



JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

"Self-Belief | Self-Discipline | Self-Respect"

Kunnam, Sunguvarchatram, Sriperumbudur – 631 604



CSE, IT & ECE

**DEPARTMENT OF ARTIFICIAL INTELLIGENCE
AND
DATA SCIENCE
AUTONOMOUS SYLLABUS
REGULATION 2024**



[Signature]
Prepared by

[Signature]
Verified by
Head of the Department

[Signature]
Approved by

**Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur-631 604.**

PRINCIPAL
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur
Chennai, Tamil Nadu



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**DEPARTMENT OF ARTIFICIAL INTELLIGENCE
AND DATA SCIENCE
AUTONOMOUS CURRICULUM & SYLLABUS R2024
CHOICE BASED CREDIT SYSTEM**


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Department of Artificial Intelligence & Data Science
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VISION AND MISSION OF THE INSTITUTION

VISION

- ❖ Jeppiaar Institute of Technology aspires to provide technical education in futuristic technologies with the perspective of innovative, industrial, and social applications for the betterment of humanity.

MISSION

- ❖ To produce competent and disciplined high-quality professionals with the practical skills necessary to excel as innovative professionals and entrepreneurs for the benefit of society.
- ❖ To improve the quality of education through excellence in teaching and learning, research, leadership, and by promoting the principles of scientific analysis, and creative thinking.
- ❖ To provide excellent infrastructure, serene, and stimulating environment that is most conducive to learning.
- ❖ To strive for productive partnership between the Industry and the Institute for research and development in the emerging fields and creating opportunities for employability.
- ❖ To serve the global community by instilling ethics, values, and life skills among the students needed to enrich their lives.


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Chennai, Tamilnadu-631 604



VISION AND MISSION OF THE DEPARTMENT


VISION

- ❖ The department will serve as a centre of excellence in practicing, training and implementing AI and AI associated techniques that will enable /support innovative thoughts and ideas across industries and society

MISSION

- ❖ M1: To collaborate with industry and provide the state of the art infrastructural Facilities to meet the global requirements and societal needs for AI.
- ❖ M2: Promote learning and development of students in Artificial Intelligence thought leadership, by providing them a suitable infrastructure and Environment, enabling them to grow into successful entrepreneurs.
- ❖ M3: To encourage students to pursue higher education and research in the field of AI.
- ❖ M4: To impart moral and ethical values in their profession


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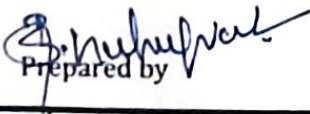
PROGRAMME EDUCATIONAL OBJECTIVES

- ❖ PEO 1: Utilize their proficiencies in the fundamental knowledge of basic sciences, mathematics, Artificial Intelligence, data science and statistics to build systems that require management and analysis of large volumes of data.
- ❖ PEO 2: Advance their technical skills to pursue pioneering research in the field of AI and Data Science and create disruptive and sustainable solutions for the welfare of ecosystems.
- ❖ PEO 3: Think logically, pursue lifelong learning and collaborate with an ethical attitude in a multidisciplinary team.
- ❖ PEO 4: Design and model AI based solutions to critical problem domains in the real world
- ❖ PEO 5: Exhibit innovative thoughts and creative ideas for effective contribution towards economy building

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge:** (K3) Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** (K4) Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** (K4) Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** (K5) Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** (K3, K5, K6) Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** (A3) Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** (A2) Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** (A3) Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** (A3) Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** (A3) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write


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Head of the Department


Approved by

Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur-631 504.

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Chennai, Tamil Nadu

effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** (A3) Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** (A2) Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES


PSO 1: To evolve AI based efficient domain specific processes for effective decision making in several domains such as business and governance domains.

PSO 2: To arrive at actionable Foresight, Insight, hindsight from data for solving business and engineering problems

PSO 3: To create, select and apply the theoretical knowledge of AI and Data Analytics along with practical industrial tools and techniques to manage and solve wicked societal problems

PSO 4: To develop data analytics and data visualization skills, skills pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence be capable of coordinating complex projects.

PSO 5: To able to carry out fundamental research to cater the critical needs of the society through cutting edge technologies of AI.


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Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur-601 504.

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Chennai, Tamilnadu-601 604



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
Autonomous Curriculum AI&DS - 2024 - 2025 - Credits Summary

S.No	Subject Area	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	Humanities and Social Sciences including Management Courses(HS)	1	1	0	0	0	0	0	0	2
2	Basic Science Courses(BS)	4	4	4	0	0	0	0	0	12
3	Engineering Science Courses(ES)	10	12	0	0	0	0	0	0	22
4	Professional Core Courses(PC)	3	4	11	13	11	5	5	0	52
5	Professional Elective Courses(PE)	0	0	0	3	3	6	3	6	21
6	Open Electives(OE)	0	0	0	0	3	0	3	0	6
7	Employment Enhancement Courses(EEC)	1	1	1	1	1	2	7	11	25
8	Mandatory Courses(MC) - No Credit	EE, PE&HV	IC & LE	EEEng	0	0	0	0	0	0
	Total	19	22	16	17	18	13	18	17	140

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[Signature]
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[Signature]
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Principal

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Chennai, Tamilnadu - 631 604



DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
AUTONOMOUS CURRICULUM R2024 (CBCS)
CURRICULUM AND SYLLABI FOR SEMESTERS I TO III

SEMESTER - I

S.No	Course Code	Course Title	Category	Periods			C	CIE	SEE	TOTAL
				L	T	P				
THEORY										
1	AIP001	Induction Program		0	0	0				
2	AMA101	Matrices and Calculus	BS	3	1	0	4	40	60	100
3	APH101	Computational Physics	ES	3	0	0	3	40	60	100
4	ACS101	Principles of programming	PC	3	0	0	3	40	60	100
5	ACS102	Python Programming	ES	3	0	0	3	40	60	100
6	AHS101	Language Enhancement	HS	2	0	0	1	40	60	100
7	AMC101	Employment Enhancement Skills	MC	2	0	0	-	-	-	-
8	AMC102	Professional Ethics and Human Values	MC	2	0	0	-	-	-	-
PRACTICALS										
9	APH301	Computational Physics Lab	ES	0	0	4	2	60	40	100
10	ACS301	Python Programming Lab	ES	0	0	4	2	60	40	100
11	AEEC301	Mini project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	16	1	12	19			

SEMESTER - II

S.No	Course Code	Course Title	Category	Periods			C	CIE	SEE	TOTAL
				L	T	P				
THEORY										
1	AMA102	Discrete Mathematics	BS	3	1	0	4	40	60	100
2	AECS103	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	40	60	100
3	AAI101	Introduction to Data Science	ES	3	0	0	3	40	60	100
4	ACS106	Data Structures and Algorithms	PC	3	1	0	3	40	60	100
5	ACS142	Fundamentals of Cloud Computing	ES	3	0	0	3	40	60	100

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6	AMC103	Indian Constitution	MC	2	0	0	0	-	-	-
PRACTICALS										
7	AECS302	Basics of Electrical and Electronics Engineering Lab	ES	0	0	4	2	60	40	100
8	AHS301	Communication Skills and Technical Writing	HS	0	0	2	1	60	40	100
9	ACS304	Data Structures and Algorithms Lab	PC	0	0	4	1	60	40	100
10	ACS302	Cloud Computing Lab	ES	0	0	4	1	60	40	100
11	AMC301	Yoga and Happy Living	MC	0	0	3	0	-	-	-
12	AEEC302	Mini project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	19	2	17	22			

SEMESTER - III

S.No	Course Code	Course Title	Category	Periods			C	CIE	SEE	TOTAL
				L	T	P				
THEORY										
1	AAI102	Artificial Intelligence	PC	3	1	0	4	40	60	100
2	ACS108	Database Management Systems	PC	3	0	0	3	40	60	100
3	AMA105	Probability and Statistics	BS	3	1	0	4	40	60	100
4	AHS102	Skill Enhancement- I	HS	2	0	0	1	40	60	100
5	AMC108	Environmental Engineering and Sustainability	MC	3	0	0	0	-	-	-
PRACTICALS										
6	ACS306	Database Management Systems Lab	PC	0	0	4	2	60	40	100
7	AAI301	Artificial Intelligence Lab	PC	0	0	4	2	60	40	100
8	AEEC303	Mini Project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	13	2	12	17			

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Verified by

Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)

Principal
Approved by

Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sengalpet, Chennai-600 044



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
AUTONOMOUS SYLLABUS R2024 (CBCS)

SEM-I

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PRINCIPAL

Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur - 631 604

Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur
Chennai, Tamilnadu - 631 604

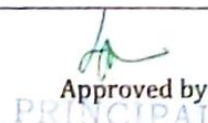
I YEAR I SEMESTER

AMA101 - MATRICES AND CALCULUS

Programme&Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	BS	3	1	0	4
Preamble	<ul style="list-style-type: none">➤ Introduce the matrix techniques and to explain the nature of the matrix.➤ provide the necessary basic concepts of a few numerical methods and give procedures for solving numerically different kinds of problems occurring in Engineering and Technology.➤ familiarize the students with differential calculus.➤ understand techniques of calculus which are applied in the Engineering problems.➤ acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications						
Unit 1	MATRICES					9+3	
Matrices - Eigenvalues and eigenvectors - Diagonalization of matrices using orthogonal transformation – Cayley Hamilton Theorem (without proof) - Quadratic forms - Reduction to canonical form using orthogonal transformation							
Unit 2	SOLUTION OF LINEAR SYSTEM OF EQUATIONS AND EIGENVALUE PROBLEMS					9+3	
Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Gauss Seidel iterative method - Matrix Inversion by Gauss Jordan method - Eigen values of a matrix by Power method – Jacobi method.							
Unit 3	DIFFERENTIAL CALCULUS					9+3	
Limit of a function-Continuity-Derivatives-Differentiation rules (sum, product, quotient, chain rules)-Implicit Differentiation-Logarithmic Differentiation-Applications: Maxima and Minima of functions of one variable							
Unit 4	INTEGRAL CALCULUS					9+3	
Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions – Improper integrals.							
Unit 5	MULTIPLE INTEGRALS					9+3	
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids –Change of variables in double and triple integrals – Applications: Moments and centres of mass, moment of inertia.							
Total: 60							
TEXTBOOKS							
1	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.						
2	Erwin Kreyszig, "Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016						
3	Grewal. B.S., and Grewal. J.S., Numerical methods in Engineering and Science, Khanna Publishers, 9th Edition, New Delhi, 2001.						
REFERENCES							


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1	Ramana. B.V., " Higher Engineering Mathematics ", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.
2	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008

