DEPARTMENTOFCOMPUTERSCIENCE

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Rathinam Techzone, Pollachi Road, Eachanari, Coimbatore – 641021

Syllabusfor

B.Sc. Artificial Intelligence & Data Science

(I-VISemester)

2024–2025Batchonwards

VisionandMissionoftheInstitution:

VISION

To emerge as a world-renowned Institution that is integrated with industry to impartKnowledge, Skills, Research CultureandValues inyoungsterswhocan acceleratetheoveralldevelopmentof India.

MISSION

Toprovidequalityeducationataffordablecost,buildacademicandresearchexcellence, maintain eco-friendly and robust infrastructure, and to create a team ofwell qualified faculty who can build global competency and employability among theyouthof India.

MOTTO

TransformtheyouthintoNationalAsset.

VisionandMissionoftheDepartment:

Vision

Toberenowneditasareputedorganizationineducationandresearchaimedtowardsindustrial andsocietalneeds

Mission

Toprovidequalityeducationtomeettheneedofprofessionandsociety.EstablishIndustryInstitute Interactionprogramto enhancetheentrepreneurshipskills.

ProgramEducationalObjectives(PEO)

Within a few years of graduation, our alumni will:

PEO1	:	Be successful in top graduate schools and in professional positions within academic&research institutions and industries, and in entrepreneurial and consultancy ventures.
PEO2	:	Contribute their Information Technology expertise effectively as members of technological Teams.
PEO3	:	Demonstrate lifelong learning and engagement through continued professional development, and participation and leadership in professional societies and organizations.
PEO4	:	Conduct themselves in a responsible, professional, and ethical manner.
PEO5	:	Emerge as a globally competent and universally employable professional who accelerates the overall development of India.

Mappingof InstituteMissiontoPEO

InstituteMission	**PEO's**
Toprovidequalityeducationataffordablecost,buildacademicandresearchexcellencemaintain eco-friendlyand robust infrastructure, and	PEO1,PEO2
Tocreateateamofwellqualifiedfacultywhocanbuildglobalcompetencyandemployabilityamongtheyouth ofIndia.	PEO2,PEO5

MappingofDepartmentMissiontoPEO

DepartmentMission	**PEO's**
Toprovidequalityeducationtomeet theneedofprofessionandsociety.	PE01,PE02
EstablishIndustryInstituteInteractionprogramto enhancetheentrepreneurshipskills.	PEO3, PE04,PE05

ProgramOutcomes (PO):

During the completion of the program, the graduate willbe able to:

PO1 (Disciplinary Knowledge)	:	Demonstrate knowledge competency in required disciplines in University level courses appropriate to the study program.
PO2 (Problem Analysis)	:	Apply appropriate knowledge and adopt suitable skills to identify, formulate, analyze and solve complex problems in real life situations and reach substantiated conclusions.
PO3 (Investigation)	:	Conduct investigation of complex problems by following scientific approach to knowledge development that include appropriate experiments, analysis, evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; interpretation of data, formulation of coherent arguments and synthesis of information (assumptions, hypothesis or implications) in order to reach valid conclusions.
PO4 (Design of Solutions)	:	Design solutions for complex, open-ended real-life problems and to design systems, components or processes that meet specific needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.
PO5 (Modern Tool Usage)	:	Create, select, apply, adapt, and extend appropriate techniques, resources, and modern tools to a range of activities, from simple to complex, with an understanding of the associated limitations.
PO6 (Individual and Team Work)	:	Work effectively and respectfully as a member and leader in teams, facilitate cooperative or coordinated effort, act together as a group or a team in the interests of a common cause and work efficiently, preferably in a multi-disciplinary setting. Possess knowledge of the values and beliefs of multiple cultures and a global perspective. Task mapping, setting direction, building a team, formulating an inspiring vision, motivating and inspiring team members who can help achieve the vision, and guide people to the right destination.
PO7 (Communicati on)	:	Express complex concepts within the profession and with society at large. Such ability includes listening, speaking, reading and writing, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.
PO8 (Professionali sm)	:	Understand the professional roles and responsibilities in society, especially the primary role of protection of the public and the public interest.
PO9 (Environment and Sustainability)	:	Analyze social and environmental aspects of-------activities. Such ability includes an understanding of the interactions that ----- has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

P10 (Moral and Ethical Awareness)	:	Embrace moral/ ethical values; formulate a position/ argument about an ethical issue from multiple perspectives and apply professional ethics, accountability and equity.
P11 (Economics and Project Management)	:	Appropriately incorporate economics and business practices including project, risk, and change management into the practice of ----- and to understand their limitations.
P12 (Life-long Learning)	:	Identify and address their own educational needs in a changing World in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge.

ProgramSpecificOutcomes(PSO):

PSO1	:	It ensures students integrate theory with practical applications, equipping them with industry-relevant skills and expertise..
PSO2	:	The course content fosters students' readiness for self-entrepreneurship by providing themwith the necessary skills and knowledge.
PSO3	:	The course syllabi serve as a strong foundation for advanced studies in computer science.
PSO4	:	The course structure is tailored to facilitate automation and digitization across diverse domains.

CorrelationbetweenthePO/PSOandthePEOs

Program Outcomes		PEO1	PEO2	PEO3	PEO4	PEO5
PO1	:	L	M	M	M	L
PO2	:	M	S	L	S	S
PO3	:	L	S	S	M	M
PO4	:	S	S	L	S	S
PO5	:	M	L	S	S	S
PO6	:	S	S	M	M	S
PO7	:	S	L	S	S	M
PO8	:	M	M	L	M	S
PO9	:	S	S	S	L	M
PSO1	:	S	L	L	M	L
PSO2	:	L	S	M	L	L
PSO3	:	L	M	S	L	L
PSO4	:	M	L	L	S	L

ComponentsconsideredforCourseDeliveryislistedbelow:

1. ClassroomLecture
2. Laboratoryclassanddemo
3. Assignments
4. MiniProject
5. Project
6. OnlineCourse
7. ExternalParticipation
8. Seminar
9. Internship

MappingofPOswithCourseDelivery:

Program Outcomes	CourseDelivery								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
PO1	L	M	S	S	L	M	S	S	M
PO2	M	S	M	M	S	M	L	S	S
PO3	S	S	S	S	S	M	S	M	M
PO4	M	L	S	M	S	M	M	L	M
PO5	S	M	M	L	M	S	S	M	M
PO6	M	S	L	S	M	S	M	S	S
PO7	L	M	S	S	L	S	M	M	S
PO8	S	S	M	S	S	S	S	S	S
PO9	S	S	S	M	S	S	L	S	S
PSO1	S	M	M	M	L	M	M	M	S
PSO2	M	S	M	M	L	L	S	L	M
PSO3	S	L	S	M	M	M	S	L	M
PSO4	L	S	S	L	S	S	M	S	S

RATHINAM COLLEGE OF ARTS AND SCIENCE

(AUTONOMOUS)

B.SC. COMPUTER SCICNE WITH AI&DS DEGREE PROGRAMME

B. Sc (CS with AI&DS) Curriculum Structure - Regulation – 2024

(For students admitted from 2024-2025 and onwards)

S.No.	Sem	Part	Sub Type	Course Code	Course Name	Credit	Hours	INT	EXT	Total
1	1	1	L1		Language - I	3	5	50	50	100
2	1	2	L2		English - I	3	5	50	50	100
3	1	3	Core		Core Course – I **Theory** Problem Solving Techniques using C	4	5	50	50	100
4	1	3	Core		Core Course – II **Theory / Practical** Programming Lab in C	4	4	50	50	100
5	1	3	Allied		Allied-I Mathematics for Computer Science	4	5	50	50	100
6	1	4	SEC		Skill Enhancement Courses – I **Database Management System** / Practical – Database Management system Lab	4	4	50	50	100
7	1	4	AEC		Ability Enhancement Course I Environmental Studies **or** Universal Human Values & Professional Ethics	2	2	50	0	50
						24	**30**	**350**	**300**	**650**
1	2	1	L1		Language - II	3	5	50	50	100
2	2	2	L2		English - II	3	5	50	50	100
3	2	3	Core		Core Course – III **Theory** Java Programming **R Smart: Python Programming**	4	5	50	50	100
4	2	3	Core		Core Course – IV Theory / **Practical** Java Programming	4	4	50	50	100

					Lab **R Smart: Python Programming Lab**					
5	2	3	Elective		Elective - I Entrepreneurship Development **R Smart: Data Structures**	4	4	50	50	100
6	2	3	Allied		Allied-II Operations Research **R Smart: Discrete Mathematics**	4	5	50	50	100
7	2	4	AEC		Ability Enhancement Course II Design Thinking	2	2	50	0	50
8	2	5	Ext		Extension Activity - I (NASA)	1	0	25	0	25
						25	**30**	**375**	**300**	**675**
1	3	1	L1		Language - III	3	4	50	50	100
2	3	2	L2		English - III	3	4	50	50	100
3	3	3	Core		Core Course – V **Theory** Software Engineering **R Smart: Analytics Using Excel**	4	6	50	50	100
4	3	3	Core		Core Course – VI **Theory** / Practical Software Engineering Lab **R Smart: Analytics Using Excel Lab**	4	4	50	50	100
5	3	3	Allied		Allied-III Numerical Methods **R Smart: Quantitative Aptitude**	4	5	50	50	100
6	3	4	SEC		Skill Enhancement Courses – II Practical / Training Ethical Hacking **R Smart: Fundamentals of Data Science**	4	5	50	50	100
7	3	4	AEC		Ability Enhancement Course III Soft Skill-1	2	2	50	0	50

8	3	3	ITR		Internship / Industrial Training (Summer vacation at the end of II semester activity)	2	0	50	0	50
9	3	5	Ext		Extension Activity - II **(NASA)**	1	0	25	0	25
						27	**30**	**425**	**300**	**725**
1	4	1	L1		Language - IV	3	4	50	50	100
2	4	2	L2		English - IV	3	4	50	50	100
3	4	3	Core		Core Course – VII **Theory** PHP and MySQL **R Smart: Deep Learning**	4	6	50	50	100
4	4	3	Core		Core Course – VIII Theory / **Practical** PHP and MySQL **R Smart: Deep Learning**	4	4	50	50	100
5	4	3	Allied		Allied-IV Satistics and Probability **R Smart: Industrial Statistics**	4	5	50	50	100
8	4	3	Elective		Elective - II i) Data Communication and Networking ii) R Programming iii) Remote Process Automation Tools **R Smart: Computer Networks**	4	5	50	50	100
7	4	4	AEC		Ability Enhancement Course IV Soft Skill-2	2	2	50	0	50
8	4	5	Ext		Extension Activity - III **(NASA)**	1	0	25	0	25
						25	**30**	**375**	**300**	**675**
1	5	3	Core		Core Course – IX Theory Python Programming **R Smart: Natural Language Processing**	4	6	50	50	100
2	5	3	Core		Core Course – X **Theory** / Practical	4	6	50	50	100

					RDBMS Lab **R Smart: Natural Language Processing Lab**					
3	5	3	Elective		Elective - III Option 1 Datamining Option2 Principles Of Compiler Design Option 3 Optimization Techniques **R Smart: Optimization Techniques**	4	6	50	50	100
	5	3	PRJ		Project	0	6	0	0	0
4	5	4	SEC		Skill Enhancement Courses – III Practical / Training Database management - MongoDB **R Smart: Data Visualization**	4	6	50	50	100
5	5	3	ITR		Internship / Industrial Training - (Summer vacation at the end of IV semester activity)	2	0	50	0	50
6	5	5	Ext		Extension Activity - IV (**NASA**)	1	0	25	0	25
						19	**30**	**275**	**200**	**475**
1	6	3	Core		Core Course – XI Theory Machine Learning **R Smart: Big data Analytics**	4	6	50	50	100
2	6	3	Core		Core Course – XII Theory / **Practical** Machine Learning Lab **R Smart: Big data Analytics Lab**	4	4	50	50	100
3	6	3	Elective		Elective – IV Elective – Option 1 Software Project Management Option2 Cyptocurrency And Blockchain Technology Option 3 Computer Networks	4	6	50	50	100

