

**MOTHER TERESA WOMEN'S
UNIVERSITYKODAIKANAL
&
TAMILNADUSTATECOUNCILFORHIGHEREDUCATION
(TANSCH, CHENNAI)**



**M.Sc. Computer Science
(2023-2024Onwards)
(AsperTANSCHFramework)**

May,2023

TANSCHEREGULATIONSONLEARNINGOUTCOMES-BASEDCURRICULUMFRAMEWORKFORPOSTGRADUATEEDUCATION	
Programme	M.Sc.,ComputerScience
ProgrammeCode	M.Sc.CS
Duration	PG-TwoYears
ProgrammeOutcomes(POs)	PO1: Problem Solving Skill: Apply knowledge of Management theories and Human Resource practice to solve business problems through research in Global context. PO2: Decision Making Skill: Foster analytical and critical thinking abilities for data-based decision-making. PO3: Ethical Value Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities. PO4: Communication Skill Ability to develop communication, managerial and interpersonal skills. PO5: Individual and Team Leadership Skill Capability to lead themselves and the team to achieve organizational goals. PO6: Employability Skill Inculcate contemporary business practices to enhance employability skills in the competitive environment. PO7: Entrepreneurial Skill Equip with skills and competencies to become an entrepreneur. PO8: Contribution to Society Succeed in career endeavors and contribute significantly to society. PO9: Multicultural competence Possess knowledge of the values and beliefs of multiple cultures and a global perspective. PO10: Moral and ethical awareness/reasoning Ability to embrace moral/ethical values in conducting one's life.
Programme Specific Outcomes(PSOs)	PSO1–Placement To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions. PSO2-Entrepreneur To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations. PSO3–Research and Development Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development. PSO4–Contribution to Business World To produce employable, ethical and innovative professionals to sustain in the dynamic business world. PSO5–Contribution to the Society To contribute to the development of the society by collaborating with stakeholders for mutual benefit.

CreditDistributionforPGProgramme

Semester-I	Credits	Semester-II	Credits	Semester-III	Credits	Semester-IV	Credits
1.1. Core-I	5	2.1. Core-IV	5	3.1. Core-VII	5	4.1. Core-XI	5
1.2 Core-II	5	2.2 Core-V	5	3.2 Core-VIII	5	4.2 Core-XII	5
1.3 Core – III	5	2.3 Core – VI Theory/Practical (Depending on the discipline)	4	3.3 Core – IX	5	4.3 Project with Viva-Voce	7
1.4 Elective - I : Discipline Centric	3	2.4 Elective - III Discipline Centric	3	3.4 Core- X Theory/Practical (Depending on the discipline)	4	4.4 Elective - VI (Industry / Entrepreneurial) – 20% Theory and 80% Practical	3
1.5 Elective - II Generic Elective – Women Empowerment	2	2.5 Elective - IV Generic Elective – Cyber Security	3	3.5 Elective – V	3	4.5 Skill Enhancement Course - Professional Competency Skill	2
		2.6 NME - Skill Enhancement Course - SEC 1	2	3.6 NME - 2	2	4.6 Extension Activity	1
				3.7 Internship/ Industrial Activity	2		
	20		22		26		23
	Total Credit Points						91

ComponentwiseCreditDistribution

Credits	Sem-I	Sem-II	Sem-III	SemIV	Total
PartA	18	19	21	19	72
PartB					
(i)Discipline–Centric/GenericSkill	2	3	3	3	8
(ii)SummerInternship/Industrial Training			2		
PartC				1	1
Total	20	22	26	23	91

METHODS OF EVALUATION		
Internal Evaluation	Continuous Internal Assessment Test	25 Marks
	Assignments/Snap Test/Quiz	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
Total		100 Marks
METHODS OF ASSESSMENT		
Remembering (K1)	- The lowest level of questions requires students to recall information from the course content - Knowledge questions usually require students to identify information in the textbook.	
Understanding (K2)	- Understanding of facts and ideas by comprehending, organizing, comparing, translating, interpolating and interpreting in their own words. - The questions go beyond simple recall and require students to combine data together	
Application (K3)	- Students have to solve problems by using/applying a concept learned in the classroom. - Students must use their knowledge to determine an exact response.	
Analyze (K4)	- Analyzing the question is one that asks the students to break down something into its component parts. - Analyzing requires students to identify reasons, causes or motives and reach conclusions or generalizations.	
Evaluate (K5)	- Evaluation requires an individual to make judgment on something. - Questions to be asked to judge the value of an idea, a character, a work of art, or a solution to a problem. - Students are engaged in decision-making and problem-solving. - Evaluation questions do not have single right answers.	
Create (K6)	- The questions of this category challenge students to get engaged in creative and original thinking. - Developing original ideas and problem-solving skills	

WRITTEN EXAMINATION QUESTION PAPER PATTERN**Theory Paper (Bloom's Taxonomy based)****(Common for UG, PG, Certificate, Diploma and P.G. Diploma Programmes)**

Intended Learning Skills	Maximum 75 Marks Passing Minimum: 50% Duration: Three Hours
Memory Recall/Example/Counter Example /Knowledge about the Concepts/Understanding	Part-A (10x2=20 Marks) Answer ALL questions Each Question carries 2 marks
	Two questions from each Unit
	Question 1 to Question 10
Descriptions/Application (problems)	Part-B (5x5=25 Marks) Answer ALL questions Each question carries 5 Marks
	Either-or Type Both parts of each question from the same Unit
	Question 11(a) or 11(b) to Question 15(a) or 15(b)
Analysis/Synthesis/Evaluation	Part-C (3x10 = 30 Marks) Answer any THREE questions Each question carries 10 Marks
	There shall be FIVE questions covering all the five units
	Question 16 to Question 20

***Minimum credits required to pass: 91**

**PROGRAMMEOUTCOMES(PO)-PROGRAMMESPECIFICOUTCOMES(PSO)
MAPPING**

PROGRAMMESPECIFICOUTCOMES(PSO)					
	PO1	PO2	PO3	PO4	PO5
PSO1	3	3	3	3	3
PSO2	3	3	3	3	3
PSO3	3	3	3	3	3
PSO4	3	3	3	3	3
PSO5	3	3	3	3	3

LevelofCorrelation betweenPO'sandPSO's

(SuggestedbyUGC asper Six SigmaTool– Cause andEffectMatrix)