COURSEOUTCOMES: At the end of the course, learners will be able to		Bloom's Taxonomy Level
CO1	Demonstrate the matrix techniques in solving the related problems in engineering and technology.	K4
CO2	Apply matrix methods to solve system of linear equations	K3
CO3	Apply differential calculus tools in solving various application problems	K3
CO4	Apply different methods of integration in solving practical problems.	K3
CO5	Evaluate multiple integrals to conduct investigations of complex problems	K5

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 1	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	-	-	-	-	-	-	-	1		1	1	-
CO 2	3	2	1	-	-	-	-	-	-	-	-		1	1	-
CO 3	3	2	3	-	-	-	-	-	-	-	-		1	1	-
CO 4	3	2	3	-	-	-	-	-	-	-	1		-	1	-
CO 5	3	2	3	-	-	-	-	-	-	-	-		1	-	-

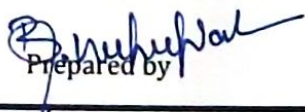
APH101 - COMPUTATIONAL PHYSICS							
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	BS	3	1	0	4
Preamble	<ul style="list-style-type: none"> ➤ To instill knowledge on physics of semiconductors, determination of charge carriers and device applications. ➤ The students will acquire knowledge on the concepts of Photonics 						


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	<ul style="list-style-type: none">➤ To provide the basic concepts of quantum mechanics and various formalism of quantum mechanics➤ To acquire the knowledge of basic sciences required to understand the fundamentals of nano materials➤ To motivate the students towards the applications of quantum mechanics and quantum computing	
Unit 1	SEMICONDUCTOR AND DEVICES	9
Intrinsic Semiconductor- Energy Band Diagram- -Direct and Indirect Band Gap Semi-Conductors – Diode Laser-Hall Effect and Devices- Logic Gates-AND,OR, NOT,NAND, E-OR,E-NOR Gates.		
Unit 2	DIFFERENTIAL EQUATIONS IN COMPUTATIONAL PHYSICS	9
Solution of differential equations: Taylor series method, Euler method, Runge Kutta method, predictor-corrector method. Eigen values and Eigen vectors of matrix: Determinant of a matrix, characteristic equation of a matrix, eigen values and eigen vectors of a matrix, power method.		
Unit 3	FUNDAMENTALS OF QUANTUM MECAHNICS	9
Photons and light waves- Electrons and matter waves- The Schrodinger equation (Time dependent and time independent wave equation)- Physical significance of wave function- particle in an infinite potential well: 1D, 2D and 3D Boxes-Degeneracy and Non-Degeneracy.		
Unit 4	INTRODUCTION TO NANO MATERIAL	9
Introduction to nanomaterial -Electron density in bulk material - Size dependence of Fermi energy - Quantum confinement - Quantum structures - Density of states in quantum well, quantum wire and quantum dot structure - Band gap of nanomaterial- Properties and Applications of nano materials- Tunneling: single electron phenomena and single electron transistor-Quantum dot laser.		
Unit 5	QUANTUM INFORMATION AND COMPUTING	9
Quantum computing: Introduction - Postulates of quantum Mechanics- Differences between quantum and classical computation. Quantum system for information processing-quantum states-Classical bits-quantum bits or qubits - Density matrices- Entanglement-Quantum gates-C-NOT Gate-Bloch sphere.		
Total: 45		
TEXTBOOKS		
1	Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mcgraw Hill Education Private Limited, New Delhi 2010.	
2	Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cengage Learning India Pvt.Ltd. Delhi 2010.	
3	V Rajendran, "Engineering Physics" Tata Mcgraw Hill Education Private Limited, New Delhi 2011.	
REFERENCES		
1	Dattu R Joshi, "Engineering Physics" Tata Mcgraw Hill Education Private Limited, New Delhi 2010.	
2	A Marikani, "Engineering Physics" PHI Learning Private Limited New Delhi 2010.	
3	Kenneth B. Howell, " Ordinary Differential Equations" CRC Press , 21 January 2023	
COURSEOUTCOMES:		
At the end of the course, learners will be able to		Bloom's Taxonomy Level

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CO1	Understand clearly of semiconductor physics and functioning of semiconductor devices.	K2
CO2	Solution of differential equations to understand the computational physics.	K2
CO3	Understand the basic concepts and principles of quantum mechanics	K2
CO4	Explain the effects of quantum confinement on the electronic structure and corresponding physical and chemical properties of materials	K2
CO5	Apply the quantum mechanical principals and basic concept of quantum computing	K3


CO's-PO's & PSO's MAPPING

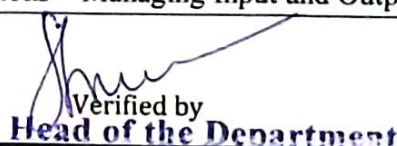
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-
2	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
3	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-
4	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
5	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
AV	3	2	1.5	1.5	2	1	-	-	-	-	-	1	-	-	-

1-LOW, 2-MEDIUM, 3-HIGH, "- NO CORRELATION

ACS101 PRINCIPLES OF PROGRAMMING

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	PC	3	0	0	3
Preamble	<ul style="list-style-type: none">➤ Be exposed to the basics of computers and number systems.➤ Learn to think logically and write pseudo code or draw flow charts for problems.➤ Be familiar with syntax and programming in C.➤ To develop modular applications in C using functions, pointers and structures➤ To do input/output and file handling in C						
Unit 1	INTRODUCTION TO COMPUTERS					9	
Introduction – Characteristics of Computers – Evolution of Computers – Computer Generations – Classification of Computers – Basic Computer organization – Number Systems-Number Conversion							
Unit 2	PROBLEM SOLVING AND COMPUTER SOFTWARE					9	
Problem formulation – Problem Solving - Algorithm – Flow Charts – Pseudocode - Computer Software –Types of Software – Software Development Steps – Internet Evolution - Basic Internet Terminology – HTML -Getting connected to Internet Applications. Application Software Packages- Introduction to Office Packages							
Unit 3	INTRODUCTION TO C					9	
Overview of C – structure of a C program – compilation and linking processes, Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision							

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Making – Arrays, Branching and Looping, Handling of Character Strings.		
Unit 4	FUNCTIONS, POINTERS AND STRUCTURES	9
Built-in Functions-User-defined Functions – Definitions – Declarations -Call by reference – Call by value – Structures and Unions – Pointers – The Preprocessor – Developing a C Program		
Unit 5	FILE MANIPULATION	9
Introduction, Character Input output in Files, Command Line Arguments, String Input Output in Files, High level Disk I/O Functions, Direct Input Output, Error Handling functions, File Positioning, Introduction to Preprocessor, Macro substitution, File Inclusion.		
		Total: 45

TEXTBOOKS

1	Ashok.N.Kamthane, "Computer Programming", Pearson Education (India)
2	Behrouz A.Forouzan and Richard.F.Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks-Cole Thomson Learning Publication

REFERENCES

1	Pradip Dey, Manas Ghoush, "Programming in C", Oxford University Press
2	Byron Gottfried, "Programming with C", 2 nd Edition, (Indian Adapted Edition), TMH publications
3	Stephen G.Kochan, "Programming in C", Third Edition, Pearson Education India.
4	Brian W.Kernighan and Dennis M.Ritchie, "The C Programming Language", Pearson Education Inc.
5	E.Balagurusamy, "Computing fundamentals and C Programming", Tata McGraw-Hill Publishing Company Limited.

COURSEOUTCOMES:

At the end of the course, learners will be able to

Bloom's Taxonomy Level

CO1	To enable the student to learn the major components of a computer system	K2
CO2	To demonstrate knowledge on logical thinking and problem solving	K2
CO3	Design and implement applications on C Programming constructs using arrays and strings	K2
CO4	Develop and implement modular applications in C using functions, structures and pointers.	K2
CO5	Design applications using sequential and random access file processing.	K3

CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

1-LOW, 2-MEDIUM, 3-HIGH, "- NO CORRELATION

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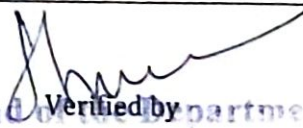
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ACS102 - PYTHON PROGRAMMING

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	ES	3	0	0	3
Preamble	To understand the basics of algorithmic problem solving. To learn to solve problems using Python conditionals and loops. To define Python functions and use function calls to solve problems. To use Python data structures - lists, tuples, dictionaries to represent complex data. To do input/output with files in Python.						
Unit 1	BASICS OF PYTHON PROGRAMMING					9	
Overview of programming language- Python history-Interactive mode – script mode-Tokens:Literal-Keyword-Delimiter-Identifier-Data types: Integer-Floating-Complex-Boolean-String-Indentation-Input operation-Comments							
Unit 2	CONTROL STRUCTURE, OPERATORS AND FUNCTIONS					9	
Statements: if, if-else, nested if, if–elif - Iterative statements: while, for, Nested loops, else in loops, break, continue and pass statements. Operators: Arithmetic-Membership-Identity-Bitwise Functions: Types, parameters, arguments: positional arguments, keyword arguments, parameters with default values, functions with arbitrary arguments, Scope of variables: Local and global scope, Recursion							
Unit 3	COLLECTIONS, STRINGS AND REGULAR EXPRESSIONS					9	
List: Create Access, Negative Indices, Slicing, Splitting, List Methods, and comprehensions Tuples: Create, Indexing and Slicing, Operations on tuples. Dictionary: Create, add, traversing and replace values, operations on dictionaries. Sets: Create and operations on set. Strings: Formatting, Comparison, Slicing, Splitting, Stripping, Negative indices, String functions. Regular expression: Matching the patterns, Search and replace							
Unit 4	FILE HANDLING AND EXCEPTIONS					9	
Files: Open, Read, Write, Append, Tell, Seek and Close. Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, Exception Chaining, Userdefined Exceptions, Defining Clean-Up actions							
Unit 5	NUMPY, PANDAS, MATPLOTLIB					9	
Introduction - Basics of NumPy - N-dimensional Array in NumPy – Methods and Properties - Basics of SciPy - Broadcasting in NumPy Array Operations - Array Indexing in NumPy, Pandas - Introduction - Series - Data Frame - Matplotlib - Basics - Figures and Axes - Method subplot() - Axis container							
Total: 45							
TEXTBOOKS							
1	Ashok Namdev Kamthane, Amit Ashok Kamthane “Programming and Problem Solving with Python” , 2 nd edition , Mc Graw Hill						
2	Dr.R.Nageswara Rao, “Core Python Programming”,3 rd edition, Deamtech Publisher						
REFERENCES							

Prepared by 

Head of Department  Verified by

Approved by 

1	Paul Dietel, Harvey Deitel, "Python for Programmers", Pearson	
2	Reema Thareja, "Problem Solving and programming with Python, Oxford University Press	
COURSE OUTCOMES: At the end of the course, learners will be able to		Bloom's Taxonomy Level
CO1	Develop algorithmic solutions to simple computational problems.	K3
CO2	Develop and execute simple Python programs.	K3
CO3	Write simple Python programs using conditionals and loops for solving problems.	K2
CO4	Decompose a Python program into functions.	K3
CO5	Represent compound data using Python lists, tuples, dictionaries etc.	K3


CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

1-LOW, 2-MEDIUM, 3-HIGH, "-" NO CORRELATION

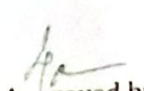
AMC101 - EMPLOYMENT ENHANCEMENT SKILLS

AMC101 - EMPLOYMENT ENCHANCEMENT SKILLS							
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	MC	2	0	0	0
Preamble							
Unit 1	RESUME WRITING					6	
Resume: Objective; Formats; Meticulous & Attention to Detail; Organizing Information; Highlight skills; Mistakes to avoid; Qualification & Skill; SWOT Analysis; Assignment – Draft Resume & Corrections							

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Unit 2	INTERVIEW SKILLS	6
Types of Interviews; Preparation – Company, Role, Brush up Concepts, Technical Strengths; Strengths & Weakness; Importance of Grooming; Interview Questions – HR & Technical; Non Verbal Communication; Negotiation Skills; How to start/end an interview; Group Discussion; Assignment – Preparation for “Tell me about yourself”, Mock Interviews.		
Unit 3	PROFESSIONAL ETIQUETTES	6
Workplace Etiquette – Global & Local; Culture Sensitivity; Gender Sensitivity; Communication Netiquettes – Phone, Email, Social Media; Avoid Gossip; How to be personable yet be professional. Meetings: Types of meetings; Agenda; Schedule & Participants; Materials required; Minutes of Meeting.		
Unit 4	PRESENTATION SKILLS	6
What is a Presentation; Develop an effective slide; Know your Slides; Know your Audience; Barriers in Presentation; Time Management; Listening to the silent audience; Question & Answer session; Feedback.		
Unit 5	COMMUNICATION AT WORKPLACE	6
Language & Communication; Types of Communication – Internal & External, Formal & Informal; Direction of Communication Flow – Downward, Upward, Lateral, Diagonal; Team Work; Emotional Intelligence		
Total: 30		
TEXTBOOKS		
1	“Soft Skills & Employability Skills” by Sabina Pillai&Agn Fernandez	
2	“Soft Skills” by Meenakshi Raman &ShaliniUpadhyay	
3	“Campus Recruitment” by Ramanadhan Ramesh Babu, Israel Battu, Akash R Bhutada&Vijaya Lakshmi Krishnan	
REFERENCES		
1	“Personality Development & Soft Skills (Old Edition)” by Barun K Mitra	
2	“Soft Skills Training: A Workbook to develop Skills for Employment” by Frederick H Wentz	
3	“Ten Soft Skills You Need to Advance Your Career(Andre Keys Book 9)” by Lisa Smith	
4	“Get Your First Job: A Companion For Getting Your First Job – A Guide to Employability Skills & Career Planning” by AJ Balasubramanian&Dr J Sadakkadulla	

S. Mahalingam
Prepared by

[Signature]
Head of the Department
Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur-631 504.

[Signature]
Approved by
Jeppiaar Institute of Technology
Kunnam, Sunguvarchatram, Sriperumbudur
Chennai, Tamilnadu-631 504

CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

1-LOW, 2-MEDIUM, 3-HIGH, "-"-NO CORRELATION

AMC102 - PROFESSIONAL ETHICS AND HUMAN VALUES							
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	MC	2	0	0	0
Preamble	To create an awareness on Engineering Ethics and Human Values. To understand social responsibility of an engineer. To appreciate ethical dilemma while discharging duties in professional life.						
Unit 1	HUMAN VALUES					2	
Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage –Empathy – Self-Confidence – Character							
Unit 2	ENGINEERING ETHICS					4	
Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories. Valuing Time – Co-operation – Commitment							
Unit 3	ENGINEERING AS SOCIAL EXPERIMENTATION					3	
Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study							
Unit 4	SAFETY, RESPONSIBILITIES AND RIGHTS					3	
Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies							
Unit 5	GLOBAL ISSUES					3	
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral							

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Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sengavarchatram, Sriperumbudur-601 304.

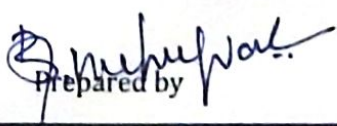
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Kunnam, Sengavarchatram, Sriperumbudur
Chennai, Tamilnadu-601 304


leadership	
Total: 15	
TEXTBOOKS	
1	Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996
2	Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004
REFERENCES	
1	Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint now available).
2	Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available).
3	John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4	Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

1-LOW, 2-MEDIUM, 3-HIGH, "-- NO CORRELATION

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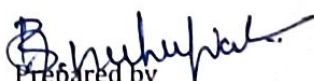
Verified by

Head of the Department


Approved by


P. J. J. L.

AHS101 - தமிழர்மரபு

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	HS	1	0	0	1
Preamble							
அலகு I	மொழிமற்றும்இலக்கியம்					3	
<p>இந்திய மொழிக் குடும்பங்கள்-திராவிட மொழிகள்-தமிழ் ஒரு செம்மொழி தமிழ் செவ்விலக்கியங்கள்-சங்க இலக்கியத்தின் சமயச்சார் பற்ற தன்மை சங்க இலக்கியத்தில்கிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள்-தமிழ்க் காப்பியங்கள்,தமிழகத்தில் சமணபௌத்த சமயங்களின் தாக்கம்-பக்தி இலக்கியம்,ஆழ்வார்கள் மற்றும் நாயன்மார்கள்- சிற்றிலக்கியங்கள்-தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி தமிழ் இலக்கியவளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.</p>							
அலகு II	மரபு -பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை சிற்பக்கலை					3	
<p>நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன்சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப்பொருட்கள், பொம்மைகள் - தேர்செய்யும்கலை - சுடுமண்சிற்பங்கள் - நாட்டுப்புறத்தெய்வங்கள் - குமரி முனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம் , பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூகபொருளாதார வாழ்வில் கோவில்களின் பங்கு.</p>							
அலகு III	நாட்டுப் புறக்கலைகள் மற்றும் வீரவிளையாட்டுகள்					3	
<p>தெருக்கூத்து,கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஓயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்</p>							
அலகு IV	தமிழர்களின் திணைக் கோட்பாடுகள்					3	
<p>தமிழகத்தின் தாவரங்களும்,விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும்</p>							

Prepared by



Head of the Department
Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur-631 664.


Approved by
PRINCIPAL
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur
Chennai, Tamilnadu - 631 604

இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V

இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

3

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின்பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிக்க - தமிழ்ப் புத்தகங்களின் அச்சுவரலாறு.

Total: 15

TEXTBOOKS

1	தமிழகவரலாறு - மக்களும்பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு:தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் - முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)

REFERENCES

1	கீழடி - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல்துறைவெளியீடு)
2	பொருளை ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
3	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

CO's-PO's & PSO's Mapping

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	1	-	2	-	-	-
CO5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Prepared by

Verified by
Head of the Department

Approved by
Principal

APII301 COMPUTATIONAL PHYSICS LAB

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		I	BS	0	0	4	2
Preamble	To learn the proper use of various kinds of physics laboratory equipment. To learn how data can be collected, presented and interpreted in a clear and concise manner To make the student an active participant in each part of all exercises.						
LIST OF EXPERIMENTS							
1. Determination of Band Gap of a semiconductor.							
2. Verification and interpretation of truth table for AND, OR, NOT Gates.							
3. Verification and interpretation of truth table for NAND, NOR, Ex-OR, EX-NOR Gates.							
4. Analysis and Synthesis of Boolean expression using logic gates.							
5. Laser- Determination of the wavelength of the laser using grating							
6. Air wedge - Determination of thickness of a thin sheet/wire							
7. (a) Optical fibre -Determination of Numerical Aperture and acceptance angle (b) Compact disc- Determination of width of the groove using laser.							
COURSEOUTCOMES:				Bloom's Taxonomy Level			
At the end of the course, learners will be able to							
CO1	Understand the functioning of various physics laboratory equipment.			K2			
CO2	Use graphical models to analyze laboratory data.			K4			
CO3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.			K2			
CO4	Access, process and analyze scientific information.			K4			
CO5	Solve problems individually and collaborative.			K3			

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Head of the Department

Approved by 

CO's-PO's & PSO's MAPPING

CO	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
2	3	3	3	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
AV	3	2	1.5	1	1	-	-	-	-	-	-	-	-	-	-

1-LOW, 2-MEDIUM,3-HIGH, "-" NO CORRELATION

ACS301 - PYTHON PROGRAMMING LABORATORY

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	ES	0	0	4	2
Preamble	To understand the problem solving approaches. To learn the basic programming constructs in Python. To practice various computing strategies for Python-based solutions to real world problems. To use Python data structures - lists, tuples, dictionaries. To do input/output with files in Python.						
LIST OF EXPERIMENTS							
1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)							
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).							
3 Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)							
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building –operations of list & tuples)							
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)							

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6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)
7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)
8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)
10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)
11. Exploring Pygame tool. 12. Developing a game activity using Pygame like bouncing ball, car race etc.
Total: 60

COURSE OUTCOMES: At the end of the course, learners will be able to		Bloom's Taxonomy Level
CO1	Develop algorithmic solutions to simple computational problems	K3
CO2	Develop and execute simple Python programs.	K3
CO3	Implement programs in Python using conditionals and loops for solving problems.	K3
CO4	Deploy functions to decompose a Python program.	K3
CO5	Process compound data using Python data structures.	K3

CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

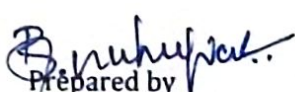
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AHS301 - COMMUNICATION SKILLS AND TECHNICAL WRITING

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		1	HS	0	0	2	1
Preamble	Impart a thorough understanding of the principles underlying effective technical communication. Develop the skills necessary to tailor technical communication to diverse audience needs. Enhance proficiency in using language techniques and understanding genres related to technical communication. Equip students with the ability to utilize technological tools to improve technical communication practices. Foster an awareness of ethical considerations and global perspectives in technical communication.						
Unit 1	PRINCIPLES OF TECHNICAL COMMUNICATION					12	
Listening -Brief video snippets of conversational moments from movies and short documentaries Speaking- Presenting oneself, introducing others, inviting people, and explaining places. Reading - Short passages that need understanding include inference and critical analysis. Writing-Finishing missing phrases and constructing suggestions based on supplied information. Grammar- Who-Questions and Yes/No Questions - Parts of Speech. Vocabulary development: prefixes, suffixes, articles, countable and uncountable nouns.							
Unit 2	AUDIENCE-CENTERED COMMUNICATION					12	
Listening: Deep Listening - Talk Shows and Debates. Reading: In depth Reading: Scanning Passages Speaking: Describe current issues, happenings, etc. Writing: Instructions, Recommendations, Note Taking, and Paragraph Writing Grammar: Continuous tenses, prepositions and articles Vocabulary: Phrasal verbs and one-word substitutes							
Unit 3	LANGUAGE TECHNIQUES AND GENRES IN TECHNICAL COMMUNICATION					12	
Listening: Listening to lectures, podcasts, audio books. Reading: Interpretation of Tables, Charts and Graphs Speaking: SWOT Analysis on oneself and Narrating incidents Writing: Formal Letter Writing, Covering Letter and Memos. Grammar: Perfect Tenses and Discourse Markers Vocabulary: Nouns, usage of keywords							
Unit 4	TECHNOLOGICAL TOOLS USED IN COMMUNICATION					12	
Listening: Instructional videos, webinars on personal branding and networking and TED talks Reading: Manuals, Research papers or articles, Graphic narratives, AI tools used in reading Speaking: Participating in and conducting mock virtual meetings, focusing on presentation skills and etiquette. Mock networking events and Elevator Pitch Writing: E-Mails, drafting formal messages in social media handles, and Usage of AI prompts.							