					R Smart: Prompt Engineering					
4	6	3	PRJ		Core Project	8	8	100	100	200
5	6	4	SEC		Skill Enhancement Courses – IV Practical / Training Artificial Neural Networks **R Smart: Information Security & Cyber Law**	4	6	50	50	100
						24	**30**	**300**	**300**	**600**
					Total credit	**144**	**180**	**2100**	**1700**	**3800**

Additional Credits										
S.No	**Sem**	**Part**	**Sub Type**	**Sub Code**	**Subject**	**Credit**	**Hours**	**INT**	**EXT**	**Total**
1	2	6	VAC		VAC – Microsoft CoE Course **Rsmart : Web Technologies**	2	2	50	0	50
2	3	6	VAC		Inter Department Course **Rsmart : AWS Cloud Technical Essentials**	2	2	50	0	50
3	4	6	IDC		VAC – Microsoft CoE Course **Rsmart : Web Technology Frameworks**	2	2	50	0	50
4	5	6	VAC		VAC – Microsoft CoE Course **Rsmart : CNN Using Tensorflow**	2	2	50	0	50

Parts	**Sem I**	**Sem II**	**Sem III**	**Sem IV**	**Sem V**	**Sem VI**	**Total Credits**
Part I	3	3	3	3	-	-	12
Part II	3	3	3	3	-	-	12
Part III	12	12	15	12	19	20	90
Part IV	2	2	6	6	4	4	24
Part V	-	-	-	-	-	2	2
Total	**20**	**20**	**27**	**24**	**23**	**26**	**140**

10.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
11T	Part I Tamil	**3**	**6**	**1**	**0**	**Theory**

Introduction:

பகுதி முதல் பாடமாக அமையும், தமிழ்ப்பாடம்கவிதைகள், இலக்கணம், இலக்கியவரலாறு ஆகியவைகள் கொண்டு அமைந்து உள்ளது. ஐந்துஅலகுகளாக பகுக்கப்பட்டுள்ளது.

Course Outcome:

CO1	:	பாரதியார், பாரதிதாசன், சிற்பி, சுரதா ஆகிய கவிதைகளின் விளக்கத்தை மாணவர்கள் அறிந்து கொள்ளுவதால், தன்னம்பிக்கையை வெளிக்கொணரும் வகையில் உள்ளது.
CO2	:	பெண் கவிஞர்களின் படைப்பு கவிதையை அறிவதன் மூலம் வாழ்வியல் செய்திகளையும், யதார்த்த நிலையும் அறிய உதவுகிறது.
CO3	:	எண்ணங்களே ஏணிப்படிகள் -வாழ்வில் வெற்றி பெற வேண்டுமானால் எண்ணங்களை வளர்ந்துக் கொள்ள வேண்டும். சிந்தனையில் மூழ்கினர்ல் தெளிவு கிடைக்கும் என்ற கருத்துக்களை அறியும் வகையில் அமைந்துள்ளது.
CO4	:	படைப்புத்திறனை வெளிப்படும் விதமாகவும், இலக்கணத்தை அறிய பயனுள்ளதாக அமைகிறது.
CO5	:	இலக்கியவரலாறு பற்றியச் செய்திகளைக் கொண்டு அதன் வளர்ச்சி நிலையை அறிவும் வகையில் உள்ளது

அலகு I : [12 **பாடவகுப்புகள்**]

பாரதியார் - பெண் விடுதலை, பாரதிதாசன் - வீரத் தமிழன், சிற்பி – நிலவுப்பூ, சுரதா - நாடுஆகியவற்றின் விளக்கம் தருதல்

அலகு II : [12 **பாடவகுப்புகள்**]

தாமரை - தொலைந்துபோனேன், அ. வெண்ணிலா - நீரிலலையும் முகம் மாலதி மைத்ரி - கன்னியாகுமரி, க்ருஷாங்கினி - புன்னை மரம் ஆகிய பெண்

கவிதைகளின் செய்திகளை அறிவதால் வாழ்வியல் சூழலையும், யாதர்த்த நிலையையும் விளக்குதல்.
அலகு III : [12 **பாடவகுப்புகள்**] எண்ணங்களே ஏணிப்படிகள் - தெளிவான இலக்கு - ஆற்றல் நதி பெருகட்டும்- அறிவை விரிவு படுத்துக்கள்- முன்னேற்றப் படிகள்- வெற்றிச் சிகரம்- எப்பொழுதும் வெற்றி ஆகியவைகள் வாழ்வின் முன்னேற்றதுக்கான செய்திகள் அறியப்பயன்படும்.
அலகு IV : [12 **பாடவகுப்புகள்**] பெயர் சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல், எச்சம் - இலக்கணத்திற்கு விளக்கம் அளித்தல் - படைப்பிலக்கியப் பயிற்சி, கவிதை எழுதல் வானொலித் தமிழ், தொலைக்காட்சித் தமிழ், பயன்பாட்டுத்தமிழ், இலக்கண நோக்கில் பயிற்றுவித்தல் எழுதுதல் கவிதை + வானொலி பேச்சுத்திறன் வளர்த்தல். ஆகியவைகள் கொண்டு திறன் வளர்க்க உதவுதல்.
அலகு V : [12 **பாடவகுப்புகள்**] இலக்கியவரலாறு பற்றியச் செய்திகள் மற்றும் புதுக்கவிதைகளின் தோற்றங்கள், வளர்ச்சிகள் அறிவும் வகையில் உள்ளது. ஹைக்கூ, குக்கூ, சென்ட்ரியூ, கஜல். ஆகியவற்றுக்கு விளக்கம் தருதல்.
பாடநூல்கள்: 1. பாரதியார் கவிதைகள், 2. பாரதிதாசன் கவிதைகள், 3. சுரதா கவிதைகள், 4. சிற்பி கவிதைகள் 5. அ. வெண்ணிலா
பார்வை நூல்கள் : 1 இலக்கியவரலாறு பாக்கியமேரி, 2. இலக்கண நூல், 3. மு.வ. தமிழ் இலக்கிய வரலாறு

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	General English					

Introduction: To encourage students to inculcate and use effective communication skills in their day-to-day lives. To develop the LSRW skills to enhance the culture and thoughts through language

Course Outcome:

CO1	:	Develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking, and Writing
CO2	:	Understand the total content and underlying meaning in the context
CO3	:	Form the habit of reading for pleasure and for information
CO4	:	Comprehend material other than the prescribed text
CO5	:	Develop the linguistic competence that enables them, in the future, to present the culture and civilization of their nation.

12 Hours

Unit I:

1.1 A Patch of Land -Subramania Bharathi. - 1.2 JRD-Harish Bhat - 1.3 The Faltering Pendulum- Bhabani Bhattacharya - 1.4 Listening for General and Specific Information - 1.5 Vocabulary: Synonyms, Antonyms, Word Formation

12 Hours

Unit II:

2.1 The Sparrow-Paul Lawrence Dunbar - 2.2 Us and Them-David Sedaris (From Dress your Family in Corduroy and Denium} - 2.3 How I taught my grandmother to read-Sudha Murthy - 2.4 Appropriate use of /articles and Parts of Speech - 2.5 Listening to Giving Instructions/Directions

12 Hours

Unit III:

3.1 A Nation's Strength- Ralph Waldo Emerson - 3.2 Uncle Podger Hangs a Picture-Jerome K.Jerome

3.3 Self-Introduction, Greeting, Introducing Others. - 3.4 Error Detection

12 Hours

Unit IV:

4.1 Love Cycle - 4.2 The Gold Frame-R.K Laxman - 4.3 Communication and its types - 4.4 Close Reading - 4.5 Paragraph Writing

12 Hours

Unit V:

5.1Translation - 5.2 Conversation - 5.3 Free Writing - 5.4 Sentence Types

Text books:

1. Steel Hawk and other stories by Bhattacharya, Bhabani, New Delhi Sahitya Akademi 1967
2. How I Taught my Grandmother to Read and Other Stories, Murthy, Sudha, Penguin Books, India, 2004

Reference Books :

1. English in use - A textbook for College Students (English, Paperback, - T.Vijay Kumar, K Durga Bhavani, YL Srinivas
2. Practical English Usage - 4th Edition By Michael Swan
3.The Art of Civilized Conversation: A Guide to Expressing Yourself with Style and Grace –Margaret Shepherd, Penny Carter, (Illustrator), Sharon Hogan, 2005.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - I – Problem Solving Using C	**4**	**6**	**-**	**-**	**Core Theory**

Introduction:

This subject covers the C Programming Course. Throughout this course, students will learn the fundamental and advanced concepts of C programming, enabling them to write efficient and reliable programs for various applications.

Course Outcome:

CO1	:	Understand basic C programming concepts and create simple programs confidently.
CO2	:	Use decision-making and looping tools to solve different problems in programming.
CO3	:	Use advanced methods to make decisions and organize data effectively in programs.
CO4	:	Manage input/output operations and files smoothly in programs.
CO5	:	Organize code effectively using functions and pointers to make programs run better.

Unit I : Introduction to C Programming and Basic Constructs

[12 periods]

Getting Started with C - The C Character Set - Constants, Variables, and Keywords - Form of a C Program - Compilation and Execution - The First C Program - C Instructions - Types of

Instructions - Type Declaration Instruction - Arithmetic Instruction - Control Instructions - Types of Operators.

Unit II: Decision Making and Looping Constructs
[12 periods]
Decision Control Instruction: - The if Statement - The if-else Statement - Nested if-else - Use of Logical Operators - The Conditional Operators - **Loop Control Instruction**:- Loops and the while Loop - The for Loop - The do-while Loop - Break and Continue Statements

Unit III: Advanced Decision Making and Data Structures [12 periods]
Case Control Instruction - Decisions using switch - Comparison of switch and if-else Ladder - The goto Keyword - Data Types Revisited - The C Pre-processor - Arrays and Multidimensional Arrays - Strings and String Functions - Structures and Array of Structures- Console I/O Functions

Unit IV:Functions, Modular Programming, and Pointers[12 periods]
Functions - Introduction to Functions - Passing Values between Functions - Scope Rule of Functions - Using Library Functions - Return Type of Function – Pointers - Call by Value and Call by Reference - Introduction to Pointers - Pointer Notation - Pointers and Arrays - Pointers to Functions - Recursion

Unit V: Input/Output Operations and Structures in C [12 periods]
Data Organization - File Operations: Opening a File - Reading from a File - Closing the File - Counting Characters – A File-Copy Program - Writing to a File - File Opening Modes - Text Files and Binary Files - Issues in Input / Output - Operations on Bits

Text books:

1. Yashavant Kanetkar , “Let us C” , Fourteenth Edition, BPB Publication, 2017.
2. E.Balagurusamy, “Programming in ANSI C”, Seventh Edition McGraw Hill, 2017

Reference Books :

1. Byron S Gottfried, “Programming with C”, Fourth Edition, McGraw-Hill, 2018
2. Herbert Schildt, “C: The Complete Reference”, Fourth Edition, McGraw-Hill, 2021

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**
CO1	1	3	1	1	3	1	3	1	1	1	1	3
CO2	1	3	2	1	1	3	3	1	1	1	1	1
CO3	1	3	3	3	1	2	1	3	3	1	3	1
CO4	1	2	3	3	1	1	1	3	2	3	2	1
CO5	1	2	3	3	1	3	1	3	2	3	1	1

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical - I – Programming In C Lab	**4**	**-**	**-**	**6**	**Core Practical**

Introduction:

This subject, C Programming Lab, will equip you with the foundational knowledge to excel in programming with C. Students will learn to effectively utilize basic constructs, implement arrays, manipulate strings, work with pointers, and understand structures and file processing techniques.

