COLLEGE VISION

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

COLLEGE MISSION

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

DEPARTMENT VISION

- To impart high quality technical education with ethical values, evolve as a center of proficiency in the field of Artificial Intelligence & Data Science, promote collaborative research, lifelong learning and entrepreneur; produce industry ready engineers to meet the global challenges and societal needs.

DEPARTMENT MISSION

- Empowering women students with innovative, modern and cognitive skills in the field of Artificial Intelligence and Data Science.
- Become a Centre of Excellence in the field of Artificial Intelligence and Data Science and produce technocrats who can able to provide solutions to inter-disciplinary applications to meet the social needs
- Enable integration of academics and industry, to bring innovative ideas in the student's mind, thus empowering them to meet the global challenges.
- Encourage the students for higher education, research and entrepreneurship in Artificial Intelligence and Data Science.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1: Knowledgeable engineering professionals to use Artificial Intelligence and Data Science to solve engineering problems.

PEO 2: Capable of pursuing higher educations and research, with wider opportunities in teaching and shaping the future

PEO 3: Develop communication skills, follow professional ethics and involve in team work in their profession.

PROGRAMME SPECIFIC OUTCOMES (PSOS):

PSO1	Ability to design and improve Artificial Intelligence algorithms, tools and techniques for solving real world problems.
PSO2	Ability to classify and use applicable analytical tools and techniques on massive datasets to extract information

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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 andwrite effective reports and design documentation, make effective presentations, and give andreceive 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

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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											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	P O 12
I	√	√	√		√		√				√	√
II			√	√		√						√
III								√	√	√		

CURRICULUM BREAKDOWN STRUCTURE									
Summary of Credit Distribution									
Category	Semester								Total No. of Credits
	SEM 1	SEM 2	SEM 3	SEM 4	SEM 5	SEM 6	SEM 7	SEM 8	
HSMC	4	4							8
BSC	8	8	4	4					24
ESC	7	8							15
PCC			15	15	15	15	4		64
PEC					3	3	9		15
OEC					3	3	3		9
EEC	1		2	2	1	1	6	10	23
MC						1			1
CTC				1	1	1			3
Semester wise total	20	20	21	22	23	24	22	10	162

HSC-Humanities and Social science, BSC- Basic Science courses, ES- Engineering Science courses, PCC-Professional Core, PE-Professional Elective, OE-Open Elective, EEC-Employability Enhancement courses, MC- Mandatory Courses, CTC-Career Track Courses, HSMC- Humanities and social science including management courses. CA-Continuous Assessment ESE-End Semester Examination

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Elayampalayam, Tiruchengode – 637 205

Programme	B.Tech.	Programme Code	109	Regulation	2023
Department	ARTIFICIAL INTELLIGENCE AND DATA SCIENCE			Semester	I

CURRICULUM

(Applicable to the students admitted from the academic year 2024 - 2025 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**

*Common for all branches
#Common for BT, CSE, CST, IT, AI & DS
@Common for AI & DS, CSE, IT & CST
$Common for CSE, CST, IT, BT, AI & DS

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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**II**

CURRICULUM

(Applicable to the students admitted from the academic year 2024 – 2025 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 தொழில்நுட்பமும்/ 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	2	1	60	40	100
MANDATORY COURSES									
U23MCFY2	Indian Constitution$	MC	2	0	0	0	100	-	100
					Total	**20**	**480**	**420**	**900**

*Common for all branches

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

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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**III**

CURRICULUM

(Applicable to the students admitted from the academic year 2024-2025 onwards)

Course Code	Course Name	Category	Periods/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
THEORY									
U23MA304	Discrete Mathematics[$]	BSC	3	1	0	4	40	60	100
U23IT302	Data Structures[#]	PCC	3	0	0	3	40	60	100
U23CS305	Computer Organization and Architecture[$]	PCC	3	0	0	3	40	60	100
U23AD301	Essentials of Python Programming	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 WITH PRACTICAL									
U23AD302	Artificial Intelligence I	PCC	3	0	2	4	50	50	100
PRACTICAL									
U23IT303	Data Structures Laboratory[#]	PCC	0	0	2	1	60	40	100
U23AD303	Python Programming Laboratory	PCC	0	0	2	1	60	40	100
U23CTCP2	Personality Development	EEC	1	0	2	1	60	40	100
Total						**21**	**430**	**470**	**900**

*Common for all branches

[#]Common for CSE, IT, EEE, ECE, BME, CST, AI & DS

[$]Common for AI & DS, CSE, IT & CST

[@]Common for CSE, CST, IT, BT, AI & DS

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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**IV**

CURRICULUM

(Applicable to the students admitted from the academic year 2024-2025 onwards)

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
U23AD404	Artificial Intelligence-II	PCC	3	0	0	3	40	60	100
U23AD405	Computer Networks	PCC	3	0	0	3	40	60	100
U23AD406	Database Management Systems	PCC	3	0	0	3	40	60	100
	Additional Language	EEC	3	0	0	2	40	60	100
THEORY INTEGRATED WITH PRACTICAL									
U23AD407	Operating Systems	PCC	3	0	2	4	50	50	100
PRACTICAL									
U23AD408	Computer Networks Laboratory	PCC	0	0	2	1	60	40	100
U23AD409	Database Management Systems Laboratory	PCC	0	0	2	1	60	40	100
CAREER TRACK COURSE									
	Career Track Course-I	CTC	2/0	0	0/2	1	40/60	60/40	100
					Total	**22**	**470**	**430**	**900**

[#]Common for CSE, IT, EEE, ECE, BME, CST, AI & DS

[$]Common for AI & DS, CSE, IT & CST

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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**V**

CURRICULUM

(Applicable to the students admitted from the academic year 2024-2025 onwards)

Course Code	Course Name	Category	Periods/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
THEORY									
U23AD510	Data Science	PCC	3	0	0	3	40	60	100
U23AD511	Ethics and Future of AI	PCC	3	0	0	3	40	60	100
U23AD512	Machine Learning	PCC	3	0	0	3	40	60	100
	Professional Elective – I	PEC	3	0	0	3	40	60	100
	Open Elective -I	OEC	3	0	0	3	40	60	100
THEORY INTEGRATED WITH PRACTICAL									
U23AD513	Web Programming	PCC	3	0	2	4	50	50	100
PRACTICAL									
U23AD514	Data Science Laboratory*	PCC	0	0	2	1	60	40	100
U23AD515	Machine Learning Laboratory	PCC	0	0	2	1	60	40	100
U23AD516	Mini Project – I	EEC	0	0	2	1	60	40	100
CAREER TRACK COURSE									
	Career Track Course-II	CTC	2	0	0	1	100	-	100
					Total	**23**	**530**	**470**	**1000**

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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**VI**

CURRICULUM

(Applicable to the students admitted from the academic year 2024-2025 onwards)

Course Code	Course Name	Category	Periods/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
THEORY									
U23AD617	Internet of things	PCC	3	0	0	3	40	60	100
U23AD618	Exploratory Data Analytics	PCC	3	0	0	3	40	60	100
U23AD619	Deep Learning	PCC	3	0	0	3	40	60	100
	Professional Elective– II	PEC	3	0	0	3	40	60	100
	Open Elective– II	OEC	3	0	0	3	40	60	100
THEORY INTEGRATED WITH PRACTICAL									
U23CT620	Data Visualization	PCC	3	2	0	4	50	50	100
PRACTICAL									
U23AD621	Internet of things Laboratory	PCC	0	0	2	1	60	40	100
U23AD622	Deep Learning Laboratory	PCC	0	0	2	1	60	40	100
U23AD622	Mini Project –II	EEC	0	0	2	1	60	40	100
CAREER TRACK COURSE									
	Career Track Course-III	CTC	2	0	0	1	100	-	100
MANDATORY COURSE									
U23IT619	Comprehensive Examination	MC	2	0	0	1	100	-	100
					Total	**24**	**570**	**430**	**1000**

