Problem Solving Platforms

E-Resources

1.	www.nptel.ac.in
2.	https://www.javatpoint.com/cpp-oops-concepts
3.	https://www.javatpoint.com/java-tutorial

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.Tech.**	Programme Code		**104**	Regulation		**2023**	
Department	**INFORMATION TECHNOLOGY**				Semester		**II**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23EN202	**Professional Communication***	2	0	3	3	50	50	100

Course Objective	The main objective of this course is to: • Provide suitable reading &writing tasks to develop communicative ability for academic and professional progress • Inculcate channelized reading to make learners proficient in the chosen professional writing contexts. • Improve learners' vocabulary and grammar to supplement their language use at professional context • Assist students in the development of intellectual flexibility, creativity, and cultural literacy so that they may engage in life-long learning. • Identify and begin to apply the language features of academic and professional writing and speaking	
Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Acquire sufficient command over language to speak at an academic or professional context	K1
	CO2: Write technically well at professional contexts through exposing them to similar readings.	K1
	CO3: Use language at length at technical and professional situations through enrichment of vocabulary and strengthening of grammatical knowledge.	K2
	CO4: Ethically gather, understand, evaluate and synthesize information from a variety of written and electronic sources.	K2
	CO5: Be proficient in oral communication and writing.	K3
Pre-requisites	Nil	

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

Cos	Programme Outcomes (POs)												**CO/PSO Mapping** 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**
CO 1						2			3	3		3		1
CO 2						2			3	3		3		1
CO 3						2			3	3		3		1
CO 4						2			3	3		3		1
CO 5						2			3	3		3		1

Course Assessment Methods

Direct
1. Continuous Assessment Test I & II 2. Continuous Assessment Test III in the Communication Skills Lab 3. Assignments 4. End-Semester examinations

Indirect
1. Course - end survey

Content of the syllabus

Unit – I		Periods	**15**

Listening- Listening for Cultural Awareness, Listening to Professional Conversations, Talks, Interviews and Lectures **Speaking-** Developing Confidence to get rid of Fear on the Dias, Discussion at a Corporate Context. **Reading**– Inferential Reading, Reading Short Messages and Technical Articles, **Writing**- Introduction to Letter Writing, Writing Formal and Informal Letters, Thanking Letters, Letters Calling for Quotations, Letters Placing an Order, Seeking clarification, Letters of Complaint. **Focus on Language**–Adjectives and Degrees of Comparisons

Unit – II		Periods	**15**

Listening- Listening to specific information relating to technical content, Listening for statistical information **Speaking**- Expressing opinions, Formal Discussions, Describing Role Play at Business Context and Consolidating Ideas. **Reading**–Reading Technical Articles in Journals and Comparing Articles. **Writing**- Letter seeking permission to undergo practical training and to undertake project work. **Focus on Language**– Simple, compound and complex sentences and Transformation of Sentences.

Unit – III		Periods	**15**

Listening- Listening to understand the overall meaning, Listening to Interviews and Presentations. **Speaking-** Giving Instructions and Showing Directions and Rephrasing Instructions. **Reading**– Skimming and Scanning, Reading Job Advertisements. **Writing**- Applying for a Job, Writing a CV. **Group Discussion:** Introduction – Topic Analysis – Thematic Expressions-Objective and content of discussion.

Unit – IV		Periods	**15**

Listening- Listening and retrieving Information. **Speaking-** Developing fluency and Coherence, Accent Neutralization, Voice Modulation, and Intonation, Improving Voice Quality. **Reading**–Reading and understanding Advertisements. **Writing**- Letters to the Editor, Letter of Complaint, Various kinds of Reports, Permission to go for Industrial visits. **Presentation skills:** Making Self Introduction Effectively-Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Accents analysis – Stylistics.

Unit – V		Periods	**15**

Listening- Listening to Fragmented Texts and Filling in the Blanks. **Speaking-**Mind Mapping, Developing Coherence and Self-Expression, Making presentations, Paralinguistic and Extra linguistic Features (body language), **Reading**– Predicting content, Interpreting Reports. **Writing**- Writing Proposals, Agenda, Minutes of the Meeting. **Soft Skills:** 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.

Total Periods	**75**

Text Books

1.	Dr. S. R. Kannan, Sumant. S, Pereira Joyce, Professional Communication, Vijay Nicole Imprints Pvt. Ltd., 2023.
2.	Sokkaalingam, S.RM., The Art Of Speaking, English Versatile Publishing House, 2019.

References

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.

E-Resources	
1.	http://www.kalevleetaru.com/Publish/Book_Review_Who_Moved_My_Cheese.pdf
2.	http://www.bookbrowse.com/reviews/index.cfm/book_number/304/who-moved-my-cheese
3.	http://www.imdb.com/title/tt0482629/plotsummary

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Programme	**B.TECH**	Programme Code	**104**	Regulation	**2023**
Department	**Information Technology**			Semester	**II**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CH202	**Chemistry Laboratory$**	0	0	2	1	60	40	100

Course Objective

The main objective of this course is to:

- Gather knowledge about basic simple acid-base reactions and study the mechanism of acid mixture with base.
- Learn pH and potential of hydrogen in a sample solution.
- Study the redox reaction through potential difference.
- Infer iron forms complex with thiocyanate.
- Gather knowledge on hardness producing salts and removal of hardness through estimation.
- Collect data required for dissolved oxygen present in water sample.
- Understand alkalinity and available chlorine present in water sample.

Course Outcome	The students who complete this course successfully are expected to:	Knowledge Level
	CO1: Infer knowledge on neutralization reaction between acid, acid mixture with base and identify the concentrations.	K3
	CO2: Identify the concentration of sample using pH.	K3
	CO3: Spot the concentration of sample solution through redox reaction by potentiometric method	K4
	CO4: Estimate Iron by complexation reaction spectrometric ally.	K4
	CO5: Determine hardness and dissolved oxygen present in domestic water supply and Identify alkalinity and available chlorine present in the given sample.	K4

Pre-requisites **Nil**

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

COs	Programme Outcomes (POs)												**CO/PSO Mapping** PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO8**	**PO 9**	**PO 10**	**PO 11**	**PO12**	**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

Content of the syllabus

S.No	Name of the Experiment	Course Outcome
1.	Estimation of HCl using NaOH by Conductometric titration	CO1
2.	Estimation of Mixture of acid [standard HCl+ unknown CH_3COOH] 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
	Total Periods	**30**

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

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Programme	**B.Tech.**	Programme Code	**104**		Regulation		**2023**	
Department	**Information Technology**				Semester		**II**	
Course Code	Course Name	Periods Per Week			Credit		Maximum Marks	
		L	T	P	C	CA	ESE	Total
U23GE204	**Engineering Practices Laboratory***	0	0	3	1	60	40	100

Course Objective

The main objective of this course is to:
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.