Assignthevalue

1 –Low

2 –Medium

3 – High

0–NoCorrelation

M.Sc.,ComputerScience

CourseCode	Titleof theCourse	Credi ts	Ho urs		MaximumMarks		
			Theory	Practic al	CIA	ESE	Total
FIRSTSEMESTER							
P23CST101	CoreTheory – 1:Advanced JAVA Programming	5	7	-	25	75	100
P23CST102	Core Theory2: DataStructures adAlgorithm	5	7	-	25	75	100
P23CSP103	CorePractical 1:Advanced JAVAandDataStructures & AlgorithmsLab	5	-	6	25	75	100
P23CSE11A/P23CS E11B/ P23CSE11C	Elective1: A. Compiler Design / B. Distributed Operating System / C. Object Oriented Analysis and Design	3	5	-	25	75	100
P23WSG101	GenericCourse–I: WomenEmpowerment	2	5	-	25	75	100
Total		20	24	6			500
SECONDSEMESTER							
P23CST204	CoreTheory 3– PythonProgramming	5	6	-	25	75	100
P23CST205	CoreTheory 4– ComputerNetworks	5	6	-	25	75	100
P23CSP206	CorePractical 2– PythonProgrammin gLab	4	-	6	25	75	100
P23CSE22A/ P23CSE22B/ P23CSE22C	Subject Based Elective 2: A. Cryptography and Network Security / B. Digital Electronics and Computer Organization / C. Soft Computing	3	5	-	25	75	100
P23CSG202	GenericCourse–II: Cyber Security	3	4	-	25	75	100
P23CSS201	SkillEnhancementCourse (NME) –SEC-1: E– CommerceTechnologies	2	4	-	25	75	100
Total		22	25	6			600

- Internship to be done during the summer vacation (This will be valued during the next semester)

THIRD SEMESTER							
Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	Total
P23CST307	Core Theory 5 - Digital Image Processing	5	6		25	75	100
P23CST308	Core Theory 6– Cloud Computing	5	6		25	75	100
P23CST309	Core Theory 7 - Software Project Management	5	6		25	75	100
P23CST310	Core Theory 8 - Data Science & Analytics	4	6		25	75	100
P23CSE33A	Elective–V: Practical: Digital Image Processing Lab	3		3	25	75	100
P23CSE34A	Elective VI (Practical): Web Designing using HTML	2		3	25	75	100
P23CSI301	Industrial Activity	2	-		25	75	100
Total		26	24	6			700
FOURTH SEMESTER							
P23CST411	Core Theory 9 - Artificial Intelligence and Machine Learning	5	6	-	25	75	100
P23CSP412	Core Practical 3 - Web Application development & hosting Practical	5	-	6	25	75	100
P23CSPR41	Project work and Viva-Voce	7		10	25	75	100*
P23CSE45A/ P23CSE45B/ P23CSE45C	Elective – VI – A. Data Compression / B. R programming/ C. Photo Designing	3	4	-	25	75	100
P23CSS402	Skill Enhancement Course 2 – Job Oriented / Value added Courses - Mobile Application Development Lab	2	-	4	25	75	100
P23EAS401	Extension Activity	1	-	-			
Total		23	10	20			500
Grand Total		91	83	38			

- Internship / Industrial Activity- The students should submit a report of size 25 to 40 pages.

I-SEMESTER

COURSE CODE	P23CST101	ADVANCEDJAVAPROGRAMMING	L	T	P	C
CORE THEORY- I			7	-	-	5

CourseObjectives:

The main objectives of this course are to:

1. Enable the student to learn the basic functions, principles and concepts of advanced java programming.
2. Provide knowledge on concepts needed for distributed Application Architecture.
3. Learn JDBC, Servlet packages, JQuery, Java Server Pages and JAR file format

Unit1:BASICS OF JAVA

Java Basics Review: Components and event handling – Threading concepts – Networking features.

Unit2:REMOTE METHOD INVOCATION

Remote Method Invocation- Distributed Application Architecture- Creating stubs and skeletons- Defining Remote objects- Remote Object Activation- Object Serialization.

Unit3:DATABASE

Java in Databases - JDBC principles – database access- Interacting-database search – Creating multimedia databases – Databases support in web applications

Unit4:SERVLETS

Java Servlets: Java Servlet and CGI programming- A simple Java Servlet - Anatomy of a java Servlet - Reading data from a client - Reading http request header - sending data to a client and writing the http response header-working with cookies\ Java Server Pages: JSP Overview- Installation-JSP tags-Components of a JSP page-Expressions-Scriptlets-Directives-Declarations-A complete example

Unit:5ADVANCED TECHNIQUES

JAR file format creation – Internationalization – Swing Programming – Advanced Java techniques

Text Books

1. Herbert Schildt, Java The Complete Reference, McGraw Hill Education, 10th Edition, New York, 2017

ReferenceBooks

- 1 JimKeogh,”
- 2 TheCompleteReferenceJ2EE”, TataMcGrawHillPublishingCompanyLtd,2010.
- 3 DavidSawyerMcFarland,“JavaScriptandJQuery-TheMissingManual”,OreillyPublications,3rdEdition,2011.
- 4 DeitelandDeitel,“JavaHowtoProgram”,ThirdEdition,PHI/PearsonEducationAsia.

RelatedOnlineContents[MOOC, SWAYAM,NPTEL, and Websitesetc.]

- 1 <https://www.javatpoint.com/servlet-tutorial>
- 2 <https://www.tutorialspoint.com/java/index.htm>
- 3 https://onlinecourses.nptel.ac.in/noc19_cs84/preview

CourseOutcomes:

Onthesuccessfulcompletionofthecourse,studentwillbeableto:

UnderstandtheadvancedconceptsofJavaProgramming K1,K2
 UnderstandJDBCandRMIconcepts K2,K3
 ApplyandanalyzeJavainDatabase K3, K4
 Handledifferenteventinjavausingthedelegationeventmodel,eventlistenerandclassK5Designint
 eractiveapplicationsusingJavaServlet,JSPandJDBC

K5,K6K

1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate;K6-Create

MappingwithProgrammingOutcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	M	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

*S-Strong;M-Medium;L-Low

COURSE CODE	P23CST102	DATASTRUCTURESANDALGORITHM	L	T	P	C
CORE THEORY-II			7	-	-	5

Course Objectives:

1. To introduce algorithm analysis framework for recursive and non-recursive algorithms
2. To acquire knowledge on ADTs such as List, Stack and Queue
3. To explore the binary trees and the priority queues with their applications
4. To learn the various hashing techniques and Set ADT

UNIT I: Trees

Heaps – Binary Search Trees – Selection Trees – Forests – representation of Disjoint Sets – Counting Binary Trees. **Graphs:** The Graph Abstract Data type – Elementary Graph Operations – Minimum Cost Spanning Trees – Shortest Paths and Transitive Closure – Activity Networks.

UNIT II: Hashing: Introduction – Static hashing – Dynamic hashing – Bloom filters.

Priority Queues: Single and Double ended priority queues – Left Trees – Binomial Heaps.

Fibonacci Heaps – Pairing Heaps – Symmetric Min – Max Heaps – Interval Heaps.