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Grammar: Adjectives, Verbs and Adverbs.

Unit 5

**ETHICAL AND GLOBAL PERSPECTIVES IN
TECHNICAL COMMUNICATION**

12

Listening: Podcasts, documentaries and webinars on digital ethics and cybersecurity.

Reading: Articles on fundamental ethical principles and case studies.

Speaking: Cultural sensitivity and representation cross-cultural communication strategies Mock meetings to practice global collaboration.

Writing: Case study analysis reports on legal and ethical responsibilities. Proposals for implementing sustainable communication practices.

Grammar: Reported Speech, Idioms and phrases and Loan words

Total: 60

TEXTBOOKS

1	Effective Technical Communication by M. Ashraf Rizvi (Author) 2nd Edition Paperback 2017
2	Sylvan Barnet and Hugo Bedau, 'Critical Thinking Reading and Writing', Bedford/st. Martin's: Fifth Edition (June 28, 2004)
3	Meenakshi Upadhyay, Arun Sharma – Verbal Ability and Reading Comprehension.
4	Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine Chuen Meng Goh, Cambridge.

REFERENCES


1	Technical Communication: A Reader-Centered Approach" by Paul V. Anderson
2	"Technical Writing: Process and Product" by Sharon J. Gerson and Steven M. Gerson
3	"English for Engineers and Technologists: A Skill Approach" by Jeyanthi G. and Ramasamy P
4	"A Handbook for Technical Writers and Editors" by M. Ragunathan and M. Sundararajan

COURSEOUTCOMES:

At the end of the course, learners will be able to

**Bloom's Taxonomy
Level**

CO1	To create clear and successful technical publications, use core technical communication concepts.	K2
CO2	Modify technical communication to the requirements and expectations of various audiences.	K2
CO3	Use proper language and genres to effectively communicate technical knowledge.	K2
CO4	Use technology technologies to improve the generation, management, and dissemination of technical material.	K2
CO5	Navigate ethical quandaries and explore global views in technological communication methods.	K2

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(An Autonomous Institution)

"Self-Belief | Self-Discipline | Self-Respect"

Kunnam, Sunguvarchattram, Sripurumbudur – 631 604



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AMA102 DISCRETE MATHEMATICS

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		2	BS	3	1	0	4
Preamble	Extend student's Logical and Mathematical ability to deal with abstraction Acquire basics of set theory, functions and counting ,apply them in day to day problems Understand the fundamental concepts of the Graph theory and Network connectivity Gain the concepts to identify structures of algebraic nature, prove and use properties about them Learn relations, Lattice, Boolean algebras and their properties to comprehend problems in computer Science.						
Unit 1	FOUNDATION OF LOGIC AND PROOFS					9+3	
Propositional Logic- Connectives - Propositional equivalences -Normal form –Predicates and Quantifiers – Nested Quantifiers -Validity of a well-formed formula– Rules of inference.							
Unit 2	COMBINATORICS					9+3	
Counting: The basics of counting - The pigeonhole principle - Permutations and Combinations - Recurrence relations: solving recurrence relations, generating functions - Inclusion-Exclusion principle : application of inclusion-exclusion.							
Unit 3	RELATIONS					9+3	
Relations - Equivalence relations – Functions - Bijections - Binary relations and graphs- Posets and Lattices -Hasse Diagrams – Boolean algebra.							
Unit 4	GRAPH THEORY					9+3	
Graphs and Graph models- Graph terminology and special types of Graphs – Matrix representation of Graphs and Graph isomorphism – connectivity – Eulerian and Hamiltonian Graphs.							
Unit 5	ALGEBRAIC STRUCTURE					9+3	
Algebraic structures with one binary operation – Semi groups and monoids - Groups – Subgroups – Homomorphism's – Normal subgroup and cosets – Lagrange's theorem – Algebraic structures (Definitions and simple examples only) with two binary operation- Ring, Integral domain and field.							
Total: 60							
TEXTBOOKS							

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1	J.P.Tremblay., R.Manohar., "Discrete Mathematical Structures with Applications" Tata MCGRAW Hill 38 th edition 2010
2	Kenneth.H. Rosen " Discrete Mathematics and its Applications" Tata MCGRAW Hill Special edition 2010
3	T.Veerarajan "Discrete Mathematics with Graph Theory and Combinatorics" Tata MCGRAW Hill 33rd edition 2021

REFERENCES

1	Bernard Kolman., Robert Busby., Sharon C.Ross " Discrete Mathematical Structures " Pearson Publications 6 th edition 2013.
2	Varsha H.Patil., Seymour Lipschutz., Mare lars lipson., " Discrete Mathematics" Revised 3 rd edition 2013
3	https://home.iitk.ac.in/~aral/book/mth202.pdf
4	https://archive.nptel.ac.in/courses/106/103/106103205

COURSEOUTCOMES:

At the end of the course, learners will be able to

Bloom's Taxonomy Level

CO1	Demonstrate the ability to write and evaluate a proof or outline the basic structure and give examples of each proof technique described.	K2
CO2	Apply counting principles to determine probabilities in engineering problems.	K3
CO3	Demonstrate the relations and functions and to determine their properties in solving engineering problems.	K2
CO4	Develop graph theory tools to map day-to-day applications.	K4
CO5	Expose to the concepts and properties of algebraic structures which provides solutions in design and analysis of algorithms.	K2


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CO With PO & PSO Mapping

COs	POs												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO3	3	3	3	1	-	-	-	-	-	-	-	-	1	1	-
CO4	3	2	3	-	-	-	-	-	-	-	-	-	-	1	-
CO5	3	2	3	-	-	-	-	-	-	-	-	1	1	-	-
Average	3	2.2	2.2	1								1	1	1	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

AEC103 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Programme & Branch	B.Tech-AI&DS	Sem.	Category	L	T	P	Credit
Prerequisites		2	ES	3	0	0	3
Preamble	This course provides the foundation for understanding various aspects of electrical and electronics engineering. From the basics of circuit theory to the intricacies of semiconductor devices, this subject delves into the heart of electrical and electronic systems.						
Unit-I	ELECTRICAL CIRCUITS						9
DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws –Independent and Dependent Sources – Simple problems- Nodal Analysis, Mesh analysis with Independent sources only (Steady state) Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Steady state analysis of RLC circuits (Simple problems only)							
Unit-II	ELECTRICAL MACHINES						9
Construction and Working principle- DC Separately and Self excited Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, Working principle and Applications of Transformer, Three phase Alternator, Synchronous motor and Three Phase Induction Motor.							
Unit-III	ANALOG ELECTRONICS						9
Resistor, Inductor and Capacitor in Electronic Circuits- Semiconductor Materials: Silicon & Germanium – PN Junction Diodes, Zener Diode –Characteristics Applications – Bipolar Junction Transistor-Biasing, JFET, SCR, MOSFET, IGBT – Types, I-V Characteristics and Applications, Rectifier and Inverters							
Unit-IV	DIGITAL ELECTRONICS						9
Review of number systems, binary codes, error detection and correction codes, Combinational logic - representation of logic functions-SOP and POS forms, K-map representations - minimization using K maps (Simple Problems only).							
Unit-V	MEASUREMENTS AND INSTRUMENTATION						9
Functional elements of an instrument, Standards and calibration, Operating Principle, types -Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT, DSO- Block diagram- Data acquisition.							
							Total:45

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TEXTBOOK:

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020
2. S.K.Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
3. Sedha R.S., "A textbook book of Applied Electronics", S. Chand & Co., 2008
4. James A .Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018.
5. A.K. Sawhney, PuneetSawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', DhanpatRai and Co, 2015.

REFERENCES:

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2017.
3. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
4. MahmoodNahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill,

COURSEOUTCOMES:**At the end of the course, learners will be able to****Bloom's Taxonomy Level**

CO1	Compute the electric circuit parameters for simple problems.	K4
CO2	Explain the working principle and applications of electrical machines.	K2
CO3	Analyze the characteristics of analog electronic devices.	K4
CO4	Explain the basic concepts of digital electronics.	K2
CO5	Explain the operating principles of measuring instruments	K2

COs	POs												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO3	3	3	3	1	-	-	-	-	-	-	-	-	1	1	-
CO4	3	2	3	-	-	-	-	-	-	-	-	-	-	1	-
CO5	3	2	3	-	-	-	-	-	-	-	-	1	1	-	-
Average	3	2.2	2.2	1								1	1	1	-


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AAI101 - INTRODUCTION TO DATA SCIENCE

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		2	ES	3	0	0	3
Preamble	To understand the data science fundamentals and process. To learn to describe the data for the data science process. To learn to describe the relationship between data. To utilize the Python libraries for Data Wrangling. To present and interpret data using visualization libraries in Python						
Unit 1	INTRODUCTION					9	
Data Science: Benefits and uses – facets of data - Data Science Process: Overview – Defining research goals – Retrieving data – Data preparation - Exploratory Data analysis – build the model–presenting findings and building applications - Data Mining - Data Warehousing – Basic Statistical descriptions of Data							
Unit 2	DESCRIBING DATA					9	
Types of Data - Types of Variables -Describing Data with Tables and Graphs –Describing Data with Averages - Describing Variability - Normal Distributions and Standard (z) Scores							
Unit 3	DESCRIBING RELATIONSHIPS					9	
Correlation –Scatter plots –correlation coefficient for quantitative data –computational formula for correlation coefficient – Regression –regression line –least squares regression line – Standard error of estimate – interpretation of r^2 –multiple regression equations –regression towards the mean							
Unit 4	PYTHON LIBRARIES FOR DATA WRANGLING					9	
Basics of Numpy arrays –aggregations –computations on arrays –comparisons, masks, boolean logic – fancy indexing – structured arrays – Data manipulation with Pandas – data indexing and selection – operating on data – missing data – Hierarchical indexing – combining datasets –aggregation and grouping – pivot tables							
Unit 5	DATA VISUALIZATION					9	
Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three dimensional plotting - Geographic Data with Basemap - Visualization with Seaborn.							
Total: 45							
TEXTBOOKS							