Course Outcomes

At the end of the course, the student should be able to,	Knowledge Level
CO1: Perform basic machining operations and finish the job to the requirements and quantify the accuracy.	K2
CO2: Make various joints such as cross lap joint and Tee lap joint in the carpentry.	K2
CO3: Understand the basics of house wiring techniques and the measurements of basic electrical quantities.	K2
CO4: Understand the resistor value identification through colors coated on resistor.	K2
CO5: Understand the soldering techniques in PCB board for designing the projects.	K2

Pre -requisites Nil

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO 1	3	2	3	2	2	-	-	-	2	-	-	-	2	2
CO 2	3	2	3	2	2	-	-	-	2	-	-	-	3	2
CO 3	3	2	2	3	2	2	-	-	2	-	-	-	2	-
CO 4	3	2	2	3	2	2	-	-	2	-	-	-	2	-
CO 5	3	2	3	3	2	2	-	-	2	-	-	-	3	3

Course Assessment Methods

Direct

1.Pre lab and Post lab
2.Record mark
3.End- Semester Examinations

Indirect

1.Course –End survey

Content of the Syllabus

GROUP A
(CIVIL & MECHANICAL ENGINEERING)

CIVIL ENGINEERING PRACTICE:	**COs**
1.Plumbing: 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
2.Carpentry: a) To make a Cross Lap Joint from the given work piece. b) Preparation of ' T' Lap Joint from the given work piece.	CO2
MECHANICAL ENGINEERING PRACTICE:	
3.Welding: 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
4.Basic Machining: a) To perform simple facing & turning operation. b) To perform of step turning operation.	CO1
5.Sheet Metal: a) To make a rectangular tray from the given sheet metal. b) To make a basket from the given sheet metal.	CO1
STUDY EXPERIMENT: 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

GROUP B
(ELECTRICAL & ELECTRONICS ENGINEERING)

ELECTRICAL ENGINEERING PRACTICE	
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
ELECTRONICS ENGINEERING PRACTICE	
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
Total Periods	**45**

Reference Book :

1.	Dr.P.Kannan, Mr.T.Satheeskumar & Mr.K.Rajasekar, "Engineering Practices Laboratory" Manual. First Edition, 2017.
2.	Mr.T.Jeyapoovan, Mr.M.Saravana Pandian, "Engineering Practices Lab" Manual, Vikas Publishing House Pvt Ltd, 2017.

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Elayampalayam, Tiruchengode – 637 205

Programme	**B.Tech.**	Programme Code	**104**	Regulation	**2023**
Department	**Information Technology (IT)**			Semester	**II**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23MCFY2	**Indian Constitution$**	2	0	0	0	100	NA	100

Course Objective

The main objective of this course is to:

i) Know about the basic structure of Indian constitution.
ii) Know about our central government executive system of India
iii) Know about our state government executive system of India
iv) Learn the election system, amendments and emergency provisions given by the constitution.
v) Know about the special constitutional provisions in India

Course Outcome

At the end of the course, the student should be able to,	Knowledge level
● Understand the functions of the Indian government	K1
● Know about our Central Government, political structure & codes, procedures	K1
● Understand our State Executive & Elections system of India.	K1
● Remember the Election system, Amendments and Emergency Provisions given by the constitution.	K2
● Understand our Special Constitutional Provisions in India	K2

Pre-requisites ---

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

COs	Programme Outcomes (POs)												**CO/PSO Mapping** 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					
CO 2						3		3	3					
CO 3						3		3	2					
CO 4						3		3	3					
CO 5						3		3	3					

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment
Indirect
1. Course - end survey

Content of the syllabus			
Unit – I	**INTRODUCTION**	Periods	**6**
Historical Background – Constituent Assembly of India – Fundamental Rights – Citizenship – Constitutional Remedies for citizens			
Unit - II	**STRUCTURE AND FUNCTION OF CENTRAL**	Periods	**6**
Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India			
Unit – III	**STRUCTURE AND FUCTION OF STATE**	Periods	**6**
State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts			
Unit - IV	**ELECTION PROVISIONS, EMERGENCY PROVISIONS, AMENDMENT OF THE CONSTITUTION**	Periods	**6**
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.			
Unit – V	**SPECIAL CONSTITUTIONAL PROVISIONS**	Periods	**6**
Directive Principles of State Policy: Importance and its relevance. Special Constitutional Provisions for Schedule Castes, Schedule Tribes & Other Backward Classes, Women & Children.			
		Total Periods	**30**

Text Books	
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)
References	
1.	R.C.Agarwal, (1997) “Indian Political System”, S.Chand and Company, New Delhi.
2.	M.Laksmikanth, Indian polity, Tata mchraw hill publications.
E-Resources	
1.	https://mhrd.gov.in/
2.	https://niti.gov.in/content/niti-aayog-library
3.	www.drishtiias.com/

SEMESTER –III

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Programme	**B.Tech**	Programme Code	**104**	Regulation	**2023**
Department	**INFORMATION TECHNOLOGY**			Semester	**III**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23MA304	**DISCRETE MATHEMATICS**	3	1	0	4	40	60	100

Course Objective

. The Main Objective of the course is to

- Introduce basic tools and techniques in Discrete Mathematical Structure.
- Provide information about the concepts needed to test the logic of a program and Theory of inference.
- Recognize the connection between set, operations and logic.
- Identify the domain and range of a relation.
- Recognize the concepts of groups.

Course Outcome

At the end of the course, the student should be able to,	Knowledge level
CO1: Demonstrate the mathematical reasoning and logics	K2
CO2: Reformulate statements from common language to formal language	K5
CO3: Posses knowledge in relations and lattices.	K3
CO4: Solve recurrence relations by applying appropriate function.	K5
CO5: Understand the concepts various algebraic Structures.	K3

Pre-requisites -

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**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	

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment. 3. End-Semester examinations
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**PROPOSITIONAL CALCULUS**	Periods	**9+3**

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.

Unit - II	PREDICATE CALCULUS	Periods	9+3
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.			
Unit – III	**SET THEORY**	Periods	**9+3**
Set Theory: 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.			
Unit - IV	**FUNCTIONS**	Periods	**9+3**
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.			
Unit – V	**GROUP THEORY**	Periods	**9+3**
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.			
		Total Periods	**45+15=60**

Text Books	
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.
References	
1.	Kenneth H. Rosen, "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Publishing Company, 2012
2.	Singh S.B., Jai Kishore and Ekata, "Discrete Structures", 3rd 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, 6th Edition, 2015.
5.	D.S.Malik, "Discrete Mathematical Structures Theory and Applications", Thomson Publishers, 2004.
E-Resources	
1.	https://en.wikipedia.org › wiki › Discrete_mathematics
2.	www.learnerstv.com/Free-engineering-Video-lectures
3.	www.nptel.ac.in

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Programme	**B.E / B.Tech.**	Programme Code			Regulation	**2023**		
Department	**CSE & IT**				Semester	**III / IV**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23IT301	**Digital Systems Design**	3	0	0	3	40	60	100
Course Objective	The Main Objective of the course is to • Understand common forms of number representation, Boolean laws and logic minimization using Karnaugh Map. • Understand the concepts of combinational logic circuits. • Understand the concepts of sequential logic circuits. • Understand the concepts of Asynchronous sequential circuits. • Learn basic of digital memories and fundamental concepts used in programmable logic.							
Course Outcome	At the end of the course, the student should be able to,					Knowledge level		
	CO1: Realize the number representation, Different forms of Boolean law and logic minimization using K Maps.					**K2**		
	CO2: Analyze and Reproduce the combinational logic circuits.					**K3**		
	CO3: Analyze and Reproduce sequential logic circuits.					**K3**		
	CO4: Understand the analysis and design procedures for asynchronous sequential circuits.					**K3**		
	CO5: Characterize Boolean functions using programmable logics.					**K2**		
Pre-requisites	-							

