Department of ComputerScience (Artificial Intelligence) UG

Programme Specific Outcomes PSOs

On the successful completion of the Undergraduate programme, the students will be able to

PSO1 **Disciplinary Knowledge**	understand the principles and organization of computers in the modelling and design of computer-based systems that include both hardware and software.
PSO2 **Communication Skills**	communicate effectively with others in development methodologies of software systems.
PSO3 **Problem Solving**	identify, formulate, review and analyze problems and solve in real life situations scientifically and systematically by computing techniques.
PSO4 **Analytical Reasoning**	employ analyze, design, implement and interpret data to provide valid conclusions for decision making.
PSO5 **Research Skills**	make use of crucial analysis and to cater the critical needs of the society through cutting edge technologies of Artificial Intelligence.
PSO6 **Digital Literacy**	create a strong foundation in programming along with the knowledge of modern languages, tools and technologies needed to build secure, robust software systems.
PSO7 **Leadership and Teamwork**	work effectively as an individual or a leader in diverse teams for problem solving to accomplish a common goal.
PSO8 **Moral and Ethical Awareness/Reasoning**	understand the moral and ethical framework and commit to professional ethics and responsibilities in assorted environment.
PSO9 **Multicultural Competence**	exhibit exposure in global and multicultural aspects that provide a platform for further exploration into multi-dimensional aspects of computing sciences.
PSO10 **Self-directed & Lifelong Learning**	apply computing, communicative and entrepreneurial skills for employability to engage in lifelong learning process and prioritize the acquired professional skills for empowerment of society.

Department of ComputerScience (Artificial Intelligence) UG

Learning Outcomes - Based Curriculum Framework LOCF

w.e.f 2024-2025

Sem	Part	Course Code	Course Title	Hours/Wk.	Credits	Marks
1	I	24XXXNNNN	Tamil/Hindi /French	3	2	30
1	II	24XXXNNNN	English	3	2	30
1	III CC	24CAI1501	C Programming	5	5	75
1	III CC	24CAI1401	C Programming Lab	4	4	60
1	III CC	24CAI1403	Digital Principles and Computer Organization	4	4	60
1	III S	24XXXNNNN	*Offered by Mathematics*	5	4	60
1	IV NME	24XXXNNNN	*Non Major Elective – I*	3	2	30
1	IV AEC	24HVS1200 /CHR1200	Human Values Development/ Christian Studies	3	2	30
1	V	24XXXNNNN	NSS/NCC/PED/SLP/GMP/ GNS/LIB/ACH	-	-	-
			Total	**30**	**25**	**375**
2	I	24XXXNNNN	Tamil/Hindi /French	3	2	30
2	II	24XXXNNNN	English	3	2	30
2	III CC	24CAI1502	Java Programming	5	5	75
2	III CC	24CAI1402	Java Programming Lab	4	4	60
2	III CC	24CAI1404	Operating System	4	4	60
2	III S	24XXXNNNN	*Offered by Mathematics*	5	4	60
2	IV NME	24XXXNNNN	*Non Major Elective – II*	3	2	30
2	IV AEC	24CAI1200	Environmental Studies	3	2	30
2	V	24XXXNNNN	NSS/NCC/PED/SLP/GMP/ GNS/LIB/ACH	-	1	15
			Total	**30**	**25+1**	**375+15**
3	I	24XXXNNNN	Tamil/Hindi /French	3	2	30
3	II	24XXXNNNN	English	3	2	30
3	III CC	24CAI2401	Database Management Systems	4	4	60
3	III CC	24CAI2403	Database Management Systems Lab	4	4	60
3	III CC	24CAI2405	Data Structure and Algorithms	4	4	60
3	III CC	24CAI2407	Introduction to Artificial Intelligence	4	4	60
3	III S	24XXXNNNN	*Offered by Mathematics*	5	4	60
3	IV SEC	24XXXNNNN	*Skill Enhancement Course – I*	3	2	30
3	V	24XXXNNNN	NSS/NCC/PED/SLP/GMP/ GNS/LIB/ACH	-	-	-
			Total	**30**	**26**	**390**

Sem	Part	Course Code	Course Title	Hours/Wk.	Credits	Marks
4	I	24XXXNNNN	Tamil/Hindi /French	3	2	30
4	II	24XXXNNNN	English	3	2	30
4	III CC	24CAI2402	Python Programming	4	4	60
4	III CC	24CAI2404	Python Programming Lab	4	4	60
4	III CC	24CAI2406	Data mining and Warehousing	4	4	60
4	III CC	24CAI2408	Computer Networks	4	4	60
4	III S	24CAI2410	Data Science Using R Programming	5	4	60
4	IV SEC	24XXXNNNN	*Skill Enhancement Course – II*	3	2	30
4	V	24XXXNNNN	NSS/NCC/PED/SLP/GMP/ GNS/LIB/ACH	-	1	15
			Total	**30**	**26+1**	**390+15**
5	III CC	24CAI3401	Machine Learning	4	4	60
5	III CC	24CAI3403	Machine Learning Lab	4	4	60
5	III CC	24CAI3501	Web Technology	5	5	75
5	III CC	24CAI3503	Software Engineering	5	5	75
5	III DSE	24XXXNNN	*Discipline Specific Elective – I*	5	4	60
5	III GE	24XXXNNNN	*Generic Elective – I*	4	3	45
5	IV IS	24CAI3255	Internship*	-	2	30
5	IV SEC	24XXXNNNN	*Skill Enhancement Course – III*	3	2	30
			Total	**30**	**29**	**435**
6	III CC	24CAI3602	Natural Language Processing	6	6	90
6	III CC	24CAI3604	Principles of Deep Learning	6	6	90
6	III CC	24CAI3606	Project	6	6	90
6	III DSE	24XXXNNNN	*Discipline Specific Elective – II*	5	4	60
6	III GE	24XXXNNNN	*Generic Elective – II*	4	3	45
6	IV SEC	24CAI3266	Professional Competency Skill	3	2	30
			Total	**30**	**27**	**405**
			Grand Total	**180**	**158+2**	**2370+30**

* Internship - Second Year Vacation 30 Hrs.

Part III

Discipline Specific Elective DSE

Sem	Part	Course Code	Course Title	Hours/Wk.	Credits	Marks
5	III	24CAI3401	Introduction to Reinforcement Learning	5	4	60
		24CAI 3403	Cryptography			
		24CAI 3405	Grid Computing			
6	III	24CAI3402	BlockChain Technology	5	4	60
		24CAI3404	Computer Vision			
		24CAI3406	Mobile Application Development			

Generic Elective GE

Sem	Part	Course Code	Course Title	Hours/Wk.	Credits	Marks
5	III	24CAI3301	Artificial Intelligence for daily life	4	3	45
		24CAI3303	E-Commerce Technologies			
6	III	24CAI3302	Web Application	4	3	45
		24CAI3304	Information Security			

Part IV

Non-Major Electives NME

Sem	Part	Course Code	Course Title	Hours/Wk.	Credits	Marks
1	IV	24CAI1201	Digital Empowerment	3	2	30
2	IV	24CAI1202	Web Designing using HTML 5	3	2	30

Skill Enhancement Courses SEC

Sem	Part	Course Code	Course Title	Hours/Wk.	Credits	Marks
3	IV	24CAI2201	Internet of Things and Robotics	3	2	30
4	IV	24CAI2202	Generative AI for Software Development	3	2	30
5	IV	24CAI3201	Visual Analytics	3	2	30

Mapping with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CAI	3	3	3	3	2	3	3	2	2	2

Mapping of Courses with PSOs

Courses	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
24CAI1501	3	3	3	3	2	3	3	2	2	2
24CAI1401	3	3	3	3	2	3	3	2	2	2
24CAI1403	3	3	3	3	2	3	2	2	2	2
24CAI1502	3	2	3	2	2	3	2	2	2	1
24CAI1402	3	2	3	2	1	3	2	2	2	2
24CAI1404	3	3	3	2	1	3	2	3	2	2
24CAI1200	1	1	1	1	1	1	2	2	1	1
24CAI2401	3	3	3	3	2	2	2	2	2	2
24CAI2403	3	3	3	2	1	3	2	2	2	2
24CAI2405	3	3	3	2	1	3	2	3	2	2
24CAI2407	3	3	3	2	1	3	2	3	2	2
24CAI2402	3	3	3	3	2	3	3	2	2	2
24CAI2404	3	3	3	3	2	3	3	2	2	2
24CAI2406	3	3	3	3	2	2	3	2	2	2
24CAI2408	3	2	3	3	2	3	3	1	2	2
24CAI2410	3	2	3	3	2	3	3	2	2	2
24CAI3401	3	3	3	3	3	3	3	2	2	2

24CAI3403	3	3	3	3	3	3	3	2	2	2
24CAI3501	3	3	3	3	2	3	3	2	2	2
24CAI3503	3	3	3	3	2	3	3	2	2	2
24CAI3401/ 24CAI3403/ 24CAI3405	3	3	3	3	2	3	3	2	2	2
24CAI3255	3	3	3	3	2	3	3	2	2	2
24CAI3602	3	3	3	3	2	3	3	2	2	2
24CAI3604	3	3	3	3	2	3	3	2	2	2
24CAI3606	3	3	3	3	2	3	3	2	2	2
24CAI3402/ 24CAI3404/ 24CAI3406	3	3	3	3	2	3	3	1	2	2
24CAI3266	3	3	3	3	2	3	2	2	2	2
Average	**2.9**	**2.7**	**2.9**	**2.6**	**1.8**	**2.8**	**2.6**	**2.0**	**1.9**	**1.9**

Mapping of Courses with POs

Courses	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
24CAI1201	3	3	3	3	2	3	3	2	2	2
24CAI1202	3	3	3	3	2	3	2	2	2	2
24CAI2201	3	3	3	3	2	3	3	2	2	2
24CAI2202	3	3	3	3	1	3	3	2	1	1
24CAI3301/ 24CAI3303	3	3	3	3	2	3	3	2	2	1
24CAI3201	3	3	3	3	1	3	2	2	1	1
24CAI3302/ 24CAI3304	3	3	3	3	2	3	3	2	2	2
Average	**3**	**3**	**3**	**3**	**1.7**	**3**	**2.7**	**2**	**1.7**	**1.5**

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1501	C Programming (T)	Core	5	5

This course will enable the students to understand the concepts of C programming language and gain knowledge on algorithms, flowcharts and logical thinking. On successful completion of this course the student will have the programming ability in C Language, and develop software application using C.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the basic data types and control statements in C.

CO2: summarize the concept of arrays and strings in C.

CO3: discuss passing arrays to functions for processing, allowing functions to work on collections of data.

CO4: using memory more efficiently by storing different types of data in the same memory location.
CO5: performing operations on pointers and memory buffers efficiently.

Unit I   **15 Hours**

Importance of C-sample C program- C program structure- executing C program- Constants-Variables- and Data Types- Character set- C tokens- keywords and identifiers-constants-variables, data types declaration of variables-Assigning values to variables-Assignment statement- declaring a variable as constantas volatile. Operators and Expression-Type conversions-mathematical functions. Managing Input and Output Operators- Reading and writing a character- formatted input- formatted output.

Unit II   **15 Hours**

Decision making with If- simple IF- IF ELSE- nested IF ELSE, ELSE IF ladder- switch- GOTO statement. Decision Making and Looping: While- Do-While- For- Jumps in loops.

Unit III   **15 Hours**

Arrays-Declaration and accessing of one & two-dimensional arrays- initializing two-dimensional arrays- multidimensional arrays. Functions- The form of C functions, Return values and types- calling a function- categories of functions- Nested functions-

Recursion-functions with arrays- call by value- call by reference- storage classes-character arrays and string functions.

Unit IV   **15 Hours**

Structure- Defininggiving values to members-initialization and comparison of structure variables-arrays of structure-arrays within structures, structures within structures- structures and functions- unions- Preprocessors-Macro substitution-file inclusion.

Unit V   **15 Hours**

Pointer definition- declaring and initializing pointers-accessing a variable through address and through pointer-pointer expressions-pointer increments and scale factor-pointers and arrays- pointers and functions-pointers and structures. File Management in C- Opening, closing and I/O operations on files-random access to files-command line arguments.

Learning Resources:

Text Book:

1.Balagurusamy.E, " Programming in ANSI C", Eighth Edition, Tata McGraw Hill-2019.

References:

1.Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.

2.YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021.

WebSites/e-Learning Resources:

1. https://www.geeksforgeeks.org/error-handling-during-file-operations-in-c-c/
2. https://www.prepbytes.com/blog/c-programming/random-access-file-in-c/
3. https://www.prepbytes.com/blog/c-programming/structure-pointer-in-c/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	3	3	2	3	2	1	2	2
CO2	3	3	3	3	2	2	3	2	2	3
CO3	3	3	2	3	1	3	2	2	2	2
CO4	2	3	3	3	2	3	3	2	3	2
CO5	3	3	3	3	2	3	3	2	2	3
Average	2.8	2.8	3	3	1.8	2.8	2.6	1.8	2.2	2.4

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1401	C Programming Lab(L)	Core	4	4

This course enables the student to gain knowledge in the basic principles of programming concepts in C and to develop skills for writing program using 'C'.It also helps the student to build applications using C concepts and there by improve problem solving ability.

Course Outcomes

At the end of the course the student will be able to:

CO1: remember and demonstrate how to write programs using the basic syntax and semantics in C .

CO2: extend the skills to write C program and to solve different problems.

CO3: carry out top-down approach for implementing function.

CO4: evaluate the program execution flow with test cases and apply debugging.

CO5: generate file program for creating application software.

List of Exercises:

1. Evaluation of expression ex: x+y ^2 * x+z/w

2.Temperature conversion problem Fahrenheit to Celsius

3.Program to convert days to months and days Ex: 364 days = 12 months and 4 days

4.Solution of quadratic equation

5.Salesman salary Given: Basic Salary, Bonus for every item sold, commission on the total monthly sales

6.Maximum of three numbers

7.Calculate Square root of five numbers using goto statement

8.Pay-Bill Calculation for different levels of employee Switch statement

9. Fibonacci series

10.Floyds Triangle

11.Pascal's Triangle

12.Prime numbers in an array

13.Sorting data Ascending and Descending

14.Matrix Addition and Subtraction

15.Matrix Multiplication

16.Function with no arguments and no return values

17.Function that convert lower case letters to upper case

18. Factorial using recursion.

19.Perform String Operations using Switch Case.

20. Structure that describes a hotel name, address, grade, avg room rent, number of rooms Perform some operations list of hotels of a given grade etc.

21. Using Pointers in Structures.

22. Cricket team details using Union.

23. Write a macro that calculates the max and min of two numbers

24.Nested macro to calculate Cube of a number.

25.Evaluation of Pointer expressions

26.Function to exchange two pointer values

27.Creation, insertion and deletion in a linked list

28.Program to read a file and print the data.

29.Program to receive a file name and a line of text as command line arguments and write the text to the file

30.Program to copy the content of one file to another file.

Text Book:

1.Balagurusamy.E, " Programming in ANSI C", Eighth Edition, Tata McGraw Hill-2019.