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S. N. Chakraborty

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1	David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016. (Unit I)
2	Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017.(Units II and III)
3	Jake Vander Plas, "Python Data Science Handbook", O'Reilly, 2016. (Units IV and V)

REFERENCES

1	Allen B. Downey, "Think Stats: Exploratory Data Analysis in Python", Green Tea Press, 2014.
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COURSEOUTCOMES:		Bloom's Taxonomy Level
At the end of the course, learners will be able to		
CO1	Define the data science process	K1
CO2	Understand different types of data description for data science process	K2
CO3	Gain knowledge on relationships between data	K2
CO4	Use the Python Libraries for Data Wrangling	K3
CO5	Apply visualization Libraries in Python to interpret and explore data	K3

CO's- PO's & PSO's MAPPING

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	3	3	2	3	-	-	-	1	2	2	2	1	1	2
CO2	2	2	2	3	3	-	-	-	2	1	1	1	1	3	2
CO3	3	3	2	2	2	-	-	-	2	1	2	2	2	2	1
CO4	2	2	1	3	3	-	-	-	1	1	1	1	1	2	2
CO5	2	2	2	3	2	-	-	-	2	2	1	2	3	3	1

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DATA STRUCTURES AND ALGORITHMS

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	Credit
Prerequisites		2	PC	3	0	0	3

- Preamble**
- To understand the concepts of ADTs.
 - To Learn linear data structures – lists, stacks, and queues.
 - To understand non-linear data structures – trees and graphs
 - To understand sorting, searching and hashing algorithms
 - To apply Tree and Graph structures.

Unit-I INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS 9

Introduction to Data Structures - Need - Classification-Arrays - Singly linked list - Representation of a linked list in memory - Operations on a singly linked list - Circular linked list - Doubly linked list. Fundamentals of Algorithmic Problem Solving - Time Complexity - Space complexity with examples - Growth of Functions - Asymptotic Notations and its properties - Complexity Analysis Examples - Performance measurement - Instance Size, Test Data, Experimental setup.

Unit-II STACK AND QUEUES 9

Basic Stack Operations - Representation of a Stack using Arrays - Algorithm for Stack Operations - Infix to postfix Transformation - Evaluating Arithmetic Expressions. Basic Queue Operations - Representation of a Queue using array - Enqueue - Dequeue - Circular Queues - Priority Queues. Solving Recurrence Equations - Substitution Method - Recursion Tree Method - Master Method - Sorting in Linear Time - Lower bounds for Sorting: Counting Sort.

Unit-III TREES AND GRAPHS 9

Trees- Binary Trees - Properties of Binary trees -Implementation using Array and Linked list - Recursive and Non-Recursive Binary Tree traversals - Binary Search Tree - Insertion and Deletion. Graph - Representation using Array and Linked List - Types of graphs - Graph traversals - BFS and DFS - Minimum Spanning Tree - Kruskal's, Prim's Algorithm - Shortest path using Dijkstra's, Bellman Ford and Floyd Warshall Algorithm.

Unit-IV ALGORITHM DESIGN TECHNIQUES 9

Divide and Conquer methodology: Finding maximum and minimum - Merge sort - Quick sort , Binary Search: Dynamic programming: Elements of dynamic programming - Multi stage graph — Optimal Binary Search Trees. Greedy Technique: Elements of the greedy strategy - Activity-selection problem — Optimal Merge pattern — Huffman Trees.

Unit-V STATE SPACE SEARCH ALGORITHMS 9

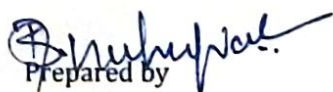
Backtracking: n-Queens problem - Hamiltonian Circuit Problem - Subset Sum Problem – Graph colouring problem Branch and Bound: Solving 15-Puzzle problem - Assignment problem - Knapsack Problem - Travelling Salesman Problem- Polynomial time algorithms - NP Complete Problems.

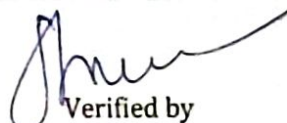
Total:45

TEXTBOOK:

1. Anany Levitin, —Introduction to the Design and Analysis of AlgorithmsI, 3rd Edition, Pearson Education, 2012.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Fundamentals of Computer AlgorithmsI, 2nd Edition, Universities Press, 2007.
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, —Introduction to AlgorithmsI, 4th Edition, MIT Press, 2022.

REFERENCES:


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1. Goodrich MT, Tamassia R, Goldwasser MH., — Data structures and Algorithms in Python1, John Wiley and Sons Ltd; 2013.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms David E. Goldberg, —Genetic Algorithm In Search Optimization And Machine Learning1 Pearson Education India, 2013

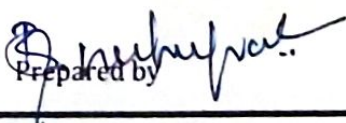
COURSE OUTCOMES: At the end of the course, learners will be able to		Bloom's Taxonomy Level
CO1	Comprehend the concepts of data structures and analyze the efficiency of an algorithm based on time and space complexity.	K4
CO2	Design applications of linear data structures and apply appropriate algorithms for solving problems like sorting and searching.	K2
CO3	Demonstrate the representation and traversal techniques of graphs and their applications.	K4
CO4	Design a solution by using branch and bound, backtracking techniques and implement the various non-linear data structures and perform the intended operations.	K2
CO5	Utilize the state space tree method for solving problems.	K2

CO's-PO's & PSO's MAPPING

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	3	3	2	2	-	-	-	1	2	2	2	3	1	2
CO2	2	2	2	1	3	-	-	-	2	1	3	1	1	3	2
CO3	3	3	3	1	2	-	-	-	2	2	2	2	3	2	2
CO4	1	2	1	1	3	-	-	-	1	1	1	1	1	2	1
CO5	2	2	3	3	2	-	-	-	3	2	1	2	3	3	2

ACS104 - FUNDAMENTALS OF CLOUD COMPUTING

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		2	ES	3	0	0	3
Preamble	To understand the principles of cloud architecture, models and infrastructure. To understand the concepts of virtualization and virtual machines. To gain knowledge about virtualization Infrastructure. To explore and experiment with various Cloud deployment environments. To learn about the security issues in the cloud environment.						
Unit 1	BASIC CONCEPTS OF CLOUD COMPUTING						9

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Network-Based Systems- Concepts of Distributed Systems. Definition of Cloud, Concepts of Cloud Computing. Cloud Service Providers, NIST Cloud Computing, Cloud Characteristics

Unit 2	CLOUD INFRASTRUCTURE	9
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Cloud Pros and Cons. Layered Architectural Design, Cloud Delivery Models. Cloud Deployment Models, Architectural Design Challenges, Cloud Storage - Storage-as-a-Service – Advantages of Cloud Storage - Cloud Storage Providers - S3.

Unit 3	VIRTUALIZATION BASICS	9
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Virtual Machine and its architecture-VM primitive operations- Virtual Infrastructures- Data Center Virtualization for Cloud Computing-Levels of Virtualization Implementation – VMM Design Requirements, Virtualization Support at the OS Level, Physical versus Virtual Clusters. Live VM Migration Steps

Unit 4	BUILDING CLOUD NETWORKS	9
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Designing and Implementing a Data Center-Based Cloud Installing Open Source Cloud service. Virtual Box – Eucalyptus Public Cloud Platforms: Google App Engine, Amazon Web Services (AWS). Google Cloud Platform. Emerging Cloud Software Environments

Unit 5	CLOUD SECURITY AND APPLICATIONS	9
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Cloud Security Infrastructure Security Network level security- Host level security, Application level security- Data privacy and security Issues. Access Control and Authentication in cloud computing, IAM Security Standards

Total: 45

TEXTBOOKS

1	Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, Morgan Kaufmann Publishers, 2012.
2	Mastering Cloud Computing Foundations and Applications Programming RajkumarBuyya, Christian Vechhiola, S. ThamaraiSelvi

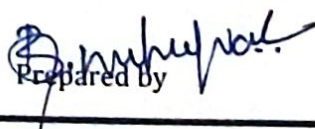
REFERENCES

1	Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, Ricardo Puttini, Zaigham Mohammad 2013
2	Krutz, R. L., Vines, R. D, "Cloud security. A Comprehensive Guide to Secure Cloud Computing", Wiley Publishing, 2010

COURSEOUTCOMES:

At the end of the course, learners will be able to

Bloom's Taxonomy
Level

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CO1	Understand the design challenges in the cloud.	K2
CO2	Apply the concept of virtualization and its types.	K3
CO3	Experiment with virtualization of hardware resources.	K3
CO4	Develop and deploy services on the cloud and set up a cloud environment.	K3
CO5	Explain security challenges in the cloud environment.	K2

CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	3	1	-	-	-	2	3	1	2	3	3	3
2	2	2	2	3	3	-	-	-	1	2	2	3	1	1	3
3	3	3	3	3	3	-	-	-	2	1	1	2	2	1	3
4	3	3	1	1	1	-	-	-	1	3	1	3	2	1	1
5	3	2	2	2	3	-	-	-	2	3	2	2	2	3	3
AVG	2.8	2.4	2	2.4	2.2	-	-	-	1.6	2.4	1.4	2.4	2	1.8	2.6

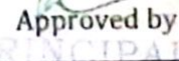
AHS301 - COMMUNICATION SKILLS AND TECHNICAL WRITING

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		2	HS	0	0	2	1
Preamble	Impart a thorough understanding of the principles underlying effective technical communication. Develop the skills necessary to tailor technical communication to diverse audience needs. Enhance proficiency in using language techniques and understanding genres related to technical communication. Equip students with the ability to utilize technological tools to improve technical communication practices. Foster an awareness of ethical considerations and global perspectives in technical communication.						
Unit 1	PRINCIPLES OF TECHNICAL COMMUNICATION					12	
Listening -Brief video snippets of conversational moments from movies and short documentaries Speaking- Presenting oneself, introducing others, inviting people, and explaining places. Reading - Short passages that need understanding include inference and critical analysis. Writing-Finishing missing phrases and constructing suggestions based on supplied information. Grammar- Who-Questions and Yes/No Questions - Parts of Speech. Vocabulary development:							