CO /POMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2–Medium,1–Weak												**CO/PSO Mapping**	
COs	ProgrammeOutcomes(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	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

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment / Quiz / Seminar 3. End-Semester examination
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**Number Systems, Boolean Algebra and Minimization Techniques**	Periods	**9**

Number Systems & Boolean Algebra: Number systems review: Decimal– Binary– Octal– Hexadecimal, 1s and 2s Complements, Boolean postulates and laws – De-Morgan's theorem – Principle of Duality. **Logic Gates &Minimization of Boolean functions:** Logic Gates – Universal Gates - Karnaugh map minimization: Three, Four variables with Don't Care Entries -Implementations of logic functions using logic gates.			
Unit - II	**Combinational Logic Circuits**	Periods	**9**
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			
Unit – III	**Sequential Logic Circuits**	Periods	**9**
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			
Unit - IV	**Asynchronous Sequential Logics**	Periods	**9**
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.			
Unit – V	**Memory and Programmable Devices**	Periods	**9**
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.			
		Total Periods	**45**
Text Books:			
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		
REFERENCE BOOKS:			
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		
E-Resources:			
1.	https://byjus.com/gate/sequential-circuitsnotes/#:~:text=A%20sequential%20circuit%20refers%20to,form%20of%20the%20present%20state.		
2.	https://www.youtube.com/watch?v=Wj01JfGEQT8		
3.	https://www.tutorialspoint.com/digital_circuits/digital_circuits_sequential_circuits.html		

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous Institution Affiliated to Anna University, Chennai)
Elayampalayam, Tiruchengode – 637 205

Programme	**B.E. /B.Tech.**	Programme code		Regulation	**2023**
Department	**CSE, IT & CST**			Semester	**III**

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CS305	**Computer Organization and Architecture**	3	0	0	3	40	60	100

Course Objective

The student should be made to,

- Discuss the basic concepts and structure of computers
- Understand concepts of computer processing units and addressing modes
- Know the logic and arithmetic operations
- Explain different types of I/O and memory organization.
- know about the Parallelism concepts in Programming

Course Outcome	At the end of the course, the students will be able to,	**KL**
	CO1: Examine various concepts of basics of computer organization and architecture	K2
	CO2: Identify the difference between RISC and CISC architectures	K2
	CO3: Demonstrate various arithmetic operations	K3
	CO4: Analyze the various performance measures for memory and I/O organization	K3
	CO5: Interpret performance of different pipelined processors and multi core architectures.	K3

Pre-requisites -

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO 1	3	2	2							1		1	3	2
CO 2	2	3	1	2						1			2	2
CO 3	2	2	1	2				2		1			2	2
CO 4	2	2	2							1		2	3	2
CO 5	2	2	1		2			1		1		1	3	2

Course Assessment Methods

Direct

1. Continuous Assessment Test I, II & III
2. Assignments / Seminar/Quiz
3. End-Semester examinations

Indirect

1. Course - end survey

Content of the syllabus

Unit - I	BASIC STRUCTURE OF COMPUTERS	Periods	9
Digital Computers: Definition of Computer Organization - Computer Design and Computer Architecture - Bus and memory transfers. **Basic Computer Organization and Design**: Instruction codes- Computer Registers - Computer instructions -Timing and Control - Instruction cycle - Memory Reference Instructions- Input – Output and Interrupt.			
Unit – II	**BASIC PROCESSING UNIT**	Periods	**9**
Central Processing Unit: General Register Organization - Instruction Formats-Addressing modes- Data Transfer and Manipulation - Program Control **Reduced Instruction Set Computer:** CISC Characteristics -RISC Characteristics			
Unit – III	**ARITHMETIC FOR COMPUTERS**	Periods	**9**
Signed and Unsigned number representations - **Arithmetic operations**: Addition and Subtraction – Fast Adders – Binary Multiplication – Booth algorithm-Binary Division – Floating Point Numbers – **Representation and operations:** Arithmetic Micro operations- logic micro operations- shift micro operations- Arithmetic logic shift unit.			
Unit – IV	**I/O AND MEMORY ORGANIZATION**	Periods	**9**
Input-Output Organization: Input-Output Interface- Asynchronous data transfer- Modes of Transfer- Priority Interrupt - Direct memory Access. **Memory Organization**: Memory Hierarchy -Main Memory - Auxiliary memory - Associate Memory- Cache Memory.			
Unit - V	**PIPELINING AND MULTI CORE ARCHITECTURE**	Periods	**9**
Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. **Multi core architecture:** Introduction to Multi-core Processors- Multi-core Processor Architecture- Multi-core Processor Machines - Applications of using Multi-core Processors			
		Total Periods	**45**

Text Books	
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.
References	
1.	William Stallings, "Computer Organization and Architecture – Designing for Performance", 10th Edition, Pearson Education, 2022.
2.	John L. Hennessey and David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, 6th 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.
E-Resources	
1.	https://www.javatpoint.com/computer-organization-and-architecture-tutorial

2.	https://www.studytonight.com/computer-architecture/memory-organization
3.	http://home.ustc.edu.cn/~louwenqi/reference_books_tools/Computer%20Organization%20and%20Architecture%2010th%20-%20William%20Stallings.pdf
4.	https://medium.com/@adityasinghz/multi-core-processor-architecture-7580bc347042
5.	https://www.mbit.edu.in/wp-content/uploads/2020/05/computer-systems-Architecture.pdf

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Programme	**B.E /B.Tech.**	Programme Code			Regulation	**2023**		
Department	**CSE, EEE,ECE,IT, BME, CST**				Semester	**III / IV**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23IT302	**Data Structures**	3	0	0	3	40	60	100

Course Objective	The main objective of this course is to: • Understand the significance of Data structures and List ADTs. • Learn the concepts and applications of Stacks, Queues • Understand the Tree ADT and types of balancing the tree • Learn the fundamentals of Graph ADT, various Traversal algorithms, Types and finding the Minimum spanning Tree • Learn the different types of Sorting and Searching Techniques and Hashing	
Course Outcome	At the end of the course, the student should be able to,	Knowledge level
	CO1: Implement List ADT and its types.	**K1**
	CO2: Implement Stack ADT, Queue ADT, Priority Queue and Parsing the Arithmetic Expression in C	**K2**
	CO3: Implement Tree ADT, Binary search tree, AVL and Splay tree in C	**K3**
	CO4: Develop C Programs to Implement the concept of Topological ordering and Minimum spanning Tree of a Graph ADT	**K4**
	CO5: Implement various sorting and searching algorithms in C	**K4**
Pre-requisites	-	

CO /POMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2–Medium,1–Weak													**CO/PSO Mapping**	
COs	ProgrammeOutcomes(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	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

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment / Quiz / Seminar 3. End-Semester examinations
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**INTRODUCTION**	Periods	**9**

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

Unit - II	STACKS, QUEUES AND DEQUEUES	Periods	9
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.			
Unit – III	**TREES**	Periods	**9**
Tree ADT –Binary Trees – Binary Search Tree - Tree- Traversal Algorithms -Search Trees : AVL Tree – Splay Tree- Balancing Tree- B+.			
Unit - IV	**GRAPHS**	Periods	**9**
Graph ADT –Types of Graphs – Graph Traversals – Topological Ordering – Dijkstra's Algorithm – Minimum Spanning Tree – Prims Algorithm – Kruskal's Algorithm.			
Unit – V	**SORTING, SEARCHING AND HASHING**	Periods	**9**
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.			
		Total Periods	**45**