Course Outcome:

CO1	:	Understand and apply C programming constructs effectively.	
CO2	:	Develop programs in C using basic constructs proficiently.	
CO3	:	Implement arrays in C programs for various applications.	
CO4	:	Utilize strings, pointers, and functions proficiently in C applications.	
CO5	:	Implement structures and file processing techniques effectively in C applications.	

1. Create a program that calculates the area of a circle given its radius.
2. Implement a program that determines whether a given year is a leap year or not.
3. Display whether the entered number is an Armstrong number or not
4. Create a program that compares three numbers and prints the largest one.
5. Write a program to print the Fibonacci series up to a certain number of terms using a while loop.
6. Write a program that takes an integer input n and prints a triangle pattern with n rows, where each row contains one more asterisk(*) than the previous row.
7. Write a program to find the sum of elements in a one-dimensional array.
8. Implement a program to count the number of vowels in a given string.
9. Create a program to reverse a given string.
10. Write a function that receives marks received by a student in 3 subjects and returns the average and percentage of these marks. Call this function from main( ) and print the results in main( ).
11. Write a program to swap two numbers using pointers.
12. Write a program to calculate the factorial of a number using a recursive function.
13. Write a program to store and display information about students using structures.
14. Write a program to read data from a file and display it on the screen.
15. Write a program to copy contents of one file to another. Whiledoing so replace all lowercase characters to their equivalentuppercase characters.

Text books:

1. Yashavant Kanetkar , "Let us C" , Fourteenth Edition, BPB Publication, 2017.
2. E.Balagurusamy, "Programming in ANSI C", Seventh Edition McGraw Hill, 2017

Reference Books :

1. Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw-Hill, 2021
2. Byron S Gottfried, "Programming with C", Fourth Edition, McGraw-Hill, 2018

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**
CO1	1	3	1	1	1	2	1	1	1	1	1	1
CO2	1	3	1	1	1	3	1	1	1	1	1	1
CO3	1	1	2	3	3	1	1	1	1	1	2	1
CO4	1	1	1	3	3	1	1	3	1	1	2	1
CO5	1	1	1	3	3	1	1	3	1	1	1	1

MATHEMATICS FOR COMPUTER SCIENCE

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied-MATHEMATICS FOR COMPUTER SCIENCE	**4**	**4**	**-**	**-**	**Theory**

Goal: This paper focuses on the Mathematical logic, Relations& Functions, Formal languages and Graph Theories

Objective:

1. To understand the basic concepts of set theory.
2. To understand the various statements in light of mathematical logic.
3. To study various relations and funtions.
4. To understand graph theory in the course's context.
5. To understand the deeper concepts of graph theory.

Course Outcomes:

CO1	**:**	To demonstrate a working knowledge of set notation and elementary set theory with its corresponding set operations and also Venn diagram.
CO2	**:**	To apply the fundamental concepts of Mathematical Logic and Tautologies.
CO3	**:**	To apply and understand the fundamental concepts of Relations and Functions.
CO4	**:**	To demonstrate different traversal methods for graphs.
CO5	**:**	To demonstrate different methods for trees and its properties.

Unit I: **[12 periods]**

Set theory – Introduction-Basic definition – Types of sets – Operations on sets –Euler-Venn diagrams – Laws of set theory – Power sets and products – Inclusion and exclusion principle.

Unit II: **[12 periods]**

Mathematical logic – Introduction to propositional logic – Basic logical operations-Tautologies – Contradiction – Predicates and Quantification.

Unit III: **[12 periods]**

Relations – Binary Relations – Set operation on relations – Types of Relations – Partial order relation – Equivalence relation – Composition of relations – Functions – Types of functions – Invertible functions – Composition of functions

Unit IV: **[12 periods]**

Graph theory – Basic terminology – Paths, cycle and connectivity – sub graphs – Types of graphs – Representation of graphs in computer memory.

Unit V: **[12 periods]**

Trees – Properties of Trees – Binary trees – Traversing Binary Trees – Computer Representation of general trees.

Text Book:

1. Discrete Mathematics for Computer Science by Gary Haggard, JohnSchlipf and Sue Whitesides
2. Discrete Mathematics by J.K. Sharma second edition – 2005. Macmillan India Ltd.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	M	M	L	L	L	L	L	L
CO2	M	M	L	L	L	L	L	L
CO3	H	M	M	L	L	L	L	L
CO4	H	M	M	L	L	L	L	L
CO5	H	H	M	M	L	L	L	L

H - High; M- Medium; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
21T	Part I Tamil	**3**	**6**	**1**	**0**	**Theory**

Introduction:

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Course Outcome:

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
22E	**General English**					

Introduction: To encourage students to inculcate and use effective communication skills in their day-to-day life. To develop the LSRW skills to enhance the culture and thoughts through language

Course Outcome:

CO1	:	Learn to introduce themselves and talk about everyday activities confidently
CO2	:	Be able to write short paragraphs on people, places, and events
CO3	:	Identify the purpose of using various tenses and effectively employ them in speaking and writing
CO4	:	Gain knowledge to write subjective and objective descriptions
CO5	:	Identify and use their skills effectively in formal contexts.

12 Hours

Unit I:

1.1 Very Indian Poem in Indian English -Nissim Ezekiel - 1.2 If you Are Wrong Admit it-Dale Carnegie - 1.3 Reading for General and Specific Information (Charts, tables schedules, graphs, etc.) - 1.4 Homonyms, Homophones, Homographs

12 Hours

Unit II:

2.1 Still I Rise- Maya Angelou - 2.2 Kindly Adjust Please- Shashi Tharoor - 2.3 Verbs and Tenses

2.4 Subject Verb Agreement

12 Hours

Unit III:

3.1 Alchemist-Paulo Coelho

12 Hours

Unit IV:

4.1 The Flower- Tennyson - 4.2 The Spoon-Fed Age. W.R. Inge - 4.3 Paragraph Writing - 4.4 Error detection

12 Hours

Unit V:

5.1 On Killing a Tree- Gieve Patel - 5.2 Taking and Note Making - 5.3 Reading news and weather reports

5.4 Precis Writing.

Text books:

1. The Alchemist - Paulo Coelho Harper - 2005

Reference Books :

1 Advanced English Grammar. Martin Hewings. Cambridge University Press, 2000

2. Descriptive English. SP Bakshi, Richa Sharma • 2019, Arihant Publications (India) Ltd.

3. The Reading Book: A Complete Guide to Teaching Reading. Sheena Cameron, Louise Dempsey, S & L. Publishing, 2019.

4. Skimming and Scanning Techniques, Barbara Sherman, Liberty University Press, 2014
5 Brilliant Speed Reading: Whatever you need to read, however ...Phil Chambers

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core – Java Programming	**4**	**4**	**-**	**-**	**Core Theory**

Unit I : Java Programming Fundamentals: [12 periods]

The Java Language, the Key Attributes of Object-Oriented Programming, the Java Development Kit, a First Simple Program, Handling Syntax Errors, the Java Keywords, Identifies in Java, the Java Class Libraries Introducing. Data Types and Operators: Java's Primitive Types, Literals, A Closer Look at Variables, The Scope and Lifetime of Variables, operators, Shorthand Assignments, Type conversion in Assignments, Using Cast, Operator Precedence, Expressions.

Unit II: Program Control Statements: [12 periods]

Input characters from the Keyword, if statement, Nested ifs, if-else-if Ladder, Switch Statement, Nested switch statements, for Loop, Enhanced for Loop, While Loop, do-while Loop, Use break, Use continue, Nested Loops. Introducing Classes, Objects and Methods: Class Fundamentals -Objects - Reference Variables and Assignment, Methods, Returning from a Method, Returning Value, Using Parameters, Constructors, constructor types, The new operator Revisited, Garbage Collection and Finalizers, The this Keyword.

Unit III: More Data Types and Operators: [12 periods]

Arrays, Multidimensional Arrays, Alternative Array Declaration Syntax, Assigning Array References, Using the Length Member, The Bitwise operators. String Handling: String Fundamentals, The String Constructors, Three String-Related Language Features, String Buffer and String Builder. A Closer Look at Methods and Classes: Controlling Access to Class Members, Pass Objects to Methods, How Arguments are passed, Returning Objects, Method Overloading, Overloading Constructors, Recursion, Understanding Static, Introducing Nested and Inner Classes, Var args: Variable-Length Arguments.

Unit IV: Inheritance: [12 periods]

Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Method Overriding, Overridden Methods support polymorphism, Why Overridden Methods, Using Abstract Classes, Using final keyword. Interfaces: Fundamentals, Creating, Implementing, References, Implementing Multiple Interfaces, Constants, Interface extended, Nested Interfaces. Packages: Fundamentals, Packages and Member Access, Importing Packages, Static Import. Exception Handling: Hierarchy,

Fundamentals, Uncaught Exception, Multiple catch clauses, tryblocks, throwing an Exception, finally, throws, Java's Built-in Exceptions.

Unit V: Multithreaded Programming: **[12 periods]**

Multithreaded Programming: fundamentals, thread creation types, Multiple Threads, Thread Priorities, Synchronization, using Synchronization Methods. Enumerations, Auto boxing and Annotations: Enumerations, Java Enumeration are class types, Auto boxing, Annotations (metadata) Generics: Generics Fundamentals Bounded Types, Methods, Constructors, Some Generic Restrictions. Applets: basics - Skeleton, life cycle of applet – applet methods - Passing parameters to Applets.

Text books:

1. Herbert Schildt, Java The Complete Reference, 11th Edition, Copyright © 2019 by McGraw-Hill Education (Publisher).

Reference Books :

1. Mahesh Bhave and Sunil Patekar, "Programming with Java", First Edition, Pearson Education,2008, ISBN:9788131720806.
2. Rajkumar Buyya,S Thamarasi selvi, xingchen chu, Object oriented Programming with java, Tata McGraw Hill education private limited.
3. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.
4. Anita Seth and B L Juneja, JAVA One step Ahead, Oxford University Press, 2017.

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	1	3	3	1	1	1	1	1
CO2	2	3	1	1	1	1	2	1
CO3	1	1	1	1	1	1	1	3
CO4	2	3	2	1	1	1	1	1
CO5	1	3	3	3	1	3	1	2

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Practical – Java Programming lab	**2**	**0**	**0**	**4**	**Practical**

1. To find the sum of any number of integers entered as command line arguments
2. To learn use of single dimensional array by defining the array dynamically.
3. To check if a number is prime or not, by taking the number as input from the keyboard
4. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
5. Write a program that show working of different functions of String and StringBufferclasss like setCharAt(, setLength(), append(), insert(), concat()and equals().
6. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions (from lower to higher data type)
7. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
8. Write a program to demonstrate the concept of boxing and un-boxing.
9. Create a multi-file program where in one file a string message is taken as input from the user
10. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.
11. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages

Write a program DivideByZero that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.

13. Write a program to demonstrate priorities among multiple threads.
14. Write a program to generate a window without an applet window using main() function.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type

	Allied – OPERATIONS RESEARCH	**4**	**4**	**-**	**-**	**Theory**

OPERATIONS RESEARCH

Goal: This paper enables the students to learn the basic skills of solving very common problems which we come across in various fields like transportation, sequencing and industries with machines.

Course Outcomes:

CO1	:	To identify the goals and objectives of LPP and describe the procedure of solving LPP.
CO2	:	To develop the ability to handle the LPP equation to analyze the effect of objectivefunction.
CO3	:	To understand the various methods of solving the Transportation Problem.
CO4	:	To understand how to reduce the cost value of the Assignment Problems.
CO5	:	To develop the sequence procedure for solving a real-life problems.