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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**VII**

CURRICULUM

(Applicable to the students admitted from the academic year 2024-2025 onwards)

Course Code	Course Name	Category	Periods/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
THEORY									
U23AD723	Generative AI	PCC	3	0	0	3	40	60	100
U23AD724	Agile Methodology	EEC	3	0	0	3	40	60	100
	Professional Elective– III	PEC	3	0	0	3	40	60	100
	Professional Elective–IV	PEC	3	0	0	3	40	60	100
	Professional Elective–V	PEC	3	0	0	3	40	60	100
	Open Elective-III	OEC	3	0	0	3	40	60	100
PRACTICAL									
U23AD725	Generative AI Laboratory	PCC	0	0	2	1	60	40	100
U23AD726	Internship Training and Project Phase-I	EEC	0	0	4	3	60	40	100
					Total	**22**	**360**	**440**	**800**

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Programme	**B. Tech**	Programme code	109	Regulation	**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**VIII**	

CURRICULUM

(Applicable to the students admitted from the academic year 2024- 2025 onwards)

Course Code	Course Name	Category	Periods/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ESE	Total
PRACTICAL									
U23AD827	Project Phase-II	EEC	0	0	20	10	60	40	100
					Total	**10**	**60**	**40**	**100**

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Career Track Courses										
Sem	**Course Code**	**Course Name**	**Category**	**Periods/Week**			**Credit**	**Maximum Marks**		
				L	**T**	**P**	**C**	**CA**	**ESE**	**Total**
Track 1 – Entrepreneurship										
IV	U23CTCE1	Entrepreneurial Mind-set 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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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**			
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To 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		

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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	**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 (8th Edition), Cengage Learning, 2015.
2. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.

References

1. Reyszig E, Advanced Engineering Mathematics (10th Edition), John Wiley (2015).
2. Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media (Animprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
3. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus ", 14th Edition, Pearson India, 2018
4. Anton H, Calculus: Early Transcendentals, 10th Edition, Wiley (2016).
5. B V Ramana, Higher Engineering Mathematics, Tata McGraw Hill Education Pvt Ltd., New Delhi (2016)

E-Resources

1. https://freevideolectures.com › All Courses › Calculus › UCLA
2. www.learnerstv.com/Free-engineering-Video-lectures
3. www.nptel.ac.in

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Elayampalayam, Tiruchengode - 637 205

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.Tech**	Programme Code	**109**	Regulation	**2023**			
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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, 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 -

CO /PO Mapping
(3/2/1indicates 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						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 / Quiz / Seminar
3. End-Semester examinations

Indirect

1. Course - end survey

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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,2018.		
REFERENCE BOOKS			
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 forEnglish 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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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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 ultrasonic.
- 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
CO1: Understand the elastic properties of the materials	K2
CO2: Gain knowledge about the conduction properties of metals	K3
CO3: Determine packing factor for various unit cells and understand different types of crystal imperfections and learn the engineering, medical applications.	K1
CO4: Discuss the basic idea of semiconducting materials and realize the function of modern engineering materials	K1
CO5: 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	PO 10	PO 11	PO 12	PSO1	PSO 2
CO 1	3	2	3	1	2									2
CO 2	3	2	3	3	1									
CO 3	3	3		3	1									2
CO 4	3		2	1	1								3	2
CO 5	3			1	2	2								2

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

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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.	Dr.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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	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
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
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	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

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

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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 - malloc, 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.Malliga, C. S. Kanimozhi and K.Kousalya, "Problem Solving and Programming",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		**109**	Regulation		**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				Semester		**I**	
Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA101	**Heritage of Tamils** / தமிழர் மரபு	1	0	0	1	40	60	100
	Content of the syllabus							
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.								

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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

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Elayampalayam, Tiruchengode – 637 205

Programme	**B.Tech.**	Programme code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**I**

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

Content of the syllabus

UNIT I	**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**

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TEXT-CUM-REF

1	தமிழகவரலாறும் – 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.

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Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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 -

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

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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 ,Third Edition,2019
2.	Jain and Gautam ,"Engineering Graphics & Design ",Khanna Publishing House, 2018
Reference Book :	
1.	Dr.P.Kannan and Dr.J.Bensam Raj, "Engineering Graphics", JBR Tri Sea Publishers Pvt. Ltd,2018.
2.	K.V Natarajan, "Engineering Drawing and Graphics", M/s. N.Dhanalakshmi, Chennai,2014.
3.	K.Venugopal and V. Prabhu Raja, "Engineering Graphics"New Age International Publishers,2011.
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,50th Edition,2010
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.

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Programme	**B.Tech**	Programme code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**		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**	
	Programme Outcomes (POs)												PSOs	
COs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**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

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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

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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

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Programme	**B.Tech.**	Programme Code	**109**		Regulation	**2023**		
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				Semester	**I**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23PH102	**PHYSICS LABORATORY**	0	0	2	1	60	40	100

Course Objective

- 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
- To 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: To understand the importance of laser beam compared to ordinary light	K2

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	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	

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Course Assessment Methods

Direct

1. Pre lab and post lab test
2. End-Semester examination

Indirect

1. Course - end survey

Content of the syllabus

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

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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
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

3. Pre lab and post lab test
4. End-Semester examination

Indirect

1. Course - end survey

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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

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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 RollNo:101 Percentage :89.7 **Entered details:** Name: abi RollNo: 101 Percentage: 89.70	CO5

Total Periods	**45**
Tools Required	
Codetandra / HackerRank / HackerEarth / Any online Problem Solving Platforms	
E-Resources	
https://www.programiz.com/c-programming	
https://www.cprogramming.com/	
https://beginnersbook.com/2015/02/simple-c-programs/	

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Programme	**B.Tech**	Programme Code	**109**	Regulation	**2023**			
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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: Aweraness about population growth, human rights and Environment	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**	**PSO 2**
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

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

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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, database, 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/

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Faculty of Computer Science and Engineering
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Elayampalayam, Tiruchengode

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205						
Programme	**B.Tech**	Programme Code	**109**	Regulation	**2023**		
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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

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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	w.learnerstv.com/Free-engineering-Video-lectures
3	w.nptel.ac.in

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Elayampalayam, Tiruchengode – 637 205

Programme	B.Tech	Programme Code	109	Regulation	2023
Department	ARTIFICIAL INTELLIGENCE AND DATA SCIENCE			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 propertiesand applications.
- Familiarize about the Nonrenewable, 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

At the end of the course, the student should be able 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	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	2	1	2	2	2					1	1	3
CO 2	3	2	2	2		2	2	1					2	2	3
CO 3	3	2	2	3	2	1	2	1					2	1	3
CO 4	3	3	2	2	1	1	3	2					3	2	3
CO 5	3	3	3	2	1	2	2	1					2	1	3

Course Assessment Methods

Direct

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

Indirect

1. Course - end survey

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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, Electro dialysis. 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 vapor 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
Nonrenewable energy - nuclear energy, nuclear reaction and its types; Nuclear power plant and its working (light water nuclear power plant & breeder reactor).Renewable energy and its sources - solar Energy - photo voltaic cells-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**

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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**

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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai)Elayampalayam, Tiruchengode – 637 205						
Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**		
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**II**		

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23EE201	**Basic Electrical and 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 ofelectrical 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**	**PSO 1**	**PSO 2**	**PSO 3**
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

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

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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.	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

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Elayampalayam, Tiruchengode – 637 205

Programme	**B.Tech**	Programme code	**109**	Regulation	2023
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	II

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA202	தமிழரும் தொழில் நுட்பமும்/ TAMILS AND TECHNOLOGY	1	0	0	1	40	60	100

	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**

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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**

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Programme	B.Tech	Programme code	109	Regulation	2023
Department	ARTIFICIAL INTELLIGENCE AND DATA SCIENCE			Semester	II

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23TA202	TAMILS AND TECHNOLOGY	1	0	0	1	40	60	100

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

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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.