Text Books:	
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.
REFERENCE BOOKS:	
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, 1st Edition ,2016.
3.	R. Venkatesan and S. Lovelyn Rose,"Data Structures **",**2nd Edition, Wiley Publications,2019.
4.	Robert Sedgewick and Kevin Wayne, "Algorithms",4th Edition, Addison-Wesley, 2011.
5.	Peter Brass, "Advanced Data Structures", 1st Edition, Cambridge,2008.
E-Resources:	
1.	https://www.javatpoint.com/data-structure-tutorial
2.	https://www.geeksforgeeks.org/data-structures
3.	https://www.udemy.com/course/data-structures-and-algorithms-deep-dive-using-java
4.	https://dl.ebooksworld.ir/books/Introduction.to.Algorithms.4th.Leiserson.Stein.Rivest.Cormen.MIT. Press.9780262046305.EBooksWorld.ir.pdf

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Programme	**B.Tech.**	Programme code	**104**	Regulation	**2023**
Department	**Information Technology**		Semester		**III**

Course Code	Course Name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CTCP1	**Verbal, Quantitative Aptitude and Reasoning - I**	2	0	0	1	40	60	100

Course Objective

The student should be made to,

- Identify and begin to apply the language features
- Understand the mathematical techniques for solving the real life problems
- Use number theory arguments to justify relationships involving divisors, multiples and factoring
- Help in preparation of competitive exams

Course Outcome	At the end of the course, the student should be able to,	**Knowledge Level**
	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

Pre-Requisites -

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak

COs	Programme Outcomes (POs)												**CO/PSO Mapping** 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		2		3	2					3		3	1	2
CO 2	3	3		2	2					3		3	2	3
CO 3	3	3		3	2					3		3	3	3
CO 4	3	3		2	3					2		2	3	3
CO 5		2		2	2					2		2	3	3

Course Assessment Methods

Direct

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

Indirect

1. Course -end survey

Content of the syllabus

Unit –I	VERBAL ABILITY (ERROR SPOTTING)	Periods	5

CONJUNCTIONS: Error on coordinative conjunction: The seven coordinating conjunctions are (**fan boys)**: **for, and, nor, but, or, yet, so, Errors on Subordinate Conjunction** After, although, as soon as, because, before, by the time, in case, now that, since, unless, when, whether or not, while, yet...., **Errors on correlative conjunction (**Either.....or, neither.....nor, not only.... but also, as....as, both....and, whether.... or, so...as, such...that, the)

CONDITIONAL CLAUSES: 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

ADVERBS: 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

ADJECTIVES: 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

DETERMINERS: Definite Article, Indefinite Article, Quantifying Article – few, many, Possessive Article, (my, your, his, her, its, our, your, their….)

NOUNS: Pronoun, Common Noun, Collective Noun, Abstract Noun, Material Noun

SUBJECT – VERB AGREEMENT:

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

Unit–II	NUMBER SYSTEMS	Periods	6

NUMBER SYSTEMS (Divisibility Rule, Unit Digit, Remainder Theorem(1 Or -1, Cancellation, Wilson, Fermets), Progressions(Arithmetic, Geometric, Harmonic), Log, Surds And Indices, Simplification)

Unit – III	AVERAGE AND LCM & HCF PROBLEMS	Periods	8

AVERAGE (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)

LCM and HCF (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

Unit– IV	RATIO AND PROPORTION	Periods	5

RATIO (Zig Zag Model, Finding The Individual Component, Coins & Values Based Ratios, Number Based Ratios, Increment/Decrement Based Ratios, Miscellaneous)- PROPORTION (Continuous, Third, Fourth, Mean)

Unit-V	LOGICAL REASONING	Periods	6

CODING-DECODING- Types of Coding and Decoding (Letter Coding, Conditional Coding, Crypt arithmetic –Addition, Crypt arithmetic – Subtraction)

BLOOD RELATION (Type 1: Pointing or Introducing, Type 2: Family Tree or Relational Puzzle, Type 3: Coded Relation)

NUMBER SERIES (Pattern 1: Perfect Square Series, Pattern 2: Perfect Cube Series, Pattern 3: Geometric Series, Pattern 4: Ratio series, Pattern 5: Multi Stage Series)

SYLLOGISM (Type 1: BASIC SYLLOGISM, Type 2: Either or Neither nor, Type 3: Only – Only a few)

Total Periods	**30**

Text books

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

References

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”, 3rd 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
E-Resources	
1.	Aptitude: https://www.indiabix.com
2.	Reasoning: https://placement.freshersworld.com
3.	Verbal: https://testbook.com

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Programme	**B.E. /B.Tech.**	Programme code		Regulation	**2023**
Department	**CSE, IT**			Semester	**III**

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CS306	**Python Programming and Frameworks ***	3	0	2	4	50	50	100

Course Objective

The student should be made to,
- Understand the fundamentals of Python programming
- Handle list, tuples, sets and Dictionaries data types
- Learn function of OOPS and CRUD Operations
- Learn Data Manipulation in NumPy
- Understand Data Manipulation with pandas and data visualization

Course Outcome	At the end of the course, the student should be able to,	**KL**
	CO1: Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements	K2
	CO2: Perform operations on list, tuples, sets and Dictionaries using python.	K2
	CO3: Implement the OOPS concept and CRUD Operations.	K3
	CO4: Apply Numpy for Data Manipulation and perform operations on CSV files.	K3
	CO5: Perform Data Manipulation with pandas and data visualization.	K3

Pre-requisites -

CO /PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong,2–Medium,1 -Weak

CO/PSO Mapping

COs	Programme Outcomes(POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**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

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III
2. Assignments / Seminar/Quiz /Model Lab
3. End-Semester examinations

Indirect
1.Course –end survey

Content of the syllabus

Unit –I	**Introduction to Python**	Periods	**9**

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	Data Structures, File Operations and Exception	Periods	9
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.			
Unit – III	**Object Oriented Programming & Python Database Integration**	Periods	**9**
Classes and Objects – Classes and Functions – Classes and methods – Object-oriented features – __init__() method – __str__() 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			
Unit– IV	**Data Manipulation with NumPy Arrays**	Periods	**9**
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.			
Unit-V	**Data Manipulation with Pandas and Matplotlib**	Periods	**9**
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			
		Total Periods	**45**

Suggested List of Experiments

List of Experiments	CO's
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

Lecture 45: Practical 30; Total: 75

Text Books:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 1st Edition, O'Reilly Publishers, 2016 for Units I,II,III
2. Jake Vander Plas, "Python Data Science Handbook Essential Tools for Working with Data", 1st Edition, O'Reilly Publishers, 2019 for Units IV,V

Reference:

1.	Martin C Brown, “Python: The Complete Reference”, 4th Edition, McGraw Hill Education, 2018
E-Resources:	
1.	https://www.dataquest.io/blog/data-structures-in-python/
2.	https://docs.python.org/3/library/stdtypes.html
3.	https://www.geeksforgeeks.org/difference-between-association-and-aggregation/
4.	https://www.i2tutorials.com/crud-operations-with-mysql-database-using-python/

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Elayampalayam, Tiruchengode – 637 205

Programme	**B.E./B.Tech.**	Programme Code		Regulation	**2023**
Department	**CSE,EEE,ECE, IT CST,BME**		Semester		**III / IV**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23IT303	**Data Structures Laboratory #**	0	0	2	1	60	40	100

Course Objective

The Main Objective of the course is to

- Familiarize the operations on Linear Data Structures and Nonlinear Data Structures
- Understand the concepts of various Searching and Sorting Techniques
- Understand the basic operations on Search Trees
- Known to the basics of various graph Traversal methods.