UNIT III: Efficient Binary Search trees:

Optimal Binary Search Trees – AVL Trees – Red – Black Trees – Splay Trees. **Multiway Search Trees:** m-way Search Trees – B-Trees – B⁺-Trees.

UNIT IV: Dynamic Programming:

The General Method – Multistage graphs – All-pairs shortest paths – Single-source shortest paths – Optimal binary search trees – string editing – 0/1 knapsack – reliability design – The Travelling Salesperson problem – flow shop scheduling.

Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Biconnected Components and DFS.

UNIT V: Backtracking:

The General Method – The 8 - Queens Problem – Sum of subsets – Graph coloring – Hamiltonian cycles – Knapsack problem.

Branch and Bound: The Method – 0/1 Knapsack problem – Traveling Sales person (*) – Efficiency considerations.

TEXTBOOK(S):

1. Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Fundamental of Data Structures in C++, University Press (India) Private Limited, Second Edition, Reprinted, 2017.
2. Alfred V. Aho, John E. Hopcraft and Jeffrey D. Ullman, Data Structures and Algorithms, Pearson Education, Fourteenth Impression, 2013.

REFERENCEBOOK(S):

1. Timothy A. Budd, Classic Data Structures in C++, – Addison Wesley Publishing Co., First Edition., 1994.
2. Timothy A. Budd, Data Structure and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, Addison Wesley Publishing Company, 1997.
3. Sara Baase and Allen Van Gelder, Computer Algorithms – Introduction to Design & Analysis, Third Edition, Pearson Education, New Delhi, 2000.
4. P. T. Rajan, Data Structures, A. Chitra, Vijay Nicol Imprints Pvt Ltd, McGraw Hill Education of India Pvt. Ltd., 2006.
5. Sridhar, Design and Analysis of Algorithms, Oxford University Press, 2015
6. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms – University Press (India) Private Limited, Second Edition, Reprinted, 2017.

COURSE OUTCOMES

- CO1: Describe the dynamic structures – trees and graphs and discuss the application of these structures in finding simplified solutions K1
- CO2: Describe hash and priority queues and its application K2
- CO3: Implement binary search tree, balanced tree and multi-way indexed tree K2
- CO4: Solve problems using dynamic programming and apply traversal techniques of trees and graphs K3
- CO5: Analyze and solve problems using backtracking and branch-and-bound technique. K4

MAPPING OF COs WITH POs AND PSO:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	M	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	M	S	S	S	S	M	M	S	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSCP101	Advanced JAVA and Data Structures & Algorithms Lab	L	T	P	C
COREPRACTICAL1			-	-	6	5

Java List

1. Program to display life cycle of an applet
2. Program to display digital clock using applet
3. Program to display different graphical shapes in applet
4. Program to display graphical bar chart by passing parameters in applet
5. Write an Applet which will play two sound notes in a sequence continuously use the play() methods available in the applet class and the methods in the AudioClip interface.
6. Program to find factorial value of N using AWT high level event handling
7. Program to illustrate window closing using AWT low level event handling.
8. Program to illustrate TCP based network communication.
9. Program to illustrate UDP based network communication.
10. Program to find sum of digits using RMI
11. Program to find length of the given string using RMI
12. Program using Java Script to find length of the given string.
13. Use JDBC connectivity and create Table, insert and update data.

Data Structures and Algorithms List using C

1. Implementation of Stack using Array
2. Implementation of Queue using LinkedList
3. Implementation of Heap Tree.
4. Implementation of Tree Traversal.
5. Implementation of BFS.
6. Implementation of DFS.
7. Implementation of Merge Sort using Divide and Conquer.
8. Implementation of Prim's Algorithm using Greedy Technique.
9. Implementation of n-queens Problem using Backtracking

Text Books

1. Herbert Schildt, Java The Complete Reference, McGraw Hill Education, 10th Edition, New York, 2017

Reference Books

- 1 Jim Keogh, "The Complete Reference J2EE", Tata McGraw Hill Publishing Company Ltd, 2010.
- 2 David Sawyer McFarland, "JavaScript and JQuery - The Missing Manual", O'Reilly Publications, 3rd Edition, 2011.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

- 1 <https://www.javatpoint.com/servlet-tutorial>
- 2 <https://www.tutorialspoint.com/java/index.htm>
- 3 https://onlinecourses.nptel.ac.in/noc19_cs84/preview

Course Outcomes:

On the successful completion of the course, student will be able to:

- | | |
|---|--------|
| 1. Understand to the implement concepts of Java using HTML forms, JSP & JAR | K1, K2 |
| 2. Must be capable of implementing JDBC and RMI concepts | K3, K4 |
| 3. Able to write Applets with Event handling mechanism | K4, K5 |
| 4. To Create interactive web based applications using Servlets and JSP | K5, K6 |

K1-Remember; **K2** -Understand; **K3**-Apply; **K4**-Analyze; **K5** -Evaluate; **K6**-Create

Mapping with Programming Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSE11A	COMPILERDESIGN	L	T	P	C
ELECTIVE1			5	-	-	3

Course Objectives:

1. To study features of Compilers and Translators.
2. To understand the lexical analyzer
3. To learn the LR and SLR.
4. To gain knowledge on Symbol and optimization

UNIT I: Introduction to Compilers:

Compilers and Translators-Why Do We Need Translators?-The Structure of A Compiler- Lexical Analysis-Syntax Analysis-Intermediate Code Generation-Optimization-Code Generation- Book Keeping-Error Handling-Compiler-Writing Tools-Getting started.

UNIT II: Lexical Analysis:

The role of the lexical analyzer-Simple approach to design of a lexical analyzer-Regular Expressions – Finite Automata – From regular expression to finite automata – Minimizing the number of states of a DFA-A language for specifying lexical analyzer - Implementing a lexical analyzer.

UNIT III: Semantic Analysis:

The Syntactic Specification of Programming Languages- Context free grammars -Derivation and Parse Trees-Parsers-Shift-reduce Parsing-Operator-precedence parsing-Top-down parsing – Predictive Parsers.

UNIT IV: Syntax Analysis:

LR parsers-The canonical collection of LR(0) items-constructing SLR parsing tables-constructing canonical LR parsing tables – constructing SLR parsing tables – constructing LALR parsing tables. Syntax directed translation schemes – Implementation of syntax directed schemes – Intermediate Code- Parse Tree and Syntax Trees -Three Address code, quadruples, and triples – Translation of assignment statements.

UNIT V: Code Optimization and Code Generation:

The contents of a symbol table-Data structure for a symbol table-Representing Scope information. Code Optimization-The principal sources of optimization – Loop optimization – The DAG representation of basic blocks-Peephole Optimization.