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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.Tech**	Programme Code		Regulation	**2023**			
Department	**CSE, IT & CST,AI& DS**			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

Direct

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

Indirect

1. Course - End survey

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Content of the syllabus			
Unit – I	**INTRODUCTION TO OOP AND C++**	Periods	**9**
Object Oriented Programming - Features – Merits & Demerits- Applications – Difference –Structure of C++ - 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	

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Text Books		
1.	Reema Thareja, "Object Oriented Programming with C++", Third Edition, Oxford University Press, NewDelhi,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	
Resources		
1.	www.nptel.ac.in	
2.	https://www.javatpoint.com/cpp-oops-concepts	
3.	https://www.javatpoint.com/java-tutorial	

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Programme	**B.Tech**	Programme Code	**109**	Regulation	**2023**			
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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 contexts
- 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	-	

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

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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**

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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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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.Tech**	Programme Code		**109**	Regulation		**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				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

Objective

The main objective of this course is to:

- Gather 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 Outcomes

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

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	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

Pre-requisites | **Nil**

Direct

1. Pre lab and Post lab
2. Execution of Experiment and Viva-voce
3. End semester examination

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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	**109**		Regulation		**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				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	2	1	60	40	100

Course Objective

The main objective of this course is to:
The students should made to

- Know the plumbing line assemblies.
- Weld lap joint, butt joint and T-joint.
- Learn the assembling and dismantling methodology of home appliances.
- Learn the resistor value identification through colors coated on resistor.
- Learn the basics of signal generation in CRO.
- 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

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	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

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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.

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Programme	**B.Tech**	Programme Code		**109**	Regulation	**2023**		
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				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: • To know about the basic structure of Indian constitution. • To know about our Central Government Executive system of India • To know about our State Government Executive system of India • To learn the Election system, Amendments and Emergency Provisions given by the constitution. • To 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	---							

Course Assessment Methods

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

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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/

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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/CST/ AI&DS**			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

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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 – 2004.
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	**IT,CSE,CST,BME,ECE,EEE**				Semester	**III**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23IT302	**Data Structures**	3	0	0	3	40	60	100

Course Objective

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	-	

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

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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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Elayampalayam, Tiruchengode – 637 205

Programme	B.E. /B.Tech.	Programme code		Regulation	2023
Department	CSE, IT & CST , AI &DS			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

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

CO/PSO Mapping

Course Assessment Methods

Direct

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

Indirect

1. Course - end survey

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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.

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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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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	B.Tech.	Programme Code		109	Regulation		2023	
Department	ARTIFICIAL INTELLIGENCE AND DATA SCIENCE				Semester		III	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD301	Essentials of Python Programming	3	0	0	3	40	60	100

Course Objective	The Main objective of this course is to: • Know about the basics of Python programming • Understanding the data structures of python programming • Knowing Functions and Files in python programming • Applying python libraries for machine learning • Learn basic libraries for data visualization	
Course Outcome	At the end of the course, the student should be able to,	Knowledge level
	CO1: Read, write, execute by hand simple Python programs and Structure simple Python programs for solving problems	**K1**
	CO2: Represent compound data using Python Data structures	**K2**
	CO3: Implement function prototypes and manipulate file processing	**K2**
	CO4: Identify and process different python libraries for machine learning applications	**K3**
	CO5: Apply different basic libraries used for data visualization	**K3**
Pre-requisites	-	

CO /PO Mapping (3/2/1indicates 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	3	2	3	1				3		3	3	3	3
CO 2	3	3	2	2	1				3		3	3	3	3
CO 3	3	3	2	2	1				3		3	3	3	3
CO 4	3	3	2	1	3				3		3	3	3	3
CO 5	3	3	2	2	3				3		3	3	3	3

Course Assessment Methods

Direct
4. Continuous Assessment Test I, II & III 5. Assignment / Quiz / Seminar 6. End-Semester examinations
Indirect
2. Course - end survey

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Content of the syllabus			
Unit – I	**INTRODUCTION TO PYTHON PROGRAMMING**	Periods	9
Introduction to Python – features of python - native data types – variables – operators – conditional statements - control statements – continue – pass – break-Mutable vs immutable datatypes			
Unit - II	**PYTHON DATA STRUCTURES**	Periods	9
Types of python data structures-Basic syntax of python data structures(List,Tuples,Dictionaies and Sets)-Lists: list operations - list slices - list methods and functions – aliasing – Dictionaries: operations ,functions and methods			
Unit – III	**FUNCTIONS AND FILES**	Periods	9
Functions-Basics of functions-Function definition - declaration, arguments, parameters – formal and local, parameter passing methods - function prototypes - recursion; Files: Basics of file operations-Text files, reading and writing files			
Unit - IV	**PYTHON LIBRARIES FOR MACHINE LEARNING**	Periods	9
Dataset- Load dataset - Read the dataset - display dataset - Basic Libraries – Numpy- N dimensional array in Numpy-Numpy methods and properties-Scipy –Constants in Numpy- pandas –Basics of pandas-Working on files in various formats			
Unit – V	**PYTHON LIBRARIES FOR DATA VISUALIZATION**	Periods	9
Data visualization – Basics of confusion matrix - Basic Libraries – Matplotlib-Key Features of Matplotlib-Matplotlib Figure-Different Types of Plots in Matplotlib-Introduction to Seaborn-Different categories of plot in Seaborn--Some basic plots using seaborn			
	Total Periods		45

Text Books:	
	John Zelle, " Python Programming: An Introduction to Computer Science", franklin, Beedle & Associates, 3rd Edition, 2020
3.	Anurag Gupta, G.P BISWAS ," Python Programming – Problem solving, packages and Libraries, Edition 1, Tata McGraw Hill, 2018
4.	Jake Vanderplas," Python Data Science Handbook", O'Reilly Media, 2nd Edition, 2021
REFERENCE BOOKS	
1.	E Balagurusamy, "Problem Solving and Python Programming", Edition1 ,TataMcGraw Hill, 2018
2.	Allen B. Downey, "Think Python: How to Think Like a Computer Scientist,,,,, 2nd edition, Updated forPython 3, Shroff/O,,Reilly Publishers, 2016
3.	John V. Guttag,, Introduction to Computation and Programming using Pythonl, Prentice Hall of India,2014.
4.	Reema Thareja, "Python Programming using Problem Solving Approach", OXFORD University Press, 2017
5.	AI Sweigart, "Automate the Boring Stuff with Python:Practical Programming for Total Beginners", 2nd edition, No Starch Press, 2019
E-Resources	
1.	http://greenteapress.com/wp/think- python/
2.	https://beginnersbook.com/2018/03/python-tutorial-learn-programming/
3.	www.udemy.com/PythonVideos/Online-Course

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Programme	**B.Tech**	Programme code	**109**	Regulation	**2023**		
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			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

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

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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,

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

Programme	**B.Tech**	Programme code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**		Semester	**III**	

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD302	**Artificial Intelligence-I**	3	0	2	4	50	50	100

Course Objective

The main objective of this course is to:

- Know about the basic concepts of Artificial Intelligence Agents
- Understanding different search strategies in AI
- Analyzing the Concept of AI in Game playing
- Identifying the different representation of Knowledge using Logic Programming
- Expertise knowledge in Expert system and Uncertainty

Course Outcome	**At the end of the course, the student should be able to,**	Knowledge level
	CO1: To know the basics of Artificial intelligence and intelligent agents.	**K2**
	CO2: To analyze the different search strategies in AI.	**K3**
	CO3: To apply the concepts of AI in Game playing techniques	**K3**
	CO4: To carry out and apply the concept of Logic programming and represent the different knowledge representation techniques for various AI applications	**K2**
	CO5: To understand the basics of Expert systems and Uncertainty	**K2**