References:

1.Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.

2.YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021.

WebSites/e-Learning Resources:

1. https://www.geeksforgeeks.org/scanf-and-fscanf-in-c/
2. https://www.tutorialspoint.com/cprogramming/c_file_io.htm
3. https://www.geeksforgeeks.org/error-handling-during-file-operations-in-c-c/
4. https://www.prepbytes.com/blog/c-programming/random-access-file-in-c/
5. https://www.prepbytes.com/blog/c-programming/structure-pointer-in-c/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	1	3	2	2	1	3
CO3	3	3	3	3	2	3	3	3	3	2
CO4	3	2	3	3	2	2	2	3	2	3
CO5	3	3	3	3	1	3	1	2	3	2
Average	3	2.6	2.6	2.6	1.6	2.6	2	2.4	2.2	2.4

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1403	Digital Principles and Computer Organization(T)	Core	4	4

This course will enable the student to understand the fundamentals of digital principles and the basics of computer organization. To familiarize the student in the concepts of gates, Boolean Algebra, Processor and Memory.

Course Outcomes

At the end of the course the student will be able to:

CO1: identify different types of number systems, Logic Gates, Boolean laws and theorems.

CO2: formulate different theorems for simplification of basic digital electronics circuits and able to build arithmetic operations using logic circuits.

CO3: carry out the basics of Flip-flop, shifts register, counters and Semiconductor memory for data Processing circuits.

CO4: recognize the basic structure of computer and control unit operations.

CO5: extend the learning of memory organization.

Unit I   **12 Hours**

Number Systems -Binary- Octal and Hexadecimal number systems – Conversion between number systems – Binary Arithmetic - Binary codes – BCD - Arithmetic. Boolean Algebra and Logic Gates- AND-OR, NOT- NAND- NOR- XOR and XNOR gates – Truth tables Applications of XOR Gate- Fundamentals of Boolean Algebra – Laws and theorems of Boolean Algebra – Demorgan's theorem.

Unit II   **12 Hours**

Canonical SOP and POS forms – Algebraic Simplification – Karnaugh Maps – NAND / NOR Implementation of Boolean Expressions –. Combinational Logic Circuits: Half and Full Adders –Multiplexer &Demultiplexer – Encoder & Decoder.

Unit III   **12 Hours**

Flip-flop- -NAND Latch – SR Flipflop – JK Flipflop – Edge Triggering – PRESET and CLEAR inputs- Shift Register- Universal Shift Register – Counters- Asynchronous and Synchronous Counters – BCD counter.

Unit IV   **12 Hours**

Instruction Codes – Computer Register – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instruction – Input Output and Interrupt - CPU: General Register Organization – Stack Organization – Instruction Formats – Addressing Modes.

Unit V   **12 Hours**

Main memory - Memory Hierarchy – Main memory – Auxiliary memories – Associative

Memory – Cache memory – Virtual Memory.

Learning Resources:

Text Books:

1. MorisMano," Digital Logic and Computer Design" –Pearson India, 1st edition,2014.

2. Carl Hamacher, "Computer Organization", 5th edition, Tata McGraw Hill, 2014.

References:

1.A. P. Malvino, "Digital Principles and Applications"- McGraw Hill 8th editions, 2015.

2.Morris Mano, "Computer System Architecture", 3rd edition, Prentice Hall, 2014.

WebSites/e-Learning Resources:

1.https://www.toppr.com/guides/computer-aptitude-and-knowledge/basics-of-computers/number-systems/

2.https://www.tutorialspoint.com/digital_circuits/digital_circuits_k_map_method.htm

3.https://www.electronics-tutorials.ws/sequential/seq_5.html

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	2	2	2	3	2	2	2	2
CO2	3	2	2	2	2	3	3	2	1	2
CO3	3	3	3	3	2	3	3	3	3	2
CO4	2	3	3	3	2	2	2	3	3	1
CO5	3	3	3	3	1	3	2	2	3	1
Average	2.8	2.6	2.6	2.6	1.8	2.8	2.4	2.4	2.4	1.6

Strong -3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1201	Digital Empowerment(T)	NME	3	2

This course aims to develop students to understand digital technologies, digital literacy skills, online communication, digital security, ethical considerations and some of the technologies of the digital world.

Course Outcomes

At the end of the course the student will be able to:

CO1: use ICT and digital services in daily life.

CO2: develop skills to communicate and collaborate in cyberspace using social platforms, teaching/learning tools.

CO3:discuss the significance of security and privacy in the digital world.

CO4: evaluate ethical issues in the cyber world.

CO5: discuss the Emerging Technology.

Unit I **9 Hours**

Definition of Digital Literacy -Current Trends of Digital Technology - Evaluating the credibility of online information- Copyright and plagiarism awareness - Application of our country -Digi Locker-E-Hospitals- e-Pathshala, SHIM- e-Kranti -Electronic Delivery of Services- e-Health Campaigns

Unit II **9 Hours**

Online Communication and Collaboration- Electronic Communication: electronic mail- blogs- social media - Collaborative Digital platforms Tools platforms for online learning Collaboration Using File Sharing- messaging-video conferencing.

Unit III **9 Hours**

Digital Security- Online security and privacy -Threats in the digital world- Data breach and Cyber Attacks -BlockchainTechnology- Security Initiatives by the Govt of India.

Unit IV   **9 Hours**

Responsible online behaviour and digital etiquette - Understanding online communities and their norm - Ethical considerations in digital technology usage.

Unit V   **9 Hours**

Emerging Technology- Exploring emerging technology and it's impact -AI and Machine Learning - IOT and Connected Devices

Learning Resources:

Text Book:

1.Understanding Digital Literacies: A Practical Introduction, by Rodney H. Jones, Christoph A. Hafner.

References:

1.Understanding the Digital World: What You Need to Know about Computers, the Internet, Privacy, and Security Hardcover by Brian W. Kernighan.

WebSites/e-Learning Resources:

1.https://decodingdigitalliteracy.org/

2.http://laurabiancoedtech.weebly.com/digital-rights-and-responsibilities.html

3.https://qat.com/9-emerging-technologies/

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	2	2	2
CO2	3	3	3	2	2	3	3	2	1	2
CO3	3	3	3	3	1	3	3	3	2	2
CO4	2	3	3	3	2	2	3	3	2	1
CO5	3	3	3	3	2	3	2	2	2	1
Average	2.8	3	3	2.8	1.8	2.8	2.6	2.4	1.8	1.6

Strong -3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1502	Java Programming(T)	Core	5	5

To enable the students to learn the basic concepts of Java programming and to use class and objects to create applications. This course helps to understand applet, swings, AWT and Event handling in Java.

Course Outcomes

At the end of the course the student will be able to:

CO1: understand the basic Object-oriented concepts and implement the basic constructs of Core Java.

CO2: apply reusability using inheritance and package.

CO3: implement multi-threading and I/O Streams of Core Java.

CO4: design real time applications using AWT and event handling concepts.

CO5: able to design GUI based applications.

Unit I   **15 Hours**

Introduction of Object Oriented Concepts – History of Java – Java buzzwords – JVM architecture - Datatypes - Variables - Scope and life time of variables - arrays - operators – control statements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data – Static Method String and String Buffer Classes.

Unit II   **15 Hours**

Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch -Usage of final keyword.Packages:Definition-AccessProtection - ImportingPackages-Interfaces-Definition–Implementation–Extending Interfaces.

Unit III   **15 Hours**

Try – catch- throw - throws – finally – Built-in Exceptions - Creating own Exception classes, Thread Class - Runnable interface, I/O Streams: Concepts of streams - Stream classes- Byte and Character stream - File Handling.

Unit IV   **15 Hours**

The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Color - Fonts and layout managers. Event Handling: Events - Event sources - Event Listeners - Event Delegation Model EDM - Handling Mouse and Keyboard Events.

Unit V   **15 Hours**

Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton – Jlabel-JTextField - JTextArea - JList - JComboBox - JScrollPane.

Learning Resources:

Text Books:

1. Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.

2.Herbert Schildt, "JAVA 2: The Complete Reference", McGraw Hill 2018, 11th Edition.

References:

2. Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.

WebSites/e-Learning Resources:

1.http://www.javaworld.com

2.http://www.inside-java.com

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	2	2	2	3	2	1	2	1
CO2	3	2	2	2	2	3	3	2	1	1
CO3	2	2	3	3	2	3	3	2	2	2
CO4	2	3	3	2	1	2	1	2	2	1
CO5	3	3	3	3	1	2	2	2	3	1
Average	2.6	2.4	2.6	2.4	1.6	2.6	2.2	1.8	2	1.2

Strong - 3 Medium - 2 Low -1

Course Code	Name Of the Course	Category	Hours/Wk.	Credits
24CAI1402	Java Programming Lab(L)	Core	4	4

This course is to enable the student to understand the basics of Java programs and their execution. It also helps them to understand the life cycle of the applets, database connectivity and their functionality.

Course Outcomes

At the end of the course the student will be able to:

CO1: apply Object Oriented Programming concepts through Java program.

CO2: develop robust program using Exception Handling.

CO3: develop simple programs with multiple threads, Applet and Swing.

CO4: construct java programs to connect databases and files.

CO5: design an application using an Applet.

List of Programs:

1.Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer

2.Write a Java program to multiply two given matrices.

3.Write a Java program that displays the number of characters, lines and words in a text

4.Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.

5.Write a program to do String Manipulation using Character Array and perform the following string operations:

a.String length

b. Finding a character at a particular position

6.Write a program to perform the following string operations using String class:

a. String Concatenation

b. Search a substring

c.To extract substring from given string

7.Write a program to perform string operations using String Buffer class:

a. Length of a string

b. Reverse a string

c.Delete a substring from the given string

8.Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

9.Write a threading program which uses the same method asynchronously to print the numbers

1to10 using Thread1 and to print 90 to100 using Thread2.

10.Write a program to demonstrate the use of following exceptions.

a. Arithmetic Exception

b. NumberFormat Exception

c.ArrayIndexOutofBoundException

d.NegativeArraySizeException

11.Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes

12.Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.

13.Write a Java program that handles all mouse events and shows the event name at the centre of the window when a mouse event is fired. Use adapter classes.

14.Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

15.Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.

Learning Resources:

Text Books:

1. Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.

2.Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.

References:

1.Herbert Schildt, "JAVA 2: The Complete Reference", McGraw Hill 2018, 11th Edition.

2. Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India,

2010.

WebSites/e-Learning Resources:

1.https://www.oracle.com/java/technologies/java-technology-reference.html

2.https://webreference.com/java/

3..http://sel.scu.edu/~gbhimara/thesis/JavaTutor.html

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	2	2	2	3	2	1	2	2
CO2	3	2	2	2	1	3	3	2	2	1
CO3	2	2	3	3	2	3	3	2	2	2
CO4	2	3	3	2	1	2	1	2	2	1
CO5	3	3	3	3	1	2	2	2	3	2
Average	2.6	2.4	2.6	2.4	1.4	2.6	2.2	1.8	2.2	1.6

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1404	Operating System(T)	Core	4	4

This course will enable the student to have an overview on the components of the Operating systems. It will also provide knowledge on the principles of deadlock, design issues related to processor scheduling, process management, storage management and file management.

Course Outcomes

At the end of the course the student will be able to:

CO1: identify the components of operating systems, process and threads.

CO2: summarize the process management concept for the given situation.

CO3:to gain knowledge on indefinite postponement, condition for deadlock and deadlock solutions.

CO4: have complete knowledge of scheduling algorithms and its types.

CO5:choose the page replacement algorithms and storage structure concepts.

Unit I   **12 Hours**

Introduction- operating system history1990s to 2000 and beyond-, Distributed computing- parallel computation. Process concepts-Definition of process-Process states- Life cycle of a Process-Process management- Process state transitions-Process Control Block(PCB)-Process operations- suspend and resume-Context switching-Interrupts -Interrupt processing-Interrupt classes- Inter process communication-Signals-Message passing.

Unit II   **12 Hours**

Asynchronous concurrent processes- mutual exclusion - critical section- mutual exclusion primitives- implementing mutual exclusion primitives-Peterson's algorithm-Semaphores –Mutual exclusion with Semaphores-counting semaphores-implementing semaphores- Concurrent programming- monitors- message passing.

Unit III   **12 Hours**

Resource concepts- four necessary conditions for deadlock-deadlock prevention-deadlock avoidance and Dijkstra's Banker's algorithm- deadlock detection- deadlock recovery.

Unit IV   **12 Hours**

Scheduling levels-scheduling objectives- scheduling criteria-preemptive vs non-preemptive scheduling- interval timer or interrupting clock- priorities- scheduling algorithms- FIFO scheduling- RR scheduling- quantum size- SJF scheduling- SRT scheduling- HRN scheduling- multilevel feedback queues-Fair share scheduling.

Unit V   **12 Hours**

Memory organization- Memory management- Memory hierarchy- Memory management strategies- contiguous vs non- contiguous memory allocation- single user contiguous memory allocation- fixed partition multiprogramming- variable partition multiprogramming- Memory swapping- Virtual Memory organization-virtual memory basic concepts- multilevel storage organization-block mapping-paging basic concepts-segmentation-paging/segmentation systems-Virtual Memory Management- Demand Paging- Page replacement strategies.

Learning Resources:

Text Book:

1. H.M. Deitel, Operating Systems, Third Edition, Pearson Education Asia, 2011.

References:

1.   William Stallings, Operating System: Internals and Design Principles, Seventh Edition, Prentice-Hall of India, 2012.

2.   A. Silberschatz, and P.B. Galvin., Operating Systems Concepts, Nineth Edition, John Wiley &Sons ASIA Pte Ltd.,2012.

.**WebSites/e-Learning Resources:**

1.https://www.guru99.com/operating-system-tutorial.html

2.https://www.geeksforgeeks.org/what-is-an-operating-system/

3.https://www.tutorialspoint.com/operating_system/os_memory_management.htm

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	2	1	2	3	3	2	3
CO2	2	3	2	3	2	3	3	2	1	3
CO3	3	3	3	3	2	3	2	3	3	2
CO4	2	2	3	2	1	2	2	3	3	2
CO5	3	3	3	2	1	3	2	2	3	2
Average	2.6	2.8	2.8	2.4	1.4	2.6	2.4	2.6	2.4	2.4

Strong -3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1202	Web Designing using HTML 5 (TcL)	NME	3	2

The course introduces the students to planning and designing effective web by writing HTML and CSS code producing a functional website.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the principle and basics of Web page design.

CO2: visualize the basic concept of HTML.

CO3:recognize the elements of CSS and its features.

CO4: explain the fundamentals of Java Script.

CO5: publish the web pages.

Unit I   **9Hours**

Introduction HTML- HTML Documents- basic structure of an HTML document- creating an HTML document- markup tags- heading-paragraphs- line breaks- HTML tags.

Unit II   **9 Hours**

Introduction to elements of HTML- working with Text- working with Lists- tables and frames- working with hyperlinks- images and multimedia- working with forms and controls.