TEXTBOOK(S):

1. Principles of Compiler Design, Alfred V. Aho and Jeffrey D. Ullman, 25th Reprint, 2013.

REFERENCE BOOK(S):

1. C.Allen Compiler Designing, I.Holub Prentice Hall of India, 2003.
2. C.N.Fischer and R.J.LeBlanc, Crafting a compiler with C, Benjamin Cummings, 2003.
3. J.P.Bennet, Introduction to Compiler Techniques, Second Edition, Tata Mc.Graw Hill, 2003.

COURSE OUTCOMES

CO1: Describe the basics of Compiler Structure

K3

CO2: Analyze the functioning of Lexical Analyzer and implementation using Finite Automata.

K2 CO3: Understand the role of Context Free Grammar and Parsing Techniques

K1

CO4: Analyze the working methodology of LR Parsers and Representation of Intermediate Code Generation Phase

K4

CO5: Discuss about the Data Structures used by Compiler, various Code Optimization Sources and apply the techniques

MAPPING OF COs WITH POs AND PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	S	S	S	S	S	M	M	S	S

*S-Strong; M-Medium; L-Low

COURS ECODE	P23CSE11B	CHOICE-II	L	T	P	C
SBE1		DISTRIBUTED OPERATING SYSTEM	5	-	-	3

Course Objectives:

1. To study features of Distributed operating system.
2. To understand the communication of different hardware and software in distributed environment.
3. To learn the distributed resource management components.
4. To gain knowledge on modern operating system working principles.

UNIT-I: Introduction

Introduction – Operating System Definition – Functions of Operating System – Types of Advanced Operating System – Design Approaches – Synchronization Mechanisms – concepts of a Process – Critical Section Problem – Process Deadlock – Models of Deadlock – Conditions for Deadlock – System with single-unit requests, Consumable Resources, Reusable Resources.

UNIT-II: Distributed Operating Systems

Distributed Operating Systems: Introduction – Issues – Communication Primitives – Inherent Limitations – Lamport's Logical Clock, Vector Clock, Global State, Cuts – Termination Detection – Distributed Mutual Exclusion – Non-Token Based Algorithms – Lamport's Algorithm – Token Based Algorithms – Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms – Agreement protocols.

UNIT-III: Distributed Resource Management

Distributed Resource Management – Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed shared Memory – Architecture – Algorithm – Protocols – Design Issues – Distributed Scheduling – Issues – Components – Algorithms.

UNIT-IV: Failure Recovery and Fault Tolerance

Failure Recovery and Fault Tolerance – Concepts – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems – Synchronous and Asynchronous Check pointing and Recovery – Check pointing in Distributed Database Systems – Fault Tolerance Issues – Two-Phase and Non-blocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.

UNIT-V: Multiprocessor and Database OS

Multiprocessor and Database Operating Systems – Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory management – Reliability/Fault Tolerance – Database Operating Systems – concepts – Features of Android OS, Ubuntu, Google Chrome OS and Linux operating systems.

Text Book(s):

1. Mukesh Singhal N.G. Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 2000.
2. Andrew S. Tanenbaum, Distributed Operating System, PHI, 2002.

Reference Book(s):

1. Abraham Silberschatz, Peter B. Galvin, G. Gagne, "Operating Concepts", 6th Edition Addison Wesley publications, 2003.

2. Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition Addison Wesley, 2001

COURSE OUTCOMES

CO1: Understand the Operating System Structure and its Services

K1

CO2: Understand the efficient Scheduling of Multiple Process Execution.

K2

CO3: Understand the efficient allocation of available memory among Multiple processes

K3

CO4: Understand the Device Management System

K3 CO5:

Compare and Contrast the features of Windows and LINUX operating Systems in terms of their services.

K4

MAPPING OF COs WITH POs AND PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3	PSO 4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	S	S	S	S	S	M	M	S	S

*S-Strong; M-Medium; L-Low

COURS E CODE	P23CSE11C	CHOICE-III	L	T	P	C
SBE1`		OBJECTORIENTEDANALYSISANDDESIGN	5	-	-	3

Course Objectives:

1. To learn the basic principles of objects and Object Oriented System Development Life Cycle.
2. Learn to apply the Unified Modeling Language (UML) to elementary object-oriented analysis and design concepts.
3. UML presents the concepts and techniques necessary to effectively use system requirements to drive the development of a robust design model.
4. Showing how implementation details of a system can be modeled.

UNIT-I: Introduction to Object Oriented System Development:

Introduction – Two Orthogonal views – object oriented Systems development Methodology – Object orientation – unified approach – Object Basics – object oriented philosophy – objects – classes – attributes – behavior and methods – Message passing – Encapsulation and information hiding – hierarchy – polymorphism – object relationship and associations – aggregation – a case study – advanced topics.

UNIT-II: Object Oriented System And Methodology Development:

Object oriented system development life cycle (SDLC) – development process – building high quality software – use-case driven approach – reusability – Object oriented methodologies – introduction – Booch methodology – Jacobson methodologies – patterns – frameworks – unified approach.

UNIT-III: Unified Process and Use Case Diagrams

Unified modeling language – introduction – static and dynamic models – modeling – unified modeling language – UML diagrams – UML class diagrams – Use-case diagram – UML dynamic modeling – model management – OOA process – introduction – difficulty in analysis – business object analysis – use-case driven object oriented analysis – business process modeling – use-case model – developing effective documentation.

UNIT-IV: Object Classification

Object analysis – classification – common class patterns approach – use-case driven approach – CRC – naming classes – object relationships – associations – Super-Sub class relationships – aggregation – class responsibility – object responsibility – Object oriented design process and design axioms – introduction – design process – design axioms – design patterns.

UNIT-V: Design Classes:

Designing classes – introduction – object oriented design philosophy – UML object constraint – designing classes – class visibility – defining attributes – designing methods and protocols – Packages and managing classes – Access layer – Object storage and object interoperability – introduction – object store and persistence – Database management systems – database organization and access control – distributed databases.

TEXTBOOK(S):

1. AliBahrami, ObjectOrientedSystemsDevelopment, IrwinMcGrawHillPublications, 2015.

REFERENCEBOOK(S):

1. GradyBooch, ObjectOrientedAnalysisandDesign, Pearson, 2009.

COURSEOUTCOMES

- CO1: Describethebasics ofObjectOrientedconcepts
- K1CO2: Analyze the function ing methodologies provided by Booch and Jacobson; Introduction on unified approach. K2
- CO3: Illustration of UML diagrams applicable to various phases of software development. K3
- CO4: Study on Relationship between various objects in the application and various ways of their reorientations
- CO5: Import knowledge on packaging classes, distributing them among layers & introducing the object-oriented databases. K4

MAPPING OF COs WITH POs AND PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	S	S	M	M	M	S	M	M
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	S	S

*S-Strong; M-Medium; L-Low

SEMESTER II

COURSE CODE	P23CST204	PYTHON PROGRAMMING	L	T	P	C
CORE THEORY - III			6	-	-	5

Course Objectives:

The main objectives of this course are to:

1. Present an introduction to Python, creation of web applications, network applications and working in the clouds
2. Use functions for structuring Python programs
3. Understand different Data Structures of Python
4. Represent compound data using Python lists, tuples and dictionaries

Unit:1 INTRODUCTION

Python: Introduction–Numbers–Strings–Variables–Lists–Tuples–Dictionaries–Sets Comparison.