Unit I: **[12 Periods]**

LPP: Introduction- Linear Programming Problem – Formulation of L.P.P. – Graphical solutions of L.P.P – Canonical & standard form of LPP – Simplex Method – Big-M Method.

Unit II: **[12 Periods]**

Duality in LPP: - Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form -Dual simplex method.

Unit III: **[12 Periods]**

Transportation problem: Introduction- LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM - LCM -VAM) – Degeneracy in TP – Transportation Algorithm (MODI Method).

Unit IV: **[12 Periods]**

Assignment problem: Introduction- Solution methods of assignment problem – special cases in assignment problem.

Unit-V:

Sequencing Problem: Introduction- Problem of sequencing-processing n jobs through Two machines- processing n jobs through k machines- processing 2 jobs through k machines.

Text Book:

1. Operations Research by Kanti Swarup , P.K.Gupta and Man Mohan, S. Chand & Sons Education Publications, New Delhi (2008).

References:

1. Sundaresan.V, Ganapathy Subramanian. K.S. and Ganesan.K, Resource Management Techniques, A.R. Publications, 2002.
2. Prem Kumar Gupta D. S. Hira, “Operations Research”, S. Chand & Company Ltd, Ram Nagar, New Delhi.
3. S. Dharani Venkata Krishnan, “Operations Research Principles and Problems”, Keerthi publishing house PVT Ltd.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
31T	Part I Tamil	**3**	**6**	**1**	**0**	**Theory**

Introduction: மூன்றாம்பருவப்பாடத்திட்டம்சிறுகதை, வானொலி, தொலைக்காட்சி, கணிப்பொறி, மொமிப்பெயர்ப்புஆகியவைகள்கொண்டுஉருவாகியுள்ளது.

Course Outcome:

CO1	:	சிறுகதைஎழுதுதல்- சிறுகதையின்வடிவம்மையக்கதாபாத்திரம். பயனுள்ளதாகஅமையும். சிறுகதைஇலக்கணம்அறிதல், தலைப்பு, கதைக்களம்சிறுகதையின்அமைப்புஅறிந்துகொள்ளமுடிகிறது.
CO2	:	வானொலியில்இடம்பெறும்நிகழ்ச்சிகள் - தமிழ்சார்ந்தபேச்சு, விவாதம்,மாணவர்கள்அறிந்துகொள்ளபயன்உள்ளது.
CO3	:	தொலைக்காட்சியின்இயல்பு-தொலைக்காட்சியின்நன்மைகள், நிகழ்ச்சிதயாரிக்கும்முறை- நிகழ்ச்சிஒருங்கிணைப்புகள், நிகழ்;ச்சிநடத்துதல்.
CO4	:	கணிப்பொறிவரலாறு- கணிப்பொறிவகைகள்,. கணிப்பொறிபயன்பாடுகள்ஆகியவைகள்மாணவர்களுக்குபயனுள்ளது.
CO5	:	மொழிப்பெயர்ப்;புவரலாறு, மொழிபெயர்ப்புஇயல்புகள்மற்றும்முக்கியத்துவம்பற்றித்தெளிவாகபுரிந்துகொள்ளமுடியும்.

அலகு I : [12 **பாடவகுப்புகள்**]

சிறுகதைஎழுதுதல் - சிறுகதையின்வடிவம். மையக்கதாபாத்திரம், எதிர்கதாபாத்திரங்கள். சிறுகதைஇலக்கணம்அறிதல், தலைப்புகதைக்களம்சிறுகதையின்அமைப்புசிறுகதைபயன்பாடு, சிறுகதையின்தொடக்கம்தெளிவுரையுடன்விளக்கம்கொடுத்துகற்பிக்கப்படும்.

அலகு II : [12 **பாடவகுப்புகள்**]

வானொலிவரலாறு. வானொலிபயன்பாடு, வானொலியில்இடம்பெறும்நிகழ்ச்சிகள் - தமிழ்சார்ந்தபேச்சு, விவாதம்,பட்டிமன்றம். வானொலியில்கல்விஒலிபரப்பு, வேலைவாய்ப்பு, வேளாண்மைநிகழ்ச்சிகள், மருத்துவக்குறிப்புகள்ஆகியவைகள்பற்றிவிளக்கம்மற்றும்பேச்சுக்கலைகள்வளர்க்ககற்றுக்கொடுக்கப்படும்.

அலகு III: [12 **பாடவகுப்புகள்**]

தொலைக்காட்சியின்வரலாறு-தொலைக்காட்சிதன்மைகள், இயல்பு, நன்மைகள், நிகழ்ச்சிதயாரிக்கும்முறை-நிகழ்ச்சிஒருங்கிணைப்புகள், நிகழ்ச்சிநடத்துதல். தொலைக்காட்சிவர்ணனைகள்விருதுகள், நிகழ்ச்சிகள்ஆகியவைகள்பற்றிவிளக்கம்தருதல்.
அலகு IV: [12 **பாடவகுப்புகள்**] கணிப்பொறிவரலாறு- கணிப்பொறிவகைகள், கணிப்பொறிபயன்பாடுகள், மாத. நாட்காட்டிதயாரித்தல்விளம்பரம்உருவாக்கம், மதிப்பெண்பட்டியல்தயாரித்தல், கணினிகலைச்சொல்லாக்கம்விளக்கம்கொடுத்துகற்பிக்கப்படும்.
அலகு V : [12 **பாடவகுப்புகள்**] மொழிப்பெயர்ப்புவரலாறு, இயல்புகள்பயன்ஆகியவைகள்அறிந்துகொள்ளபயிற்சிகள்கொடுத்துகற்பிக்கப்படும்.
பாடநூல்கள்: 1. எழுதுவதுஎப்படி- மகரம்வாசகர்வட்டம், 2. தமிழ்இணையஇதழ்கள் - அண்ணாகண்ணன் 3. .மொழிபெயர்ப்புக்கலை : மு.வளர்மதி,4. மொழிபெயர்ப்பியல் : சு.சண்முகவேலாயுதம், 5. மொழிபெயர்ப்பும், சொல்லாக்கமும்தென்புலோலியூர், மு.கணபதிப்பிள்ளை

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
32E	**General English**					

Introduction: To encourage students to inculcate and use effective communication skills in their day-to-day lives. To develop the LSRW skills to enhance the culture and thoughts through language

Course Outcome:

CO1	:	Broaden their outlook and sensibility and be acquainted with cultural diversity and divergence in perspectives.
CO2	:	Be updated with basic informatics skills and attitudes relevant to the emerging knowledge society
CO3	:	Produce grammatically and idiomatically correct language
CO4	:	Gain knowledge in writing techniques to meet academic and professional needs
CO5	:	Be equipped with sufficient practice in Vocabulary, Grammar, Comprehension and Remedial English from the perspective of career-oriented tests.

12 Hours

Unit I:

1.1 The Voice of the Mountains -Mamang Dai - 1.2 Romeo & Juliet- The Balcony Scene - 1.3 Writing Letters and Emails - 1.4 Data Interpretation and Reporting

12 Hours

Unit II:

2.1 Sita- Toru Dutt - 2.2 Macbeth-Banquet Scene - 2.3 Writing and messaging on Social Media Platforms (blogs, Twitter, Instagram, Facebook)

12 Hours

Unit III:

3.1 A Song of Hope- Oodgeroo Noonuccal - 3.2 Julius Caesar- Murder Scene - 3.3 Tryst with Destiny-Jawaharlal Nehru - 3.4 Learning netiquette, email etiquette

12 Hours

Unit IV:

4.1 In an Artist's Studio- Christina Rossetti - 4.2 Yes, We Can Barack Obama - 4.3 Meeting Etiquettes- Language, dress code, voice modulation. - 4.4 Online Meetings- Terms and expressions used - 4.5 Framing Questions

12 Hours

Unit V:

5.1 You've Got to Find What You Love- Steve Jobs - 5.2 Group Discussion - 5.3 Conducting and participating in meetings - 5.4.Voices

Text books:

1. Arden Shakespeare Complete works by Shakespeare (Author), William (Author), Bloomsbury, 2011

Reference Books :

1. The Shakespeare Book. Big Ideas Simply Explained, Stanley Wells et al. DK Publishing, 2015
2. Famous Speeches by Mahatma Gandhi, Creatingspace Independent Publishing Platform,2016
3. How to Build a Professional Digital Profile Kindle Edition
4. by Jeanne Kelly Bernish, Bernish Communications Associates, LLC; 1st edition (May 29, 2012)
5. Keys to Teaching Grammar to English Language Learners, Second Ed.: A Practical Handbook by Keith S Folse, Michigan Teacher Training, 2016
6. 5. Role Play-Theory and Practice. Krysia M Yardley-Matwiejczuk, SAGE Publications Ltd, 1997

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Engineering	**4**	**4**	**0**	**0**	**Theory**

INTRODUCTION

This Subjects deals with the concept of present the role of software, system analysis, design concepts, testing methods and strategies.

CO1 : This gives the Knowledge about various models in software engineering.

CO2 : It gives the brief description about requirements.

CO3 : To understand knowledge about Planning.

CO4 : To analyze various testing in software testing

CO5 : It deals the concept of Maintenance.

UNIT I [12 periods]

The Evolving Role of Software – Definition of Software Engineering – The Changing Nature of Software – Software Myths – Terminologies – Software Life Cycle Models: Build and Fix Model – Evolutionary Process Models – Selection of a Life Cycle Model.

UNIT II [12 periods]

Requirements: Analysis and Specifications: Type of Requirements–Feasibility Studies– Requirement Elicitation: interviews, brain storming sessions, FAST – Requirement analysis: Data flow diagram, Data Dictionaries - Requirements Validation

UNIT III [12 periods]

Project Planning: Size Estimation–The Constructive Cost Model (COCOMO)–ThePutnam Resource Allocation Model.

UNIT IV [12 periods]

Software Design: Design: Conceptual and Technical designs, Objectives of design– Modularity - Function Oriented Design – Software reliability: Basic concepts, software reliability, maturity levels.

UNIT V [12 periods]

Software Testing: A Strategic Approach to Software Testing – Testing – Functional Testing – Structural Testing – Levels of Testing – Validation Testing.
Software Maintenance: Categories of Maintenance–Problems during Maintenance– Maintenance is Manageable – Potential Solutions to maintenance problems – Maintenance process –Estimation of maintenance cost.

Text Book:

1. K.K.Aggarwal, Yogesh Singh, "Software Engineering", New Age International Publishers, Jan 2008

Reference Book:

2. Richard e.Fairley “Software Engineering Concepts”, , McGrawHill,2012.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	L	H	H	L	L	L	L	L
CO2	M	H	L	L	L	L	M	L
CO3	L	L	L	L	L	L	L	H
CO4	M	H	M	L	L	L	L	L
CO5	L	H	H	H	L	H	L	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Engineering Lab	2	0	0	4	Practical

Introduction: Understand the basic ideas and its usage of key diagrams in Software Engineering.

Course Outcome:

CO1 : To Understanding the Requirement tasks.

CO2 : To Understanding the Requirement analysis and SRS.

CO3 : To Implement a DFD and Structured chart.

CO4 : To Understand and Implement the concept of Use case Diagram.

CO5 : To Understand and Implement the concept of Class Diagram & Object Diagram.

Lab Experiments:

1. To assign the requirement engineering tasks
2. To perform the system analysis : Requirement analysis, SRS
3. To perform the function oriented diagram : DFD and Structured chart
4. To perform the user's view analysis : Use case diagram
5. To draw the structural view diagram : Class diagram, object diagram

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	L	H	H	L	L	L	L	L
CO2	M	H	L	L	L	L	M	L
CO3	L	L	L	L	L	L	L	H

CO4	M	H	M	L	L	L	L	L
CO5	L	H	H	H	L	H	L	M

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied – NUMERICAL METHODS	**4**	**4**	**-**	**-**	**Theory**

NUMERICAL METHODS

Goal: This paper enables the students to learn numerical approximation strategies and a basic knowledge on the theory that supports numerical algorithms.