Unit III   **9 Hours**

Introduction to Cascading Style Sheets- Concept of CSS- creating style sheet- CSS properties- CSS styling -background- text format- controlling fonts- working with block elements and objects- working with lists and tables- CSS id and class- box model-Introduction- border properties- padding properties- margin properties.

Unit IV   **9 Hours**

CSS advanced features -grouping- dimension- display- positioning- floating- align-pseudo class- navigation bar- image sprites- attribute sector- CSS colour. JavaScript Fundamentals-Data types and variables- functions- methods and events- controlling program flow- JavaScript object model.

Unit V   **9 Hours**

Introduction to Web Publishing or Hosting- Creating website- saving the website-working on the website- creating website structure- creating titles for web pages-themes-publishing website.

Learning Resources:

Text Book:

1.Boehm, A., & Ruvalcaba, Z. 2018. Munarch's HTML5 and CCS4th Edition. Mike

Murach & Associates.

References:

1. Minnick, J. 2015. Web Design with HTML5 and CSS3 8th Edition. Cengage Learning.

2. Edie Clem2022 JavaScript for Beginners: Learn JavaScript Language Quickly And Easily With This Comprehensive Guide. Tips and Tricks for Coding and Programming.

WebSites/e-Learning Resources:

1.https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf

2.https://www.w3schools.com/html/default.asp

3.https://www.simplilearn.com/tutorials/css-tutorial/advanced-css

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	2	2	2
CO2	3	3	3	3	1	2	3	1	1	1
CO3	3	3	3	3	2	3	2	2	2	2
CO4	3	3	3	2	2	2	3	1	2	2
CO5	3	3	3	3	1	3	2	2	2	1
Average	3	3	3	2.8	1.6	2.6	2.4	1.6	1.8	1.6

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI1200	Environmental Studies	AEC	3	2

The course aims at sensitizing student about environmental issues with those aspects of human behaviours which are more directly related to man's interaction with bio-physical environment and his ability to understand this interaction.

Course Outcomes:

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

CO1: articulate the interconnected and interdisciplinary nature of environmental studies.

CO2: gain knowledge about environment and ecosystem.

CO3: learn about natural resource, its importance and environmental impacts of human activities on natural resource.

CO4: aware about problems of environmental pollution, its impact on human and

ecosystem and control measures.

CO5: learn about increase in population growth and its impact on environment.

Unit I   **9 Hours**

Environmental Studies – Meaning – Objectives- Components – Physical-Biological- Scope - Importance of Studying Environmental Studies.

Unit II   **9 Hours**

Eco System – Concept – Components – Kinds –Structure- Food chains – Characteristic – Eco system Services.

Unit III   **9 Hours**

Natural Resources- Land Resources- Mineral Resources- Food Resources-ForestResources. Water Resources- Uses of water.

Unit IV   **9 Hours**

Pollution – Non-Degradable and Bio gradable pollutants- Types of pollutions-
Sources.

Unit V   **9 Hours**

Human communities and the Environment- Characteristics of human population –
Population Growth Trends in India- Impact of Over Population on the Resources.

Learning Resources:

Text Book:

1. Erach Bharucha – "Textbook of Environmental Studies", published by Universities
Press

2019.

Reference Books:

1. Anindita Das -Environmental Studies: Concepts, Connections, and Controversies"

published by Oxford University Press in 2023.

2. Dr. S. S. Dhote-"Introduction to Environmental Studies", published by
   HimalayaPublishing House in 2022.

Websites/ e-Learning Resources

   1 https://www.cseindia.org/

   2. https://www.teriin.org/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	1	1	1	1	1	1	2	2	1	1
CO2	1	1	1	1	1	1	3	1	1	1
CO3	1	1	1	1	1	1	2	2	1	2
CO4	1	1	1	1	1	1	3	2	2	1
CO5	1	1	1	1	1	1	2	2	2	1
Average	1	1	1	1	1	1	2.4	1.8	1.4	1.2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2401	Database Management Systems (T)	Core	4	4

This course will enable the student to understand database management system and the relational model of data.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the various basic concepts of Database System.

CO2: define the integrity constraints and discuss basic concepts of various Data Model.

CO3: design database schema considering normalization and relationships within database.

CO4: build the database tables and make DML operations, functions and joins.

CO5: learn to design Data base operations and implement using PL/SQL programs.

Unit I 12 Hours

Introduction -Database System-Characteristics of Database Management Systems- Architecture of Database Management Systems-Database Models-System Development Life Cycle-Entity Relationship Model.

Unit II 12 Hours

Relational database model - logical view of data-keys -Integrity rules - relational set operators - data dictionary - Codd's rules. Entity relationship model - ER diagram.

Unit III 12 Hours

Database tables and Normalization – The Need for Normalization –The Normalization Process. Introduction to SQL-Data Definition Commands – Data Manipulation Commands – SELECT Queries – Additional Data Definition Commands – Additional SELECT Query Keywords – Joining Database Tables.

Unit IV 12 Hours

Relational SET Operators: UNION – UNION ALL – INTERSECT - MINUS.SQL Join Operators: Cross Join – Natural Join – Join USING Clause – JOIN ON Clause – Outer Join.Sub Queries and Correlated Queries: WHERE – IN – HAVING – ANY and

ALL – FROM. SQL Functions: Date and Time Function – Numeric Function – String Function – Conversion Function.

Unit V   **12 Hours**

PL/SQL- Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Variable Declaration – Assignment operation –Arithmetic operators.Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit Cursors, Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

Learning Resources:

Text Books:

1.Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition

2.Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India, 2016

Reference:

1.AbrahamSilberschatz, Henry F.Korth and S.Sudarshan,"Database System Concepts", McGraw Hill International Publication ,VI Edition.

WebSites/e-Learning Resources:

1. https://www.geeksforgeeks.org/dbms/

2. https://www.simplilearn.com/tutorials/sql-tutorial/what-is-normalization-in-sql

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	2	2	3	2	2	2	2
CO2	2	3	2	3	2	2	3	2	2	3
CO3	3	3	3	3	2	2	2	3	2	2
CO4	3	3	2	2	1	2	2	3	3	2
CO5	3	3	3	3	1	3	2	2	3	2
Average	2.8	3	2.6	2.6	1.6	2.4	2.2	2.4	2.4	2.2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2403	Database Management Systems Lab(L)	Core	4	4

This course will enable the students to learn the various DDL and DML commands and also queries in PL/ SQL to retrieve information from database.

Course Outcomes

At the end of the course the student will be able to:

CO1: implement the DDL, DML Commands and Constraints.

CO2: create, update query on the database.

CO3: classify various functions available in SQL.

CO4: construct programming structure using PL/SQL.

CO5: build programs using Cursor.

List of Exercises:

I.   SQL

1.   DDL Commands

2.   DML Commands

3.   TCL Commands

II.   PL/SQL

4.   Fibonacci Series

5.   Factorial

6.   String Reverse

7.   Sum of Series

8.   Trigger

III.   CURSOR

9.   Student Mark Analysis using Cursor

IV.   APPLICATION

10.   Library Management System

11.   Student MarkAnalysis

Learning Resources:

Text Books:

1.Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition

2.Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India, 2016

References:

1.AbrahamSilberschatz, Henry F.Korth and S.Sudarshan,"Database System Concepts", McGraw Hill International Publication ,VI Edition.

2.Shio Kumar Singh , "Database Systems ",Pearson publications ,II Edition.

WebSites/e-Learning Resources:

1. https://www.geeksforgeeks.org/dbms/

2.https://onlinecourses.nptel.ac.in/noc22_cs91/preview

3. https://www.simplilearn.com/tutorials/sql-tutorial/what-is-normalization-in-sql

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	2	1	3	3	3	2	2
CO2	2	3	2	3	2	3	2	3	1	3
CO3	3	3	3	3	2	3	2	3	3	2
CO4	2	3	3	2	1	2	2	2	3	2
CO5	3	3	3	2	1	3	2	2	3	2
Average	2.6	3	2.8	2.4	1.4	2.8	2.2	2.6	2.4	2.2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2405	Data Structure and Algorithms (TcL)	Core	4	4

This course explores the principles and methods in the design and implementation of various data structures. It trains the students to solve the problems using various algorithms by searching through and manipulating data structures such as stack, queue and linked list.

Course Outcomes:

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

CO1: identify the storage mechanisms of data using Array and Stack.

CO2: generate the operation of Queue and Circular Queue using Array and Linked list

CO3: summarize the operations of single Linked list and double Linked list.

CO4: apply traversal of Binary tree and Binary search tree in various applications.

CO5: analyze various sorting and searching algorithms to process data.

Unit I 12 Hours

Arrays – Strings – Stacks – Operations on Stack –Representation of Stacks using Array and Linked list - Infix - Prefix and Post fix notations - Evaluation of Post fix - Infix- Prefix expression - Applications of Stacks.

Unit II 12 Hours

Operations on queue -Representation of Queue using array and linked list –Circular Queue – Operation on Circular queue - Representation of Circular Queue using array and linked list.

Unit III 12 Hours

Operations on linked list- Types of Linked List- Single Linked List- Operation on Single linked list - Double Linked list – Operations on Double Linked List.

Unit IV 12 Hours

Binary tree – Traversal of a Binary tree – Applications of Binary Tree - Binary Search TreeOperations on Binary search tree – Applications of Binary search tree .

Unit V   **12 Hours**

Bubble sort - Selection sort - Insertion sort - Quick sort - Merge sort –Search – Linear Search – Binary Search.

Learning Resources:

Text Book:

1. YashavanKanetkar "Data structures using C++", BPB publications 2nd edition ,2016.

References:

1. P. Sudharsan and J. John Manoj Kumar,"Data Structures using C", CBS publishers and distributors pvt ltd; First Edition, 2020.

2. SahniSartaj, "Data Structures using C++", TMH 2nd edition 2012.

Websites/ e-Learning Resources

1. https://www.w3schools.com/datascience/
2. https://en.wikipedia.org/wiki/Data_science
3. http://www.cmap.polytechnique.fr/~lepennec/en/post/references/refs/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	2	2	3	2	2	2	2
CO2	2	2	2	2	2	2	3	3	2	3
CO3	3	3	3	3	1	2	2	3	2	2
CO4	3	3	2	3	2	2	2	2	3	2
CO5	3	3	3	3	1	3	2	3	3	2
Average	2.8	2.8	2.6	2.6	1.6	2.4	2.2	2.6	2.4	2.2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2407	Introduction to Artificial Intelligence(T)	Core	4	4

This course will enable the student to provide strong foundation on fundamental concepts in Computing Intelligence and to apply basic principles of Artificial Intelligence.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the informed and uninformed problem types and apply search strategies to solve them.

CO2: apply basic principles of Artificial Intelligence in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3: demonstrate awareness and a fundamental understanding of various applications of Artificial Intelligence techniques in intelligent agent's other machine learning models.

CO4: formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.

CO5: explain the latest developments in Knowledge systems and Tools.

Unit I   **12 Hours**

Definition – Future of Artificial Intelligence –Characteristics of Intelligent Agents– Typical Intelligent Agents– Problem Solving Approach to Typical AI problems.

Unit II   **12 Hours**

Search Strategies- Uninformed –Informed – Heuristics – Local Search Algorithms andOptimization Problems -Searching with Partial Observations –Constraint Satisfaction Problems – Constraint Propagation –Backtracking Search – Game Playing – Optimal Decisions inGames – Alpha – Beta Pruning – Stochastic Games.

Unit III   **12 Hours**

PHP Knowledge Representation First Order Predicate Logic –Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation– Ontological Engineering-Categories and Objects – Events –Mental Events and Mental Objects – Reasoning Systems forCategories -Reasoning with Default Information.

Unit IV   **12 Hours**

Architecture for Intelligent Agents – Agentcommunication – Negotiation and Bargaining – Argumentationamong Agents – Trust and Reputation in Multi-agent systems-Analysis-Semantic Analysis, Discuses and Pragmatic Processing – Statistical Natural Language processing.

Unit V   **12 Hours**

AI applications – Language Models – InformationRetrieval- Information Extraction – Natural LanguageProcessing – Machine Translation – Speech Recognition –Robot – Hardware –Perception – Planning – Moving.

Learning Resources:

Text Books:

1.S. Russell and P. Norvig, "Artificial Intelligence: A ModernApproach, Prentice Hall, Third Edition, 2009.

2.Artificial Intelligence: A Modern Approach, 4 th Edition, StuartRussell, peter Norvig University of California at Berkeley, Pearsoneducation, 2020.

3.I. Bratko, ―Prolog: Programming for Artificial Intelligence,Fourth Edition, Addison-Wesley Educational Publishers Inc., 2011.

References:

1. Stuart Russell & Peter Norvig , "Artificial Intelligence A Modern Approach", Perason, 2nd Edition.

2. V S Janaki Raman, K Sarukesi, P Gopalakrishnan, "Foundations of Artificial Intelligent and Expert Systems", MacMillan India limited.

WebSites/e-Learning Resources:

1.https://artificialintelligence.oodles.io/blogs/expert-systems-in-artificial-intelligence/

2.https://data-flair.training/blogs/heuristic-search-ai/

3.https://www.scholarhat.com/tutorial/artificialintelligence/knowledge-representation-in-ai

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	2	3	2	1	2	2
CO2	3	2	3	3	2	2	3	2	2	3
CO3	2	3	2	3	1	3	3	2	2	2
CO4	3	3	3	3	2	3	3	2	3	2
CO5	3	3	3	3	2	3	3	2	2	3
Average	2.8	2.8	3	3	1.8	2.8	2.8	1.8	2.2	2.4

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2201	Internet of Things and Robotics (TcL)	SEC	3	2

This course will enable the student to learn about overview of the exciting fields of Internet of Things and Robotics and explore the fundamental principles and applications of robotics.

Course Outcomes

At the end of the course the student will be able to:

CO1: explain the design principle for Connected Devicesof IoT.

CO2: design a portable IoT using Arduino/ equivalent boards and relevant protocols.

CO3: operate web services to access/control IoT devices.

CO4: demonstrate knowledge of robots, characteristics, end effectors and actuators.

CO5: construct a model to design a robot.

Unit I   **9 Hours**

Internet of things- Overview- technology of the Internet of things- enchanted objects- Design principles for connected devices- Privacy- Web thinking for connected devices

Unit II   **9 Hours**

Writing Code- building a program and deploying to a device- writing to Actuators- Blinking Led- Reading from Sensors- Light Switch- Voltage Reader- Device as HTTP Client- HTTP- Push Versus Pull .

Unit III   **9 Hours**

Pachube- Netduino- Sending HTTP Requeststhe Simple Way- Sending HTTP Requests—the Efficient Way.

Unit IV   **9 Hours**

Introduction to Robotics- Introduction to Robotics- Classification -Components- Characteristics -Applications.

Unit V   **9 Hours**

Robotics Kinematics - Position Analysis- Robots as Mechanisms- Matrix Representation- Transformation Matrices- Forward and Inverse Kinematics.

Learning Resources:

Text Books:

1.Adrian McEwen and Hakim Cassimally, ―Designing the Internet of Things,John Wiley & Sons, 2013.