Unit:2 CODE STRUCTURES

Code Structures: if, else if, and else–Repeat with while–Iterate with for–Comprehensions – Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except–User Exceptions.

Unit:3 MODULES, PACKAGES AND CLASSES

Modules, Packages, and Programs: Standalone Programs – Command-Line Arguments – Modules and the import Statement– The Python Standard Library. **Objects and Classes:** Define a Class with class – Inheritance – Override a Method– Add a Method – Get Help from Parent with super–In self Defense –Get and Set Attribute Values with Properties–Name Mangling for Privacy– Method Types–Duck Typing–Special Methods–Composition.

Unit:4 DATA TYPES AND WEB

Data Types: Text Strings–Binary Data. **Storing and Retrieving Data:** File Input/Output Structured Text Files–Structured Binary Files–Relational Databases–NoSQL Data Stores.

Web: Web Clients–Web Servers–Web Services and Automation

Unit:5 SYSTEMS AND NETWORKS

Systems: Files–Directories–Programs and Processes–Calendars and Clocks. **Concurrency:** Queues – Processes – Threads – Green Threads and gevent – twisted–Redis.

Networks: Patterns–The Publish-Subscribe Model– TCP/IP– Sockets–Zero MQ–Internet Services – Web Services and APIs – Remote Processing – Big Fat Data and Map Reduce–Working in the Clouds.

Text Books

1. Bill Lubanovic, “Introducing Python”, O’Reilly, First Edition-Second Release, 2014.
2. Mark Lutz, “Learning Python”, O’Reilly, Fifth Edition, 2013.

ReferenceBooks

- 1 David M. Beazley,“Python Reference”, Developer’s Library, EssentialEdition,2009.
- 2 SheetalTaneja,Naveen Kumar, Fourth“Python Programming- A Approach”,PearsonPublications. Modular

RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]

- 1 <https://www.programiz.com/python-programming/>
- 2 <https://www.tutorialspoint.com/python/index.htm>
- 3 https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

CourseOutcomes:

Onthesuccessfulcompletionofthecourse,studentwillbeableto:

1. UnderstandthebasicconceptsofPythonProgramming K1,K2
 2. UnderstandFileoperations,ClassesandObjects K2,K3
 3. AcquireObjectOrientedSkillsinPython K3,K4
 4. Developwebapplicationsusing Python K5
 - DevelopClientServerNetworking applications K5, K6
- K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate;K6-Create**

MappingwithProgrammingOutcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	S	S	S	S	S	M	S	M

*S-Strong;M-Medium;L-Low

COURSE CODE	P23CST205	COMPUTER NETWORKS	L	T	P	C
CORE THEORY - IV			6	-	-	5

Objective(s):

- To study layered architecture of computer networks and protocols.
- To learn the various mediums used in the physical layer.
- To study the functionalities of data link layer.
- To learn the routing algorithms and the use of IP addressing in the network layer.
- To understand the working of transport layer.
- To learn to design secure network applications.

UNIT-I INTRODUCTION, PHYSICAL LAYER

Overview: Data Communication - Network Types - Internet History - TCP/IP Protocol Suite - The OSI Model - Digital Signals - Data rate limits - Performance - Line Coding - Block Coding - Transmission Media: Guided Media - Unguided Media - Switching.

UNIT-II DATA LINK LAYER

Link Layer Addressing - ARP - Error Detection and Correction - Data Link Control Services - Data Link Layer Protocols - HDLC - PPP - Media Access Control - Ethernet - Wireless LANs: IEEE 802.11, Bluetooth - Connecting Devices.

UNIT-III NETWORK LAYER

Network Layer Services - Packet switching - Performance - IPv4 addresses - Forwarding of packets - Internet Protocol - ICMPV4 - Mobile IP - Routing algorithms - Routing Protocols - IPv6 addressing - IPv6 protocol - Transition from IPv4 to IPv6

UNIT-IV TRANSPORT LAYER

Transport Layer Services - Protocols - UDP - TCP: Transition Diagram, Flow Control, Error Control, Congestion Control - SCTP - QoS: Flow Control to improve QoS - Integrated Services - Differentiated Services - Client Server Programming.

UNIT-V APPLICATION LAYER AND SECURITY

World Wide Web and HTTP - FTP - Electronic Mail - Telnet - Secure Shell - Domain Name System - Cryptographic Algorithms - Authentication Protocols - Message Integrity Protocols - Public Key Distribution (X.509) - Network Layer Security - Transport Layer Security - Application Layer Security - Firewalls.

Text Book(s):

1. Behrouz A. Forouzan, "Data Communication and Networking", Tata McGraw-Hill, Fifth Edition, 2013
2. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Morgan Kaufmann Publishers Inc., Third Edition, 2003.

ReferenceBook(s):

1. JamesF.Kuross,KeithW.Ross,“ComputerNetworking,A Top-DownApproachFeaturingtheInternet”,AddisonWesley,ThirdEdition,2004.
2. PeteLoshin,“IPv6: Theory,Protocol andPractice”,ELSEVIER,MorganKauffmannPublishersInc.,Secondedition,2004
3. WilliamStallings,“DataandComputerCommunication”,PearsonEducation,SixthEdition,2000.
4. AndrewS.Tannenbaum,“ComputerNetworks”,PearsonEducation,FourthEdition,2003
5. D.E.Comer,“InternetworkingwithTCP/IPVol-III”,(BSDSocketsVersion),PearsonEducation,SecondEdition,2003.
6. W.RichardStevens,“UNIXNetworkProgrammingVol-I”,PearsonEducation,SecondEdition,1998.

CourseOutcomes:**CO1**

AcquireknowledgeoncomputernetworksandabletodefinethefunctionsofeachlayerintheOSIandTCP/IPmodel.This helpstocomparewithdifferentnetworksandplanhowtoselectgoodtransmissionmedia.

K1K2K3K4

CO2

Abletoillustratecommunicationsatellitesandtelephonenetworkstructure,acquirethoroughknowledgeondatalinklayerconcepts,designissuesandprotocolsandapplythemtocategorizedifferenterrordetectionandcorrectiontechniques tominimize errors.

K1K2K3K4

CO3

Acquaintwiththefundamentals ofdatalinkprotocolsandidentifyvarious elementarydatalinkprotocols forframing,errorcontrol,flowcontrolandmultipleaccessprotocolstoaccessasharednetworkchannel.