Course Outcomes:

CO1	:	To demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problem
CO2	:	To apply numerical methods to obtain approximate solutions to mathematical problems
CO3	:	To analyse and evaluate the accuracy of common numerical methods
CO4	:	To analyse error obtained in the numerical solution of the problem
CO5	:	To apply numerical methods in modern scientific computing with finite precision computation.
CO6	:	To relate the subject knowledge with their experiments during their course of study.

UNIT 1: **[12 Periods]**

Solutions of algebraic and transcendental equations: Introduction – Bisection method – The Iteration method – Newton-Raphson Method – Ramanujan's method.

UNIT 2: **[12 Periods]**

Interpolation – Errors in Polynomial interpolation, Finite differences, Differences of a polynomial, Newton's forward and backward interpolation, Central differences, Gauss, Stirling, Bessel's and Everett's Formulae, Lagrange's Interpolation formula.

UNIT 3: **[12 Periods]**

Linear systems of equations: Consistency of Linear System of equations, Solutions of Linear Systems by direct method: Gaussian elimination, Gauss Jordan, solution of tridiagonal systems, Solutions of linear systems by iterative methods: Jacobi method, Gauss-Seidel method.

UNIT 4: **[12 Periods]**

Numerical integration: Trapezoidal rule – Geometrical interpretation and error of Trapezoidal rule – Simpson's one third rule and three eighth rule formulae - Romberg integration.

UNIT 5: **[12 Periods]**

Numerical solution for ordinary differential equation-Solution of first order ODE by Taylor series method – Solution of first order ODE by Euler method – Error estimates for the Euler method – Modified Euler method – Runge-Kutta method of second, third and fourth order.

Text Book:

1. Introductory Methods Numerical Analysis, S. S. Sastry Fifth Edition, Prentice-Hall Of India.

Reference Books:

1. Venkataraman M.K., "Numerical methods in Science and Engineering", National Publishing Company, Revised Edition, 2005.
2. Kandasamy P., "Numerical Methods", S.Chand and Co, Reprint 2010
3. M.K.Jain., Iyengar. S.R.K., Jain R.K., "Numerical Methods for Scientific and Engineering Computation", (6th Edition), New Age International, 2012.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Ethical Hacking	**4**	**6**	**0**	**0**	**Elective**

Course Outcome

CO1	:	To Describe and understand the basics of the ethical hacking
CO2	:	Able to perform the foot printing and scanning
CO3	:	Characterize the malware and their attacks and detect and prevent them
CO4	:	To Understand the concepts of web server hacking and attacks
CO5	:	Able to analyze Intrusion Detection Systems and physical security

Unit I INTRODUCTION TO ETHICAL HACKING **12 Hours**
Security Fundamental - Security Testing - Hacker and Cracker – Descriptions - Test Plans-keeping it legal - Ethical and Legality-Technical Foundations of Hacking: The Attacker's Process - The Ethical Hacker's Process- Security and the Stack.
Unit II FOOTPRINTING AND SCANNING **12 Hours**
AI Governance by Human-right centered design, Normative models, Role of professional norms, Teaching Machines to be Moral.
Unit III MALWARE THREATS AND SESSION HIJACKING **12 Hours**
Viruses and Worms- Trojans - Covert Communication - Keystroke Logging and Spyware – Malware Counter Measures- Sniffers - Session Hijacking - Denial of Service - Distributed Denial of Service.
Unit IV WEB SERVER HACKING AND ATTACKS **12 Hours**
Web Server Hacking - Web Application Hacking - Database Hacking - Wireless Technologies – Mobile Security and Attacks: Wireless Technologies - Mobile Device Operation and Security – Wireless LANs.

Unit V CASE STUDY **Hours**	**12**
Intrusion Detection Systems - Firewalls - Honeypots - Physical Security - Social Engineering – Case Studies: Intrusion detection Real Secure Tripwire Dragon Snort Packet Sniffing Leave the sniffer running, Passwords in procedures & documents.	
TextBook(s)	
1. Michael Gregg,"Certified Ethical Hacker", Version 10, Third Edition, Pearson IT Certification, 2019.	
Reference Book(s)	
1. Roger Grimes ,"Hacking the Hacker" , 1st Edition, Wiley, 2017.	
2. Ankit Fadia, "The Unofficial Guide to Ethical Hacking", Laxmi Publications, 2nd Edition, 2006.	
Mapping of Course Outcomes with Program Outcomes:	

Course Outcomes	**Program Outcomes**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**2**	**3**	**3**	**1**	**3**
CO2	**3**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**3**	**3**	**2**	**2**	**2**
CO3	**3**	**2**	**2**	**2**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**1**	**3**
CO4	**3**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**3**	**3**	**2**	**3**	**2**
CO5	**3**	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**2**	**3**

Subject Code	**Subject Title**	**Credit**	**Lecture**	**Tutorial**	**Practical**	**Type**
41T	**Part I Tamil**	**3**	**6**	**1**	**0**	**Theory**

Introduction: நான்காம்பருவப்பாடத்திட்டம்புதுக்கவிதை. தகவல்தொடர்பு**,** ஓரங்கநாடகம்**,** இதழியல்பு.
நூல்மதிப்புரைஆகியவைகள்கொண்டுஉருவாகியுள்ளது**.**

Course Outcome:

CO1	:	புதுக்கவிதையின்தோற்றமும்வளர்ச்சியும்..கவிதையின்அமைப்புமுறை, புதுக்கவிதை, மரபுக்கவிதை, புதுக்கவிதை, மரபுக்கவிதைவேறுபாடுகள், கரு. வடிவம், உத்திகள்மாணவர்களுக்குபடைப்புத்திறன்வளர்வதற்குபயன்உள்ளது.
CO2	:	தகவல்தொடர்பின்அடிப்படைகள்- பண்புகள்- சிறப்புகள், பயன்பாடுகள்ஆகியவைகள்குறித்துமாணவர்களுக்குவிளக்கம்தருதல்.
CO3	:	தொலைக்காட்சியின்இயல்பு-தொலைக்காட்சியின்நன்மைகள், நிகழ்ச்சிதயாரிக்கும்முறைநிகழ்ச்சிஒருங்கிணைப்புகள், நிகழ்ச்சிநடத்துதல். ஆகியவைகள்மாணவர்கள்தெரிந்துகொள்ளல்.
CO4	:	கணிப்பொறிவரலாறு- கணிப்பொறிவகைகள்.. கணிப்பொறிபயன்பாடுகள்ஆகியவைகள்மாணவர்களுக்குபயனுள்ளது.
CO5	:	மொழிப்பெயர்ப்புவரலாறு, மொழிபெயர்ப்புஇயல்புகள்பற்றிதெளிவாகபுரிந்துகொள்ளமுடியும்.

அலகு I : [12
பாடவகுப்புகள்]

புதுக்கவிதையின்தோற்றமும்வளர்ச்சியும் - கவிதையின்அமைப்புமுறை, புதுக்கவிதை, மரபுக்கவிதை-புதுக்கவிதை, மரபுக்கவிதைவேறுபாடுகள், கரு, வடிவம், உத்திகள் - கவிதைஎழுதுவதின்நோக்கம். எழுதும்முறைகள், வரிகள்வரையறை - கவிதைஉருவாக்கம்தலைப்புதேர்வுசெய்யும்முறைகள்.

அலகு II : [12
பாடவகுப்புகள்]

தகவல்தொடர்பின்அடிப்படைகள்- பண்புகள்- சிறப்புகள், பயன்பாடுகள்- தகவல்தொடர்புசாதனங்களின்பணிகள் - தகவல்தொடர்பில்ஏற்படும்தடைகள், தகவலைஏற்பவரின்தகுதிகள் - பொதுமக்களும்தகவல்தொடர்புசாதனங்களும்.

அலகு III: [12
பாடவகுப்புகள்]

ஓரங்கநாடகம்வரலாறு, நடகத்தின்தோற்றமும், வளர்ச்சியும். - ஓரங்கநாடகம்எழுதுதல், கதைஅமைப்பு, அடிப்படைக்கூறுகள் - வானொலிஅல்லதுதொலைக்காட்சிமற்றும்திரைப்படத்துக்கு - ஓரங்கநாடகம்எழுதுதல்.

அலகு IV: [12
பாடவகுப்புகள்]

இதழியல்விளக்கம் - பத்திரிக்கைநிர்வாகஅமைப்புமற்றும்ஆசிரியர்கள் - 3.இன்றையதமிழ்நாளிதழ்கள்பற்றியசெய்கள் (தினமணி, தினமலர், தினத்தந்தி, தினகரன்).

அலகு V : [12 **பாடவகுப்புகள்**]

1. நூல்மதிப்புரை - திறனாய்வுசெய்தல் -
2.கடிதம்மற்றும்விண்ணப்பம்எழுதுதல் -
கட்டுரைதிறனைவளர்த்தல்- கட்டுரைதலைப்பு, கட்டுரைஅமைப்புமுறைகள்

பாடநூல்கள்:

1.புதுக்கவிதையின்தோற்றமும்வளர்ச்சியும்வல்லிக்கண்ணன்
மக்கள்தகவல்தொடர்பியல்- முனைவர்கி.இராசா
3..கலைச்சொல்லாக்கம்இராதாசெல்லப்பன்
4 இதழியல்கலைடாக்டர்மா.பா.குருசாமி

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
42E	**English for Communication-II**					

Introduction: To encourage students to inculcate and use effective communication skills in their day-to-day lives. To develop the LSRW skills to enhance the culture and thoughts through language and Literature

Course Outcome:

CO1	:	Learn to communicate effectively and appropriately in real-life situation
CO2	:	Use English effectively for study purposes across the curriculum
CO3	:	Develop interest in and appreciation of Literature
CO4	:	Develop and integrate the use of the four language skills
CO5	:	Enhance their language skills, especially in the areas of grammar and pronunciation

12 Hours

Unit I:

1.1 I am Malala -Malala Yousafzai- Chapter1 - 1.2 Nelson Mandela's Interview with Larry King - 1.3 Job Applications: Cover Letters, CV/Resume - 1.4 Refuting, Discussion & Debating

12 Hours

Unit II:

2.1 The Zoo Story- Edward Albee - 2.2 Rakesh Sharma's Interview with Indira Gandhi from Space - 2.3 Making Suggestions& Responding to Suggestions, Asking for and Giving Advice or Help – 2.4 Creating a digital profile-LinkedIn

12 Hours

Unit III:

3.1 My Inventions-Nikola Tesla- Chapter 2 - 3.2 Lionel Messi with Sid Love-(Print) - 3.3 Body Language-Practical Skills for Interviews - 3.4 Interviews (face-to-face, telephone, and video conferencing)

12 Hours

Unit IV:

4.1 The Proposal- Anton Chekhov - 4.2. Filling forms (Online & Manual) creation of account, railway reservation, ATM, Credit/ Debit card - 4.3. Speaking in a Formal situation (welcome address, Vote of the thanks

12 Hours

Unit V:

5.1 Public Speaking - 5.2 Chicago Address-Swami Vivekananda - 5.3 SWOT Analysis

Text books:

1 Am Malala The Girl Who Stood Up for Education and Was Shot by the Taliban by Malala Yousafzai, Christina Lamb, Little Brown, 2013

2. My Inventions by Nikola Tesla, Ingram Short title, 2011 Edition

Reference Books :

1. Writing Your Life: A guide to writing Autobiographies, Mary Borg Taylor Francis, 2021.
2. One-act Plays for Acting Students: An Anthology of Short Norman A. Bert • 1987
3. The One-Act Play Companion: A Guide to plays, playwrights ... Colin Dolley, Rex Walford • 2015
4. How to Build a Professional Digital Profile Kindle Edition by Jeanne Kelly Bernish,Bernish Communications Associates, LLC; 1st edition (May)

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	PHP & MySQL	**4**	**6**	**-**	**0**	**Theory**

Introduction: Learning Php and Mysql is designed to equip you with the essential skills to build dynamic and interactive web applications. This course covers the fundamentals of PHP, a popular server-side scripting language, and MySQL, a robust relational database management system. You'll learn how to create and manage databases, write efficient SQL queries, and integrate them with PHP to develop functional web applications. Through hands-on projects and practical examples, you'll gain a comprehensive understanding of back-end web development, enabling you to create, manage, and deploy dynamic websites with ease.