Pre-requisites -

CO / PO Mapping
(3/2/1indicates 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	1	2	2			1		1	3	3	3
CO 2	3	3	1	2	3	2			1		1	3	3	3
CO 3	3	3	1	1	2	2			1		1	3	3	3
CO 4	3	3	1	1	2	2			1		1	3	3	3
CO 5	3	3	1	2	3	2			1		1	3	3	3

Course Assessment Method

Direct

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

Indirect

1.Course - end survey

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Content of the syllabus			
Unit – I	**INTELLIGENT AGENTS AND PROBLEM SOLVING**	Periods	**9**
Introduction to Artificial Intelligence-Key milestones and evolution of AI-Foundations of AI-Intelligent Systems: Features of intelligent systems, Examples and real-world applications-Sub-areas of AI-Applications of AI-Intelligent Agents-Classification of Agents-Problem Solving and Agent Characteristics			
Unit - II	**SEARCHING TECHNIQUES**	Periods	**9**
Introduction to Search in AI-Uninformed (Exhaustive) Search Techniques: Depth-First Search (DFS), Breadth-First Search (BFS), Uniform Cost Search, Informed (Heuristic) Search Techniques: Heuristic functions and their role, A* Algorithm: concept, working, and properties, Iterative-Deepening A* (IDA*)Advanced Search Strategies-Branch and Bound Search, Comparison with A*-Constraint Satisfaction Problems (CSPs)			
Unit – III	**INTRODUCTION TO PROBLEM REDUCTION AND GAME PLAYING**	Periods	**9**
Introduction to Problem reduction - Game Playing in AI- Types of games-Bounded Look-ahead Strategy and Evaluation Functions-Alpha-Beta Pruning			
Unit - IV	**LOGIC PROGRAMMING AND KNOWLEDGE REPRESENTATION**	Periods	**9**
Logic Concepts and Logic Programming: Introduction - Natural Deduction System - Semantic Tableau System, Resolution refutation - Predicate Logic-Logic Programming Introduction - Approaches to Knowledge Representation - Knowledge Representation using Semantic Network, Extended Semantic Networks for KR - Knowledge Representation using Frames			
Unit – V	**EXPERT SYSTEM AND HANDLING UNCERTAINTY**	Periods	**9**
Introduction - Phases in Building Expert Systems - Expert System Architecture - Expert Systems Vs Traditional Systems - Rule based expert Systems - Application of Expert Systems - List of Shells and Tools – Uncertainty Measure- Probability Theory - :Introduction - Probability Theory, Bayesian Belief Networks			
		Total Periods	**45**

	SUGGESTED LIST OF EXPERIMENTS	**CO'S**
1	Study of Software Architectures	**CO1**
2	Basic Implementation of Breadth First Search and Depth First Search using Python.	**CO2**
3	Basic Implementation of A* Algorithm using python	**CO2**
4	Basic Implementation of Constraint satisfaction problem using python	**CO2**
5	Basic Implementation of Missionaries-Cannibals Problems using Python	**CO2**
6	Basic Implementation of Water-Jug problem using Python.	**CO2**
7	Basic Implementation of Tic-Tac-Toe game using Python.	**CO3**
8	Basic Implementation of Hill Climbing using python	**CO3**
9	Basic Implementation of Alpha-Beta Pruning using Python.	**CO3**
10	Study of Prolog Programming language and write some simple facts for the statement using prolog	**CO4**
11	Design a Chat bot in Python	**CO5**
	Lecture 45: Practical 30; Total: 75	

Text Books:

1.	SarojKaushik.ArtificialIntelligence.CengageLearning.2011
2.	S.RussellandP.Norvig,"ArtificialIntelligence:AModernApproachI,PrenticeHall,ThirdEdition,2015

REFERENCE BOOKS

1.	Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education, 2005.
2.	Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, —Data Structures and Algorithmsl, Pearson Education, Reprint 2006.
3.	Introduction to Artificial Intelligence and expert systems DanW.Patterson.PHI.

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4.	Artificial Intelligence by George Flugerrearson fifth edition
5.	NPTEL Course Notes
E-Resources	
1.	https://www.geeksforgeeks.org/advanced-data-structures/
2.	https://www.coursera.org/
3.	https://www.unesco.org/en/artificial-intelligence

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Programme	**B.E./B.Tech.**	Programme Code			Regulation	**2023**		
Department	**IT,CSE,CST,BME,ECE,EEE, AI & DS**				Semester	**III**		
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 (3/2/1 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	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

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 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.	**CO1**

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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

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Programme	B.Tech.	Programme Code		109	Regulation	2023		
Department	ARTIFICIAL INTELLIGENCE AND DATA SCIENCE				Semester	III		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD303	Python Programming Laboratory	0	0	2	1	60	40	100

Course Objective

The Main objective of this course is to:

- Learn and understand Python programming basics and control statements.
- Discover the use of supported data structures like lists, dictionaries and tuple in Python.
- Know Functions, and Files in python programming
- Learn basic libraries for Machine learning
- Understand the use of basic libraries for data visualization

Course Outcome	The students who complete this course successfully are expected to:	Knowledge Level
	CO1: Understand the basic concepts of scripting and the contributions of scripting language.	K1
	CO2: Explore and implement python data structures like Lists, Tuples, Sets and dictionaries.	K2
	CO3: Create practical and contemporary applications using Functions, Strings and Files	K3
	CO4: Use different python libraries for machine learning applications	K3
	CO5: Display the datasets using different basic libraries in data visualization	K3

Pre-requisites -

CO /POMapping (3/2/1indicates 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	3	2	1	3	1			3	1	3	3	3	3
CO 2	3	3	2	1	3	1			3	1	3	3	3	3
CO 3	3	3	2	1	3	1			3	1	3	3	3	3
CO 4	3	3	2	1	3	1			3	1	3	3	3	3
CO 5	3	3	2	1	3	1			3	1	3	3	3	3

Course Assessment Methods Direct

Direct
1.Prelab and Post Lab 2.Record 3.End-Semester Examinations
Indirect
1.Course - end survey

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LIST OF EXPERIMENTS		
BASIC PYTHON PROGRAMS		
1	Installation and environment setup for python	CO1
2	Factorial of n numbers and generating Fibonacci series	
3	Calculating student grade and Printing a pattern	
LISTS, TUPLES, SETS AND DICTIONARIES		
4	Create and insert elements into a Lit and List operations	CO2
5	Create and insert elements into a dictionary	
6	Operations on sets and Tuples	
STRINGS,FUNCTIONS AND FILES		
7	Programs on Functions and recursion	CO3
8	Word count, file copy, file operations in python	
PYTHON LIBRARIES		
9	Implement a python program for illustrating Numpy, Scipy ,pandas libraries in machine library	CO4
10	Display a Dataset in barchart, Piechart,Scatterplot, Histogram using basic libraries	CO5
	Total Periods	**45**
Tools Required		
1.	PC, Windows OS, Python IDE	

E-Resources	
1.	https://www.python.org/about/gettingstarted/
2.	https://beginnersbook.com/2018/03/python-tutorial-learn-programming/
3.	https://www.tutorialspoint.com/python/index.html
4.	https://www.google.com/www.udemy.com/PythonVideos/Online-Course

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Programme	**B.Tech**	Programme code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND SCIENCE**			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

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

Course Assessment Methods

Direct

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

Indirect

1.Course -end survey

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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

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Programme	**B.E/B.Tech.**	Programme Code			Regulation	**2023**		
Department	**CSE/IT/CST/AI & DS**				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

e-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	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

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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 DISTRIBUTIONS**	Periods	9+3
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.Tech.**	Programme Code		**109**	Regulation		**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				**Semester**		**IV**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD404	**Artificial Intelligence-II**	3	0	0	3	40	60	100

Course Objective

The main objective of this course is to:

- Understand advanced knowledge representation techniques and reasoning strategies in AI.
- Analyze non-monotonic reasoning and handle incomplete or uncertain knowledge.
- Explore AI planning techniques and decision-making strategies.
- Design expert systems and apply uncertainty reasoning mechanisms
- Understand the basics of natural language processing and perception in AI.