K1K2K3

CO4

Understandthenetworklayerconcepts,applydesignissuesandprotocols toanalyzeroutingand congestioncontrolalgorithmstodirectinternettrafficefficiently,performanceevaluation

K1K2K3K4K5K6

CO5

Definetransportlayerdesignissues,connectionmanagementandprotocols,analyzecryptographymethodofprotectinginformationandcategorizeencryptionanddecryptiontechniques tosecureandprotectdata duringcommunication.

K1K2K3K4K5

MappingwithProgrammingOutcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	S	M

CO5	S	S	S	S	S	S	S	M	S	M
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*S-Strong;M-Medium;L-Low

COURSECODE	P23CSP206	PYTHONPROGRAMMINGLAB	L	T	P	C
COREPRACTICAL - II			-	-	5	4

CourseObjectives:

The main objectives of this course are to:

1. This course presents an overview of elementary data items, lists, dictionaries, sets and tuples
2. To understand and write simple Python programs
3. To understand the OOPS concepts of Python
4. To develop web applications using Python

LIST OF PROGRAMS

Implement the following in Python:

1. Programs using elementary data items, lists, dictionaries and tuples
2. Programs using conditional branches,
3. Programs using loops.
4. Programs using functions
5. Programs using exception handling
6. Programs using inheritance
7. Programs using polymorphism
8. Programs to implement file operations.
9. Programs using modules.
10. Programs for creating dynamic and interactive web pages using forms.

Text Books:

1. Bill Lubanovic, "Introducing Python", O'Reilly, First Edition-Second Release, 2014.
2. Mark Lutz, "Learning Python", O'Reilly, Fifth Edition, 2013.
1. David M. Beazley, "Python Essential Reference", Developer's Library, Edition, 2009.
2. Sheetal Taneja, Naveen Kumar, "Approach", Pearson Publications. Fourth Python Programming-A

Reference Books

Modular

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. <https://www.programiz.com/python-programming/>
2. <https://www.tutorialspoint.com/python/index.htm>
3. https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

Course Outcomes:

On the successful completion of the course, student will be able to:

1. Able to write programs in Python using OOPS concepts K1,K2
2. To understand the concepts of File operations and Modules in Python K2,K3
3. Implementation of lists, dictionaries, sets and tuples as programs K3,K4
4. To develop web applications using Python K5,K6

K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate;**K6**-Create

Mapping with Programming Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSE22A	CHOICE1	L	T	P	C
SBE3		CRYPTOGRAPHY AND NETWORKS SECURITY	4	-	-	3

Course Objectives:

1. To learn about the Number Theory
2. To understand the basics of Cryptography
3. To understand Hash Functions and Cryptography
4. To know about Security Procedure and System Security.

UNIT-I: Introduction & Number Theory

Services, Mechanisms and attacks – the OSI security architecture - Network security model - Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography). FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields - Polynomial Arithmetic – Prime numbers-Fermat's and Euler's theorem-Testing for primality - The Chinese remainder theorem-Discrete logarithms.

UNIT-II: Block Ciphers & Public Key Cryptography

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES) - Triple DES – Blowfish - RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management-Diffie-Hellman Key exchange-Elliptic curve arithmetic- Elliptic curve cryptography.

UNIT-III: Hash Functions and Digital Signatures

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – MD5-SHA-HMAC-CMAC-Digital signature and authentication protocols – DSS-EIGamal-Schnorr.

UNIT-IV: Security Practice & System Security

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewall design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V: E-Mail, IP & Web Security

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. IP Security: Overview of IPsec-IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3-Exportability-Encoding-Secure Electronic Transaction (SET).

TextBook(s):

1. WilliamStallings,CryptographyandNetworkSecurity,6thEdition,PearsonEducation, March,2013.
2. CharlieKaufman,RadiaPerlmanandMikeSpeciner,“NetworkSecurity”,PrenticeHallowIndia,2002.

Reference Book(s):

1. BehrouzA.Ferouzan,“Cryptography&NetworkSecurity”,TataMcGrawHill,2007.
2. Man Young Rhee,“Internet Security: CryptographicPrinciples”,“AlgorithmsandProtocols”,WileyPublications,2003.
3. CharlesPFleeger,“Security inComputing”,4thEdition,PrenticeHallowIndia,2006.
4. UlysessBlack,“InternetSecurityProtocols”,PearsonEducationAsia,2000.
5. CharlieKaufmanandRadiaPerlman,MikeSpeciner,“NetworkSecurity, SecondEdition,PrivateCommunicationinPublicWorld”,PHI,2002.
6. BruceSchneierandNeilsFerguson,“PracticalCryptography”,FirstEdition,WileyDreamtechIndiaPvtLtd,2003.
7. DouglasRSimson“Cryptography– Theoryandpractice”,FirstEdition,CRCPress,1995.

COURSEOUTCOMES

CO1:UnderstandtheNumberTheory	K1
CO2:UnderstandthebasicsofCryptography	K2
CO3:UnderstandHashFunctionsandCryptography	K3
CO4:UnderstandSecurityProcedureandSystem SecurityK3	
CO5:UnderstandthevariousSecurityServices	K4

MAPPINGOFCOsWITHPOsANDPSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	S	S	M	M	M	S	M	M
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	S	S

*S-Strong;M-Medium;L-Low

COURSE CODE	P23CSE22B	DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION	L	T	P	C
ELECTIVE - II			4	-	-	3

OBJECTIVES:

1. To understand the fundamentals of computer and its role in problem solving.
2. To acquire the concept of flow of control and program structures.
3. To learn the operation of latches, flip-flops, counters, registers and register transfers in the Computer organization.
4. To design two-level logic functions with AND, OR, NAND, NOR and XOR gates with minimum number of gated delays or literals

UNIT I: NUMBER SYSTEM

Number Representation - Number System: Binary, Hexadecimal - Octal Codes - BCD- Excess-3 - Gray Code-ASCII-EBCDIC-Binary Arithmetic-1's Complement-2's Complement Representation- Error Detecting Codes-Hamming Codes. Introduction-Boolean Algebra-Demorgan's Theorem-Sum of Product method-Product of Sum method-Karnaugh Map.

UNIT II: GATES

Introduction - Logic Gates – Universal Gates – Decoder – Encoder – Multiplexer – De-multiplexer - Half Adder- Full Adder-Half Subtractor- Full Subtractor. Flip-Flops - S-R Flip-flop- J-K Flip Flops.

UNIT III: INSTRUCTIONS

Introduction: Machine Language - Assembly language – Assembler -Programming Arithmetic & Logic Operations – Input-Output Programming. Basic Computer Organization and Design Instruction Codes - Computer Registers - Computer Instruction - Timing & Control Instruction Cycles-Memory Reference Instruction.