2.CunoPfister, ―Getting Started with the Internet of Things: Connecting Sensors and Microcontrollers to the Cloud, Maker Media, 2011.

3.Rob Barton, Gonzalo Salgueiro, David Hanes, ―IoT Fundamentals:

Networking Technologies, Protocols, and Use Cases for the Internet of Things, Cisco Press, 2017.
4.SaeedB.Niku,IntroductiontoRoboticsAnalysis,Application,PearsonEducationAsia, 2001 .

References:

1.Radomir Mihajlovic, Muthu Ramachandran, ReinholdBehringer, Petar Kocovic―Emerging Trends and Applications of the Internet of Things‖, IGI Global, 2017.
2.HwaiyuGeng, ―Internet of Things and Data Analytics Handbook‖, John Wiley & Sons, 2017.
3.Marco Schwartz, ―Internet of Things with Arduino Cookbook‖, Packt Publishing, 2016.

WebSites/e-Learning Resources:

1.http://www.mb.net/resources/cloud-computing-resources.aspx
2.http://www.mastertheboss.com/cloud-computing/in-the-cloud-computing-a-beginnerstutorial
3.http://www.south.cattelecom.com/technologies/cloudcomputing/indes.aspx

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	2	2	2
CO2	3	2	3	3	2	3	3	1	2	1
CO3	3	3	3	3	2	3	3	2	2	2
CO4	2	3	3	2	2	2	3	2	2	2
CO5	3	3	3	3	2	3	2	2	2	1
Average	2.8	2.8	3	2.8	2	2.8	2.6	1.8	2	1.6

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2402	PythonProgramming (T)	Core	4	4

This course will enable the student to understand the core syntax and semantics of Python programming language and discover the need for working with the strings,functions, lists, dictionaries, tuples, packages and Dictionaries.

Course Outcomes

At the end of the course the student will be able to:

CO1: learn the basics of python and do simple programs on python.

CO2: interpret the syntax and semantics for control flow statements.

CO3 : elaborate the concept of function and implementing the concept of strings in various applications.

CO4: design and develop a program using list, tuples and dictionary.

CO5: develop application by using File handling in python.

Unit I **12 Hours**

Basics of Python Programming- History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. Python Arrays: Defining and Processing Arrays – Array methods.

Unit II **12 Hours**

Control Statements- Selection/Conditional Branching statements: if, if-else-nested if and if-elif-else statements. - Iterative Statements- while loop - for loop- else suite in loop and nested loops. -Jump Statements: break - continue and pass statements.

Unit III **12 Hours**

Functions- Function Definition – Function Call – Variable Scope-Return Statement. Function Arguments- Required Arguments - Keyword Arguments - Default Arguments and Variable Length Arguments- Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules- import statement- The Python module – dir function – Modules and Namespace – Defining our own modules.

Unit IV **12 Hours**

Lists- Creating a list -Access values in List-Updating values in Lists-Nested lists - Basic list operations-List Methods. Tuples-Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. Dictionaries- Creating-Accessing- Updating -Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.

Unit V **12 Hours**

Python File Handling- Types of files in Python - Opening and Closing files-Reading and Writing files: write and write lines methods- append method – read and read lines methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.

Learning Resources:

Text Books

1. Reema Thareja, "Python Programming using problem solving approach", First Edition, 2023, Oxford University Press.
2. Dr. R. NageswaraRao, "Core Python Programming", First Edition, 2017, Dream tech Publishers.

References

1. Kenneth A. Lambert, "Fundamentals of Python – First Programs", 2019, CENGAGE Publication.
2. Yashavant Kanetkar, Aditya Kanetkar, "Let Us Python", 6th Edition, 2024, BPB Publications, New Delhi.

Websites/ e-Learning Resources

1.http://interactivepython.org/courselib/static/pythonds

2.http://www.ibiblio.org/g2swap/byteofpython/read/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	2	3	2	2	2	2
CO2	3	3	3	2	2	3	3	2	2	3
CO3	3	2	2	3	2	3	2	2	3	2
CO4	2	3	2	3	2	2	3	2	3	2
CO5	3	3	3	3	2	3	3	2	2	3
Average	2.8	2.8	3	2.8	2	2.8	2.6	2	2.4	2.4

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2404	Python Programming Lab (L)	Core	4	4

This course will enable the student to implement the python programming features in practical applications and write, test, and debug python programs.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss theproblem-solving approaches.

CO2: demonstrate the understanding of syntax and semantics.

CO3: implement the basic programming constructs in Python.

CO4: use Python data structures - lists, tuples, dictionaries.

CO5: construct do input/output with files in Python.

List of Programs

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:

   Grade A: Percentage >=80   Grade B: Percentage >=70 and 80

   Grade C: Percentage >=60 and <70   Grade D: Percentage >=40 and <60

   Grade E: Percentage < 40
3. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Write a Python script that prints prime numbers less than 20.
5. Program to find factorial of the given number using recursive function.
6. Write a Python program to count the number of even and odd numbers from array of N numbers.
7. Write a Python class to reverse a string word by word.

8. Given a tuple and a list as input, write a program to count the occurrences of all items of the list in the tuple. Input : tuple = 'a', 'a', 'c', 'b', 'd', list = ['a', 'b'], Output : 3

9. Create a Savings Account class that behaves just like a Bank Account, but also has an interest rate and a method that increases the balance by the appropriate amount of interest Hint: use Inheritance.

10. Write a Python program to construct the following pattern, using a nested loop

```
    *
   **
  ***
 ****
*****
 ****
  ***
   **
    *
```

11. Read a file content and copy only the contents at odd linesinto a new file.

12. Create a Turtle graphics window with specific size.

13. Write a Python program for Towers of Hanoi using recursion

14. Create a menu driven Python program with a dictionary for words and their meanings.

15. Devise a Python program to implement the Hangman Game.

Learning Resources:

Text Books:

1.Reema Thareja, "Python Programming using problem solving approach", First Edition, 2017, Oxford University Press.

2. Wesley J. Chun, "Core Python Applications Programming", 3rd Edition , Pearson Education, 2016.

References:

1. Mark Lutz, "Learning Python Powerful Object Oriented Programming", O'reilly Media 2018, 5th Edition.

2. Timothy A. Budd, "Exploring Python", Tata MCGraw Hill Education Private Limited 2011, 1 st Edition.

WebSites/e-Learning Resources:

1.https://www.programiz.com/python-programming

2.https://www.guru99.com/python-tutorials.html

3.https://www.w3schools.com/python/python_intro.asp

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	2	3	2	2	2	2
CO2	2	3	3	2	2	3	3	2	2	3
CO3	3	3	2	3	3	3	2	3	3	2
CO4	3	3	3	3	2	2	3	2	2	2
CO5	3	3	3	3	3	3	3	2	2	3
Average	2.8	3	3	2.8	2.4	2.8	2.6	2.2	2.2	2.4

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2406	Data mining and Warehousing(T)	Core	4	4

This course enables the students to understand the basic concepts of data mining techniques and algorithms.

Course Outcomes

At the end of the course the student will be able to:

CO1: describe the concepts of Data mining and its process.

CO2: explain the Architecture and Characterization of Data mining.

CO3: illustrate Association Rules from Databases.

CO4: identify Classification and Prediction.

CO5: demonstrate Cluster Analysis and Clustering methods.

Unit I   **12 Hours**

Data mining Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction.

Unit II   **12 Hours**

Data Mining – Primitives – Data Mining Query Language, Architecture of Data mining Systems. Concept Description, Characterization and Comparison: Data Generalization – Summarization-Analytical Characterization- Mining Class Comparison – Statistical Measures.

Unit III   **12 Hours**

Basic Concepts – Single Dimensional Boolean Association Rules from Transaction Databases- Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.

Unit IV   **12 Hours**

Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods. Prediction – Introduction – Classifier Accuracy.

Unit V   **12 Hours**

Introduction – Types of Data in Cluster Analysis-Petitioning Methods – Hierarchical Methods-Density Based Methods – GRID Based Method – Model based Clustering Method.

Learning Resources:

Text Book:

1.Han and M. Kamber, "Data Mining Concepts and Techniques", 2001, Harcourt India Pvt. Ltd, New Delhi.

References:

1.K.P. Soman, ShyamDiwakar, V. Ajay "Insight into Data Mining Theory and Practice ",Prentice Hall of India Pvt. Ltd, New Delhi

2.Parteek Bhatia, 'Data Mining and Data Warehousing: Principles and Practical Techniques', Cambridge University Press, 2019

WebSites/e-Learning Resources:

1.https://www.educative.io/answers/what-is-association-rule-mining

2.https://www.simplilearn.com/tutorials/machine-learning-tutorial/classification-in-machine-learning

3.https://www.geeksforgeeks.org/data-mining-cluster-analysis/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	3	2	2	2	2	2
CO2	3	2	3	3	2	2	2	1	3	2
CO3	3	3	3	3	2	2	3	3	2	2
CO4	3	2	3	2	2	2	3	2	1	1
CO5	3	3	2	3	1	3	3	3	2	3
Average	3	2.6	2.8	2.8	2	2.2	2.6	2.2	2	2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2408	Computer Networks(T)	Core	4	4

This course will enable the student to understand the role of different layers of OSI and TCP/IP reference models and including cryptographic techniques for securing communication.

Course Outcomes:

At the end of the course the student will be able to:

CO1: analyze the basic concepts of network for data communication.

CO2: discuss the structure of the telephone systems in wireless networks.

CO3: assess different medium access control protocols and their operations.

CO4: compare and analyze various routing and congestion control algorithms.

CO5: evaluate the effectiveness of different cryptographic algorithms.

Unit I   **12 Hours**

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet - ATM - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media.

Unit II   **12 Hours**

Wireless Transmission - Communication Satellites – Telephone System: Structure - Local Loop - Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.

Unit III   **12 Hours**

Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – ALOHA - CSMA - Collision free protocols.

Unit IV   **12 Hours**

Network Layer - Design Issues - Routing Algorithms – Shortest Path Routing-Flooding-Distance Vector Routing-Link State Routing- Hierarchical routing-

Congestion Control Algorithms – General Principles of Congestion Control-Traffic Shaping- IP Protocol – IP Addresses – Internet Control Protocols.

Unit V   **12 Hours**

Transport Layer - Services - Addressing - Establishing and Releasing a Connection – Simple Transport Protocol – Network Security - Cryptography - Secret key Algorithms - Public key Algorithms.

Learning Resources:

Text Book:

1.A. S. Tanenbaum, Computer Networks, 4th Edition, Prentice-Hall of India, 2008.

References:

1. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2017

2. F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008

3. D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.

4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

WebSites/e-Learning Resources:

1.https://citationsy.com/styles/computer-networks

2.https://www.tutorialspoint.com/sliding-window-protocol

3.https://unstop.com/blog/routing-algorithms-in-computer-networks

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	3	1	2	3	3	1	2	1
CO2	3	2	3	1	2	3	3	1	2	2
CO3	3	2	3	1	2	3	3	1	2	2
CO4	3	2	3	1	2	3	3	1	2	3
CO5	3	2	3	1	1	3	3	2	2	3
Average	3	2	3	3	1.8	3	3	1.2	2	2.2

Strong -3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2410	Data Science Using R Programming (TcL)	Supportive	5	4

The objective of this course to understand concept of data science using a R programming language.

Course Outcomes

At the end of the course the student will be able to:

CO1: describe the data preparation and modelling.

CO2: discussthe key terminologies, concepts and techniques employed in Statistical Analysis.

CO3: practice using R Programming Language to perform basic tasks on Vectors, Matrices and Data frames.

CO4: analyze data and generate reports based on the data.

CO5: apply various concepts to write programs in R.

Unit I   **15 Hours**

Introduction to Data Science-Introduction- Life Cycle of Data Science -AI- Machine Learning and Data Science - What is Data Science -Cases for Data Science -Data Science Classification -Data Science Algorithms.

Unit II   **15 Hours**

Introduction -Data Science Process- Prior Knowledge- Data Preparation -Modelling-training and testing data sets- Applications- Knowledge.

Unit III   **15 Hours**

Introduction -Objective of Data Exploration- Data Sets -Types of Data -Data Visualization- Histogram-Quartile, Scatter plot -Classification -Decision tree -Rule indication- Support Vector Machine.

Unit IV   **15 Hours**

Getting started with R-Introduction – R variables and constants - R operators – R if statement - Data types in R- Vector -Basic plotting.

Unit V   **15 Hours**

Matrix – Arrays- list -Data frame- Factors- Table Function- Function in R - Math functions -Set operation in R.

Learning Resources:

Text Book:

1.Dr.M.DavamaniChristober, *Concepts of Data Science using R*, Kanthagapookalpathipagam, 2021.

References:

1.Jared P. Lander, "R for Everyone: Advanced Analytics and Graphics", Addison-Wesley Data & Analytics Series, 2013.

2. Norman Matloff, "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press, 2011.

WebSites/e-Learning Resources:

1. https://www.knowledgehut.com/blog/data-science/what-is-data-science-life-cycle

2.https://livebook.manning.com/book/introducing-data-science/chapter-2/

3.https://towardsdatascience.com/support-vector-machine-introduction-to-machine-learning-   algorithms-934a444fca47?gi=d254c6ba95db

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	3	3	2	3	3	1	2	1
CO2	2	2	3	3	2	3	3	2	2	2
CO3	3	2	3	3	2	3	3	2	1	2
CO4	3	2	2	2	2	3	3	1	2	2
CO5	3	2	3	3	1	3	3	2	2	3
Average	2.8	2	2.8	2.8	1.8	3	3	1.6	1.8	2

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI2202	Generative AI for Software Development (TcL)	SEC	3	2

The objective of this course to expose student to learn generative artificial intelligence tools for Software Development.

Course Outcomes

At the end of the course the student will be able to:

CO1: use the AI Chatbots.

CO2: apply image generation using midjourney.

CO3: recognize the applications, benefits and features of Synthesia.

CO4: apply Copilot by Github for writing code.

CO5: learn alternative for ChatGPT alternatives.

Unit I   **9 Hours**

Introduction to Generative AI-Chatbots- Working of AI Chatbots- Popular AI Chatbots- ChatGPT and its working- How to use ChatGPT- Usecases of ChatGPT for various users.

.**Unit II**   **9 Hours**

Role of AI in Image Generation- Image Sourcing VsImage Generation- Popular AI tools for Image Generation. Midjourney for Image Generation- Working of midjourney- Advantages and disadvantages of Midjourney- How to use Midjourney- Usecases of Midjourney.

Unit III   **9 Hours**

AI Tools in Video Making- Working of AI Video Makers- Benefits of AI Video Makers- Popular AI Video Makers- Introduction to Synthesia- Features of Synthesia- Compatibility of Synthesia- Pros and Cons of Synthesia- How to use Synthesia- How to make AI Videos in 10 minutes- Practical Case studies of Synthesia

Unit IV   **9 Hours**

Role of AI Tools in Programming- Copilot by Github- Working of Copilot- Copilot Compatibility- Advantages and Drawbacks of Copilot- How to use Copilot- How to

Install the GitHub Copilot Extension- Converting Comments to Code using Copilot-
Auto filling Repetitive Code using Copilot- Running Tests using Copilot.