Course Outcome:

CO1	:	To provide an insight of PHP basics
CO2	:	Understand and practice the function and array handling in PHP
CO3	:	Understand and practice the the file handling and date functions
CO4	:	To provide an insight of MYSQL basics
CO5	:	Strategies of file handling and Cookies in MYSQL

Unit I: **[12 periods]**

Introduction to PHP - The structure of PHP-Using comments, Basic syntax -The structure of PHP -Variable, operators, Variable assignment, Multiple line commands -Variable typing- Constants- Predefined constants- The Difference Between the echo and print Commands - Functions-Variable Scope Expressions and Control Flow in PHP - Expression, Operators – Conditionals –Looping -Implicit and Explicit Casting.

Unit II : **[12 periods]**

PHP Functions and Objects -PHP Functions- Defining a Function- -Returning a Value- Returning an Array - PHP Functions - Do Not Pass Arguments by Reference- Returning Global Variables-Recap of Variable Scope -Including and Requiring Files -PHP Version Compatibility - PHP Objects- PHP Arrays- Basic Access- Numerically Indexed Arrays - Associative Arrays - Assignment Using the array Keyword..

Unit III: **[12 periods]**

PHP Arrays- Basic Access- Numerically Indexed Arrays - Associative Arrays - Assignment Using the array Keyword - The foreach...as Loop - Multidimensional Arrays -Using Array Functions. Practical PHP- Using printf - Date and Time Functions -Date Constants - Using checkdate -File handling - System Calls - XHTML or HTML5?.

Unit IV: **[12 periods]**

Introduction to MySQL- Basics -Accessing MySQL via the Command Line –Indexes -MySQL Functions -Accessing MySQL via phpMyAdmin - Mastering MySQL -Database Design- Normalization – Relationships –Transactions -Using EXPLAIN - Backing Up and Restoring - Querying a MySQL - Database with PHP - A Practical Example - Practical MySQL - Practical MySQL - Preventing Hacking Attempts.

Unit V: **[12 periods]**

Form Handling- Building Forms -Retrieving Submitted Data -An Example Program- What's New in HTML5? - Features Awaiting Full Implementation -Cookies, Sessions, and Authentication- Using Sessions. Learning PHP, MySQL & JavaScript , 4th edition, Robin Nixon

Reference Books:

1. Robin Nixon, "Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5", 4th edition, O'Reilly, 2014.
2. Luke welling, Laura Thomson, " PHP and MySQL Web Development", 4th edition, Developer's Library , 2015
3. Joel Murach,"Murach's PHP and MySQL",3rd Edition,Mike Murach & Associates,2017

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3				3		3		3		3		3
CO2	2	3		2	3	2		3				3	
CO3	3	2	3			3	2		2	1	3		1
CO4			2	3	3					1		2	2
CO5	1	3		1		2	2		3		1		

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	2				3		3		3		3		3
CO2	2	3		2	3	2		3				3	
CO3	3	1	3			3	2		2	1	3		1
CO4			2	3	3					1		2	2
CO5	1	3		1		3	2		3		1		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Php and MySQL Lab	**4**	**0**	**-**	**5**	**Lab**

Introduction: To understand the functionality of web pages and to develop a website.

Course Outcome:

CO1	:	To understanding the basics of the PHP.
CO2	:	To apply PHP programming to generate static pages and dynamic.
CO3	:	To evaluate the integration of PHP with HTML and MySQL.
CO4	:	To create a model website using PHP and MySQL..

Lab Experiments:

1. Creating web pages using different XHTML elements like lists ,images, tables, frames
2. Formatting web pages using cascading style sheets
3. Creating dynamic web pages using form elements
4. Implementing various control structures using PHP script
5. OOP exercises using PHP
6. PHP application to handle forms
7. Database connectivity using PHP
8. CRUD operations on database using PHP

STATISTICS AND PROBABILITY

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
23BMA3AB	**Allied-– STATISTICS AND PROBABILITY**	**4**	**4**	**-**	**-**	**Theory**

Goal: To encourage students to explore and unshackle their creative abilities in statistics and probability

Objective:

1. To understand the basic concepts of statistics and probability
2. To understand the description of data using statistical techniques
3. To understand the statistical methods involved in hypothesis testing
4. To understand the difference between parametric and non-parametric tests
5. To understand the random variables, statistical expectation and its statistical and mathematical properties and concepts of regression and correlation analysis.

Course Outcomes:

CO1	**:**	Understand the importance of statistics in different research areas
CO2	**:**	Understand the basic concepts of Statistics and its evolution
CO3	**:**	Understand the suitable statistical measures to describe and summarize the data
CO4	**:**	Understand the application of statistical test to appropriate research environment
CO5	**:**	Understand the basic concepts of probability, its applications and regression analysis in finding the expected values.

Unit I: Introduction to Statistics:

History of statistics, importance of statistics in different field of research, Types of statistics, types of data, variables, types of variables – based on measurement, based on observation, difference between cross sectional and time series data, importance of cross sectional and time series data in statistical analysis, important terminologies – sample, population, universe, statistics, statistic, parameter, estimation, estimator, probability distribution function, probability density function, probability mass function, sampling distribution and standard error.

Unit II: Summarizing data using Statistical Measures

Descriptive Statistics – Measure of central tendency - Mean: Arithmetic mean, median for raw data – odd number and even number, grouped data, mode for raw data and grouped data, measure of dispersion – standard deviation, variance, covariance and its properties, coefficient of variation, quartiles, quartile deviation and mean deviation, graphical representation of data: One-dimensional, bidimensional and multidimensional.

Unit III: Testing of Hypothesis

Introduction to testing of hypothesis, Statistical assumptions, Level of significance, confidence level, Type I Error, Type II error, Critical value, power of the test, sampling distribution, small sample test – t test for one and two sample mean, F test. One way analysis of variance - assumptions of ANOVA, layout of one way ANOVA.

Unit IV: Introduction to probability theory

History of probability theory, definition of various terms related to probability – trial, events, exhaustive events, mutually exclusive events, equally likely events, independent events, introduction to prior probability, limitations of classical probability, statistical or empirical probability, theory of sets, elements of sets, and operations on sets.

Unit V: Theory of Random variables and Expectations:

Random variables- discrete and continuous random variables, statistical properties of random variables, Expectation of a random variables, expectation of random variable in terms of variance and covariance, jointly distributed random variables, moment generating function, characteristic function, limit theorems related to random variables.

Textbook:

1. Fundamentals of mathematical statistics – SC Gupta and VK Kapoor, Sultan Chand & Sons Publication, New Delhi.

References:

1. Introduction to probability Models, Ninth Edition – Sheldon M. Ross, Elsevier Publication, Academic Press, UK.
2. Introduction to Probability and Statistics for Engineers and Scientists, Third Edition - Sheldon M. Ross, Elsevier Publication, Academic Press, UK.
3. An introduction to Probability and Statistical Inference – George Roussas, Academic Press.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill - Scripting Language	**4**	**6**	**-**	**-**	**Skill**

Introduction:

All scripting languages are programming languages. The scripting language is basically a language where instructions are written for a run time environment. They do not require the compilation step and are rather interpreted. It brings new functions to applications and glue complex system together.

Course Outcome:

CO1	:	To understand the concepts and architecture of the World Wide Web
CO2	:	To understand and practice embedded dynamic scripting on client side Internet Programming
CO3	:	· To understand and practice web development techniques on client-side
CO4	:	· To explain concept of Java Script for developing web applications
CO5	:	· To explain the working of LAMP server for executing PHP Applications

Unit I : Introduction to WWW [12 periods]

Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response –– Generation of dynamic web pages.

Unit II:UI Design [12 periods]

Markup Language (HTML): Introduction to HTML and HTML5 - Formatting and Fonts – Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames- HTML Forms. Cascading Style Sheet (CSS): The need for CSS, Introduction to CSS – Basic syntax and structure -Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds – Manipulating text - Margins and Padding - Positioning using CS.

Unit III : Introduction to JavaScript

Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling- Controlling Windows & Frames and Documents - Form handling and validations

Unit IV: Advanced JavaScript

Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – JSON - jQuery and AJAX.

Unit V:Lamp Server [12 periods]

Introduction - How web works - Setting up the environment (LAMP server) - Programming basics - Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and looping structures – Functions – Reading Data in Web Pages - Embedding PHP within HTML Establishing connectivity with MySQL database.

Text books:

1. David Flanagan, 2013, “JavaScript: The Definitive Guide, Sixth Edition”, O'Reilly Media,
2. Achyut S Godbole and Atul Kahate, 2012. “Web Technologies”, Second Edition, Tata McGraw Hill.

Reference Books :

1. Thomas A Powell, Fritz Schneider, 2011. “JavaScript: The Complete Reference”, Third Edition,Tata McGraw Hill
2. Steven Holzner, 2008. “The Complete Reference - PHP”, Tata McGraw Hill,
3. Mcgrath Mike, “PHP & MySQL”, In Easy Steps Limited

Course Outcomes	Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	1	3	1	1	1	3	3	3	1	3
CO2	3				3	1	2	1					
CO3	3	3	3				2	1	3	3	3		
CO4	3		3	1							2		
CO5	3	3	3	1	3	1	2				3	2	3

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Python Programming	**4**	**5**	**-**	**0**	**Theory**

Introduction: After learning the Syntax and Semantics and create Functions, Handle Strings and Files, Understand Lists, Dictionaries and Regular expressions, Implement Object Oriented Programming concepts, Build Web Services and introduction to Network and Database Programming students are able to develop rich dynamic websites in Python.

Course Outcome:

CO1	:	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions
CO2	:	Demonstrate proficiency in handling Strings and File Systems
CO3	:	Understand Lists, Dictionaries and Regular expressions in Python
CO4	:	Interpret the concepts of Object-Oriented Programming as used in Python
CO5	:	Implement exemplary applications related to Network Programming, Web Services and Databases in Python

Unit I: **[12 periods]**

Installing Python, Simple program using Python, Expressions and Values, Variables and Computer Memory, error detection, Multiple line statements, Designing and using functions, functions provided by Python, Tracing function calls in memory model, omitting return statement. Working with Text: Creating Strings of Characters, Using Special Characters in Strings, Creating a Multiline String, Printing Information, Getting Information from the Keyboard.

Unit II : **[12 periods]**

A Boolean Type , Choosing Statements to Execute, Nested If Statements , Remembering the Results of a Boolean Expression Evaluation , A Modular Approach to Program Organization, Importing Modules , Defining Your Own Modules, Testing Code Semi automatically Grouping Functions Using Methods: Modules, Classes, and Methods , Calling Methods the Object-Oriented Way, Exploring String Methods, Underscores.

Unit III: **[12 periods]**

Storing Collections of Data Using Lists: Storing and Accessing Data in Lists, modifying Lists, Operations on Lists, Slicing Lists, Aliasing, List Methods, Working with a List of Lists. Repeating Code Using Loops: Processing Items in a List, Processing Characters in Strings, Looping Over a Range of Numbers, Processing Lists Using Indices, Nesting Loops in Loops, Looping Until a Condition Is Reached, Repetition Based on User Input, Controlling Loops Using Break and Continue Reading and Writing.