UNIT IV: I/O Organization

I/O Organization - Peripheral Devices - I/O Interface - Mode of Transfers – DMA- RAM- ROM- Memory Decoding – Error detection and correction – Programmable Logic Array – Programmable Array Logic

UNIT V: Memory Organization

Memory Organization-Memory Hierarchy-Main Memory-Auxiliary Memory-Associative Memory - Cache Memory - Virtual Memory – Dynamic Storage management – Data Management Concepts – Programmable Logic devices

TEXTBOOKS:

1. Albert Paul Malvino & Donald P. Leach-Digital Principles and Applications- 4th Edition, Tata McGraw Hill Company Limited, 2006.
2. Morris Mano-Computer System Architecture-Pearson Publication, Third Edition, 1993.

REFERENCEBOOKS:

1. P.K.Sinha&PritiSinha-ComputerFundamentals-BPBPublishations,2007.
2. Dr.AnitaGoel-ComputerFundamentals-PearsonEducation,2010.
3. AlexisLeon-FundamentalsofInformationTechnology -VikasPublication,2009
4. P.S.Manoharan-DigitalPrinciples&SystemDesign—RevisedEdition-CharulathaPublication,2017.

COURSEOUTCOMES:

Upon successful completion of the course the students will be able to

CO1: Understand the hardware and software types and components of the computer –K2

CO2: Recognize the problem-solving fundamental key points. –K1

CO3: Sketch out the representation of numbers and codes in the computer –K1.

CO4: Know the digital computer's internal components and the execution of the instructions –K2

CO5: Understand the hierarchy of memory management and usage –K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	M	W	M	S
CO2	S	M	M	S	M	M	M	M	M	M
CO3	S	M	M	W	M	M	M	M	M	M
CO4	S	S	S	S	M	S	M	M	S	S
CO5	S	M	M	S	M	M	M	M	M	M

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSE22C	SOFTCOMPUTING	L	T	P	C
ELECTIVE – II			4	-	-	3

Course Objectives:

1. To give students knowledge of soft computing theories fundamentals,
2. To learn the fundamentals of non-traditional technologies and approaches for solving hard real-world problems.
3. To learn and apply artificial neural networks, fuzzy sets and fuzzy logic, and genetic algorithms in problems solving and use of heuristics based on human experience
4. To introduce the ideas of fuzzy sets, fuzzy logic to become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems

UNIT I: Introduction to Soft Computing

Introduction, Artificial Intelligence, Artificial Neural Networks, Fuzzy Systems, Genetic Algorithm and Evolutionary Programming, Swarm Intelligent Systems, Expert Systems.

UNIT II: Introduction Neural network:

Artificial Neural Networks – First Generation –

Introduction to Neural Networks, Biological Inspiration, Biological Neural Networks to Artificial Neural Networks, Classification of ANNs, First-generation Neural Networks.

UNIT III: Introduction fuzzy logic:

Fuzzy Logic – Introduction to Fuzzy Logic, Human Learning Ability, Imprecision, and Uncertainty, Undecidability, Probability Theory vs. Possibility Theory, Classical Sets and Fuzzy Sets, Fuzzy Set Operations, Fuzzy Relations, Fuzzy Composition.

UNIT IV: Introduction Genetic Algorithms:

Genetic Algorithms and Evolutionary Programming – Introduction to Genetic Algorithms, Genetic Algorithms, Procedures of GAs, Genetic Representations, Selection, Genetic Operators, Mutation, Natural Inheritance Operators.

UNIT V: Introduction to Swarm Intelligence:

Introduction to Swarm Intelligence – Background of Swarm Intelligent Systems, Ant Colony System, Ant Colony Optimization.

TEXTBOOK(S):

1. N.P. Padhy, S.P. Simon, 'Soft computing with MATLAB programming' Oxford University Press, First Edition, 2015

REFERENCEBOOK(S):

1. S.N.SivanandamandS.N.Deepa,PrinciplesofSoftcomputing, WileyIndiaEdition,2nd Edition,2013.
2. SimonHaykin,NeuralNetworks,PearsonEducation,2003.
3. JohnYen&RezaLangari,FuzzyLogic– IntelligenceControl&Information,PearsonEducation,NewDelhi,2003.
4. N.P.Padhy,ArtificialIntelligenceandIntelligentSystemsOxfordUniversityPress, 2013.

COURSEOUTCOMES

CO1: Introduce the basic concepts and techniques of Soft Computing

K2

CO2: Differentiate Biological and Artificial Neural Network and Explain the types of Neural Networks

K3

CO3: Analyze various fuzzy models in developing fuzzy inference system to be appropriate with specific real time problems

K4

CO4: Use genetic algorithm to combinatorial optimization problems

K1

CO5: Discuss the Optimization techniques Swarm Intelligence and Ant colony Optimization

MAPPING OF COs WITH POs AND PSO:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	S	M	M	S	S	M
CO2	S	S	M	S	M	M	M	S	S	S
CO3	S	S	S	S	M	M	M	S	S	S
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	M	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSG22	CYBERSECURITY (Generic Elective - Common Paper for all PG Programmes in the II Semester)	L	T	P	C
GENERIC COURSE II			4	-	-	2

Course Outcomes:

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

1. understand what is cyber security
2. secure their e-mail communications
3. have familiarity in following security guidelines
4. know the cyber security initiatives taken by the Government
5. know how to do online transactions in a secured way

Unit-1: Introduction to Cyber Space History of Internet - Cyber Crime - Information Security –data stealing -Computer Ethics and Security Policies -violence against women- cyber security for womenstalking - pornography- usage of social media and cyber security for women.

Unit-2: Email Security & Wi-Fi Security Guidelines to choose web browsers - Securing web browser - Antivirus - Email security - Guidelines for setting up a secure password - Two-steps authentication Password – Manager - Wi-Fi Security – strategies to overcome E-mail threats- techniques of using public Wi-Fi –legal aspects regarding Email.

Unit-3: Social Media Security Guidelines for social media security - Tips and best practices for safer Social Networking - Basic Security for Windows - User Account Password - Smartphone Security guidelines: Introduction to mobile phones - Smartphone Security - Android Security - IOS Security

Unit-4: Cyber Security Initiatives in India - Importance of cyber security- making awareness - Counter Cyber Security Initiatives in India - Cyber Security Exercise - Cyber Security in curriculum - Cyber Security Assurance –case studies- government initiations to prevent cyber-crimes.

Unit-5: Online Banking, Credit Card and UPI Security Online Banking Security - Mobile Banking Security - Security of Debit and Credit Card – UPI - Micro ATM, e-wallet and POS Security - Security of Micro ATMs - e-wallet Security Guidelines - Security Guidelines for Point of Sales(POS).