Course Outcome

At the end of the course, the student should be able to,	**KL**
CO1: Implement List based and Array based Linear and Nonlinear Data Structures	**K3**
CO2: Implement Stack ADT, Queue ADT, and Parsing the Arithmetic Expression in C	**K3**
CO3: Suggest appropriate Search Tree for solving a given problem	**K4**
CO4: Appropriately use the various graph Traversal for a given problem	**K4**
CO5: Implement various sorting and searching algorithms in C.	**K3**

Pre-requisites -

CO /PO Mapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2–Medium,1-Weak

CO/PSO Mapping

Cos	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3	2	1	1	2			1	1	1	1	1	1	1
CO 2	3	2	1	1	2			1	1	1	1	1	1	1
CO 3	3	2	1	1	2			1	1	1	1	1	1	1
CO 4	3	2	1	1	2			1	1	1	1	1	1	1
CO 5	3	2	1	1	2			1	1	1	1	1	1	1

Course Assessment Methods

Direct
1. Prelab and Post Lab / Viva Questions 2. Record 3. End-Semester Examination
Indirect
1. Course - end survey

Suggested List of Experiments	**CO's**
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	**CO1**

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

E-Resources:	
1.	https://www.programiz.com/c-programming
2.	https://www.cprogramming.com/
3.	https://beginnersbook.com/2015/02/simple-c-programs/

Tools / Software Required:	
1.	Codetandra / HackerRank / HackerEarth / Any online Problem Solving Platforms

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous Institution Affiliated to Anna University, Chennai)
Elayampalayam, Tiruchengode– 637205

Programme	**B.Tech.**	Programme code	**104**	Regulation	**2023**
Department	**Information Technology**			Semester	**III**

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CTCP2	**Personality Development**	1	0	2	1	60	40	100

Course Objective

The student should be made to,

- Equip comprehensive understanding of various psychological and cognitive assessment tools
- Analyze, interpret, and apply these tools to improve personal and professional development
- Enhance communication
- Manage stress effectively

Course Outcome

At the end of the course, the student should be able to,	**Knowledge Level**
CO1: Enhance Self-Awareness	K2
CO2: Improve Communication Skills	K1
CO3: Acquire Better Academic and Life Satisfaction	K2
CO4: Enhance Problem-Solving Abilities	K3
CO5: Effective Stress Management	K3

Pre-requisites: -

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO 2**
CO 1						2			2	2		2	2	2
CO 2						2			2	2		2	3	3
CO 3						2			1	2		2	3	3
CO 4						2			2	1		2	3	3
CO 5						2			2	1		2	1	2

Course Assessment Methods

Direct

1. Self Assessment
2. Viva-Voce
3. End-Semester Examination

Indirect

1.Course -end survey

Content of the Syllabus

S. No.	List of Experiments	CO
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

Total Periods : 30

References

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

E-Resources

1. https://scales.arabpsychology.com
2. http://DOMWebserver.Hitchcock.org/mbti/
3. https://www.assessmentday.com/free/deductive-reasoning-1/DeductiveFreeTest-Solutions.pdf
4. www.prepinsta.com

SEMESTER – IV

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.Tech**	Programme Code	**104**	Regulation	**2023**			
Department	**INFORMATION TECHNOLOGY**			Semester	**IV**			
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23MA405	**Probability and Statistics**	3	1	0	4	40	60	100

Course Objective

The main objective of the course is to

- Proficiently understand the expected value, variance, and higher-order moments of random variables (for both discrete and continuous types).
- Analyze and interpret statistical data using appropriate probability distribution
- Identify testing of hypothesis for all size of samples.
- Acquaint the knowledge of analysis of variance, this plays an important role in real life problems.
- Introduce the basic concepts of statistical quality control.

Course Outcome

At the end of the course, the student should be able to,	Knowledge level
CO1: Translate the density and distribution functions for discrete and continuous variables.	K3
CO2: Enable to identify various probability distributions.	K3
CO3: Ability to test the hypothesis using suitable statistical test.	K5
CO4: Apply the basic concepts of classifications of design of experiments in the field of agriculture and computer science.	K4
CO5: Have the notion of sampling distributions and statistical techniques used in engineering and management problems.	K5

Pre-requisites -

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	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									2	1	
CO 5	3	2	1	1	1								2	1	

Course Assessment Methods

Direct

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

Indirect

1. Course - end survey

Content of the syllabus

Unit – I	**INTRODUCTION TO PROBABILITY**	Periods	**9+3**

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.

Unit - II	**RANDOM VARIABLES AND SPECIAL**	Periods	**9+3**

	DISTRIBUTIONS		
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.			
Unit – III	**TESTING OF HYPOTHESIS**	Periods	**9+3**
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.			
Unit - IV	**DESIGN OF EXPERIMENTS**	Periods	**9+3**
One way and two way classifications - Completely Randomized design – Randomized block design – Latin square design – 2^2 factorial design.			
Unit – V	**STATISTICAL QUALITY CONTROL**	Periods	**9+3**
Control charts for measurements ($\overline{X}$ and R charts)- Control charts for attributes (p,c and np charts) – Tolerance limits – Acceptance sampling.			
		Total Periods	**45+15=60**

Text Books	
1.	Montgomery, D.C. and Runger, C.G., Applied Statistics and Probability for Engineers, 7th Edition, Wiley Students Edition, Wiley, 2020.
2.	Ravichandran, J., Probability and statistics for Engineers, 1st Edition, Wiley India Ltd, 2012.
References	
1.	Gupta S.C. and Kapoor V.K, Fundamentals of Mathematical Statistics, 12th Edition, Sultan an Sons, 2020.
2.	Devore, J.L., Probability and Statistics for Engineering and the Sciences, 8th Edition, Cengage Learning, 2014.
3.	Johnson, R.A., Miller, I. and Freund, J., Miller & Freund's Probability and Statistics for Engineers 9th 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, 9th Edition,2010.
5.	Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 5th Edition, Elsevier, 2004.
E-Resources	
1.	https://online.stanford.edu
2.	www.learnerstv.com/Free-engineering-Video-lectures
3.	www.nptel.ac.in

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Programme	**B.E/B.Tech.**	Programme Code			Regulation	**2023**		
Department	**CSE , IT & CST**				Semester	**III / IV**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23IT404	**Database Management Systems**	3	0	0	3	40	60	100

Course Objective

The Main Objective of the course is to,

- Learn the fundamentals of data models, relational algebra and SQL
- Understand a database system using ER diagrams and to learn normalization techniques
- Understand the fundamental concepts of transaction, concurrency control and recovery
- Analyze how the internal storage structures using different file and indexing techniques which will help in physical DB design
- Learn the concepts of Distributed databases, Database Security and NoSQL

Course Outcome	At the end of the course, the student should be able to,	**KL**
	CO1: Construct SQL Queries using relational algebra	**K1**
	CO2: Design database using ER model and normalize the database	**K3**
	CO3: Understand how to handle transactions and maintain consistency of the database	**K2**
	CO4: Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database	**K2**
	CO5: Understand the concepts of Distributed databases, Database Security and NoSQL	**K2**