Course Outcome

At the end of the course, the student should be able to,	Knowledge level
CO1: Apply predicate logic and structured representation methods to represent knowledge in AI systems.	K3
CO2: Understand various non-monotonic reasoning approaches for uncertain and incomplete knowledge.	K2
CO3: Apply planning and decision-making techniques to solve intelligent agent problems.	K3
CO4: Understand and apply expert system principles and uncertainty reasoning (fuzzy, Bayesian, etc.).	K3
CO5: Understand the basic concepts of natural language processing and perception in AI systems.	K2

Pre-requisites: Foundation of AI and ML

CO /POMapping (3/2/1 indicatesstrengthofcorrelation)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	3	2	2	2	2								3	2
CO 2	3	3		2									3	2
CO 3	3	3	2	2	2								3	3
CO 4	3	2	2	2	2								3	3
CO 5	2	2		1	2								2	2

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Course Assessment Methods

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

Content of the syllabus

Unit – I	**FORMAL KNOWLEDGE REPRESENTATION AND REASONING**	Periods	**9**
Knowledge Representation using Predicate Logic – Syntax and Semantics of First-Order Logic – Introduction to Predicate Calculus – Resolution and Unification – Structured Representations: Semantic Networks, Frames, Scripts, and Ontologies – Knowledge Engineering in First-Order Logic – Inference Mechanisms.			
Unit - II	**NON-MONOTONIC & COMMONSENSE REASONING**	Periods	**9**
Limitations of Classical Logic – Non-Monotonic Reasoning – Default Reasoning – Circumscription – Auto epistemic Logic – Closed World Assumption vs Open World Assumption – Truth Maintenance Systems – Applications in Common-sense Reasoning.			
Unit – III	**PLANNING & DECISION MAKING**	Periods	**9**
Planning Problem – State-Space Search for Planning – Partial Order Planning – Planning Graphs – Hierarchical Planning – Decision Theory – Utility Theory – Decision Networks – Markov Decision Processes (MDP).			
Unit - IV	**EXPERT SYSTEMS & REASONING UNDER UNCERTAINTY**	Periods	**9**
Architecture of Expert Systems – Knowledge Acquisition and Validation – Inference Mechanisms – Explanation and Justification – Reasoning with Uncertainty – Bayesian Networks – Dempster-Shafer Theory – Fuzzy Logic in AI.			
Unit – V	**NATURAL LANGUAGE PROCESSING & PERCEPTION**	Periods	**9**
Natural Language Processing (NLP) Overview – Syntax and Parsing – Semantics – Discourse and Pragmatics – Natural Language Generation – Speech Processing Basics – Introduction to Computer Vision – Perception and Action in AI.			

Text Books:

1.	Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson, 4th Edition ,2021
2.	Elaine Rich, Kevin Knight, Shivashankar B. Nair, "Artificial Intelligence", McGraw-Hill Education, 4th Edition ,2020
3.	Wolfgang Ertel," Introduction to Artificial Intelligence", Springer, 2nd Edition, 2020
4.	Saroj Kaushik," Artificial Intelligence", Cengage Learning, Latest Edition , 2nd Edition,2022

REFERENCE BOOKS

1.	George F. Luger," Artificial Intelligence: Structures and Strategies for Complex Problem Solving" Pearson), 6th Edition, 2009
2.	Ronald Brachman and Hector Levesque, "Knowledge Representation and Reasoning" Morgan Kaufmann (Elsevier imprint), 1st Edition, 2004
3.	Steven Bird, Ewan Klein, Edward Loper."Natural Language Processing with Python", 1st Edition, 2009

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

Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**IV**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD405	**Computer Networks**	3	0	0	3	40	60	100

Course Objective

The main objective of this course is to:

- Build an understanding of the fundamental concepts of computer networking
- Familiarize the student with the basic taxonomy and terminology of the computer networking area
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks

Course Outcome

At the end of the course, the student should be able to,	Knowledge level
CO1: Explain basic concepts, OSI reference model, services and role of each layer of OSI model and TCP/IP, networks devices and transmission media, Analog and digital data transmission	K2
CO2: Apply channel allocation, framing, error and flow control techniques	K3
CO3: Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism	K2
CO4: Evaluate the different Transport Layer function i.e. Port addressing Connection Management, Error control and Flow control mechanism	K3
CO5: Apply the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN	K4

Pre-requisites

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

COs	ProgrammeOutcomes(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	3	2	2	2	2								3	2
CO 2	3	3		2									3	2
CO 3	3	3	2	2	2								3	3
CO 4	3	2	2	2	2								3	3
CO 5	2	2		1	2								2	2

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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 TO COMPUTER NETWORKS**	Periods	**9**
Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, frame relay. THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks, mobile telephone system			
Unit - II	**DATA LINK LAYER & WIRELESS LAN**	Periods	**9**
Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet. THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wireless LAN, Broadband Wireless, Bluetooth.			
Unit – III	**NETWORK LAYER & ADDRESSING**	Periods	**9**
Network layer design issues, routing algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service, Classful and classless addressing, VLSM and FLSM, OSPF and EIGRP			
Unit - IV	**TRANSPORT LAYER & CONGESTION CONTROL**	Periods	**9**
Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP, Congestion Control, Traffic Management			
Unit – V	**APPLICATION LAYER & TELNET**	Periods	**9**
Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http. APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet			

Text Books:	
1.	Behrouz A. Forouzan "Data Communications and Networking with TCP/IP Protocol Suite , "McGraw Hill , 6th Edition, 2021
2.	Andrew S. Tanenbaum, Nick Feamster, and David J. Wetherall,," Computer Networks", Pearson, 6th Edition (Global Edition) , 2021
3.	William Stallings," Data and Computer Communications", Pearson, 10th Edition, 2013with an updated eTextbook version in July 2021
REFERENCE BOOKS	
1	Kurose & Ross," Computer Networking: A Top-Down Approach", Pearson, 9th Edition, 2025 (Global Edition)
2	Peterson & Davie," Computer Networks: A Systems Approach", Morgan Kaufmann, 6th Edition, 2021
3	W. A. Shay, "Understanding Data Communications and Networks" , Cengage Learning, 3rd Edition, 2003
4	Douglas E. Comer," Computer Networks and Internets", Pearson, 6th Edition, 2014
E-Resources	
1.	https://www.geeksforgeeks.org/computer-network-tutorials
2.	https://nptel.ac.in/courses/106/105/106105183/

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Programme	**B.Tech.**	Programme Code		**109**	Regulation		**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				Semester		**IV**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD406	**Database Management Systems**	3	0	0	3	40	60	100

Course Objective

The main objective of this course is to:

- Learn the fundamentals of database system, data models, and E-R diagrams
- Understand the database languages, relational algebra and relational databases system
- Understand the normalization techniques, and apply the fundamental concepts of transaction, concurrency control and recovery in DBMS
- Analyze how the Query gets processed, understand internal storage structures using different file and indexing techniques and learn database security methods
- Learn the concepts of Distributed databases, and NoSQL

Course Outcome

At the end of the course, the student should be able to,	**Knowledge level**
CO1: Understand the Fundamental concept of Database management systems and create Entity-Relationship Diagrams (ERDs) to visually represent database structure	K2
CO2: Construct queries in SQL or Relational Algebra to perform operations on database.	K4
CO3: Apply the concept of transactions and Implement concurrency control mechanisms to manage concurrent access to data and different database recovery techniques	K3
CO4: Understand query processing concepts, different storage strategies and apply the principles of database security	K2
CO5: Understand the concepts of Distributed databases and NoSQL	K3