Unit V   **9 Hours**

Navigating Unfamiliar Territory with Copilot- Creating an Application Entirely With
Copilot- Some useful keyboard shortcuts for Github's Copilot-Alternative Chatbots-
Comparision of ChatGPT- Bard- LLAMA- Claude.

Learning Resources:

Text Book:

1. Generative AI for Effective Software Development,Anh Nguyen-Duc (Software
engineer), Foutse Khomh, Pekka Abrahamsson,SBN:9783031556425, ,2024

References:

1. Generative AI in Software DevelopmentBeyond the Limitations of Traditional
Coding

By Jesse Sprinter, 2023

2.Mastering Generative AI in the Software Development Life CycleBy Anand
Vemula,2024

WebSites/e-Learning Resources:

1.https://www.gartner.com/en/topics/generative-ai

2.https://www.techtarget.com/whatis/definition/ChatGPT

3.https://github.com/features/copilot

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	2	1	2
CO2	3	3	3	3	1	3	3	1	2	1
CO3	3	3	2	3	1	3	3	2	1	2
CO4	3	3	3	2	2	2	3	2	1	1
CO5	3	3	3	3	1	3	2	1	2	1
Average	3	3	2.8	2.8	1.4	2.8	2.6	1.6	1.4	1.4

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3401	Machine Learning (T)	Core	4	4

This course enables the student to understand basic concepts of machine learning and how to evaluate models generated from data .Discover how to build machine learning algorithms, prepare data, and use different techniques.

Course Outcomes

 At the end of the course the student will be able to:

CO1: discuss about Machine Learning and parametric models for classification and regression.

CO2: apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

CO3: apply appropriate data sets to the Machine Learning algorithms.

CO4: demonstrate the mathematical relationships across Machine Learning algorithms.

CO5: apply advanced learning.

Unit I 12 Hours

Introduction Machine Learning - Difference between AI, Machine Learning and Big data. Supervised and unsupervised learning- parametric vs non-parametric models-parametric models for classification and regression- Linear Regression- Logistic Regression-Naïve Bayes classifier- simple non-parametric classifier-K-nearest neighbour-support vector machines.

Unit II 12 Hours

Neural networks and genetic algorithms Neural Network Representation – Problems – Perceptron's – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms.

Unit III 12 Hours

Bayesian and computational learning Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network.

Unit IV   **12 Hours**

Instant based learning K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

Unit V   **12 Hours**

Advanced learning Recommendation systems – opinion mining, sentiment analysis. Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning.

Learning Resources:

Text Books:

1.Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education India Private Limited, 2013.

2.Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning" 2015, MIT Press.

References:

1.EthemAlpaydin, ―Introduction to Machine Learning Adaptive Computation and Machine Learning, The MIT Press 2004.

2.Stephen Marsland, ―Machine Learning: An Algorithmic Perspective, CRC Press, 2009.

WebSites/e-Learning Resources:

1..https://towardsdatascience.com/parametric-vs-non-parametric-methods-2cea475da1a

2.https://www.baeldung.com/cs/genetic-algorithms-vs-neural-networks

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	3	3	3	1	2	1
CO2	3	3	2	3	2	3	3	2	2	2
CO3	3	2	3	3	3	3	3	2	3	2
CO4	3	3	2	3	2	3	3	2	2	2
CO5	3	3	3	2	3	3	3	2	2	3
Average	3	2.8	2.6	2.8	2.6	3	3	1.8	2.2	2

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3403	Machine Learning lab (L)	Core	4	4

This course enables the student to understand the mathematical and statistical perspectives of machine learning algorithms through python programming.

Course Outcomes

At the end of the course the student will be able to:

CO1: design and evaluate the unsupervised models through python in built functions.

CO2: evaluate the machine learning model algorithms by python programming.

CO3: design and apply various reinforcement algorithms to solve real time complex problems.

CO4: apply the machine learning for visualization using python.

CO5: design and develop the code for the recommender system.

List of Programs

1. Write a program to implement the Simple and Multiple Linear Regression

2. Write a program to implement the Polynomial Regression.

3. Write a program to implement the Bagging Technique.

4. Write a program to implement the Adaboost Methods.

5. Write a program to implement Logistic Regression algorithm.

6. Write a program to demonstrate the workflow of Decision Tree Classification.

7. Write a program to implement the Random Forest Classification.

8. Write a program to implement the SVM Classification.

9. Write a program to perform the K Means Clustering.

10. Write a program to perform the Density based Clustering.

11. Write a program to implement the Apriori algorithm for market basket analysis.

12. Write a program to compare the Supervised Machine Learning algorithm.

Learning Resources:

Text Books:

1.Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education India Private Limited, 2013.

2.Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning" 2015, MIT Press.

References:

1. Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012.

2. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Third Edition, 2014.

3. Tom Mitchell, "Machine Learning", McGraw-Hill, 1997.

4. Sebastian Raschka, Vahid," Python Machine Learning and deep learning", 2nd edition, kindle book, 2018.

5. Carol Quadros," Machine Learning with python, scikit-learn and Tensorflow", Packet Publishing, 2018.

6. Gavin Hackeling," Machine Learning with scikit-learn", Packet publishing, O'Reilly, 2018 .

7. Stanford Lectures of Prof. Andrew Ng on Machine Learning.

WebSites/e-Learning Resources:

1. https://www.w3schools.com/python/python_ml_multiple_regression.asp

2.https://www.geeksforgeeks.org/python-exercises-practice-questions-and-solutions/

3.https://www.w3schools.com/python/python_ml_k-means.asp

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	3	3	3	1	2	2
CO2	3	3	2	3	2	3	3	2	2	2
CO3	3	2	3	3	3	3	3	2	2	2
CO4	2	3	3	3	2	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3
Average	2.8	2.6	2.6	3	2.6	3	3	1.8	2	2.2

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3501	WebTechnology (TcL)	Core	5	5

This course enables the student to develop websites ranging from simple online information forms to complex e-commerce sites.

Course Outcomes

. At the end of the course the student will be able to:

CO1: design a dynamic webpage by usingHTML and CSS.

CO2: apply design principles and techniques.

CO3: discuss and apply Java Script in webpages.

CO4: design and develop Web Applications using AJAX.

CO5: design interactive and dynamic web applicationsusing Bootstrap's.

Unit I   **15 Hours**

HTML-Introduction-tag basics- page structure-adding comments working with texts-paragraphs and line break- heading and horizontal rules-list-font size- face and colour-alignmentlinks-tables-frames-Forms- Images and Multimedia

Unit II   **15 Hours**

DHTML – Features – components - Document object model (DOM)- difference between HTML and DHTML – CSS – Properties of CSS – types of CSS- Connecting CSS to a page - CSS examples – Bootstrap- CSS variables – Color modes-Layout – Components - Forms

Unit III   **15 Hours**

Adding the JavaScript tag- Adding JavaScript to HTML pages- Using external JavaScript - Building a JavaScript program: JavaScript Programming- Functions-Objects – Adding jQuery: Introduction- Installing jQuery- Adding jQuery to a page - Working with HTML using jQuery.

Unit IV   **15 Hours**

Introduction to Ajax- advantages -disadvantages-Purpose of Ajax based web application-alternatives of Ajax-Introduction to array-operators- making statements-date & time-mathematicsstrings-Event handling-form properties AJAX.

Unit V **15 Hours**

Bootstrap Layout-Bootstrap tables-Bootstrap List-Bootstrap Form-Bootstrap Object navigation-Create a web page using bootstrap elements-Create a web page using bootstrap objects.

Learning Resources:

Text Book:

1Gopalan, N. P., Adikesavan, T. A. 2014. Web Technology: A Developer's Perspective. India: PHI learning.

References:

1. Html5 Black Book: Covers Css3, Javascript, Xml, XHTML, Ajax, PHP And jquery",Wiley India Pvt. Limited, 2011.

2.Chris Bates, Web Programming: Building Internet Applications, 3rd Ed. 2007. India: Wiley India Pvt. Limited.

3. Akanksha Rastogi, Web Technology, K.Nath& Co Educational Publishers, 1st Edition, 2012.

WebSites/e-Learning Resources:

1.https://www.w3schools.com/html/

2. https://www.codecademy.com/

3. https://www.javatpoint.com/html-tutorial

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	3	3	2	3	2	1	2	2
CO2	3	3	3	3	2	2	3	2	1	2
CO3	3	3	2	3	2	3	2	2	2	2
CO4	2	2	3	2	2	3	3	2	3	2
CO5	3	3	3	3	2	3	3	2	2	3
Average	2.8	2.6	2.8	2.8	2	2.8	2.6	1.8	2	2.2

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3503	Software Engineering (T)	Core	5	5

This course enables the students will gain experience on various processes used in Software industry for the development of a software product.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the various Software Life Cycle Models.

CO2: apply design principles and techniques.

CO3: model a reliable and cost-effective software system.

CO4: ability to write a test case to build an effective software system.

CO5: illustrate software maintenance at various levels and produce an efficient system.

Unit I   **15 Hours**

The software engineering discipline- programs vs. software products- why study software engineering- emergence of software engineering- Notable changes in software development practices- computer systems engineering. Software Life Cycle Models- Why use a life cycle model- Classical waterfall model- iterative waterfall model- prototyping model- evolutionary model- spiral model- comparison of different life cycle models.

Unit II   **15 Hours**

Requirements gathering and analysis- Software requirements specification SRS- Software Design- Good software design- cohesion and coupling- neat arrangement- software design approaches- object- oriented vs function-oriented design.

Unit III   **15 Hours**

Overview of SA/SD methodology- structured analysis- data flow diagrams DFD's- structured design- detailed design. User-Interface design- Characteristics of a good interface; basic concepts; types of user interfaces; component-based GUI development- a user interface methodology.

Unit IV   **15 Hours**

Coding- code review- testing; testing in the large vs testing in the small- unit testing- black-box testing; white-box testing; debugging; program analysis tools- integration testing- system testing- some general issues associated with testing. Software Reliability and Quality Management- Software reliability-statistical testing; software quality- software quality management system- SEI capability maturity model-personal software process.

Unit V   **15 Hours**

CASE and its scope- CASE environment-CASE support in software life cycle-other characteristics of CASE tools- towards second generation CASE tool- architecture of a CASE environment-Software Maintenance- Characteristic of software maintenance-software reverse engineering; software maintenance process models-estimation of maintenance cost.

Learning Resources:

Text Book:

1. Rajib Mall, Fundamentals of Software Engineering, Fifth Edition, Prentice-Hall of India, 2018.

References:

1. Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill publishing company Ltd, Edition 1997.

2. Roger S. Pressman, Software Engineering, Seventh Edition, McGraw-Hill.

WebSites/e-Learning Resources:

1.https://www.scaler.com/topics/software-engineering/srs/

2.https://www.techtarget.com/whatis/definition/software-testing

3.https://www.techopedia.com/definition/3973/computer-aided-software-engineering-case

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	2	3	3	1	2	2
CO2	3	3	3	3	2	3	3	2	2	2
CO3	3	2	3	3	3	2	3	2	1	2
CO4	3	3	3	2	2	3	2	2	2	2
CO5	3	3	3	3	2	3	3	1	2	2
Average	3	2.8	2.8	2.8	2.2	2.8	2.8	1.6	1.8	2

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3401	Introduction to reinforcement learning(TcL)	DSE	5	4

This course enables the student to understand statistical learning techniques where an agent explicitly takes actions and interacts with the world and to understand the importance and challenges of learning agents that make decisions.

Course Outcomes

At the end of the course the student will be able to:

CO1: formalize problems as Markov Decision Processes.

CO2: discuss basic exploration methods and the exploration/exploitation tradeof.

CO3: explain value functions, as a general-purpose tool for optimal decision-making.

CO4: implement dynamic programming as an efficient solution approach to an industrial control problem.

CO5: setup to start usingreinforcement learning for real time problems.

Unit I   **15 Hours**

Monte-Carlo methods- policy evaluation- rollouts- on policy and off-policy learning- Importance of sampling

Unit II   **15 Hours**

Temporal Difference learning- TD prediction- Optimality of TD0- SARSA- Q-learning- Games and after states- Maximization Bias and Double Learning.

Unit III   **15 Hours**

Eligibility traces- n-step TD prediction- TDlambda- forward and backward views- Qlambda- SARS lambda- replacing traces and accumulating traces.

Unit IV   **15 Hours**

Value prediction- gradient descent methods- linear function approximation- Control algorithms- Fitted Iterative Methods- Deep Q-learning

Unit V   **15 Hours**

Policy Gradient methods- non-associative learning - Reinforce algorithm- exact gradient methods- estimating gradients- approximate policy gradient algorithms-

actor-critic methods- Asynchronous Advantage Actor-Critic. Hierarchical RL- MAXQ framework- Options framework- HAM framework- Option discovery algorithms.

Learning Resources:

Text Books:

1.R. S. Sutton and A. G. Barto. Reinforcement Learning - An Introduction. MIT Press. 2nd Edition. 2018.

2.Richard S. Sutton and Andrew G. Barto, "Reinforcement learning: An introduction", Second Edition, MIT Press, 2019.

References:

1. Li, Yuxi. "Deep reinforcement learning."preprint arXiv:1810.06339 2018.

2. Wiering, Marco, and Martijn Van Otterlo. "Reinforcement learning." Adaptation, learning, and optimization 12 2012

WebSites/e-Learning Resources:

1.https://towardsai.net/p/l/reinforcement-learning-monte-carlo-learning

2.https://towardsdatascience.com/intro-to-reinforcement-learning-temporal-difference-learning-sarsa-vs-q-learning-8b4184bb4978

3.https://medium.com/ai%C2%B3-theory-practice-business/reinforcement-learning-part-6-td-%CE%BB-q-learning-99cdfdf4e76a

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	2	2	3	3	1	2	2
CO2	2	3	2	3	2	3	3	2	2	1
CO3	3	3	3	3	2	2	3	1	1	2
CO4	3	3	3	3	2	3	3	2	2	2
CO5	3	2	2	3	3	3	3	2	2	3
Average	2.8	2.8	2.6	2.8	2.2	2.8	3	1.6	1.8	2

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3403	Cryptography(T)	DSE	5	4

This course enables the student to understand fundamentals of Cryptography, acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.

Course Outcomes

At the end of the course the student will be able to:

CO1: identify computer and network security threats, classify the threats and develop a Security model to prevent, detect and recover from the attacks.

CO2: discuss the Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.

CO3: illustrate Key management, Public key cryptosystems, Message authentication, Hash functions and algorithms.

CO4: describe the advanced security issues and technologies.

CO5: analyze E-mail-attacks and establishing keys privacy E-Mail attacks.

Unit I   **15 Hours**

The OSI security Architecture – Security Attacks – Security Mechanisms – Security Services – A model for network Security.

.Unit II   **15 Hours**

Symmetric Cipher Model – Substitution Techniques: Caesar Cipher – Monoalphabetic Cipher – Play fair cipher – Poly Alphabetic Cipher – Transposition Techniques – Stenography.