Pre-requisites -

CO /PO Mapping
(3/2/1 indicates strength of correlation)3-Strong,2–Medium,1–Weak

CO/PSO Mapping

COs	Programme Outcomes(POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**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

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment / Quiz / Seminar 3. End Semester Examination
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**Relational Databases**	Periods	**10**
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			
Unit – II	**Database Design**	Periods	**8**
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			
Unit – III	**Transactions**	Periods	**9**
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			
Unit – IV	**Implementation Techniques**	Periods	**9**
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			
Unit – V	**Advanced Topics**	Periods	**9**
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			
		Total Periods	**45**

Text books:	
1.	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 7th Edition, McGraw Hill, 2021.
2.	M. Tamer Özsu Patrick Valduriez, "Principles of Distributed Database Systems" , 4th Edition, Springer , 2020.
3.	Michael Kaufmann, SQL and NoSQL Databases: Modeling, Languages, Security and Architectures for Big Data Management,2nd Edition ,Springer 2023.
Reference books:	
1.	C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.
2.	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 7th Edition, Pearson Education, 2017
E-resources:	
1.	https://www.geeksforgeeks.org/
2.	https://archive.nptel.ac.in/courses/106/105/106105175/
3.	https://www.khoury.northeastern.edu/home/kathleen/classes/cs3200/20-NoSQLMongoDB.pdf

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Programme	**B.E/B.Tech.**	Programme Code			Regulation	**2023**		
Department	**CSE & IT**				Semester	**IV**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23IT405	**Agile Software Engineering ***	3	0	0	3	40	60	100
Course Objective	The Main Objective of the course is to • Learn the fundamental principles and practices associated with each of the agile development methods • Apply the principles and practices of agile software development on a project of interest and relevance to the student. • Provide a good understanding of software design and a set of software technologies and APIs. • Understand the process of Kanban, Flow and Policies • Introduce the concepts, Techniques of Agile development and testing							
Course Outcome	At the end of the course, the student should be able to,					**KL**		
	CO1: Apply the requirement engineering tasks, design concepts and analyze the various software development models for a given scenario					**K4**		
	CO2: Outline agile principles and apply Scrum for project development					**K2**		
	CO3: Create model applications using XP, Lean and Kanban practices					**K4**		
	CO4: Outline the Concepts of Kanban, Flow and policies					**K2**		
	CO5: Make use of various software testing techniques to test the software systems					**K3**		
Pre-requisites	-							

CO /PO Mapping (3/2/1 indicates strength of correlation)3-Strong,2–Medium,1–Weak												**CO/PSO Mapping**	
COs	Programme Outcomes(POs)												PSOs
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**
CO 1	3	2	1										3	2
CO 2	3	2	1										3	2
CO 3	3	2	1										3	2
CO 4	3	2	1										3	2
CO 5	3	2	1										3	2

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & III 2. Assignment / Quiz / Seminar 3. End-Semester Examination
Indirect
1. Course - end survey

Content of the syllabus

Unit – I	**Process Models, Analysis and Design**	Periods	**9**
Software process structure – Process models: Waterfall model – Incremental process models – Evolutionary process models - Requirements engineering - Requirements analysis - Scenario Based Modeling – Class-Based Modeling – Flow Oriented Models –Behavioral Models- Design Concepts			
Unit – II	**Agile Principles and Scrum**	Periods	**9**
Understanding the Agile Values – Agile Principles – Agile Project - Scrum and Self-Organizing Teams - Basic pattern for a Scrum Project – Rules of Scrum – Self-Organizing Teams - Scrum Values – Daily Scrum – Sprints,Planning and Retrospectives - Scrum Planning and Collective Commitment - User stories – Conditions of Satisfaction – Story Points and Velocity – Burn down Charts – Planning and Running a Sprint – Generally Accepted Scrum Practices – JIRA Tool.			
Unit – III	**XP and Incremental Design, Lean**	Periods	**9**
Primary Practices of XP – An effective mindset starts with the XP values – Understanding the XP principles – Feedback Loops - Lean Thinking – Commitment, Options Thinking and Set Based Development – Create Heroesand Magical Thinking – Eliminate Waste – Value Stream Map – Deliver as Fast As Possible – WIP Area Chart – Pull Systems			
Unit – IV	**Kanban, Flow and Policies**	Periods	**9**
The Principles of Kanban, Experimental Evolution - System, Code, Improving Your Process with Kanban, Visualize the Workflow, Limit Work in Progress, Measure and Manage Flow, Managing Flow with WIP Limits, Make Process Policies Explicit - Emergent Behavior with Kanban.			
Unit – V	**Software Testing Fundamentals**	Periods	**9**
Software testing strategies: Strategic approach – Issues – Test strategies for conventional and Object Orientedsoftware –Validation and System testing – Debugging – Testing conventional applications: White box testing – Basis path testing – Control structure testing – Black box testing – Software configuration management – SCM repository – SCM process.			
		Total Periods	**45**
Text books:			
1.	Roger S. Pressman & Bruce R. Maxim, "Software Engineering: A Practitioner‘s Approach", 7th Edition, McGraw-Hill Education, 2019.		
2.	Andrew Stellman and Jennifer Greene, “Learning Agile: Understanding Scrum, XP, Lean and Kanban”, First Edition, O’Reilly Media Inc, 2015.		
Reference books:			
1.	Hazza & Dubinsky, “ Agile Software Engineering, Series: Undergraduate Topics in Computer Science”, Springer, VIII edition, 2009		
2.	Dingsoyr, Torgeir, Dyba, Tore, Moe, Nils Brede (Eds.), “Agile Software Development, Current Research and Future Directions”, Springer-Verilag Berlin Heidelberg, 2010		
3.	Kevin C. Desouza, “Agile information systems: conceptualization, construction, and management”, Butterworth-Heinemann, 2007.		
E-resource:			
1.	https://www.geeksforgeeks.org/software-engineering-agile-software-development/		

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Elayampalayam, Tiruchengode – 637 205

Programme	**B.E. /B.Tech.**	Programme code		Regulation	**2023**
Department	**CSE & IT**			Semester	**IV**

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CS408	**Design and Analysis of Algorithms**	3	0	0	3	40	60	100

Course Objective

The student should be made to,

- Analyze the asymptotic performance of algorithms.
- Apply the concept of Divide and conquer and greedy algorithms
- Demonstrate a familiarity of Dynamic Programming.
- Apply important concept of Backtracking.
- Synthesize efficient algorithms for NP Problems

Course Outcome	At the end of the course, the student should be able to,	**KL**
	CO1: Analysis algorithm techniques and analyze asymptotic runtime complexity of algorithms.	**K2**
	CO2: Apply the algorithms and design techniques to solve problems using divide and conquer and Greedy algorithm.	**K3**
	CO3: Understand and design algorithms using dynamic programming	**K3**
	CO4: Apply concepts of Back tracking	**K4**
	CO5: Synthesize efficient algorithms for NP problems	**K4**