Pre-requisite -

CO / PO Mapping
(3/2/1indicates 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	3	2	2	2	2	1						2	3	2
CO 2	3	2	2	3	2	3						2	3	2
CO 3	3	2	2	2	2	3						2	3	2
CO 4	3	2	2	3	2	3						2	3	2
CO 5	3	2	2	3	2	3						2	3	2

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Course Assessment Method

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 to Database and Database Design**	Periods	**9**
Purpose of Database System–Views of data–Data Models–Database System Architecture–Database users and administrators- -Applications of Database E-R Relationship model-E-R Diagrams- Database design for University Application -Embedded SQL			
Unit–II	**Relational Algebra and Relational Databases**	Periods	**9**
Structure of relational database-Database schema-Keys-Relational algebra &Relational Calculus- Database Languages- Introduction of SQL--Basic Structure of SQL Queries-Join operation-SQL Set operations, Aggregate Functions-Nested Query			
Unit – III	**Normalization, Transaction ,concurrency control and Database recovery**	Periods	**9**
Basics of Normalization- First, Second, and third normal forms – Boyee/Codd normal form. Transaction Concepts – ACID Properties – Schedules – Serializability –Need for Concurrency–Concurrency control protocols–Two Phase Locking-Timestamp— Failure Classification – Recovery Concepts: Shadow Paging &ARIES Algorithm			
Unit– IV	**Query Processing, Database Storage strategies & Database Security**	Periods	**9**
Phases in Query processing and optimization-Overview of physical storage media-RAID – File Organization – Indexing::Ordered Indices –Hashing: Static Hashing –Dynamic Hashing – Database Security: Authentication – Authorization and Access Control			
Unit– V	**Distributed Database and Handling Unstructured Data**	Periods	**9**
Distributed Databases: Architecture - Data Storage – Distributed Transaction –Cloud based Database- CAP Theorem -Introduction to NoSQL-Key features-Types-Working of Mongo DB-Mongo DB vs RDBMS-Applications of RDBMS and NOSQL			
		Total Periods	**45**

TEXTBOOKS:

1.	AbrahamSilberschatz,HenryF.Korth,S.Sudharshan,"DatabaseSystemConcepts",7thEdition,McGrawHill, 2021.
2.	M. Tamer ÖzsuPatrick 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.

REFERENCEBOOKS:

1.	C.J.Date,A.Kannan,S.Swamynathan,"AnIntroductiontoDatabaseSystems",8 th Edition,PearsonEducation,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	**Common to All**					Semester	**IV**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23ADL01	**French**	2	0	0	1	**100**	-	**100**

Content of the syllabus

Unit –I		**Periods**	**6**

ENGLISH : Introduction about the language and the country, Alphabets and accents, Important phrases in french, pronunciation rules, Days, Months, Numbers 1- 50.

FRANÇAIS : Introduction sur le pays France et langue français, L'alphzbets et accents, les phrases en français, règles pour pronunciation, Les jours, Les mois et les nombres 1-50.

Unit –II		**Periods**	**6**

ENGLISH : How are you? what is your name? What is it? Who is he? To be, To have – Verb. Pronoun, Family, School, Adjectives, Nationality, Yes/No type Answering, Negative, professions

FRANÇAIS : Comment vas tu?, Comment tu t'appelles? Qu'est – ce-que c'est? Qui est ce? Le verbe – être, avoir, pronoun et conjugation , La famille, L'ecole, Adjectives,Nationalitè , oui/Non, Négatif, Question Words et professions.

Unit –III		**Periods**	**6**

ENGLISH: Verbs—Er, IR, RE and pronominal verbs and conjugation. Preposition, Types of articles, Demonstrative and possessive adjectives Sentence formation.

FRANÇAIS : Verbs de er, ir , re et pronomial verbes , conjugation , prepositions et articles Démonstratif et possessif adjectifs.

Unit –IV		**Periods**	**6**

ENGLISH : Introduce the personne , Express the interest, speak about the family and small topics. Verbs - to go, to come, to do, can , want. Vocabulary.

FRANÇAIS : Décrire les personnes,Exprimer les goûts, et parler de la famille et petits titres. Verbes – aller venir, faire pouvoir, vouloir vocablaires.

Unit –V		**Periods**	**6**

ENGLISH : Encouraging students to speak , write and listen the language.

FRANÇAIS : Encourage les étudiants pour parler ,becrire et ecourer la langue.

	Total Periods	**30**

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Text Books	
1.	Babusha Verma, Deepti Walia, "Idées méthod de francai", Goyal Publishers.
2.	A.Monnerie Beinvenue En France. Documentation Marrie Franchoise Boullet
3.	G.Mauger Cours DE Languet De Civilisation Francaises
4.	Annie Heminway, Complete French all in one Premium Second Edition, Tata McGraw Hill Education
5.	Diamond French-Aprenons Le Francois New Saraswathi House (India)Private Limited

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Programme	**B.E./B.Tech**	Programme Code			Regulation	**2023**		
Department	**Common to All**				Semester	**IV**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23ADL02	**German**	2	0	0	1	**100**	-	**100**

Content of the syllabus

Unit –I		**Periods**	**6**

English: Intro of German and Germany, Letters- German Alphabets and Other letters, Pronunciation- Vowel, Consonants; Greetings, Courtesy, The days of the week, The months of the year.

German: Einführung in Deutsch, Deutschland - Das Alphabet, Der Umlaut, Aussprache, Vokale, Konsonanten, Die Begrüßungen, Wie Heizen sie, Die Wochentage, Monate.

Unit –II		**Periods**	**6**

English: Articles, Nominative Case, Masculine, Feminine, and Neuter; Gender of nouns; Colours, Seasons, Numbers, Cardinal (1-100) & Ordinal (1-20), Types of Verb.

German: Artickel, Masculine, Feminine & Neuter, Nomen, Kleuren, Zeiten; Jaherzeiten; Zahlen, Kardinalzahlen (1-100) und Ordnungszahlen (1-20), Zuge in Deutschland, Verbtypen.

Unit –III		**Periods**	**6**

English: Nationality, Personal pronoun, Auxiliary verb, Professions, Verb (to have), to call oneself, Regular 1st group (er)verbs - speak, live, like, watch, etc.,

German: Nationalität, Personal pronomen, Hilfsverben, Sein, Beruf, Haben, Heißen, Reguläre verben, sprechen, wohnen, lieben, schauen.

Unit –IV		**Periods**	**6**

English: Irregular Verbs, Model Auxiliary verbs, Negation, Ask Questions, Prepositions, Conjunctions, Time units, Form of registration.

German: Unregelmäßige verben, Modale hilfsverben, Negationen, Fragewörter, die präposition, Verbindungen, Zeiteinheiten, Anmeldeformular.

Unit –V		**Periods**	**6**

English: Pronoun, Personnel, Possessive, Indefinite –Reflexive – Relative- Adjective- Adverb- Le verb prefix – Word order- Dialogues in German – Tourist attractions in German

German: Das Pronomen - Das Adjektiv- Das Adverb- Die Verb-Präfixe- Die Wortreihenfolge – Dialoge In Deutscher Sprache - Touristenattraktionen

		Total Periods	**30**

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Text Books	
1.	Grasp the Basics of Deutsch im schnellgang by Edward Swick
2.	Netzwerk Deutsch als fremdsprache A1.1 Kursbuch
3.	Netzwerk Deutsch als fremdsprache A1.1 Arbeitsbuch

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Programme	**B.E/B.Tech**	Programme Code				Regulation	**2023**	
Department	**Common to All**					Semester	**IV**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23ADL03	**Japanese**	2	0	0	1	**100**	-	**100**

Content of the syllabus

Unit –I		**Periods**	**6**

Introduction to Hiragana and Katakana: Chart 1, Chart 2, Chart 3, Annexures 1 and 2 and basic Japanese rules along with similar sounded vocabularies for each chart.

Unit –II		**Periods**	**6**

Introduction to Nouns, various particles and usages: Forming simple sentences, asking questions, positioning differentiation and owning fundamentals – new particles and usages.