Unit III   **15 Hours**

Block Cipher Principles – DES – The Strength of DES –RSA: The RSA algorithm.

Unit IV   **15 Hours**

IP Security overview - IP Security architecture – Authentication Header- Web Security-SecureSocket Layer and Transport Layer Security – Secure Electronic Transaction.

Unit V   **15 Hours**

Intruders – Malicious software – Firewalls.- Encapsulation Security Payload ESP - SSL/TLS Basic Protocol-computing the keys - Encoding Secure Electronic Transaction SET.

Learning Resources:

Text Book:

1. William Stallings, Cryptography and Network Security, 6th Edition, Pearson Education, March 2013.

References:

1. Bernard Menezes,"Network Security and Cryptography", Cengage Learning,India Edition,2010.

2. Behrouz A.Forouzan, Debdeep Mukhopadhyay, "Cryptography and Network Security", Tata McGraw Hill Second Edition, 2010.

WebSites/e-Learning Resources:

1.https://www.tutorialspoint.com/cryptography/

2.https://gpgtools.tenderapp.com/kb/how-to/introduction-to-cryptography

3.https://www.tutorialspoint.com/cryptography/data_encryption_standard.htm

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	3	3	3	1	2	2
CO2	3	3	2	3	2	3	3	2	1	1
CO3	3	3	3	3	3	2	3	2	2	2
CO4	3	3	3	2	2	3	3	2	2	2
CO5	2	2	3	3	2	3	2	1	2	3
Average	2.8	2.8	2.8	2.8	2.4	2.8	2.8	1.6	1.8	2

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3405	Grid Computing(T)	DSE	5	4

This course enables the student to learn the basic construction and application of Grid computing organization and their role.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the basic elements and concepts of Grid computing.

CO2: explain the Grid computing toolkits and Framework.

CO3: apply the concepts of Anatomy of Grid Computing.

CO4: illustrate the concept of service-oriented architecture.

CO5: gain knowledge on grid and web service architecture.

Unit I   **15 Hours**

Early Grid Activity- Current Grid Activity- Overview of Grid Business areas- Grid Applications- Grid Infrastructures.

Unit II   **15 Hours**

Organizations Developing Grid Standards- and Best Practice Guidelines- Global Grid Forum GCF- Organization Developing Grid Computing Toolkits and Framework- Organization and building and using grid based solutions to solve computing- commercial organization building and Grid Based solutions.

.Unit III   **15 Hours**

The Grid Problem- The conceptual of virtual organizations- Grid Architecture and relationship to other distributed technology.

Unit IV   **15 Hours**

Autonomic computing- Business on demand and infrastructure virtualization- Service-Oriented Architecture and Grid- Semantic Grids.

Unit V   **15 Hours**

Merging the Grid services Architecture with the Service-Oriented Architecture- Web Service Architecture- XML messages and Enveloping- Service message description Mechanisms- Relationship between Web Services and Grid Services- Web services Interoperability and the role of the WS-I Organization.

Learning Resources:

Text Book:

1.Joshy Joseph and Craig Fellenstein, Grid computing, Pearson / IBM Press, PTR, 2004.

References:

1.Ahmer Abbas and Graig computing, A Practical Guide to technology and applications, Charles River Media, 2003.

WebSites/e-Learning Resources:

1.https://en.wikipedia.org/wiki/Grid_computing

2.https://link.springer.com/chapter/10.1007/978-1-84882-409-6_4

3.https://www.redbooks.ibm.com/redbooks/pdfs/sg246778.pdf

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	3	3	3	1	2	2
CO2	3	3	2	3	2	3	3	2	2	2
CO3	3	2	3	1	3	3	1	1	1	1
CO4	2	3	1	3	2	3	3	2	2	2
CO5	3	2	3	3	1	3	3	2	2	3
Average	2.8	2.6	2.2	2.6	2.2	3	2.6	1.6	1.8	2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3301	Artificial Intelligence for daily life(TcL)	GE	4	3

This course aims to introduce the fundamental concepts of artificial intelligence to individuals from all academic backgrounds. Participants will understand the artificial intelligence technologies and their potential applications in various fields.

Course Outcomes

At the end of the course the student will be able to:

CO1: explain the fundamental concepts and subfields of Artificial Intelligence.

CO2: identify real-world applications of Artificial Intelligence across various industries.

CO3: identify transformation in different domains.

CO4: analyze the ethical, social, and economic implications of Artificial Intelligence.

CO5: recognize the potential ofArtificial Intelligence to drive innovation.

Unit I   **12 Hours**

Introduction to Artificial Intelligence -Definition and scope of AI Historical overview - key milestones-Differentiating AI from human intelligence.

Unit II   **12 Hours**

AI Subfields and Technologies -Machine learning- Supervised- unsupervised-reinforcement learning- Deep learning and neural networks -Natural language processing NLP and computer vision.

Unit III   **12 Hours**

Applications of AI –AI in healthcare- Diagnosis- treatmentand medical imaging- AI in finance- Fraud detection-algorithmic trading- and risk assessment AI in transportation- Autonomous vehicles and traffic optimization-Artificial Intelligence tools for students - customer service and chatbots - AI in education-Personalized learning and intelligent tutoring systems.

Unit IV 12 Hours

Ethical and Social Implications of AI -Bias and fairness in AI systems - Privacy and data protection concerns -Impact of AI on employment and the workforce - AI and social inequality

Unit V 12 Hours

Other Important Issues- Ethical guidelines and responsible AI practices- AI and Innovation Emerging trends-future directions in AI and creativity-Generative models and artistic applications.

Learning Resources:

Text Book:

1.Artificial Intelligence for All: Transforming Every Aspect of Our Life-Utpal Chakraborty.

References:

1.Artificial Intelligence: Concepts and Applications Kindle Edition by Lavika Goel

WebSites/e-Learning Resources:

1.https://www.techtarget.com/searchenterpriseai/definition/AI-Artificial-Intelligence

2.https://www.akkio.com/post/the-five-main-subsets-of-ai-machine-learning-nlp-and-more

3.https://www.forbes.com/sites/bernardmarr/2023/05/10/15-amazing-real-world-applications-of-ai-everyone-should-know-about/?sh=2ead469285e8

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	1	1	1
CO2	3	2	3	3	2	3	3	1	1	1
CO3	3	3	3	3	1	3	2	2	1	2
CO4	3	3	3	3	2	3	3	2	2	1
CO5	3	3	3	3	2	3	2	2	2	1
Average	3	2.8	3	3	1.8	3	2.4	1.6	1.4	1.2

Strong -3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3303	E-Commerce Technologies(T)	GE	4	3

This course aims to provide students with a comprehensive understanding of the concepts, technologies, and practices associated with E-Commerce.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the basic concept of E-Commerce.

CO2: describe the concepts of Internet and the Marketing.

CO3: elaborate the importance of E- security.

CO4: explain the different types of electronic payment systems.

CO5: classify the concept of Internet marketing.

Unit I   **12 Hours**

An introduction to Electronic commerce and Definition- Main activities E-Commerce, Goals of E-Commerce, Technical Components of ECommerce, Functions of E-Commerce- Advantages and disadvantages of E-Commerce-Scope of E-Commerce-Electronic Commerce Applications.

Unit II   **12 Hours**

Evolution of Internet, Domain Names and Internet Organization .edu, .com, .mil, .gov, .net Types of Network- Internet Service Provide- World Wide Web-Internet - Role of Internet in B2B Application- building own website- Cost- Time- Reach- Registering a Domain Name-Shopping Bot.

Unit III   **12 Hours**

Internet Security: Secure Transaction, Computer Monitoring- Privacy on Internet-Corporate Email privacy-Computer Crime Laws - Types of Crimes-Threats, Attack on Computer System- Software Packages for privacy- Hacking- Computer Virus How it spreads- Virus problem, virus protection- Encryption and Decryption- Secret key Cryptography- DES- Public Key Encryption-RSA-Authorisation and Authentication-Firewall-Digital Signature.

Unit IV   **12 Hours**

Electronic Data Exchange- Introduction, Concepts of EDI and Limitation-Applications of EDI-Disadvantages of EDI- EDI model-Electronic Payment System-Introduction- Types of Electronic Payment System- Payment Types- Value Exchange System- Credit Card System- Electronic Fund Transfer- Paperless bill- Modern Payment Cash-Electronic Cash

Unit V   **12 Hours**

Internet Marketing- The PROS and CONS of online shopping- The cons of online shopping-Justify an Internet business-Internet marketing techniques-The E-cycle of Internet marketing-Personalization e-commerce.

Learning Resources:

Text Books:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.

2. Kamlesh K Bajaj and Debjani Nag , E- Commerce , 2005.

References:

1. Gray P. Schneider , Electronic commerce, International Student Edition, 2011.

2. Henry Chan, Raymond Lee, TharamDillon, Elizabeth Chang E-commerce, Fundamentals and Applications, Wiely Student Edition, 2011.

WebSites/e-Learning Resources:

1.https://theintactone.com/2020/02/04/technical-components-of-e-commerce/

2.www.tutorialspoint.com/internet_technologies/internet_domain_name_system.htm

3.https://www.acronis.com/en-sg/blog/posts/what-is-internet-security/

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	2	2	2
CO2	3	3	3	2	1	3	3	2	1	2
CO3	3	3	3	3	1	3	3	3	2	2
CO4	2	3	3	3	2	2	3	3	2	1
CO5	3	3	3	3	1	3	2	2	2	1
Average	2.8	3	3	2.8	1.4	2.8	2.6	2.4	1.8	1.6

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3255	Internship	IS	-	2

This course aims to provide students to gain multidisciplinary knowledge through real time projects and industry internship training and providing a sustainable competitive edge and meeting industry needs.

Course Outcomes

At the end of the course the student will be able to:

CO1: explore the real-life problems and their implementation through Tools and Techniques.

CO2: expose the creative design process through the integration and application of diverse technical knowledge.

CO3: analyze the possible solutions to meet the requirements of the problem solving.

CO4: build a solution by employing a variety of tools and technologies.

CO5: validate the designed solution to ensure impactfulness towards the selected problem.

Internship allow the students to give real-time exposure of the software industry and hands experience on project development. It also gives them the opportunity to be a part of the project team. This internship process is carried out by the UG students during the summer vacation. The student will be sent to software industries of their choice or to the industry/organizations.

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	3	3	3	1	2	2
CO2	3	3	2	3	2	3	3	2	2	2
CO3	3	2	3	1	3	3	2	1	2	1
CO4	2	3	2	3	2	3	3	2	2	2
CO5	3	2	3	3	1	3	3	2	2	3
Average	2.8	2.6	2.6	2.6	2.2	3	2.8	1.6	2	2

Strong -3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3201	Visual Analytics (TcL)	SEC	3	2

This course enables the student to understand the importance of data Visualization in the world of Data Analytics and Prediction

Course Outcomes

At the end of the course the student will be able to:

CO1: visualize data through seven stages of data analysis process.

CO2: explore hybrid types of data visualization.

CO3: discuss various stages of visualizing data.

CO4: create charts using Tableau Tool.

CO5: visualize data as maps and forecast future data using Tableau Tool.

Unit I   **9 Hours**

Creating Visual Analytics with tableau desktop- connecting to your data-How to Connect to your data- generated Values- Knowing when to use a direct connection-Joining tables with tableau-blending different data sources in a single worksheet.

Unit II   **9 Hours**

Building your first Visualization- How Me works- Chart types- Text Tables Maps- bar chart-Line charts- Area Fill charts and Pie charts, scatter plot-Bullet graph- Gantt charts- Sorting data in tableau-Enhancing Views with filters-sets groups and hierarchies.

Unit III   **9 Hours**

Creating calculations to enhance your data- What is aggregation, what are calculated values and table calculations- Using the calculation dialog box to create- Building formulas using table calculations-Using table calculation functions.

Unit IV   **9 Hours**

Using maps to improve insights-Create a Standard Map View- Plotting your own locations on a map- Replace Tableau's standard maps- Shaping data to enable Point-to-Point mapping.

Unit V   **9 Hours**

Developing an Adhoc analysis environment- generating new data with forecasts- providing selfevidence adhoc analysis with parameters- Editing views in tableau Server.

Learning Resources:

Text Books:

1. Joshua N. Millign. (2019). Learning Tableau ,3rd Edition, Packt publications.

2. Daniel G. Murray and the Inter works BI team. (2016). Tableau your data, Wiley Publications.

References:

1. Alexandru C. Telea. (2014). Data Visualization principles and practice, 2nd Edition, CRC Publications.

2. Nussbaumer Knaflic (2014). Storytelling with Data: A Data Visualization Guide for Business Professionals by Cole.

3. Ashutosh Nandeshwar. (2013). Tableau Data Visualizaton Cookbook, PACKT publishing.

WebSites/e-Learning Resources:

1. https://www.tableau.com/

2.https://www.tutorialspoint.com/tableau/index.htm

3. https://www.coursera.org/specializations/data-visualization

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	1	3	2	2	1	2
CO2	3	3	3	3	1	3	3	1	2	1
CO3	3	3	3	2	1	3	2	2	1	2
CO4	3	3	3	2	2	2	2	2	1	1
CO5	3	3	3	3	1	3	2	1	2	1
Average	3	3	3	2.6	1.2	2.8	2.2	1.6	1.4	1.4

Strong – 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3602	Natural Language Processing (TcL)	Core	6	6

This course enables the student to understand the models, methods, and algorithms of statistical Natural Language Processingfor common Natural Language Processing tasks, such as speech recognition, machine translation, spam filtering, text classification and spell checking.

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the approaches to syntax and semantics in Natural Language Processing.

CO2: explain approaches to discourse, generation, dialogue and summarization

within Natural Language Processing.

CO3: apply the current methods for statistical approaches to machine translation.

CO4: interpret machine learning techniques used in Natural Language Processing.

CO5: explore deeplearning-basedNatural Language Processing.

Unit I 18 Hours

Introduction to NLP - application of NLP techniques and key issues- MT grammar checkers- dictation – document generation- NL interfaces- Natural language processing key issues- the different analysis level used for NLP- morpho- lexical-syntactic-semantic- pragmatic-markupTEI-UNICODE-finite test automata- Recursive and augmented transition networks.

Unit II 18 Hours

Lexical Level - error tolerant lexical processing spelling error correction-transducers for the design of morphologic analyzers features-towards syntax: part-of-speech tagging BRILL- HMM- efficient representations for linguistic sources lexica-grammar. tries and finite state automata.

Unit III 18 Hours

Syntactic Level-grammar- formal-Chomsky hierarchy- DCSGs, systematic case, unification, stochastic- parsing top-down- bottom up-CYK algorithm- automated estimation of probabilistic model parameters inside-outside algorithm-data oriented

parsing- grammar formalisms and tree banks-efficient pasting for context-free grammars CFGs.

Unit IV   **18 Hours**

Logical forms - ambiguity resolution -semantic network and parsers- procedural semantics -montague semantics- vector space approaches - distributional semantics-lexical semantics and word sense disambiguation-compositional semantics semantic role labelling and sematic parsing.