Pre-requisites -

CO / PO 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

CO/PSO Mapping

Course Assessment Methods

Direct

1. Continuous Assessment Test I, II & III
2. Assignments / Seminar/Quiz
3. End-Semester examinations

Indirect

1. Course - end survey

Content of the syllabus

Unit - I	**ALGORITHM ANALYSIS AND RECURRENCE EQUATION**	Periods	**9**
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.			
Unit – II	**DIVIDE AND CONQUER & GREEDY ALGORITHMS**	Periods	**9**
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			
Unit – III	**DYNAMIC PROGRAMMING**	Periods	**9**
General Method – Multistage Graphs – Warshall's and Floyd's algorithm – Optimal binary search trees – 0/1 Knapsack – Traveling salesperson problem.			
Unit – IV	**BACKTRACKING & BRANCH AND BOUND**	Periods	**9**
n - Queens problem – Subset Sum Problem – graph coloring - Hamiltonian Circuit problem – knapsack problem. Branch and Bound: LIFO and FIFO search – assignment problem			
Unit - V	**PROBLEM CLASSES**	Periods	**9**
NP-Completeness: Polynomial Time, Polynomial-time verification, NP Completeness and reducibility, NP - Completeness Proofs, NP Complete Problems.			
		Total Periods	**45**
Text Books:			
1.	T.H.Cormen, C.E.Leiserson, R.L.Rivest, C.Stein, –Introduction to Algorithms‖, 4th Edition, Prentice-Hall India, 2022.		
2.	Anany Levitin, "Introduction to the Design and Analysis of Algorithms, 3rd Edition, Pearson Education, 2017		
References:			
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.		
E-Resources:			
1.	https://edutechlearners.com/download/Introduction_to_algorithms-3rd%20Edition.pdf		
2.	http://www.cs.sjtu.edu.cn/~jiangli/teaching/CS222/files/materials/Algorithm%20Design.pdf		
3.	www.nptel.ac.in		

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Programme	**B.E. / B.Tech.**	Programme Code		Regulation	**2023**
Department	**CSE , IT & CST**			Semester	**IV**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23CT406	**Operating Systems**	3	0	2	4	50	50	100

Course Objective

- To understand the operating system structures.
- To learn Processes, Threads and analyze Scheduling algorithms.
- To have a basic understanding of Deadlocks and analyze memory management schemes.
- To be familiar with File system management.
- To be familiar with the basics of virtual machines

Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Gain knowledge on operating system structures.	K2
	CO2: Analyze various scheduling algorithms and process synchronization.	K3
	CO3: Investigate deadlock prevention and avoidance algorithms and compare various memory management schemes.	K3
	CO4: Illustrate the functionality of file systems.	K3
	CO5: Understand the basic concepts of virtual machines.	K2

Pre-requisites: Nil

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak

Cos	Programme Outcomes (POs)												**CO/PSO Mapping** 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	1	1	1					1	1	1	2	2	2
CO 2	2	3	1	3	1				3	2	2	3	2	2
CO 3	2	2	3	3	2				3	1	1	2	2	1
CO 4	2	2	1	2	1				1	3	2	1	2	1
CO 5	2	3	3	2	1				3	1	2	1	2	2

Course Assessment Methods

Direct

1. Continuous Assessment Test I, II & III
2. Assignments /seminar/ Quiz/ Model Lab
3. End-Semester examinations

Indirect

1. Course - End survey

Content of the syllabus			
Unit – I	**INTRODUCTION AND OPERATING SYSTEM STRUCTURES**	Periods	**9**
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.			
Unit - II	**PROCESS MANAGEMENT**	Periods	**9**
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.			
Unit – III	**DEADLOCKS AND MEMORY MANAGEMENT**	Periods	**9**
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.			
Unit - IV	**FILE SYSTEM MANAGEMENT**	Periods	**9**
File-System Interface - File Concept - Access Methods - Directory Structure - File System Mounting - Protection; File System Implementation - Directory Implementation - Allocation Methods - Free-space Management.			
Unit – V	**STORAGE MENAGEMENT AND VIRTUALIZATION**	Periods	**9**
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.			
		Total Periods	**45**

Suggested List of Experiments	**CO's**
1. Installation of windows operating system	**CO1**
2. Illustrate Shell Programming	**CO1**
3. Process Management using System Calls : Fork, Exec, Getpid, Exit, Wait, Close	**CO1**
4. Simulation of CPU scheduling algorithms :FCFS, SJF, Priority and Round Robin	**CO2**
5. Implement process synchronization using semaphores	**CO2**
6. Simulation of Banker s algorithm to check whether the given system is in safe state or unsafe state	**CO3**
7. Implementation of Dynamic memory allocation algorithms: First-fit, Best-fit, Worst-fit	**CO3**
8. Implementation of Page Replacement Algorithms : FIFO, LRU and Optimal	**CO3**
9. Implement the following File Allocation Strategies : Sequential, Indexed, Linked	**CO4**
10. Install Linux operating system using VMware	**CO5**
Lecture 45: Practical 30; Total: 75	

Text Books

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

References	
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.
Tools Required	
1.	PC, Linux / Windows OS, C Compiler, VMWare / VirtualBox
E-Resources	
1.	https://www.geeksforgeeks.org/operating-systems
2.	https://www.tutorialspoint.com/operating_system/ index.htm
3.	youtube.com/playlist?list=PLDW872573QAb4bj0URobvQTD41IV6gRkx

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.E./ B.Tech.**	Programme Code			Regulation	**2023**		
Department	**CSE,IT &CST**				Semester	**III / IV**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23IT406	**Database Management Systems Laboratory** $	0	0	2	1	60	40	100
Course Objective	The student should be made to, • Learn and implement important commands in SQL. • Learn the usage of nested and joint queries. • Understand functions, procedures and procedural extensions of databases. • Understand design and implementation of typical database applications. • Familiar with the use of a front end tool for GUI based application development.							
Course Outcome	At the end of the course, the student should be able to,							**KL**
	CO1: Create databases with different types of key constraints.							**K3**
	CO2: Construct simple and complex SQL queries using DML and DCL commands.							**K4**
	CO3: Use advanced features such as stored procedures and triggers and incorporate in GUI based application development							**K4**
	CO4: Create and manipulate data using NoSQL database							**K3**
	CO5: Create a Simple Projects using real life database applications							**K3**
Pre-requisites	-							

CO /PO Mapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2–Medium,1-Weak													**CO/PSO Mapping**	
Cos	Programme Outcomes(POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO5**	**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

Course Assessment Methods

Direct
1. Prelab and Post Lab / Viva Questions 2. Record 3. End-Semester Examination
Indirect
1. Course - end survey

<table>
<tr><th colspan="2">Suggested List of Experiments</th><th>CO's</th></tr>
<tr><td>1.</td><td>Create a table called Employee with the following structure.