Unit IV: **[12 periods]**

Files: Kinds of files, opening a File, Techniques for Reading Files, Files over the Internet, Writing Files, and Writing Algorithms That Use the File-Reading Techniques, Multiline Records. Storing Data Using Other Collection Types: Storing Data Using Sets, Storing Data Using Tuples, Storing Data Using Dictionaries, inverting a Dictionary, Using the In Operator on Tuples, Sets, and Dictionaries, Comparing Collections.

Unit V: **[12 periods]**

Collection of New Information Object-Oriented Programming : Understanding a Problem Domain , Function “Isinstance,” Class Object, and Class Book , Writing a Method in Class Book, Plugging into Python Syntax: More Special Methods, Creating Graphical User interface: Building a Basic GUI, Models, Views, and Controllers, Customizing the Visual Style Introducing few more Widgets, Object-Oriented GUIs, Keeping the Concepts from Being a GUI Mess.

Reference Books:

1. L. Halterman, “Fundamentals of Python Programming”, Southern Adventist University July 26, 2018, Copyright © 2017 Richard L. Halterman Richard.
2. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
4. Timothy A. Budd, ―Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.,, 2015.
5. Kenneth A. Lambert, ―Fundamentals of Python: First Programs‖, CENGAGE Learning, 2012.
6. Charles Dierbach, Introduction to Computer Science using Python: A Computational ProblemSolving Focus, Wiley India Edition, 2013

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	1	3		3		2				3	3		3

CO2		**2**	**3**		**1**		**3**	**2**	**3**				
CO3	**2**	**1**	**2**			**1**				**2**	**1**	**3**	**2**
CO4	**3**			**1**	**3**	**3**			**1**	**3**		**1**	**3**
CO5		**3**			**2**		**2**	**3**					

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Python Programming Lab	**4**	**0**	**-**	**5**	**Lab**

Course Outcome:

CO1	:	Write, test, and debug simple Python programs.
CO2	:	Implement Python programs with conditionals and loops for stack, sorting algorithms.
CO3	:	Read and write data from/to files in Python.
CO4	:	Use Python lists, dictionaries for representing compound data.
CO5	:	Write Script to SQL and Demonstrate Exception in Python.

Introduction: Understand the basic operations and creations of various applications using python.

Lab Experiments:

Create a calculator program using Python.
Create Python program using different String functions.
Implement Selection sort algorithm using Python Program.
Implement stack Operation using Python Program.
Read and Write into a file using Python Program.
Demonstrate use of Dictionaries in Python Program.
Create Comma Separate Files (CSV), Load CSV files into internal Data Structure.
Write script to work like a SQL SELECT statement for internal Data Structure made in earlier exercise.
Write script to work like a SQL Inner Join for an internal Data Structure made in earlier exercise.
Demonstrate Exceptions in Python.

Course Outcomes	**Program Outcomes**												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**				**3**		**3**		**3**		**3**		**3**
CO2	**2**	**3**		**2**	**3**	**2**		**3**				**3**	
CO3	**3**	**2**	**3**			**3**	**2**		**2**	**1**	**3**		**1**
CO4			**2**	**3**	**3**					**1**		**2**	**2**
CO5	**1**	**3**		**1**		**2**	**2**		**3**		**1**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	DATA MINING	**4**	**6**	**0**	**0**	**Theory**

Introduction:
This course is an introductory course on data mining. It introduces the basic concepts, principles, methods, implementation techniques, and applications of data mining, with a focus on two major data mining functions: (1) pattern discovery and (2) cluster analysis.

Course Outcome:

CO1	:	Ability to understand the role of data mining in knowledge discovery process
CO2	:	To study the different data mining techniques
CO3	:	To familiarize with various data mining functionalities and how it can be applied to various real-world problems.
CO4	:	To learn about finding data characteristics and evaluating the outcome of data mining process.
CO5	:	To apply Data mining concepts in different fields

Unit 1
Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective

Unit II
Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

Unit III
Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision.

Unit IV
Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitioned Algorithms.

Unit V
Association Rules: Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

Text books:

1. Jiawei Han & Micheline Kamber, "Data Mining Concepts & Techniques", 2011, 3rd Edition

Reference Books :

1. Margaret H.Dunbam, "Data Mining Introductory and Advanced Topics", Pearson
2. Education 2003.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type

	Elective 1- Principle of Compiler Design	**4**	**6**	**-**	**-**	**Core Theory**

Introduction:

A compiler is software that translates or converts a program written in a high-level language (Source Language) into a low-level language (Machine Language). Compiler design is the process of developing a program or software that converts human-written code into machine code.

Course Outcome:

CO1	:	Remember the different phases of a compiler and the principles behind each phase.
CO2	:	Understand the concepts of regular expressions, automata and apply the same to implement lexical analyzer using LEX tool.
CO3	:	Understand the concepts of context free grammars and able to know the LR parsers and various methods to generate intermediate code.
CO4	:	Analyse semantic rules into a parser that performs attribution while parsing.
CO5	:	Understand how the code is optimized and the target code is generated.

Unit I

Introduction to Compilers Translators-Compilation and Interpretation-Language processors – The Phases of Compiler-Errors Encountered in Different Phases-The Grouping of Phases Compiler Construction Tools – Programming Language basics.

Unit II:Lexical Analysis

Need and Role of Lexical Analyzer-Lexical Errors-Expressing Tokens by Regular Expressions Converting Regular Expression to DFA- Minimization of DFA Language for Specifying Lexical Analysers-LEX-Design of Lexical Analyzer for a sample Language.

Unit III : Syntax Analysis

Need and Role of the Parser-Context Free Grammars –Top-Down Parsing –General Strategies Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser- LR (0)Item Construction of SLR Parsing Table –Introduction to LALR Parser – Error Handling and Recovery in Syntax Analyzer-YACC-Design of a syntax Analyzer for a Sample Language.

Unit IV:

Syntax Directed Translation & Run Time Environment

Syntax directed Definitions Construction of Syntax Tree-Bottom-up Evaluation of S-Attribute Definitions- Design of predictive translator – Type Systems-Specification of a simple type checker Equivalence of Type Expressions-Type Conversions – Run-Time Environment: Source Language Issues Storage Organization-Storage Allocation Parameter Passing-Symbol Tables-Dynamic Storage Allocation.

Unit V: Code Optimization and Code Generation **[12 periods]**

Optimization-DAG Optimization of Basic Blocks-Global Data Flow Analysis Efficient Data Flow Algorithms Issues in Design of a Code Generator – A Simple Code Generator Algorithm.

Text books:

1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, “Compilers – Principles, Techniques and Tools”, Edition, Pearson Education, 2014..

Reference Books :

2. Steven S. Muchnick, “Advanced Compiler Design and Implementation”, Morgan Kaufmann Publishers an imprint of Elsevier 2014

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied – OPTIMIZATION TECHNIQUES	**4**	**4**	**-**	**-**	**Theory**

OPTIMIZATION TECHNIQUES

Goal: This paper enables the students to learn the basic skills of optimally solving the common problems which we come across in various fields of game theory, queuing theory, network analysis and inventory problems.

Course Outcomes:

CO1	:	To apply and extend the game theory problems to analyze real world systems.
CO2	:	To find solutions to network flow problems using standard algorithms.
CO3	:	To analyze a project with deterministic as well as probabilistic activity times.
CO4	:	To understand and develop the inventory models and setting safety stocks.
CO5	:	To deal the problems with simulation to determining how to manage the resources efficiently under various types of simulation.

Unit -I **[12 Periods]**

Game Theory: Introduction- Two person zero sum game – MAXIMIN – MINIMAX Principle – Saddle Point – Games without Saddle Point – Graphical solutions of 2 x n and m x 2 games – Dominance Property – General solution of m x n games by LPP.

Unit-II **[12 Periods]**

PERT and CPM – Basic components – logical sequencing - Rules of network construction- Critical path analysis - Probability considerations in PERT-Distinction between PERT and CPM.

Unit-III **[12 Periods]**

Inventory control – Types of inventories – Inventory costs – EOQ Problem with no shortages – Production problem with no shortages – EOQ with shortages – Production problem with shortages – EOQ with price breaks.

Unit IV: **[12 Periods]**

Queueing Theory – Introduction – Queueing system – Characteristics of Queueing system – symbols and Notation – Classifications of queues – Problems in (M/M/1) : (∞/FIFO)(Derivation also); (M/M/1) : (N/FIFO); (M/M/C) : (∞/FIFO); (M/M/C) : (N/FIFO) Models- Simple Problems.

Unit V: **[12 Periods]**

Simulation – Introduction – simulation models – Event – Types of simulation – Generation of Random Numbers – Mante - carlo simulation – simulation of queueing system.

Text Book:

1. Operations Research by Kanti Swarup, P.K.Gupta and Man Mohan, S. Chand & Sons Education Publications, New Delhi (2008).

References:

1. Sundaresan.V, Ganapathy Subramanian. K.S. and Ganesan.K, Resource Management Techniques, A.R. Publications, 2002.
2. Prem Kumar Gupta D. S. Hira, "Operations Research", S. Chand & Company Ltd, Ram Nagar, New Delhi.
3. S. Dharani Venkata Krishnan, "Operations Research Principles and Problems", Keerthi publishing house PVT Ltd.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	SKILL ENHANCEMENT COURSE - DATABASE MANAGEMENT SYSTEMS USING MONGODB	**4**	**6**	**0**	**0**	**Theory**

Introduction:

Relational Database Management Systems are expensive and not in a position to support these unstructured data. NoSQL database technology is now getting popularity to manage these voluminous unstructured data. The objective of this course is to make candidates familiarize with NoSQL database Technology and give some hands-on one of the most popular NoSQL database MongoDB.

Course Outcome:

CO1	:	Understand the basics of database management system in MongoDB
CO2	:	MongoDB course will help you to understand & learn the leading document-oriented NoSQL database, MongoDB Architecture.
CO3	:	The instructors will help you understand why more organizations are using MongoDB as a database for their business requirements.
CO4	:	MongoDB is a distributed database at its core, so high availability, horizontal scaling, and geographic distribution are built-in and easy to use
CO5	:	MongoDB course allows you to work on real-time projects that help in building your career.

Unit I

Introduction to MongoDB-Getting Started-Using the MongoDb shell-Inserting and Saving documents-Removing document-Updating document-Query Criteria-Type specific query – Cursors – Database Commands.

Unit II

Introduction to Indexing – Using explain() and hint() – Identifying and changing indexes – Capped Collections – Aggregation – Pipeline operation – Mapreduce – Aggregation commands – Normalization versus Denormalization – Optimization for Data manipulation – Planning.

Unit III

Introduction to Replication – Configuring a replica set – Member Configuration Options – Component of replica set – Connecting to a replica set – Administration.

Unit IV:

Introduction to sharding – configuring Sharding – Choosing a shared key – Sharding Administration

Unit V:

Application Administration – Data Administration – Durability – Server Administration

Text books:

1. MongoDB: The Definitive Guide, Second Edition by Kristina Chodorow

Reference Books :

1. MongoDB Basics "A quick introduction to MongoDB" by David Hows,Peter membrey.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Course – XI Theory Machine Learning	**4**				**Core Theory**

Introduction: This course introduces fundamental concepts and practical applications of machine learning (ML). Starting with essential Python libraries, it covers supervised and unsupervised learning, feature engineering, model evaluation, and advanced topics like text data processing and deployment.

Course Outcome:

CO1	:	Understand ML basics, data preprocessing, and model evaluation.
CO2	:	Apply supervised learning with algorithms like k-NN and decision trees.
CO3	:	Use unsupervised learning for clustering and dimensionality reduction.
CO4	:	Perform feature engineering and model evaluation with relevant metrics.
CO5	:	Use Python libraries (NumPy, SciPy, pandas, scikit-learn) for ML tasks and visualization.