Unit V   **18 Hours**

knowledge representation- reasoning-plan/goal recognition –speech acts/intentions – belief models- discourse- reference. Natural language generation-content determination – sentence planning- surface realization, subjectivity and sentiment analysis: information extraction – automatic summarization- information retrieval and question answering– named entity recognition and relation extraction-software maintenance process models- estimation of maintenance cost.

Learning Resources:

Text Book:

1. DanielJ and James. Martin, An Introduction to natural language processing, computation a linguistics and speech recognition prenticehall,2009.

References:

1.LanH Written and Elbef, Mark A. Hall, datamining: practical machine learning tools and techniques, Morgan Kaufmann, 2013.

2. Mohamed ZakariaKurdi, Natural Language Processing and Computational Linguistics 1, speech, Morphology, and syntax, Wiley, ISTE Ltd, 2016.

WebSites/e-Learning Resources:

1.https://www.deeplearning.ai/resources/natural-language-processing/

2.https://www.gatevidyalay.com/cyk-cyk-algorithm/

3.https://www.techtarget.com/searchenterpriseai/definition/natural-language-generation-NLG

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	3	3	3	1	2	1
CO2	3	3	3	3	2	3	3	2	2	2
CO3	3	2	3	2	3	3	1	1	1	1
CO4	3	3	2	3	2	3	3	2	2	2
CO5	3	2	3	3	1	3	3	2	2	2
Average	3	2.6	2.6	2.8	2.2	3	2.6	1.6	1.8	1.6

Strong -3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3604	Principles of Deep Learning (TcL)	Core	6	6

This course enables the student to understand the concept the theoretical foundations, algorithms and methodologies of Neural Network and to design develop an application using specific deep learning models.

Course Outcomes

At the end of the course the student will be able to:

CO1: explain the fundamentals of Deep Learning.

CO2: classify different methodologies to create application using deep nets.

CO3: identify and apply appropriate deep learning algorithms for analyzing the data for variety of problems.

CO4: design and implement deep neural network systems.

CO5: implement deep learning algorithms and solve real-world problems.

Unit I   **18 Hours**

Introduction to Learning - The Neural Network–Limits of Traditional Computing–Machine Learning–Neuron– FF Neural Networks–Types of Neurons –Softmax output layers.

Unit II   **18 Hours**

Deep Learning Models -Tensorflow–Variables–Operations–Placeholders–Sessions–SharingVariables–Graphs– Visualization

Unit III   **18 Hours**

Convolution Neural Network–Feature Selection–Max Pooling–Filters and Feature Maps–Convolution Layer–Applications.

Unit IV   **18 Hours**

Recurrent Neural Network–Memory cells–sequence analysis–word 2vec- LSTM—Memory augmented Neural Networks–NTM—Application.

Unit V   **18 Hours**

Reinforcement Learning –MDP–Q Learning– Applications.

Learning Resources:

Text Book:

1. Nikhil Buduma, Nicholas Locascio, ― Fundamentals of Deep Learning: Designing Next Generation Machine Intelligence Algorithms,; Reilly Media, 2017.

References:

1. Ian Goodfellow, Yoshua Bengio, Aaron Courville, ‖Deep Learning Adaptive Computation and Machine Learning series‖, MIT Press, 2017.

WebSites/e-Learning Resources:

1.https://deepai.org/machine-learning-glossary-and-terms/feed-forward-neural-network

2.https://www.esri.com/en-us/arcgis/deep-learning-models

3.https://www.geeksforgeeks.org/introduction-convolution-neural-network/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	3	3	3	1	2	2
CO2	3	2	3	3	2	3	3	2	2	2
CO3	3	3	3	1	3	3	1	1	1	1
CO4	3	3	2	3	2	3	3	2	2	2
CO5	3	3	3	3	1	3	3	2	2	3
Average	3	2.8	2.6	2.6	2.2	3	2.6	1.6	1.8	2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3606	Project	Core	6	6

This course enables the student to give the real-life exposure on software modelling and development in the relevant field to give the exposures on research problems and analysis, solutions.

Course Outcomes

At the end of the course the student will be able to:

CO1: select and summarize all aspects of the real-life problem through survey.

CO2: apply acquired knowledge to develop working model and plan different phases for its execution.

CO3: analyze outcome of each phase using various tools, techniques, and coding practices.

CO4: justify/defend opinions, validity of ideas or quality of work based on a set of criteria.

CO5: test the working model and modify related phase accordingly. Finally integrate all phases.

The final year project work is mandatory as part of the curriculum to impart the real-time problem-solving skills and to apply the acquired programming and project development skills.

The project guides will be allocated based on selection from the lot.

They are encouraged to select any real-world problem from the society or environment to develop is as application.

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	3	3	3	1	2	2
CO2	3	3	2	3	2	3	3	2	2	2
CO3	3	2	3	2	3	2	1	1	2	2
CO4	2	3	3	3	2	3	3	2	2	2
CO5	3	2	3	3	1	3	3	2	2	3
Average	2.8	2.6	2.6	2.8	2.2	2.8	2.6	1.6	2	2.2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3402	BlockChainTechnology(T)	DSE	5	4

This course enables the student to understand the technical aspects of public distributed ledgers, blockchain systems, cryptocurrencies, and smart contracts.

Course Outcomes

At the end of the course the student will be able to:

CO1: state the basic concepts of block chain.

CO2: paraphrase the list of consensus protocol.

CO3: demonstrate and Interpret working of Hyper ledger Fabric.

CO4: recognizing some of latest cryptocurrency aspects leads to understand some of basic concepts of Market and Global Economy.

CO5: explain the Digital identity for Government.

Unit I   **15 Hours**

Digital Money to Distributed Ledgers -Design Primitives: Protocols- Security- Consensus- Permissions- Privacy-lock chain Architecture and Design-Basic crypto primitives- Hash- Signature-Hash chain to Block Chain-Basic consensus mechanisms.

Unit II   **15 Hours**

Requirements for the consensus protocols-Proof of Work PoW-Scalability aspects of Block chain consensus protocols- Permissioned Block Chains-Design Goals- Consensus protocols for Permissioned Block chains.

Unit III   **15 Hours**

Decomposing the consensus process-Hyper ledger fabric components-Chain code Design and Implementation: Hyper ledger Fabric II: -Beyond Chain code: fabric SDK and Front End-Hyper ledger composer tool.

Unit IV   **15 Hours**

Block chain in Financial Software and Systems FSS -Settlements- -KYC-Capital Markets-Insurance-Block chain in trade-supply chain-Provenance of goods- visibility- trade-supply chain finance- invoice management-discounting.

Unit V   **15 Hours**

Digital identity- land records and other kinds of record keeping between government entities- public distribution system - social welfare systems-Block chain Cryptography: Privacy and Security on Block chain.

Learning Resources:

Text Books:

1. Mark Gates, "Block chain: Ultimate guide to understanding block chain, bit coin, crypto currencies, smart contracts and the future of money", Wise Fox Publishing and Mark Gates 2017.

2. Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd, Venkatraman Ramakrishna, "Hands-On Block chain with Hyper ledger: Building decentralized applications with Hyperledger Fabric and Composer", 2018.

3. Bahga, Vijay Madisetti, "Block chain Applications: A Hands-On Approach", Arshdeep Bahga, Vijay Madisetti publishers 2017.

References:

1. Andreas Antonopoulos, "Mastering Bitcoin: Unlocking Digital Crypto currencies", O'Reilly Media, Inc. 2014. 2. Melanie Swa, "Block chain", O'Reilly Media 2014.

WebSites/e-Learning Resources:

1.https://coincodecap.com/the-architecture-of-blockchain-technology

2.https://www.techtarget.com/searchcio/tip/Permissioned-vs-permissionless-blockchains-Key-differences

3.https://blockchain.oodles.io/dev-blog/components-of-hyperledger-fabric-network/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	3	3	3	1	2	2
CO2	3	3	3	3	2	2	3	2	2	2
CO3	3	2	3	2	2	3	2	1	1	2
CO4	3	3	2	3	2	3	3	1	2	2
CO5	3	2	3	3	1	3	3	2	2	3
Average	3	2.6	2.8	2.8	2	2.8	2.8	1.4	1.8	2.2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3404	Computer Vision (TcL)	DSE	5	4

This course enables the student to understand the fundamentals of image formation and the major ideas, methods, and techniques of computer vision and pattern recognition.

Course Outcomes

At the end of the course the student will be able to:

CO1: identify basic concepts, terminology, theories, models and methods in the field of computer vision.

CO2: discuss known principles of human visual system.

CO3: illustrate basic methods of computer vision related to multi-scale representation.

CO4: describeedge detection and detection of other primitives, stereo, motion and object recognition.

CO5: suggest a design of a computer vision system for an application.

Unit I   **15 Hours**

Computer Vision and Computer Graphics- what is Computer Vision - Low-level- Midlevel- High-level- Overview of Diverse Computer Vision Applications-Document Image Analysis- Biometrics- Object Recognition- Tracking- Medical Image Analysis- Content-Based Image Retrieval- Video Data Processing- Multimedia- Virtual Reality and Augmented Reality.

Unit II   **15 Hours**

Digital Image Formation and low-level processing- Fundamentals of Image Formation- Transformation- Orthogonal- Euclidean- Affine- Projective- Fourier Transform- Convolution and Filtering- Image Enhancement- Restoration- Histogram Processing.

Unit III   **15 Hours**

Feature Extraction & Image Segmentation Edges - Canny- LOG- Line detectors - Hough Transform- Corners - Harris and Hessian Affine- Gabor Filters and DWT-

Image Segmentation: Contour based representation- Region based representation- Level set representations- Fourier and wavelet descriptors- Multiresolution analysis.

Unit IV **15 Hours**

K-Means- K-Medoids- Classification: Discriminant Function- Supervised- Un-supervised- Semi supervised- Classifiers: Bayes- KNN- Dimensionality Reduction: LDA- ICA- Background Subtraction and Modelling-Temporal Analysis- Dynamic Stereo- Motion parameter estimation.

Unit V **15 Hours**

Photo album – Face detection – Face recognition – Active appearance and 3D shape models of faces Application: Surveillance – foreground-background separation – particle filters – tracking and occlusion – combining views from multiple cameras – human gait analysis Application- In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians.

Learning Resources:

Text Book:

1. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer-Verlag London Limited 2011.

References:

1. Computer Vision: A Modern Approach, D. A. Forsyth, J. Ponce, Pearson Education, 2003.

WebSites/e-Learning Resources:

1.https://onlinedegrees.sandiego.edu/introduction-to-computer-vision/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	2	3	3	1	2	2
CO2	3	3	3	3	2	3	3	1	1	2
CO3	3	2	3	2	2	3	2	1	1	1
CO4	3	3	2	3	2	3	3	2	2	2
CO5	3	3	3	3	2	2	3	1	2	2
Average	3	2.8	2.6	2.8	2	2.8	2.8	1.2	1.6	1.8

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3406	Mobile Application Development (TcL)	DSE	5	4

This course enables the student to understand the basic concepts of mobile application development, user-interface design, basics of graphics, multimedia and to gain knowledge about testing and publishing of Android application.

Course Outcomes

At the end of the course the student will be able to:

CO1: explain the needs and characteristics of mobile applications.

CO2: discuss mobile operating systems -Android and their architecture.

CO3: operate the Android development tools.

CO4: design Android User Interface and Event Handling.

CO5: demonstrate Gesture based UI, Multimedia, SMS, Phone Call, Sensor and Location Based Android application.

Unit I   **15 Hours**

Android overview and Versions –Features of Android – Architecture of Android - Setting up Android Environment -Eclipse-Android Studio- SDK- AVD- Anatomy of an Android Application - Simple Android Application Development.

Unit II   **15 Hours**

Layouts- Linear- Relative- Frame and Scrollview- Managing changes to Screen Orientation. Views: TextView- Button- ImageButton- EditText- CheckBox- RadioButton- RadioGroup- ProgressBar- AutoCompleteTextView- ListViews and WebView

Unit III   **15 Hours**

Saving and Loading User Preferences- File Handling- File System-Internal and External Storage-Permissions-File Manipulation-Managing Data using Sqlite-Creation of database-Insertion- Retrieval and Updation of records.

Unit IV   **15 Hours**

Sending and Receiving messages - Sending E-mail–Networking: Downloading Binary Data – Downloading Text Files.

Unit V   **15 Hours**

Displaying maps- Displaying zoom control- Changing view – Adding Markers-
Getting the location – Geo-coding Publishing Android Applications- Preparing for
publishing-Deploying APK Files.

Learning Resources:

Text Books:

1. Wei-Meng Lee, Beginning Android 4 Application Development, Wiley, 2012.

2. Onur Cinar, Android Apps with Eclipse, Apress, Springer, 2012.

References:

1.Ed Burnette, "Hello Android: Introducing Google's Mobile Development Platform",
3rd edition, 2010, The Pragmatic Publishers.

2.Reto Meier, "Professional Android 4 Application Development", 2012, Wrox
Publications John Wiley, New York.

WebSites/e-Learning Resources:

1.www.tutorialspoint.com/android/index.htm

2. www.javatpoint.com/android-tutorial

3.www.vogella.com/articles/Android/article.html

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	3	2	3	3	1	1	2
CO2	3	3	2	3	1	2	3	2	2	1
CO3	3	2	3	2	1	3	1	1	1	1
CO4	3	3	3	3	2	3	3	1	2	2
CO5	3	3	3	3	1	3	3	1	1	2
Average	3	2.8	2.6	2.8	1.4	2.8	2.6	1.2	1.4	1.6

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3302	Web Application (TcL)	GE	4	3

This course aims to introduces the tools and menus to master Photoshop and Dream Weaver**.**

Course Outcomes

At the end of the course the student will be able to:

CO1: discuss the basic tools used in Adobe Photoshop to create and edit images.

CO2:design interactive Web page**.**

CO3:ability to use a range of tools and filters in Photoshop.

CO4: creatively solve visual problems.

CO5: design Web pages using Photoshop and Dream Weaver.

Unit I   **12 Hours**

Basics of Adobe Photoshop – Getting started with Photoshop – title bar – Menu bar - option bar – tool box – screen modes.

Unit II   **12 Hours**

Introduction to digital Image editing -Create your own painted images – Edited scanned images – import rendered visuals – Working with images and colors**.**

Unit III   **12 Hours**

Using tools and palettes – selection tools, Painting and editing tools – menu commands – creating type – change the type settings – styles

Unit IV   **12 Hours**

Methods and Techniques of Adobe Photoshop - Layers – working with layers – merging layers – linking layers –transforming layers and layer effects- filters**.**

Unit V   **12 Hours**

Getting started with Dreamweaver – creating web applications with Dreamweaver.

Learning Resources:

Text Books:

1. Greenberg, "Photoshop – The Complete reference", TMH.

2. "Dream Weaver – Complete reference.

References:

1.Adobe Photoshop 2020 for Photographers: A professional image editor's guide to the creative use of Photoshop for the Macintosh and PC.