<table><tr><th>Name</th><th>Type</th></tr><tr><td>Empno</td><td>Number</td></tr><tr><td>Ename</td><td>Varchar2(10)</td></tr><tr><td>Job</td><td>Varchar2(10)</td></tr><tr><td>Mgr</td><td>Number</td></tr></table>
a. Add a column commission with domain to the Employee table.
b. Insert any five records into the table.
c. Update the column details of job
d. Rename the column of Employ table using alter command.
e. Delete the employee whose Empno is 105.</td><td>CO1</td></tr>
<tr><td>2.</td><td>a. Create a user and grant all permissions to the user.
b.Insert the any three records in the employee table and use rollback. Check the result.
c.Add primary key constraint and not null constraint to the employee table.
d.Insert null values to the employee table and verify the result.</td><td>CO1</td></tr>
<tr><td>3.</td><td>Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.</td><td>CO2</td></tr>
<tr><td>4.</td><td>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 thesalary difference between the old values and new values:
<table><tr><th>ID</th><th>NAME</th><th>AGE</th><th>ADDRESS</th><th>SALARY</th></tr><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></table></td><td>CO2</td></tr>
<tr><td>5.</td><td>Write user defined functions and stored procedures in SQL.</td><td>CO3</td></tr>
<tr><td>6.</td><td>Execute complex transactions and realize DCL and TCL commands.</td><td>CO3</td></tr>
<tr><td>7.</td><td>Create Document, column and graph based data using NoSQL database tools.</td><td>CO4</td></tr>
<tr><td>8.</td><td>Case Study using any of the real life database applications from the following list
1)Inventory Management for a EMart Grocery Shop
2) Society Financial Management
3) Cop Friendly App – E-seva
4) Property Management – e-Mall
5) Star Small and Medium Banking and Finance
i) Build Entity Model diagram.
The diagram should align with thebusiness and functional goals stated in the application. Apply Normalization rules in designing the tables in scope.
ii) Prepared applicable views, triggers (for auditing purposes), functionsfor enabling enterprise grade features.
iii) Build PL SQL / Stored Procedures for Complex Functionalities, ex EOD</td><td>CO5</td></tr>
</table>

	Batch Processing for calculating the EMI for Gold Loan for each eligible Customer. iv) Ability to showcase ACID Properties with sample queries with appropriate settings	
	Total Periods	**45**
E-Resources		
1.	https://www.javatpoint.com/	
2.	https://www.geeksforgeeks.org/	

CAREER TRACK COURSES

TRACK 1 – ENTERPRENEURSHIP

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205												
Programme	**B.E. / B.TECH**		Programme code		**104**		Regulation		**2023**				
Department	**Information Technology**						Semester		**IV**				
Course code	**Course Name**	Periods per week			Credit		Maximum Marks						
		L	T	P	C		CA		ESE		Total		
U23CTCE1	**Entrepreneurial Mindset and Business Model Canvas**	0	0	2	1		60		40		100		
Course Objective	The student should be made to, • Cultivate an entrepreneurial mindset that embraces innovation and risk-taking. • Learn the components of the Business Model Canvas and develop skills using the Business Model Canvas as a tool for business planning. • Design innovative business models based on customer needs and market opportunities. • Understand the process of transforming a business model into a comprehensive business plan. • Understand the application processes and legal implications of business licenses and permits.												
Course Outcome	At the end of the course, the student should be able to,												**KL**
	CO1: Explain the key traits and behaviors of successful entrepreneurs.												K2
	CO2: Identify and describe the components of the Business Model Canvas.												K2
	CO3: Design innovative business models tailored to specific customer needs and market conditions.												K6
	CO4: Demonstrate the ability to write comprehensive business plans, incorporating elements such as market analysis, financial projections, and operational strategies.												K4
	CO5: Identify different types of licenses and permits necessary for various types of businesses.												K2
Pre-requisites	-												

CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 - Weak													**CO/PSO Mapping**	
COs	Programme Outcomes (POs)												PSOs	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO 1	1	1	2	1	1			1	2	1	3	3	1	1
CO 2	2	1	3	3	2			1	2	1	3	3	1	1
CO 3	2	1	3	2	3			1	2	1	3	3	2	2
CO 4	1	1	3	1	2			1	2	1	3	3	2	2
CO 5	1	1	3	1	2			1	2	1	3	3	1	1

Course Assessment Methods

Direct

1. Continuous Assessment through Reviews
2. End Semester Examinations

Indirect

1. Course - end survey

Content of the syllabus

Unit - I	Introduction to Entrepreneurial Mindset	Periods	6
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			
Unit – II	**Understanding the Business Model Canvas**	Periods	**6**
Definition of a Business Model- Types of Business Models -Customer Segments - Value Propositions – Channels and Partners - Customer Relationships - Revenue Model and Streams			
Unit – III	**Designing and Testing Business Models**	Periods	**6**
Key Resources - Key Activities - Key Partnerships - Cost Structure - Prototyping Business Models - Evaluating Business Models			
Unit – IV	**Business Model to Business Plan**	Periods	**6**
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.			
Unit - V	**Licenses, Permits and Funding**	Periods	**6**
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			
		Total Periods	**30**

Text Books	
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, 6th Edition
References	
1.	Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", Cengage Learning, 2016. 10th Edition
2.	Ries, E." The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses " , Currency, 2017, 9th Edition
E-Resources	
1.	https://fastercapital.com/content/Entrepreneurship-Education-via-Business-Model-Canvas.html
2.	https://online.bath.ac.uk/articles/business-models
3.	https://creately.com/guides/business-model-canvas-explained/

TRACK II / III / IV – COMPETITIVE EXAMINATION / HIGHER STUDIES / PLACEMENT

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam,Tiruchengode– 637205						
Programme	**B.Tech.**	Programme code	**104**	Regulation	**2023**		
Department	**Information Technology**			Semester	**IV**		
Course Code	Course Name	Periods per week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
U23CTCP3	**Verbal, Quantitative Aptitude and Reasoning - II**	2	0	0	1	40	60	100

Course Objective	The student should be made to, ● Identify and begin to apply the language features ● Understand the mathematical techniques for solving the real life problems ● Use number theory arguments to justify relationships involving divisors, multiples and factoring ● Perform well in all competitive exams	
Course Outcome	At the end of the course, the student should be able to,	**Knowledge Level**
	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
Pre-requisites	-	

CO / PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2 – Medium, 1 – Weak

CO/PSO Mapping

COs	Programme Outcomes (POs)											PSOs		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO 1		2		3	2					3		3	1	2	
CO 2	3	3		2	2					3		3	2	3	
CO 3	3	3		3	2					3		3	3	3	
CO 4	3	3		2	3					2		2	3	3	
CO 5		2		2	2					2		2	3	3	

Course Assessment Methods

Direct

1. Continuous Assessment Test I, II & III
2. Assignments / Seminar/Quiz
3. End-Semester Examination

Indirect

1. Course -end survey

Content of the syllabus

Unit -I	VERBAL ABILITY	Periods	4
Verbal Analogy, Sentence completion, Gen-Z lexis **STATEMENT ANALYSIS:** Statements and Conclusions, Statements and Assumptions, Statements and Agreements, Cause and effect, Making Judgements.			
Unit–II	**PROFIT AND LOSS**	Periods	**8**
PROBLEMS ON PROFIT AND LOSS PERCENTAGE: 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. **SIMPLE AND COMPOUND INTEREST:** 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.			
Unit – III	**TIME AND WORK**	Periods	**6**
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.			
Unit– IV	**TIME, SPEED AND DISTANCE**	Periods	**6**
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.			
Unit-V	**LOGICAL REASONING**	Periods	**6**
DIRECTION SENSE: Direct yourself, based on Angle, Directional reference point, correct map based on wrong map, Direction in Clocks, Shadowing. **SEATING ARRANGEMENT:** 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.			
		Total Periods	**30**

Text books	
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
References	
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”, 3rd 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
E-Resources	
1.	Aptitude: https://www.indiabix.com
2.	Reasoning: https://placement.freshersworld.com
3.	Verbal: https://testbook.com