Unit –III		**Periods**	**6**

Introduction of Verbs, time and place markers: Usage of action words in sentences and framing them – place and time markers usages – giving and receiving – omission of certain particles in a sentence.

Unit –IV		**Periods**	**6**

Introduction of Adjectives, Adverbs and usages: Describing nouns and verbs and framing them to relate day to day conversations- positive and negative ending of the same – introduction of the likes and dislikes expressions

Unit –V		**Periods**	**6**

Introduction to Counters and Kanji: How to use numbers-How to use quantifiers-Present form of adjectives and Nouns-Other necessary particles-How to use numbers and quantifiers – 55 kanji characters

		Total Periods	**30**

Text Books / Manuals

1.	Takuji Kobayashi "MINNA NO NIHONGO –Japanese for Everyone", 2nd Edition GOYAL Publishers & distributors Pvt.Ltd, New Delhi, 2017.
2.	"SPEED MASTER N5"
3.	MINNA NO NIHONGO 1-1 Translation & Grammatical notes in English elementary
4.	SHIN NIHONGO NO KISO 1 (Grammatical Notes in English)

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Elayampalayam, Tiruchengode – 637 205

Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**			Semester	**IV**

Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD407	**Operating Systems**	3	0	2	4	50	50	100

Course Objective

The main objective of this course is to:

- To understand the basics and functions of operating systems.
- To understand Processes and Threads
- To analyze Scheduling algorithms and process synchronization.
- To understand the concept of Deadlocks.
- To analyze various memory management schemes.
- To be familiar with I/O management and File systems.
- To be familiar with the basics of virtual machines and Mobile OS like iOS and Android.

Course Outcome

At the end of the course, the student should be able to,	**Knowledge level**
CO1: Analyze various scheduling algorithms and process synchronization.	**K4**
CO2: Explain deadlock, prevention and avoidance algorithms.	**K2**
CO3: Compare and contrast various memory management schemes.	**K4**
CO4: Explain the functionality of file systems I/O systems, and Virtualization	**K2**
CO5: Compare iOS and Android Operating Systems.	**K4**

Pre-requisites -

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

CO/PSO Mapping

CO's	Programme Outcomes (PO's)												PSO's	
	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	3	1
CO 3	2	2	3	3	2	-	-	-	3	1	1	2	1	1
CO 4	2	2	1	2	1	-	-	-	1	3	2	1	1	2
CO 5	2	3	3	2	1	-	-	-	3	1	2	2	3	2

Course Assessment Method

Direct

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

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Indirect			
1.Course - end survey			
Content of the syllabus			
Unit – I	**INTRODUCTION**	Periods	**9**
Computer System - Elements and organization; Operating System Overview - Objectives and Functions - Evolution of Operating System; Operating System Structures – Operating System Services - User Operating System Interface - System Calls – System Programs - Design and Implementation - Structuring methods.			
Unit - II	**PROCESS MANAGEMENT**	Periods	**9**
Processes - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication; CPU Scheduling - Scheduling criteria - Scheduling algorithms: Threads - Multithread Models – Threading issues; Process Synchronization - The critical-section problem - Synchronization hardware – Semaphores – Mutex - Classical problems of synchronization - Monitors; Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.			
Unit – III	**MEMORY MANAGEMENT**	Periods	**9**
Main Memory - Swapping - Contiguous Memory Allocation – Paging - Structure of the Page Table - Segmentation, Segmentation with paging; Virtual Memory - Demand Paging – Copy on Write - Page Replacement - Allocation of Frames –Thrashing.			
Unit - IV	**STORAGE MANAGEMENT**	Periods	**9**
Mass Storage system – Disk Structure - Disk Scheduling and Management; File-System Interface - File concept - Access methods - Directory Structure - Directory organization - File system mounting - File Sharing and Protection; File System Implementation - File System Structure - Directory implementation - Allocation Methods - Free Space Management; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem.			
Unit – V	**VIRTUAL MACHINES AND MOBILE OS**	Periods	**9**
Virtual Machines – History, Benefits and Features, Building Blocks, Types of Virtual Machines and their Implementations, Virtualization and Operating-System Components; Mobile OS - iOS and Android.			
		Total Periods	**45**
Text Books:			
1.	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2018.		
2.	Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 4th Edition, New Delhi, 2016.		
REFERENCE BOOKS			
1.	Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.		
2.	William Stallings, "Operating Systems: Internals and Design Principles", 7 th Edition, Prentice Hall, 2018. Achyut S.Godbole, Atul Kahate, "Operating Systems", McGraw Hill Education, 2016.		
3.	Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.		
E-Resources			
1.	https://www.geeksforgeeks.org/introduction-of-operating-system-set-1		
2.	https://www.geeksforgeeks.org/deadlock-in-operating-system		
3.	https://www.geeksforgeeks.org/memory-management-in-operating-system		
4.	https://www.geeksforgeeks.org/cpu-scheduling-in-operating-systems		

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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205						
Programme	**B.Tech.**	Programme Code	**109**	Regulation	**2023**		
Department	**ARTIFICIAL INTELLIGENCE & DATA SCIENCE**			Semester	**IV**		
Course Code	**Course Name**	Periods Per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
U23AD408	**Computer Networks Laboratory**	0	0	2	1	60	40	100

Course Objective	The student should be made to, • Relate the theoretical and practical base in computer networks issues. • Have hands on experience on various networking protocols like FTP, DNS, SNMP. • Understand the basic concepts of application layer protocol design; including client/server models, peer to peer models, and network naming. • Compare the performance of various routing protocols	
Course Outcome	At the end of the course, the student should be able to,	Knowledge Level
	CO1: Demonstrate the use of network tool with packet tracer.	K4
	CO2: Apply networking concepts to design and test a basic network setup for small-scale applications or organizations.	K3
	CO3: Simulate and analyze network protocols (e.g., TCP, UDP, ARP, DHCP) using simulation tools such as Cisco Packet Tracer or NS2/NS3.	K5
	CO4: Analyze packet-level data to understand protocol behavior and communication patterns in a network.	K5
	CO5: Configure and test various networking devices (e.g., routers, switches) and services (e.g., DNS, FTP, HTTP) in a LAN setup.	K6
Pre-requisites	-	

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

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Course Assessment Methods Direct	
Direct	
1. Prelab and post lab test 2. End-Semester examinations	
Indirect	
1.Course - end survey	

LIST OF EXPERIMENTS		
COMPUTER NETWORKS		
1.	Packet Tracer with Network Topology.	CO1
2.	HTTP web client program to download a web page using TCP sockets.	CO1
3.	Applications using TCP sockets like: Echo client and echo server, Chat and File Transfer.	CO1
4.	Code simulating ARP /RARP protocols.	CO2
5.	Simulate Distance Vector/ Link State Routing algorithm.	CO3
6.	Network simulator (NS) and Simulation of Congestion Control Algorithms using NS	CO4
7.	TCP/UDP performance using Simulation tool.	CO4
8.	Simulation of DNS using UDP sockets.	CO4
9.	Performance evaluation of Routing protocols using Simulation tool.	CO5
10.	Simulation of error correction code (like CRC).	CO5
	Total Periods	**45**

E-Resources	
1.	https://www.cisco.com
2.	https://www.netcad.com
3.	https://study-ccna.com

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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.Tech.**	Programme Code			**109**	**Regulation**	**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				**Semester**		**IV**	
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
U23AD409	**Database Management 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 join queries. • Understand views, procedures and functions databases. • Install Mongodb and implement important commands in SQL • Implement Database queries and concepts and apply in real time applications	
Course Outcome	At the end of the course, the student should be able to,	**KL**
	CO1: Construct simple SQL Queries using DML Commands	K2
	CO2:Construct simple and complex SQL queries using DML and DCL commands.	K3
	CO3: Use advanced features such as stored procedures and triggers and in corporate in GUI based application development	K3
	CO4: CreateandmanipulatedatausingNoSQLdatabase	K2
	CO5: Createa 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	1	1	1
CO 2	3	3	3	3	2					2	1	1	1	1
CO 3	3	2	2	3	2					2	1	1	3	1
CO 4	2	2	2	2	2					2	1	1	1	1
CO 5	3	3	2	2	2					2	1	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