12 Hours **Unit I: Introduction to Machine Learning and Python Basics:** Why Machine Learning? - Problems Machine Learning Can Solve - Essential Python Libraries: NumPy, SciPy, matplotlib, pandas - Setting up the environment and installing scikit-learn - A First Application: Classifying Iris Species - Exploring the Iris dataset - Training and testing data - Building a k-Nearest Neighbors model - Evaluating the model
12 Hours **Unit 2: Supervised Learning:** Classification and Regression - Generalization, Overfitting, and Underfitting - Supervised Machine Learning Algorithms: k-Nearest Neighbors - Linear Models - Decision Trees - Ensemble Methods (Random Forests, Gradient Boosting) - Neural Networks (Introduction) - Uncertainty Estimates from Classifiers - Evaluating Model Performance
12 Hours **Unit 3: Unsupervised Learning and Preprocessing:** Types of Unsupervised Learning -Challenges in Unsupervised Learning - Preprocessing and Scaling Data - Dimensionality Reduction Techniques: - Principal Component Analysis (PCA) - Manifold Learning (t-SNE) - Clustering Algorithms: k-Means Clustering - Agglomerative Clustering – DBSCAN - Evaluating Clustering Algorithms
12 Hours **Unit 4: Feature Engineering and Model Evaluation: -** Representing Data and Engineering Features: Categorical Variables - One-Hot-Encoding - Feature Scaling and Transformation - Feature Selection Techniques - Cross-Validation Techniques - Grid Search for Hyperparameter Tuning - Evaluation Metrics for Classification and Regression - Building Algorithm Chains and Pipelines
12 Hours **Unit 5: Advanced Topics and Application:** Working with Text Data - Representing Text Data (Bag-of-Words, tf-idf) - Text Preprocessing Techniques (Tokenization, Stemming, Lemmatization) - Topic Modeling (Latent Dirichlet Allocation): - Wrapping Up and Practical Considerations: Approaching Machine Learning Problems - From Prototype to Production - Testing and Deploying ML Systems - Future Directions and Continuing Education in Machine Learning
Text books: 1. Müller, A. C., & Guido, S. (2016). Introduction to machine learning with Python: a guide for data scientists. " O'Reilly Media, Inc.".
Reference Books : 1. James, D. (2018). Introduction to Machine Learning with Python: A Guide for Beginners in Data Science. CreateSpace Independent Publishing Platform. 2. Lee, W. M. (2019). Python machine learning. John Wiley & Sons.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Course – XII Theory / Practical Machine Learning Lab	**4**				**LAB**

Introduction:

Machine Learning Lab focuses on practical Python-based machine learning skills. Students learn setup, data exploration, and algorithm implementation.

Course Outcome:

CO1	:	Set up Python environments and install necessary libraries for machine learning.
CO2	:	Use pandas for data exploration and analysis.
CO3	:	Implement various machine learning algorithms and evaluate their performance
CO4	:	Assess model performance using metrics like accuracy, precision, recall, and silhouette score.
CO5	:	Apply advanced techniques such as PCA for dimensionality reduction and process text data for sentiment analysis.

List of Experiments:

1. Setting up Python environment with Anaconda and installing necessary libraries (NumPy, SciPy, matplotlib, pandas).
2. Explore the Iris dataset using pandas.
3. Implementing a k-Nearest Neighbors classifier for Iris species classification and evaluating its performance using metrics such as accuracy, precision, and recall.
4. Exploring overfitting and underfitting using a decision tree classifier on a synthetic dataset.
5. Training a linear regression model to predict housing prices and evaluating its performance.
6. Implementing a Random Forest classifier for a classification problem and comparing it with a single decision tree.
7. Introduction to neural networks using a simple feedforward network for digit recognition.
8. Applying PCA to reduce the dimensionality of the Iris dataset and visualizing the results.
9. Implementing k-means clustering on a dataset and evaluating clustering quality using metrics like silhouette score.
10. Processing text data for sentiment analysis using techniques like tokenization, stemming, and tf-idf representation.

Text books:

1. Müller, A. C., & Guido, S. (2016). Introduction to machine learning with Python: a guide for data scientists. " O'Reilly Media, Inc.".

Reference Books :

1. James, D. (2018). Introduction to Machine Learning with Python: A Guide for Beginners in Data Science. CreateSpace Independent Publishing Platform.
2. Lee, W. M. (2019). Python machine learning. John Wiley & Sons.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Project Management	**4**	**6**	**-**	**-**	**Elective Theory**

Introduction:
To outline the need for Software Project Management also highlight different techniques for software cost estimation and activity planning.

Course Outcome:

CO1	:	To understand and explore the basics of Software Projects and Risks.
CO2	:	Understand the Methods and techniques of Software Projects.
CO3	:	To learn the functions of Classes and Objects.
CO4	:	To familiarize the Project schedules and activities
CO5	:	Implementing Framework and Management control

Unit I : [12 periods]
Introduction – what is a project? – Activities by software project Management – software project vs other project – The project as a system – What is Management? – Management control – Stakeholders- Requirements specifications.

Unit II: [12 periods]
Introduction to stepwise project planning – Select project – Project scope and objectives – project infrastructure – project characteristics – project products and activities – estimate effort for each activity –Identify activity risk – Allocate Resources – Review/Publicize plan – Execute plan and lower levels of planning.

Unit III: [12 periods]
Project Evaluation – Strategic and Technical Assessment – Coat-benefit Analysis – Cost-benefit Evaluation Techniques – Risk Evaluation

Unit IV: [12 periods]

Project approach – Technical plans –Structure Methods- Rapid Application Development - Waterfall Model - V-process model - spiral model- prototype model –Software prototyping - Incremental Delivery

Unit V: [12 periods]
Effort Estimation- Estimation Basis – Techniques – COCOMO Model- Activity planning – CPM/PERT-Risk Management and its Techniques – Resource allocation – Monitoring control.

Text books:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2021.

Reference Books:

1. "Software Projects Management" DCAP304/DCAP515– Lovely professional University, pagwara

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Block chain Fundamentals	**4**	**6**	**-**	**-**	**Elective Theory**

Introduction:

This subject covers the details of Block chain and its various applications.

Course Outcome:

CO1	:	understand Blockchain and its Uses	
CO2	:	Understand the Bitcoin details.	
CO3	:	Students will be familiar with blockchain and cryptography basics.	
CO4	:	Students will learn how this system works and how can they utilize and what application can be built.	
CO5	:	Build their own application using the learned concepts.	

Unit I

Blockchain: An Introduction to Block chain –Why Block Chain – The Structure of Blockchain – Data Structure of Block chain – Data Distribution in block chain – Block Validation.

UnitII:

What is Bitcoin? – History of Bitcoin – Bitcoin uses, Users and their stories – How bitcoin works? – Transactions- Bitcoin Mining –Value of Bitcoin – Advantages and Disadvantages

UnitIII:

Introduction -Public key cryptography and crypto-currency - Private and Public Keys 63 Private Keys 63 Public Keys – Bitcoin Networks.

UnitIV:

Ethereum – How to be the part of Ethereum – Dap –Components of Ethereum – Cryptocurrency – Hyperledger

Unit

MetaMask – Mist – Truffle- Embark – Solidity – Multichain.

Text books:

1. Cybrosys Limited Edition – BLOCK CHAIN E-BOOK.

Reference Books:

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies

Course Outcomes	Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**	**3**	**1**	**3**	**1**	**1**	**1**	**3**	**3**	**3**	**1**	**3**
CO2	**3**	**2**	**3**	**1**	**3**	**1**	**2**	**1**	**3**	**3**	**2**	**2**	**2**

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

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill - Computer Networks	**4**	**6**	**-**	**-**	**Core Theory**

Introduction:

To understand the concept of Data communication and Computer network. To get a knowledge on routing algorithms. To impart knowledge about networking and inter networking devices. To gain the knowledge on Security over Network communication.

Course Outcome:

CO1	:	To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models
CO2	:	To gain knowledge on Telephone systems and Satellite communications
CO3	:	To impart the concept of Elementary data link protocols
CO4	:	To analyse the characteristics of Routing and Congestion control algorithms
CO5	:	To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS

Unit I : [12 periods] Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media
Unit II: [12 periods] Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.
Unit III : [12 periods] Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth
Unit IV: [12 periods] Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.
Unit V: [12 periods] Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP) - Network Security: Cryptography
Text books: 1. A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.
Reference Books : 2. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2017. 3. F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008.

Course Outcomes	**Program Outcomes**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	**3**	**3**	**3**	**1**	**3**	**1**	**1**	**1**	**3**	**3**	**3**	**1**	**3**
CO2	**3**	**2**	**3**	**1**	**3**	**1**	**2**	**1**	**3**	**3**	**2**	**2**	**2**
CO3	**3**	**3**	**3**	**1**	**3**	**1**	**2**	**1**	**3**	**3**	**3**	**1**	**3**
CO4	**3**	**2**	**3**	**1**	**3**	**1**	**2**	**1**	**3**	**3**	**2**	**3**	**2**
CO5	**3**	**3**	**3**	**1**	**3**	**1**	**2**	**1**	**3**	**3**	**3**	**2**	**3**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Enhancement Course - Vue JS	**4**	**6**	**0**	**0**	**Theory**

Introduction:
The integration of AI with cloud computing revolutionizes data processing and decision-making by enhancing scalability, efficiency, and intelligence. This synergy enables businesses to leverage advanced analytics and automation, driving innovation and operational transformation across various sectors.

Course Outcome:
CO1 : Understand basic intelligent agent frameworks.
CO2 : Use decision-making and Apply problem solving techniques.
CO3 : Apply game playing and CSP techniques.
CO4 : Perform logical reasoning.
CO5 : Perform probabilistic reasoning under uncertainty.

Unit I
Introduction to JavaScript and Fundamental Concepts: Why learn JavaScript - Setting up environment – Variables - Data types – Operators – Arrays –Objects - Logic Statements (if, else, switch) - Loops (while, for, do-while).

Unit II
Functions and Object-Oriented Programming : Functions (basic, parameters, arguments) - Function scope and closures - Function expressions and arrow functions - Callback functions - Classes and constructors - Prototypes and inheritance Encapsulation, polymorphism, and abstraction - The DOM (Document Object Model) - DOM manipulation techniques - Event handling and event listeners.

Unit III
Advanced JavaScript Topics and Practical Applications : Regular expressions - Debugging techniques - Concurrency (callbacks, promises, async/await) - HTML5

features - Canvas basics - Integrating JavaScript with HTML5 - Next steps in web development (libraries, frameworks, backend).

Unit IV

Advanced Vue.js Concepts and Techniques: Form Handling: Input fields – validation and async actions; Vue Router: Client-side routing - navigation and route guarding; Vuex State Management: Store setup - data management and communication; Custom Events: Component communication techniques.

Unit V

Testing and Full-Stack Development with Vue.js : Unit Testing: Setting up Jest, writing tests. - Server Communication: HTTP requests, handling responses. Full-Stack Development: Backend integration, deployment.

Text books:

1. Fullstack Vue, The Complete Guide to Vue.js and Friends, Written by Hassan Djirdeh, Nate Murray, and Ari Lerner, Published in San Francisco, California, 2018.

Reference Books :

1. Erik Hanchett, Benjamin Listwon, Vue.js in Action, Published: Shelter Island, New York, 2018
2. Olga Filipova. Learning Vue.js 2, Published: Birmingham, UK, 2017
3. John Au-Yeung, Vue.js 3 By Example, Published: Birmingham, UK, 2021
4. Hassan Djirdeh, Nate Murray, Ari Lerner, Fullstack Vue: The Complete Guide to Vue.js and Friends, Published: San Francisco, California, 2018