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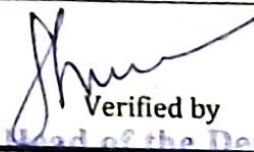
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prefixes, suffixes, articles, countable and uncountable nouns.		
Unit 2	AUDIENCE-CENTERED COMMUNICATION	12
Listening: Deep Listening - Talk Shows and Debates. Reading: In depth Reading: Scanning Passages Speaking: Describe current issues, happenings, etc. Writing: Instructions, Recommendations, Note Taking, and Paragraph Writing Grammar: Continuous tenses, prepositions and articles Vocabulary: Phrasal verbs and one-word substitutes		
Unit 3	LANGUAGE TECHNIQUES AND GENRES IN TECHNICAL COMMUNICATION	12
Listening: Listening to lectures, podcasts, audio books. Reading: Interpretation of Tables, Charts and Graphs Speaking: SWOT Analysis on oneself and Narrating incidents Writing: Formal Letter Writing, Covering Letter and Memos. Grammar: Perfect Tenses and Discourse Markers Vocabulary: Nouns, usage of keywords		
Unit 4	TECHNOLOGICAL TOOLS USED IN COMMUNICATION	12
Listening: Instructional videos, webinars on personal branding and networking and TED talks Reading: Manuals, Research papers or articles, Graphic narratives, AI tools used in reading Speaking: Participating in and conducting mock virtual meetings, focusing on presentation skills and etiquette. Mock networking events and Elevator Pitch Writing: E-Mails, drafting formal messages in social media handles, and Usage of AI prompts. Grammar: Adjectives, Verbs and Adverbs.		
Unit 5	ETHICAL AND GLOBAL PERSPECTIVES IN TECHNICAL COMMUNICATION	12
Listening: Podcasts, documentaries and webinars on digital ethics and cybersecurity. Reading: Articles on fundamental ethical principles and case studies. Speaking: Cultural sensitivity and representation cross-cultural communication strategies Mock meetings to practice global collaboration. Writing: Case study analysis reports on legal and ethical responsibilities. Proposals for implementing sustainable communication practices. Grammar: Reported Speech, Idioms and phrases and Loan words		
Total: 60		
TEXTBOOKS		
1	Effective Technical Communication by M. Ashraf Rizvi (Author) 2nd Edition Paperback 2017	
2	Sylvan Barnet and Hugo Bedau, 'Critical Thinking Reading and Writing', Bedford/st. Martin's: Fifth Edition (June 28, 2004)	
3	Meenakshi Upadhyay, Arun Sharma – Verbal Ability and Reading Comprehension.	
4	Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine Chuen Meng Goh, Cambridge.	
REFERENCES		
1	Technical Communication: A Reader-Centered Approach" by Paul V. Anderson	

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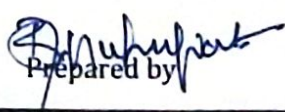
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2	"Technical Writing: Process and Product" by Sharon J. Gerson and Steven M. Gerson	
3	"English for Engineers and Technologists: A Skill Approach" by Jeyanthi G. and Ramasamy P	
4	"A Handbook for Technical Writers and Editors" by M. Ragunathan and M. Sundararajan	
COURSEOUTCOMES: At the end of the course, learners will be able to		Bloom's Taxonomy Level
CO1	To create clear and successful technical publications, use core technical communication concepts.	K2
CO2	Modify technical communication to the requirements and expectations of various audiences.	K2
CO3	Use proper language and genres to effectively communicate technical knowledge.	K2
CO4	Use technology technologies to improve the generation, management, and dissemination of technical material.	K2
CO5	Navigate ethical quandaries and explore global views in technological communication methods.	K2

AMC103 - INDIAN CONSTITUTION

AMC103 - INDIAN CONSTITUTION							
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	Credit
		2	MC	2	0	0	0
Preamble	<p>This Course intends to impart a comprehensive outlook about the nature of the Indian constitution; rights and duties of the citizens, Political Institutions of Central and State governments and its relationship with each other and the organization and functions of local government.</p> <p>A detailed analysis of the functions of the statutory bodies are incorporated in this course.</p>						
Unit 1						9	
Constitutional Assembly – Philosophy – Preamble – Salient Features of Indian Constitution							
Unit 2						9	
Fundamental Rights – Directive Principles of State Policy – Fundamental Duties.							
Unit 3						9	
Union Executive – President : Election – Powers and Functions – Council of Ministers – Prime Minister : Position and Powers – Relationship between Prime Minister and President. State Executive – Governor : Powers and functions – Chief Minister : Position and Powers – Relationship between Chief							

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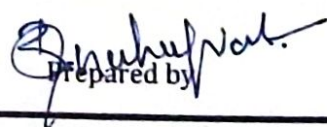
Minister and Governor.		
Unit 4		9
Union Legislature : Structure, Powers and Functions – Speaker : Power and Functions – Procedures of Constitutional Amendment – State Legislature : Structure, Powers and Functions.		
Unit 5		9
Judiciary – Supreme Court: Powers and Functions – High Court : Powers and Functions – Judicial Review		
Total: 45		
TEXTBOOKS		
1	Siwach,J.R, Dynamics of Indian Government and Politics, New Delhi: Sterling, 1985.	
2	Narang, A.S., Indian Government and Politics New Delhi: Gitanjali ,1995	
REFERENCES		
1	Thakur, R. The Government and Politics of India : London: Macmillan, 1995.	
2	Gupta,D.C, Indian Government and Politic, New Delhi, 1996	

CO's-PO's & PSO's Mapping

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		-	-	-	3	3	3	-	3	-	2	-	1	-
CO2	2		-	-	-	3	3	3	-	3	-	2	-	1	-
CO3	2		-	-	-	3	3	3	-	3	-	2	-	1	-
CO4	-	3	-	-	-	3	3	3	-	3	-	2	-	1	-
CO5	1		-	-	-	3	3	3	-	3	-	2	-	1	-

AEC302 - BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		2	ES	0	0	4	2
Preamble	Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB. Study of basic electrical and digital equipment.						

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Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur-631 004.

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Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur
Chennai, Tamilnadu-631 004

LIST OF EXPERIMENTS

1. Soldering simple electronic circuits and checking continuity.
2. Assembling and testing electronic components on a small PCB.
3. Study of electronic components and equipment's.
 - (a) Resistor Color coding using digital multi-meter.
 - (b) Assembling electronic components on breadboard.
4. Verification of Logic Gates
5. Verification of Half Adder and Full Adder
6. Measurement of electrical quantities-voltage current, power & power factor in RLC circuit
7. Verification of KVL, KCL
8. Verification of Thevenin, Norton, Superposition Theorem
9. Fluorescent lamp wiring
10. Stair case wiring
11. Study of iron box wiring and working
12. Assembly and dismantle of computer/ laptop

Total: 60

COURSE OUTCOMES:

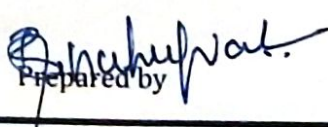
At the end of the course, learners will be able to

Bloom's Taxonomy Level

CO1	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K3
CO2	Demonstrate the wiring of various electrical joints in common household electrical wire work.	K3
CO3	Test the working of basic logic gates.	K3
CO4	Understand the working of basic electrical devices	K3
CO5	Apply basic electrical concepts to implement basic electrical circuits.	K3

CO's-PO's & PSO's Mapping

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

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CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO5	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

ACS304-DATA STRUCTURES AND ALGORITHMS LABORATORY						
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P
Prerequisites		2	PC	0	0	4
Preamble	To demonstrate array implementation of linear data structure algorithms. To implement the applications using Stack To implement the applications using Linked list To implement Binary search tree and AVL tree algorithms. To implement the Heap algorithm. To implement Dijkstra's algorithm. To implement Prim's algorithm To implement Sorting, Searching and Hashing algorithms.					
List of Exercises/Experiments:						
1.	Implement Linear Search and recursive Binary Search. Determine the time required to search for an element. Repeat the experiment for different values of n, the number of elements in the list to be searched and plot a graph of the time taken versus n.					
2.	Given a text txt [0...n-1] and a pattern pat [0...m-1], write a function search (char pat [], char txt []) that prints all occurrences of pat [] in txt []. You may assume that n > m.					
3.	Sort a given set of elements using the Insertion sort and Heap sort methods and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.					
4.	Develop a program to implement graph traversal using Breadth First Search and Depth First Search.					
5.	From a given vertex in a weighted connected graph, develop a program to find the shortest paths to other vertices using Dijkstra's algorithm.					
6.	Find the minimum cost spanning tree of a given undirected graph using Prim's					

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	algorithm.
7.	Develop a program to find out the maximum and minimum numbers in a given list of n numbers using the divide and conquer technique.
8.	Implement Merge sort and Quick sort methods to sort an array of elements and determine the time required to sort. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
9.	Implement Floyd's algorithm for the All-Pairs- Shortest-Paths problem.
	Total: 60
REFERENCES/MANUAL/SOFTWARE:	
1.	Laboratory Manual
COURSE OUTCOMES:	
At the end of the course, learners will be able to	
	Bloom's Taxonomy Level
CO1	Implement Linear data structure algorithms using arrays and Linked lists. K3
CO2	Analyze the efficiency of algorithms using various frameworks K3
CO3	Analyze the various searching and sorting algorithms. K4
CO4	Apply graph algorithms to solve problems and analyze their efficiency. K2
CO5	Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems. K3
Mapping of Cos with Pos and PSOs	

COs/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	2	1	-	-	2	2	3	1	2	2	2	2	3	3	3
CO2	3	2	-	-	3	3	3	1	2	2	2	2	3	3	3
CO3	3	-	1	-	2	2	2	1	2	2	2	2	3	3	3
CO4	3	2	1	1	2	2	2	1	2	2	2	2	3	3	3
CO5	3	2	1	-	2	2	2	1	2	2	2	1	3	3	3

1-Slight, 2-Moderate, 3-Substantial, BT-Bloom's Taxonomy

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ACS302-CLOUD COMPUTING LAB

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		2	ES	0	0	4	2
Preamble	<p>To learn the basics and types of Virtualization</p> <p>To understand the Hypervisors and its types</p> <p>To Explore the Virtualization Solutions</p> <p>To Experiment the virtualization platforms</p>						

LIST OF EXPERIMENTS

Create type 2 virtualization in VMWARE or any equivalent Open Source Tool. Allocate memory and storage space as per requirement. Install Guest OS on that VMWARE.