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Suggested List of Experiments		CO's
1.	1. (Exercise on retrieving records from the table) EMPLOYEES (Employee_Id, First_Name, Last_Name, Email, Phone_Number, Hire_Date, Job_Id, Salary, Commission_Pct, Manager_Id, Department_Id) (a) Find out the employee id, names, salaries of all the employees (b) List out the employees who works under manager 100 (c) Find the names of the employees who have a salary greater than or equal to 4800 (d) List out the employees whose last name is 'AUSTIN' (e) Find the names of the employees who works in departments 60,70 and 80 (f) Display the unique Manager_Id.	CO1
2.	2. (Exercise on updating records in table) Create Client_master with the following fields(ClientNO, Name, Address, City, State, bal_due) (a) Insert five records (b) Find the names of clients whose bal_due> 5000 . (c) Change the bal_due of ClientNO " C123" to Rs. 5100 (d) Change the name of Client_master to Client12 . (e) Display the bal_due heading as "BALANCE"	CO1
3.	3. Rollback and Commit commands Create Teacher table with the following fields(Name, DeptNo, Date of joining, DeptName, Location, Salary) (a) Insert five records (b) Give Increment of 25% salary for Mathematics Department (c) Perform Rollback command (d) Give Increment of 15% salary for Commerce Department (e) Perform commit command	CO2
4.	4 (Exercise on order by and group by clauses) Create Sales table with the following fields(Sales No, Salesname, Branch, Salesamount, DOB) (a) Insert five records (b) Calculate total salesamount in each branch (c) Calculate average salesamount in each branch . (d) Display all the salesmen, DOB who are born in the month of December as day in character format i.e. 21-Dec-09 (e) Display the name and DOB of salesman in alphabetical order of the month.	CO2
5.	Employee Database An Enterprise wishes to maintain a database to automate its operations. Enterprise is divided into certain departments and each department consists of employees. The following two tables describes the automation schemas Dept (deptno, dname, loc) Emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) a) Update the employee salary by 15%, whose experience is greater than 10 years. b) Delete the employees, who completed 30 years of service. c) Display the manager who is having maximum number of employees working under him?	CO2
6.	(i) Using the tables "DEPARTMENTS" and "EMPLOYEES" perform the following queries a) Display the employee details, departments that the departments are same in both the emp and dept. b) Display the employee name and Department name by implementing a left outer join.	CO2

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	c) Display the employee name and Department name by implementing a right outer join. d) Display the details of those who draw the salary greater than the average salary. (ii) Queries using Aggregate functions, GROUP BY, HAVING Clause	
7.	(i)Study of Views,Triggers,Procedures (ii) Implement PL/SQL queries to create demonstrate procedure and Triggers,	CO3
8.	Mongo DB installation and Configuration in Windows and execute the Commands of MongoDB and operations in MongoDB : Insert, Query, Update,Delete	CO3
9.	To study basics of front end tools and implement the forms using front end tool and use oracle/MYSQL for database Creation	CO4
10.	Mini Project(Application development using Oracle/MySQL	CO5
	Total Periods	**45**

E-RESOURCES	
1.	https://www.javatpoint.com/
2.	https://www.geeksforgeeks.org/
Tools/Software Required	
1	PC, Windows OS, MYSQl, Oracle

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TRACK 1- Entrepreneurship

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205							
Programme	**B.E / B.TECH**	Programme code	**109**	Regulation	**2023**			
Department				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**	2/0	0	0/2	1	40/60	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

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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/

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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		**109**	Regulation		**2023**	
Department	**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**				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

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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

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	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205						
Programme	**B.Tech.**	Programme Code		Regulation	**20 23**		
Department	**Common to All**			Semester	**IV**		
Course Code	Course Name	Periods Per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
U23CTCH1	**Higher Studies In Abroad & India**	2	0	0	1	**40**	**60**	**100**

Course Objective	The main objective of the course is to • Gain comprehensive knowledge of the higher education systems, admission processes, and key requirements in both India and abroad. • Identify top universities worldwide and understand the financial aspects of overseas education, including costs, funding options, and scholarships. • Acquire in-depth understanding of the GRE and GMAT, including their importance. • Learn the significance of TOEFL and IELTS for non-native English speakers, assessment patterns, and the key areas of reading, speaking, and writing. • Understand the importance, syllabus, and assessment patterns of the GATE exam, including the weightages in different domains and the general aptitude and subject-specific requirements for successful performance.	
Course Outcome	At the end of the course, the student should be able to	Knowledge Level
	CO1: To categorize the higher education in abroad and India.	
	CO2: Analyze the selection and scholarship in various countries.	
	CO3: Analyze GRE & GMAT Selection process and Assessment.	
	CO4: Analyze TOEFL & IELTS Selection process and Assessment.	
	CO5: Analyze GATE Selection process and Assessment.	
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									1	1		2			
CO 2									1	1		2			
CO 3	3								1	1		2			
CO 4	3								1	1		2			
CO 5	3								1	1		2			

Course Assessment Methods

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

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Content of the syllabus			
Unit – I	**OVERVIEW OF HIGHER STUDIES**	Periods	**6**
Higher Education in abroad: Introduction-Admission process- Identification & Procedure - SOP-LORDesirable Characteristics - Introduction to Proficiency test-Higher education in India & Examinations.			
Unit - II	**SELECTION & SCHOLARSHIP**	Periods	**6**
Top Universities in world- Cost of overseas education- Funding & Scholarships-Case studies Higher Education in USA, UK, France, Singapore, Germany, Norway, Sweden, Australia & Netherland			
Unit – III	**GRE & GMAT**	Periods	**6**
GRE & GMAT: Importance of GRE & GMAT- Syllabus- Assessment pattern- Analytical reasoningQuants-Verbal-Integrated Reasoning-Analytical writing assessment			
Unit - III	**TOEFL & IELTS**	Periods	**6**
Importance of TOEFL & IELTS - Syllabus-Assessment Pattern-Reading-Speaking –Writing			
Unit - V	**GATE**	Periods	**6**
Importance of GATE- Syllabus -Assessment Pattern- Weightages in the different domain-General Aptitude-Candidate selected subject			
		Total Periods	**30**

Text Books	
1.	B.S.Warrier, "Studying Abroad", 1st edition, Tata Mcgraw Hill Education Private Limited, 2011.
2.	Dr.T.P.Sethumadhavan, "Study abroad", 1st edition, I Rank : An Imprint of DC Books publishers, 2013.
References	
1.	"GATE 2025 General Aptitude & Engineering Mathematics", Pearson Education, 2024.
2.	Jandhyala B.G. Tilak, "Higher Education in India: In Search of Equality, Quality and Quantity", 1st edition, Orient Blackswan, 2013.
3.	ONeal, Anthony, "The graduate survival guide", Brentwood, Tennessee : Ramsey Press, the Lampo Group, LLC, 2017.
4.	Christine T. Ennew, David Greenaway, "The Globalization of Higher Education", 1st edition, Palgrave Macmillan London, 2012.
5.	Abhishek Kumar, "The Ultimate Guide to Scholarships for Indian Citizens Planning to Study Abroad", 1st edition , Abiprod Pty Ltd, 2016.
6.	Magoosh, Chris Lele, Mike Mcgarry, "GRE Prep by Magoosh", Rtc Publishing, 2016.
E-Resources	
1.	Websites: Ministry of Education (India), University Grants Commission (UGC), All India Council for Technical Education (AICTE).
2.	Websites: QS World University Rankings, Times Higher Education, Studyportals, EducationUSA.

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