WebSites/e-Learning Resources:

1.https://www.instructables.com/Basics-of-Photoshop/

2.https://www.adobe.com/in/products/photoshop/edit-photos.html

3.https://websitesetup.org/dreamweaver-tutorial/

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	2	1	2
CO2	3	3	3	3	1	2	3	1	2	1
CO3	3	3	2	3	1	3	3	2	1	2
CO4	3	3	3	2	2	2	3	2	2	1
CO5	2	3	3	3	1	3	3	1	2	2
Average	2.8	3	2.8	2.8	1.4	2.6	2.8	1.6	1.6	1.6

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3304	InformationSecurity(T)	GE	4	3

This course enables the student to describe fundamental concepts of information security and system auditing.

Course Outcomes

At the end of the course the student will be able to:

CO1: describe fundamental concepts of information security and system auditing.

CO2: discuss the difference between security metrics and audits.

CO3: discuss about the web browser attacks.

CO4: explain the vulnerabilities in Wireless Networks.

CO5: describe the Cryptology and Digital Signatures in real time application.

Unit I **12 Hours**

Computer Security Concepts - Threats, Attacks, and Assets - Security Functional Requirements - Fundamental Security Design Principles - Attack Surfaces and Attack Trees - Computer Security Strategy.

Unit II **12 Hours**

IT Security Management - Organizational Context and Security Policy - Security Risk Assessment - Detailed Security Risk Analysis - Case Study: Silver Star Mines IT Security Controls-Plans and Procedures - IT Security Management Implementation - Security Controls or Safeguards - IT Security Plan - Implementation of Controls - Monitoring Risks.

Unit III **12 Hours**

Browser Attack Types - How Browser Attacks Succeed: Failed Identification and Authentication - Web Attacks Targeting Users - False or Misleading Content-Malicious Web Content - Protecting Against Malicious Web Pages - Foiling Data Attacks - Email Attacks - Fake Email - Fake Email Messages as Spam.

Unit IV   **12 Hours**

Networks- Threats to Network Communications: Interception: - Eavesdropping and Wiretapping Modification - Interruption: Loss of Service Port Scanning Wireless Network Security- WiFi Background - Vulnerabilities in Wireless Networks.

Unit V   **12 Hours**

Details of Cryptography- Cryptology - Cryptanalysis - Statistical Analysis - Asymmetric Encryption with RSA - Digital Signatures - Photon Reception- Cryptography with Photons- implementation.

Learning Resources:

Text Books:

1.Computer Security Principles and Practice 3rd Edition.

2. Security in Computing, Fourth Edition, by Charles P. Pfleeger, Pearson Education

References:

1.Andrew Vladimirov, Konstantin Gavrilenko, and Andriej Michajlowski," Assessing Information Security strategies tactics logic and framework".

2. Marty M. Weiss and Michael G. Solomon," Auditing IT Infrastructure for

WebSites/e-Learning Resources:

1.https://www.imperva.com/learn/data-security/information-security-infosec/

2. https://www.sciencedirect.com/topics/computer-science/security-risk-management

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	2	3	2	2	2	2
CO2	2	3	2	3	2	2	3	2	2	3
CO3	3	3	3	3	2	2	2	3	2	2
CO4	3	3	2	2	1	2	2	3	3	2
CO5	3	3	3	3	1	3	2	2	3	2
Average	2.8	3	2.6	2.6	1.6	2.4	2.2	2.4	2.4	2.2

Strong - 3 Medium - 2 Low -1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24CAI3266	Professional Competency Skill	SEC	3	2

This course enables the student to creating a professional competency skill for a career in computer science, as well as focusing on Artificial Intelligence.

At the end of the course the student will be able to:

CO1: demonstrate proficiency in multiple programming languages.

CO2: perform SQL queries, data normalization, and transaction management.

CO3: effectively manage and optimize operating systems and network environments.

CO4: ability to develop, implement, and evaluate various machine learning algorithms, including supervised, unsupervised methods

CO5: utilize NLP models for tasks such as text classification, sentiment analysis, and named entity recognition.

Unit I   **9 Hours**

Basic Arithmetic and Number Theory Number Systems-Introduction to programming languages (e.g., C, Python, Java)- Basic syntax and structure- Data types, variables, and operators.Data Structures- Basics of algorithms and pseudocode- Designing and analyzing algorithms- Flowcharting techniques for problem-solving.

Unit II   **9 Hours**

Relational databases and normalization-Basic SQL commands-Joins, subqueries, and transactions-Indexes and views- Stored procedures and triggers-.HTML- CSS-and JavaScript fundamentals-Basics of server-side language-SDLC models-Software design principles-Software testing techniques.

Unit III   **9 Hours**

Functions and types of operating systems-Process management and scheduling-Virtual memory and paging- Segmentation and memory allocation strategies-File system structure and management-I/O operations and device management and TCP/IP models-Network topologies and protocols-IP addressing and subnetting- Basic network devices -Security concepts and measures -encryption- authentication.

Unit IV   **9 Hours**

AI vs. Machine Learning vs. Deep Learning-AI techniques: search algorithms, optimization algorithms-Introduction to AI problem-solving methods AITools and

Frameworks-Machine Learning Fundamentals-Supervised Learning-Unsupervised Learning:

Unit V   **9 Hours**

Introduction to Neural Networks-Deep Learning Techniques- Natural Language Processing Text Processing and Understanding-NLP Models and Techniques-AI in Robotics-Blockchain Architecture and Components-Blockchain Development and Tools.

Learning Resources:

Text Books:

1.Elementary Number Theory" by David M. Burton.

2.""Flowcharting Techniques" by William C. Schuyler A guide to understanding and creating flowcharts for problem-solving and algorithm design.

3."SQL in 10 Minutes, Sams Teach Yourself" by Ben FortaA practical guide for learning basic SQL commands and concepts.

4.**"HTML and CSS: Design and Build Websites"** by Jon Duckett A beginner-friendly guide to HTML and CSS.

5.Learning PHP, MySQL & JavaScript" by Robin NixonCovers server-side programming with PHP, MySQL, and JavaScript.

References:

1."Software Engineering: A Practitioner's Approach" by Roger S. Pressman.

Comprehensive coverage of SDLC models and software engineering practices.

2."Computer Networking: A Top-Down Approach" by James Kurose and Keith Ross

Detailed coverage of OSI and TCP/IP models.

3."Machine Learning: A Probabilistic Perspective" by Kevin P. Murphy.

4."Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig.

5."Neural Network Methods for Natural Language Processing" by Yoav Goldberg.

6."Blockchain Basics: A Non-Technical Introduction in 25 Steps" by Daniel Drescher.

WebSites/e-Learning Resources:

1.https://openlibrary-epo.ecampusontario.ca/jspui/bitstream/123456789/692/3/Programming-Fundamentals-1570222270.pdf

2.https://www.geeksforgeeks.org/ai-algorithms/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	2	3	3	2	2	2
CO2	3	3	3	3	2	3	3	2	2	3
CO3	3	3	3	3	1	3	2	2	2	2
CO4	3	3	2	2	2	2	2	3	3	2
CO5	3	3	3	3	2	3	2	2	3	2
Average	3	3	2.8	2.8	1.8	2.8	2.4	2.2	2.4	2.2

Strong – 3 Medium - 2 Low -1

VALUE ADDED COURSES

Sem	Course Code	Course Title	Hours/Wk	Credits
2	24CAI122V	Designing using Figma	2	2
3	24CAI221V	Content Creation using AI Tools	2	2
5	24CAI321V	Introduction to Digital Marketing	2	2

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24 CAI122V	Designing using Figma	VAC	2	2

This course helps students to learn basic designing tools to create and manage designing using Figma. It also helps to build interactive and responsive design.

Course Outcomes:

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

CO1: gain foundations skills in navigating, creating basic designs.

CO2: develop intermediate design skills using shape creation and responsive design.

CO3: implement interactive prototypes, user flows and testing user interactions.

CO4: implement collaborative featuresand apply version control in team-based design environment.

CO5: apply advanced technique using Figma plugins.

Unit I   **6 Hours**

Introduction to Figma- Figma's role in design process- Creating Figma account- Figma dashboard- setting up project-workspace layout-selection tools -move- rotate- Working with shapes- Adding and formatting text- Applying and modifying colour- Frames and layers-create static webpage design.

Unit II   **6 Hours**

Creating complex shapes- building reusable components and symbols- Advanced text formatting: kerning, tracking, line spacing- Font styles and weights- Applying typography styles-Colour theory basics-creating colour palettes- Principles of responsive design-Design multipage interface.

Unit III   **6 Hours**

Difference between design and prototype mode-basic principle of prototyping- Adding interactions: triggers, actions, transitions and animations-Designing user flow- Adding navigation elements: buttons- links- menus-creating flowcharts and user path diagram.

Unit IV   **6 Hours**

Creating design systems: establishing component styles and guidelines- managing design libraries- using version control to track changes and updates.

Unit V   **6 Hours**

Figma plugins and extensions-integrating plugins- customizing with additional tools-exporting design-Figma API-design tokens and specifications.

Learning Resources:

Text Books :

1. Peter Boersma "Figma: User interface design and prototype", Apress.

2. Gregor Adams, "Designing user Interfaces with Figma: A comprehensive guide to designing and prototyping with Figma", Packt Publishing.

References :

1 AllaKholmatove "Designing System: A practical guide to creating design languages for digital products", Smashing magazine.

Websites/ e-Learning Resources:

1 https://www.figma.com/resources/learn-design/.

2 https://www.figma.com/community.

CO – PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	3	3	2	3	3	3	3	1	3	2
CO 2	3	2	2	3	2	3	3	1	3	2
CO 3	3	3	1	3	2	3	2	1	2	1
CO 4	3	3	2	2	2	3	3	2	3	2
CO 5	3	2	3	2	3	3	1	3	1	3
Average	3	2.6	2	2.4	2.4	3	2.4	1.6	2.4	2

Strong – 3   Medium – 2   Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24 CAI 221V	Content Creation using AI Tools	VAC	2	2

This course helps how Artificial Intelligence tools can enhance content creation across various media.

Course Outcomes:

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

CO1: learn the role of AI in content creation.

CO2: utilize AI tools for writing, editing, and design tasks.

CO3: implement AI-driven strategies for video and audio content.

CO4: analyze content performance using AI analytics tools.

CO5: develop and execute a content creation project using AI tools.

Unit I   **6 Hours**

Overview of AI and its applications in content creation-ethical considerations and limitations of AI in creative work-Overview of AI writing tools GPT-4, Jasper, Copy.ai-Hands-on exercises- Creating blog posts- articles- and social media content.

Unit II   **6 Hours**

Tools for grammar and style improvement-Practical exercises- Editing and proofreading content-introduction to AI-driven design tools-Canva- Adobe Sensei-Creating graphics- infographics- and social media visuals.

Unit III   **6 Hours**

Tools for video editing and production- Adobe Premiere Pro with AI features- Pictory-Synthesia-Basics of scriptwriting and storyboard creation using AI tools-AI tools for podcast creation and voice synthesis-Descript- Synthesia.

Unit IV   **6 Hours**

Using AI for content analysis and performance tracking-Tools for SEO and audience insights-SEMrush - utilizing AI tools for content creation.

Unit V   **6 Hours**

Exploring cutting-edge AI tools and their potential-AI for interactive content-augmented reality-Case studies of innovative AI-driven content.

Learning Resources:

Text Book :

1.AI-Powered Content CreationScaling Your Marketing Efforts with Automated Content GenerationBy Jaxon Emberwood,2024

References:

1. How to Create and Optimize Content Using AIGo AI or go home By Ekemini Robert · 2024

Websites/ e-Learning Resources:

1.https://www.copy.ai/blog/ai-content-creation

2.https://www.jasper.ai/blog/ai-content-creation

CO – PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	3	3	2	3	3	3	3	1	3	2
CO 2	3	2	2	3	2	3	3	1	3	2
CO 3	3	3	1	3	2	3	2	1	2	1
CO 4	3	3	2	2	2	3	3	2	3	2
CO 5	3	2	3	2	3	3	1	3	1	3
Average	3	2.6	2	2.4	2.4	3	2.4	1.6	2.4	2

Strong – 3   Medium – 2   Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24 CAI 321V	Introduction to Digital Marketing	VAC	2	2

This course aims at enabling the student to understand key concepts of digital marketing and utilizing effective marketing skills using social media and Search Engine Optimization.

Course Outcomes:

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

CO1: design an optimized website structure and create effective Facebook marketing campaigns.

CO2: create and manage effective Google AdWords using various ad types, and keyword strategies to optimize PayPerClick performance

CO3: implement integrated marketing strategies across LinkedIn and Twitter, utilize Google Analytics and Webmaster Tools for SEO.

CO4: analyse the difference between marketing and sales, and marketing strategies to generate and manage leads.

CO5: implement advanced PayPerClick, YouTube and email marketing strategies, lead generation for business.

Unit I   **6 Hours**

Digital Marketing Fundamentals – Website Planning and Structure – Facebook Marketing for Business.

Unit II   **6 Hours**

Google Adwords- Understanding Adwords Google Ad Types Pricing Models PPC Cost Formula-Ad Page Rank Billing and Payments Adwords User Interface Keyword Planning Keywords-Control Creating Ad Campaigns Creating Text Ads Creating Ad Groups Bidding Strategy for CPC Practical Examples.

Unit III   **6 Hours**

LinkedIN and Twitter Marketing-: Google Analytics and Webmaster Tool –Search Engine Optimization (SEO) –Affiliate Marketing & Google AdSense – Case Studies and Practical Assignments – Google Certification Program Training.

Unit IV   **6 Hours**

Marketing v/s Sales Section -Marketing Mix - Digital Marketing- Inbound vs Outbound Marketing – Content Marketing – Understanding Traffic – Understanding Leads –Strategic Flow for Marketing Activities.

Unit V   **6 Hours**

PPC Advertising YouTube and Video Marketing E-mail Marketing for Business- Lead Generation & Marketing Automation- eCommerce and Payment Gateway – Remarketing Strategies – Advance Level- Google Plus for Business.

Learning Resources:

TextBooks:

1. Ryan Deiss, Russ Henneberry, "Digital Marketing for Dummies", A Wiley Brand.
2. Ian Dodson, "The Art of Digital Marketing", Wiley

References :

1 Dave Chaffey and Fiona Ellis-Chadwick, "Digital marketing: strategy, implementations and practice", Pearson.

Websites/ e-Learning Resources:

1 https://learndigital.withgoogle.com/digitalgarage/course/digital-marketing.

2 https://academy.hubspot.com/

CO – PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	3	3	2	3	3	3	3	1	3	2
CO 2	3	2	2	2	2	3	3	1	3	2
CO 3	3	3	2	3	2	3	2	1	2	2
CO 4	3	3	2	2	2	3	3	2	3	2
CO 5	3	2	3	2	3	3	1	3	1	3
Average	3	2.6	2.2	2.4	2.4	3	2.4	1.6	2.4	2.2

Strong – 3   Medium – 2   Low – 1