2. Find a procedure for the following

Shrink and extend virtual disk

Create, Manage, Configure and schedule snapshots

Create Spanned, Mirrored and Striped volume

Create RAID 5 volume

3.Desktop Virtualization using VNC and Chrome Remote Desktop

4.Create type 2 virtualization on ESXI 6.5 server

5.Create a VLAN in CISCO packet tracer

6.Install KVM in Linux

7.Create Nested Virtual Machine(VM under another VM)

8.Install a C compiler in the virtual machine created using a virtual box and execute Simple Programs

9. Install Google App Engine. Create a hello world app and other simple web applications using python/java.

10.Find a procedure to transfer the files from one virtual machine to another virtual machine

Total: 60

COURSEOUTCOMES:

At the end of the course, learners will be able to

Bloom's Taxonomy Level

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CO1	Analyze the virtualization concepts and Hypervisor	K4
CO2	Apply the Virtualization for real-world applications	K3
CO3	Install & Configure the different VM platforms	K2
CO4	Experiment with the VM with various software	K4

CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	3	1	-	-	-	2	3	1	2	3	3	3
2	2	2	2	3	3	-	-	-	1	2	2	3	1	1	3
3	3	3	3	3	3	-	-	-	2	1	1	2	2	1	3
4	3	3	1	1	1	-	-	-	1	3	1	3	2	1	1
5	3	2	2	2	3	-	-	-	2	3	2	2	2	3	3
AVG	2.8	2.4	2	2.4	2.2	-	-	-	1.6	2.4	1.4	2.4	2	1.8	2.6


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Head of the Department


Approved by

Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur-631 604.

Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchatram, Sriperumbudur
Chennai, Tamilnadu - 631 604



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CSE, IT & ECE

SEM-III

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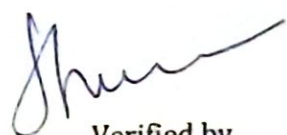
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AAI102 - ARTIFICIAL INTELLIGENCE

Programme&Branch	B.TECH& AI&DS	Sem.	Category	L	T	P	C
		3	PC	3	1	0	4
Preamble	<ul style="list-style-type: none">➤ Learn the basic AI approaches➤ Develop problem solving agents➤ Perform logical and probabilistic reasoning						
Unit 1	INTELLIGENT AGENTS					9	
Introduction to AI – Agents and Environments – concept of rationality – nature of environments structure of agents. Problem solving agents – search algorithms – uninformed search strategies							
Unit 2	PROBLEM SOLVING					9	
Heuristic search strategies – heuristic functions. Local search and optimization problems – local search in continuous space – search with non-deterministic actions – search in partially observable environments – online search agents and unknown environments							
Unit 3	GAME PLAYING AND CSP					9	
Game theory – optimal decisions in games – alpha-beta search – monte-carlo tree search – stochastic games – partially observable games. Constraint satisfaction problems – constraint propagation – backtracking search for CSP – local search for CSP – structure of CSP.							
Unit 4	LOGICAL REASONING					9	
Knowledge-based agents – propositional logic – propositional theorem proving – propositional model checking – agents based on propositional logic. First-order logic – syntax and semantics – knowledge representation and engineering – inferences in first-order logic – forward chaining – backward chaining – resolution							
Unit 5	PROBABILISTIC REASONING					9	
Acting under uncertainty – Bayesian inference – naïve Bayes models. Probabilistic reasoning – Bayesian networks – exact inference in BN – approximate inference in BN – causal networks.							
Total: 60							
TEXTBOOKS							
1	Stuart Russell and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2021.						
REFERENCES							
1	Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2007						
2	Kevin Night, Elaine Rich, and Nair B., “Artificial Intelligence”, McGraw Hill, 2008						
3	Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006						
4	Deepak Khemani, “Artificial Intelligence”, Tata McGraw Hill Education, 2013.						
COURSE OUTCOMES:							
At the end of the course, learners will be able to						Bloom's Taxonomy Level	
CO1	Explain intelligent agent frameworks					K4	
CO2	Apply problem solving techniques					K3	
CO3	Apply game playing and CSP techniques					K3	


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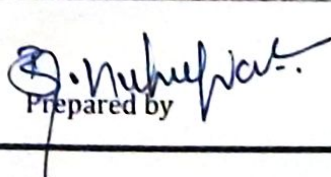
CO4	Perform logical reasoning	K3
CO5	Perform probabilistic reasoning under uncertainty	K5

CO's- PO's & PSO's MAPPING

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	1	3	3	-	-	-	-	2	3	3	1	2	1	1
CO2	2	2	1	1	1	-	-	-	2	2	3	1	3	2	2
CO3	2	1	2	1	-	-	-	-	2	1	1	3	1	2	1
CO4	2	1	2	2	1	-	-	-	2	1	2	2	2	2	1
CO5	3	2	2	1	1	-	-	-	3	2	1	2	2	2	2

1 - low, 2 - medium, 3 - high, '-' - no correlation

ACS108 - DATABASE MANAGEMENT SYSTEMS							
Programme&Branch	B.TECH& AI&DS	Sem.	Category	L	T	P	C
		3	PC	3	0	0	<u>3</u>
Preamble	<ul style="list-style-type: none">➤ This course aims to understand the concepts of database design, database languages, database-system implementation and maintenance.➤ To represent a database system using ER diagrams and to learn normalization techniques➤ To understand the fundamental concepts of transaction, concurrency and recovery processing➤ To understand the internal storage structures using different file and indexing techniques which will help in physical DB design➤ To have an introductory knowledge about the Distributed databases, NOSQL and database security						
Unit 1	RELATIONAL DATABASES					9	
Introduction: Overview of DBMS fundamentals – Overview of Relational Databases and Keys. Relational Data Model: Structure of relational databases – Database schema – Formal Relational Query Languages – Overview of Relational Algebra and Relational Operations. Database Design: Overview of the design process - The E-R Models –Constraints - Removing Redundant Attributes in Entity Sets - E-R Diagrams - Reduction to Relational Schemas - Entity Relationship Design Issues - Extended E-R Features – Alternative E-R Notations – Overview of Unified Modeling Language (UML).							
Unit 2	DATABASE DESIGN					9	
Relational Database Design: Features of Good Relational Designs - Atomic Domains and 1NF - Decomposition using Functional Dependencies: 2NF, 3NF, BCNF and Higher Normal Forms. Functional Dependency Theory - Algorithm for Decomposition – Decomposition using multi-							

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valued dependency: 4NF and 4NF decomposition. Database design process and its issues. SQL: review of SQL – Intermediate SQL – Advanced SQL.

Unit 3	TRANSACTIONS	9
Transaction concept – A simple transaction model - Storage structure - Transaction atomicity and durability - Transaction isolation – Serializability – Recoverable schedules, Cascadeless schedules. Concurrency control: Lock-based protocols – Locks, granting of locks, The two-phase locking protocol, implementation of locking, Graph-based protocols. Deadlock handling: Deadlock prevention, Deadlock detection and recovery.		
Unit 4	DISTRIBUTED DATABASE	9
Distributed Database concepts, Data Fragmentation, Replication, Allocation Techniques for Distributed Database Design, Distributed Database Architectures, Types of distributed database Distributed Catalog Management, Transaction Management, Concurrency Control and Recovery, Query processor and optimization in distributed database, Views - Integrity Procedures, Functions, Cursor and Triggers		
Unit 5	NOSQL Databases	9
Introduction to NOSQL, CAP Theorem, Document-Based NOSQL System and MongoDB, NOSQL Key-Value Stores, Column-Based, NOSQL Graph Database and Neo4j, Big Data Technologies Based on MapReduce and Hadoop: Introduction, HDFS, MapReduce, HadoopV2 alias YARN. Case Study: Different types of high level databases – MongoDB, Hadoop/Hbase, Redis, IBM Cloudant, DynamoDB, Cassandra and CouchDB etc . Tips for choosing the right database for the given problem..		
		Total: 60

TEXTBOOKS

1	Silberschatz A, Korth HF, Sudharshan S. Database System Concepts. Sixth Edition, TMH publishing company limited; 2011. (unit 1,2,3)
2	Elmasri R, Navathe SB. Fundamentals of Database Systems. Seventh Edition, Addison Wesley;2017. (unit 4&5).


REFERENCES

1	Garcia-Molina H, Ullman JD, Widom J. Database System ; The complete book. Second Edition, Pearson Education India, 2011. Ramakrishnan R, Gehrke J. Database Management Systems. Third Edition, TMH; 2003.
2	Ramakrishnan R, Gehrke J. Database Management Systems. Third Edition, TMH; 2003.

COURSEOUTCOMES:

At the end of the course, learners will be able to		Bloom's Taxonomy Level
CO1	Formulate and apply relational algebraic expressions, SQL and PL/SQL statements to query relational databases.	K4
CO2	Design and build ER models for real world databases.	K3
CO3	Design and build a normalized database management system for real world databases.	K3
CO4	Understand and apply the principles of transaction processing and concurrency control.	K3
CO5	To learn different high level databases and selection of right database.	K5


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CO-PO-PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1	-	-	-	1	3	3	3	2	1	3
2	3	1	1	2	2	-	-	-	3	2	1	1	3	1	2
3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
AVG	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2

AMA105 - PROBABILITY AND STATISTICS

Programme&Branch	B.TECH& AI&DS	Sem.	Category	L	T	P	C
		3	PC	3	0	0	3
Preamble	<ul style="list-style-type: none">➤ Determine the probability value of one-dimensional random variables.➤ Illustrate the concepts of covariance, correlation and regression.➤ Discuss the concept of testing of hypothesis for small and large samples.➤ Demonstrate the difference between the types of design to experiments.➤ Identify and interpret the control charts for variables and attributes						
Unit 1	ONE DIMENSIONAL RANDOM VARIABLES					9+3	
Random variable – Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.							
Unit 2	TWO DIMENSIONAL RANDOM VARIABLES					9+3	
Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables.							
Unit 3	TESTING OF HYPOTHESIS					9+3	
Sampling distributions – Estimation of parameters – Statistical hypothesis – Large sample tests based on Normal distribution for single mean and difference of means – Tests based on t, Chi-square and F distributions for mean, variance, and proportion – Contingency table (test for independent) – Goodness of fit.							
Unit 4	DESIGN OF EXPERIMENTS					9+3	
One way and Two-way classifications – Completely randomized design – Randomized block design – Latin square design.							
Unit 5	STATISTICAL QUALITY CONTROL					9+3	
Control charts for measurements (\bar{X} and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.							
Total: 60							
TEXTBOOKS							

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1	R.A. Johnson, I. Miller and J. Freund, "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015
2	J.S. Milton and J.C. Arnold, "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007.

REFERENCES

1	J.L. Devore, "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
2	A. Papoulis, and S. Unni Krishna pillai, Probability, "Random Variables and Stochastic
3	.M. Ross, "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edition, Elsevier, 2004.
4	M.R. Spiegel, J. Schiller and R.A. Srinivasan, "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.
5	R.E.Walpole, R.H.Myers, S.L. Myers and K.Ye, "Probability and Statistics for Engineers and Scientists".Pearson Education, Asia, 9th Edition, 2012

COURSEOUTCOMES:

At the end of the course, learners will be able to

Bloom's Taxonomy Level

CO1	Understand the fundamental knowledge of modern probability theory and standard distributions.	K4
CO2	Categorize the probability models and function of random variables based on one and two dimensional random variables.	K3
CO3	Employ the concept of testing the hypothesis in real life problems.	K3
CO4	Implement the analysis of variance for real life problems.	K3
CO5	Apply the statistical quality control in engineering and management problems.	K5

CO's- PO's & PSO's MAPPING

	PO's												PSO's			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
1	3	3	3	2	2	1	-	-	-	-	-	-	3	3	1	1
2	3	3	2	2	2	1	-	-	-	-	-	-	3	3	1	1
3	3	3	3	2	2	1	-	-	-	-	-	-	3	3	1	1
4	3	3	2	2	2	1	-	-	-	-	-	-	3	3	1	1
5	3	3	3	2	2	1	-	-	-	-	-	-	3	3	1	1
AVg	3	3	3	2	2	1	-	-	-	-	-	-	3	3	1	1

1 - low, 2 - medium, 3 - high, '-' - no correlation

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Department

PRINCIPAL

AMC108 ENVIRONMENTAL ENGINEERING AND SUSTAINABILITY

Programme&Branch	B.TECH& AI&DS	Sem.	Category	L	T	P	C
		3	MC	3	0	0	0
Preamble	<ul style="list-style-type: none">➤ To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.➤ To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.➤ To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.➤ To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.➤ To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.						
Unit 1	ENVIRONMENT AND BIODIVERSITY					6	
Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.							
Unit 2	ENVIRONMENTAL POLLUTION					6	
Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts							
Unit 3	RENEWABLE SOURCES OF ENERGY					6	
Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.							
Unit 4	SUSTAINABILITY AND MANAGEMENT					6	
Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.							
Unit 5	SUSTAINABILITY PRACTICES					6	
Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy							

Prepared by 

Head of the Department

Approved by 

Department of Artificial Intelligence & Data Science
Jeppiaar Institute of Technology (Autonomous)
Kunnam, Sunguvarchandi, Chennai-600 094

Chennai, Tamilnadu-600 094

Cycle carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socioeconomical and technological change.

Total:30

TEXTBOOKS

1	Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2	Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016
3	Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall
5	Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6	Environment Impact Assessment Guidelines, Notification of Government of India, 2006.

REFERENCES

1	R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 . edition 2010.
2	Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3	Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4	Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.

COURSE OUTCOMES:

At the end of the course, learners will be able to

Bloom's Taxonomy Level

CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K4
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K3
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K3
CO4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K3
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K5


Prepared by


Verified by


Approved by

Head of the Department

Department of Artificial Intelligence & Data Science
Jenai Institute of Technology (Autonomous)
Kudam, Sundaravaram, Tirunelveli-631 504.

Jenai Institute of Technology (Autonomous)
Kudam, Sundaravaram, Tirunelveli-631 504.
Tamil Nadu-631 504

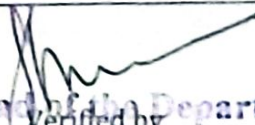
CO's-PO's & PSO's MAPPING

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS O2	PS O3
CO1	3	2	3	1	3	-	-	-	2	2	2	2	3	1	2
CO2	2	2	3	2	1	-	-	-	2	3	3	3	3	3	2
CO3	3	3	1	2	2	-	-	-	3	2	1	2	3	1	3
CO4	3	2	2	2	2	-	-	-	2	2	2	3	3	2	1
CO5	2	2	2	3	2	-	-	-	3	2	1	2	3	3	3

AHS102 - SKILL ENHANCEMENT - I

Programme & Branch	BTech-AI&DS	Sem.	Category	L	T	P	C
		3	HS	2	0	0	1
Preamble	<ul style="list-style-type: none">• To categorize, apply and use thought process to distinguish between concepts of Quantitative methods.• To educate and enrich the students on quantitative ability, reasoning ability, and verbal ability.• To learn about various aspects of soft skills and learn ways to develop personality• Understand the importance and type of communication in personal and professional environment• To create awareness on Human Centered Approach.						
Unit 1	NUMERICAL COMPUTATION						6
Number System- Divisibility Rules- Problems on Numbers- H.C.F. and L.C.M. of Numbers- Decimal Fractions & Simplification.							
Unit 2	NUMERICAL ESTIMATION & DATA INTERPRETATION-I						6
Averages - Problems on Ages - Data interpretation: Tabulation- Bar Graphs.							
Unit 3	INTRODUCTION TO SOFT SKILLS						6
<ul style="list-style-type: none">• Soft Skills: Personal, Professional and Social skills• Communication Skills: Verbal, Nonverbal, and Written Communication• Communication Today: Significance of Communication, Vitality of the Communication Process, Virtues of Listening, Fundamentals of Good Listening, responding after listening, need for Intercultural Communication, Communicating Digital World.							
Unit 4	PERSONALITY SKILLS						6
<ul style="list-style-type: none">• Personality Development: Knowing Yourself, Positive Thinking, Physical Fitness, Positive attitude, Integrity and Honesty• Emotional Intelligence: Meaning and Definition, need for Emotional Intelligence, Components of Emotional Intelligence, Competencies of Emotional Intelligence, Skills to Develop Emotional Intelligence• Stress and Time Management: Stress, Sources of Stress, Ways to Cope with Stress, Principles and Techniques for Time Management.							

Prepared by 

Head of the Department
Verified by 
Department of Artificial Intelligence & Data Science
Jawahar Institute of Technology (Autonomous)
Kunnam, Bangalore, Karnataka, India-560004

Approved by 
Principal

Jawahar Institute of Technology (Autonomous)
Kunnam, Bangalore, Karnataka, India-560004
Chennai, Tamil Nadu-601 004

Intelligence

- **Stress and Time Management:** Stress, Sources of Stress, Ways to Cope with Stress, Principles and Techniques for Time Management.

Unit 5

DESIGN THINKING

6

HOW MIGHT 'WE'

Revisiting Wheel of Life – Balancing Priorities – Project Update – QBL Application in Balancing Priorities – Handling Conflicts – Leveraging Constraints – Respond Vs. React – Importance of Teamwork – Project Assignment.

Total:30

COURSE OUTCOMES:

At the end of the course, learners will be able to

Bloom's
Taxonomy
Level

Use their logical thinking and analytical abilities to solve Quantitative aptitude questions from company specific and other competitive tests.

K3

Have an awareness of how design thinking can be applied in a wide range of contexts, from the personal to global. Investigate and think creatively about design problems and opportunities.

K4

REFERENCES:

1. Quantitative Aptitude for Competitive Exams by R. S. Agarwal.
2. Quantum CAT by Sarvesh Verma.
3. The Design of Business: Why Design Thinking is the Next Competitive Advantage, by Roger Martin Thinking in Systems, Donella Meadows.

ACS306 DATABASE MANAGEMENT SYSTEMS LABORATORY

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		3	PC	0	0	4	2
Preamble	To learn and implement important commands in SQL. To learn the usage of nested and joint queries. To understand functions, procedures and procedural extensions of databases. To understand design and implementation of typical database applications. To be familiar with the use of a front end tool for GUI based application development.						
LIST OF EXPERIMENTS							
1. Create a database table, add constraints (primary key, unique, check, Not null), insert rows, update and delete rows using SQL DDL and DML commands.							

Prepared by

Verified by

Approved by

Department of Artificial Intelligence & Data Science
Jawahar Institute of Technology (Autonomous)
Kunnam, Senguvayal, Chennai-600 064

Jawahar Institute of Technology (Autonomous)
Kunnam, Senguvayal, Chennai-600 064

2. Create a set of tables, add foreign key constraints and incorporate referential integrity.
3. Query the database tables using different 'where' clause conditions and also implement aggregate functions.
4. Query the database tables and explore sub queries and simple join operations.
5. Query the database tables and explore natural, equi and outer joins.
6. Write user defined functions and stored procedures in SQL.
7. Execute complex transactions and realize DCL and TCL commands.
8. Write SQL Triggers for insert, delete, and update operations in a database table.
9. Create View and index for database tables with a large number of records.
10. Create an XML database and validate it using XML schema.
11. Create Document, column and graph based data using NOSQL database tools.
12. Develop a simple GUI based database application and incorporate all the above-mentioned features
13. Case Study using any of the real life database applications from the following list
 - a) Inventory Management for a EMart Grocery Shop
 - b) Society Financial Management
 - c) Cop Friendly App – Eseva
 - d) Property Management – eMall
 - e) Star Small and Medium Banking and Finance

Build Entity Model diagram. The diagram should align with the business and functional goals stated in the application.

Apply Normalization rules in designing the tables in scope.

Prepared applicable views, triggers (for auditing purposes), functions for enabling enterprise grade features.

Build PL SQL / Stored Procedures for Complex Functionalities, ex EOD Batch Processing for calculating the EMI for Gold Loan for each eligible Customer.

 - Ability to showcase ACID Properties with sample queries with appropriate settings

Total: 60

COURSEOUTCOMES: At the end of the course, learners will be able to		Bloom's Taxonomy Level
CO1	Create databases with different types of key constraints.	K4
CO2	Construct simple and complex SQL queries using DML and DCL commands.	K3
CO3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.	K3
CO4	Create an XML database and validate with meta-data (XML schema).	K3
CO5	Create and manipulate data using NOSQL database.	K5


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CO's-PO's & PSO's MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1	-	-	-	1	3	3	3	2	1	3
2	3	1	1	2	2	-	-	-	3	2	1	1	3	1	2
3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
AVG	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2

AAI301-ARTIFICIAL INTELLIGENCE LABORATORY

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		3	PC	0	0	4	2
Preamble	<ul style="list-style-type: none">• To design and implement search strategies• To implement game playing techniques• To implement CSP techniques• To develop systems with logical reasoning• To develop systems with probabilistic reasoning						
LIST OF EXPERIMENTS							
1. Implement basic search strategies – 8-Puzzle, 8 – Queens problem, Cryptarithmic.							
2. Implement A* and memory bounded A* algorithms							
3. Implement Minimax algorithm for game playing (Alpha-Beta pruning)							
4. Solve constraint satisfaction problems							
5. Implement propositional model checking algorithms							
6. Implement forward chaining, backward chaining, and resolution strategies							
7. Build naïve Bayes models							
8. Implement Bayesian networks and perform inferences							
9. Mini-Project							
							Total: 60
COURSEOUTCOMES:				Bloom's Taxonomy			
At the end of the course, learners will be able to				Level			
CO1	Design and implement search strategies			K4			
CO2	Implement game playing and CSP techniques			K3			
CO3	Develop logical reasoning systems			K3			
CO4	Develop probabilistic reasoning systems			K3			

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CO's-PO's & PSO's MAPPING

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	-	-	-	1	2	2	2	3	1	2
CO2	3	3	3	2	3	-	-	-	2	1	1	1	1	3	2
CO3	3	3	3	2	2	-	-	-	3	2	3	2	3	1	1
CO4	3	3	3	2	3	-	-	-	1	1	1	1	1	2	1
CO5	2	2	3	3	2	-	-	-	3	2	1	2	3	3	1


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