References:

1. Introduction to Cyber Security -- <http://uou.ac.in/foundation-course>
2. Fundamentals of Information Security, Cyber Security Techniques
<http://uou.ac.in/progdetail?pid=CEGCS-17>
3. Cyber Attacks and Counter Measures: User Perspective <http://uou.ac.in/progdetail?pid=CEGCS-17>
4. A Guide for Women in Cyber Security, 2021. <https://cybersecurityguide.org/resources/women-in-cybersecurity/>
5. The 2017 Global Information Security Workforce Study: Women in Cybersecurity www.isc2.org/-/media/Files/Research/ISC2-Women-in-Cybersecurity2017
6. An Cybersecurity Workforce Report, Women in Cyber Security, Young, Educated and Ready to Take Charge. <https://www.isc2.org/-/media/ISC2/Research/ISC2-Women-in-CybersecurityReport.ashx>
7. Jack Balkin, et al. eds., CYBERCRIME: Digital Cops in a Networked World (NYU Press 2007) (ISBN:0814799833)
8. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York, 2011

MAPPING OF COs WITH POs AND PSO s:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	S	M	M	S	S	M
CO2	S	S	M	S	M	M	M	S	S	S
CO3	S	S	S	S	M	M	M	S	S	S
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	M	S

*S-Strong;M-Medium;L-Low

COURSE CODE	P23CSN21	E-COMMERCE TECHNOLOGIES	L	T	P	C
NME SEC I			4	-	-	2

COURSE OBJECTIVES

- To inculcate knowledge on E-Commerce concepts in the present IT world.
- Understand concept of E-commerce and its types
- Study the various online payment and marketing on Web
- Understand various E-business Strategies.

Unit-I

History of E-commerce and Indian Business Context: E-Commerce - Emergence of the Internet - Emergence of the WWW - Advantages of E-Commerce - Transition to E-Commerce in India - The Internet and India - E-transition Challenges for Indian Corporate.

Unit-II

Business Models for E-commerce: Business Model - E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

Unit-III

Enabling Technologies of the World Wide Web: World Wide Web - Internet Client-Server Applications - Networks and Internets - Software Agents - Internet Standards and Specifications - ISP. E-Marketing: Traditional Marketing - Identifying Web Presence Goals - Online Marketing - E-advertising - E-branding.

Unit-IV

E-Payment Systems: Main Concerns in Internet Banking - Digital Payment Requirements - Digital Token-based e-payment Systems - Classification of New Payment Systems - Properties of Electronic Cash - Cheque Payment Systems on the Internet.

Unit-V

Information systems for Mobile Commerce: Introduction - Wireless Applications - Cellular Network - Wireless Spectrum - Technologies for Mobile Commerce - Wireless Technologies.

TEXTBOOK:

1. P.T. Joseph, "E-Commerce - An Indian Perspective", PHI, 4th Edition, 2012.
2. C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill, 13th Reprint 2006.
3. A. Leon and M. Leon, "Introduction to Information Technology", Vijay Nicole Publications, 1st Edition, 2013.

REFERENCE BOOKS:

1. David Whiteley, "E-Commerce Strategy, Technologies and Applications", Tata McGraw Hill, 1st Edition, 2001.
2. Kamallesh K. Bajaj and Debjani Nag, "E-Commerce - The cutting edge of Business", Tata McGraw Hill Education, 2nd Edition, 2005.
3. Alexis Leon and Mathews Leon, "Internet for Everyone", UBSPublications, 15th Anniversary Mother Teresa Women's University, Kodaikanal-624101

Edition,2012.

4. Ritendra Goel,"e-commerce", NewAgeInternationalPublishers,2016.

WEBREFERENCES:

1. https://www.tutorialspoint.com/e_commerce/e_commerce_tutorial.pdf
2. <https://www.javatpoint.com/online-marketing>
<https://www.geeksforgeeks.org/e-commerce/>

COURSEOUTCOMES

CO1 Define and understand the basic concepts of internet, WWW and ecommerce. Able to **apply** the basic concepts for the challenges faced by Indian corporates due to ecommerce and the benefits given to users. **K1,K2,K3**

CO2 learn the various business models and fundamental framework of E-commerce and **ply and analyze** the model in the area of commercial trade **K1, K2, K3 K4**

CO3 Recall and understand the technologies needed for ecommerce. Can able to **apply and analyze** traditional way of doing business and ecommerce. **A group activity** like debate can be conducted and face question session. **K1K2K3K4K5**

CO4 Explain the various modes of payments system available in electric payments system and able to **compare** them. Assignment can be given to **apply** the concepts. **K1K2K3 K4**

CO5 Illustrate the various network infrastructure and communication strategy for ecommerce. Seminar with **PPT** presentation can be given to **apply** the concepts learned **K1K2K3K4K5K6**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	S	M	M	S	S	M
CO2	S	S	M	S	M	M	M	S	S	S
CO3	S	S	S	S	M	M	M	S	S	S
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	M	S

*S-Strong;M-Medium;L-Low

III SEMESTER

COURSECODE	P23CST307	Digital Image Processing	L	T	P	C
CORE THEORY - V			6	-	-	5

Pre-requisite: Basic knowledge of Signals & Systems, Digital Signal Processing and Digital Design

OBJECTIVES

1. To learn digital image fundamentals.
2. To be exposed to simple image processing techniques.
3. To be familiar with image compression and segmentation technique.
4. To represent image in form of features.

UNIT - I DIGITAL IMAGE FUNDAMENTALS

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - color models.

UNIT - II IMAGE ENHANCEMENT

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering – Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters.

UNIT - III IMAGE RESTORATION AND SEGMENTATION

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities– Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation.

UNIT - IV WAVELETS AND IMAGE COMPRESSION

Wavelets – Sub band coding – Multi-resolution expansions - Compression: Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards.

UNIT - V IMAGE REPRESENTATION AND RECOGNITION

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TEXT BOOK:

1. Rafael C. Gonzales, Richard E. Woods, “Digital Image Processing”, Third Edition, Pearson Education, 2010.

REFERENCES:

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, “Digital Image Processing Using MATLAB”, Third Edition Tata Mc Graw Hill Pvt. Ltd., 2011.
2. Anil Jain K. “Fundamentals of Digital Image Processing”, PHI Learning Pvt. Ltd., 2011.
3. Willliam K Pratt, “Digital Image Processing”, John Willey, 2002. 4. Malay K. Pakhira, “Digital Image Processing and Pattern Recognition”, First Edition, PHI Learning Pvt. Ltd., 2011

Course Outcomes:

- Review the fundamental concepts of a digital image processing system.K1, K2
- Analyze images in the frequency domain using various transforms.K2, K4
- Evaluate the techniques for image enhancement and image restoration.K2,K5
- Categorize various compression techniques.K3,K4
- Interpret Image compression standards.K5, K6
- Interpret image segmentation and representation techniques.K5, K6

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S					M		S		
CO2	M	M	S				S		L	
CO3	M	S	M				M	M	M	
CO4	M	S			M				M	H
CO5		M			M	M	M		L	
CO6				M	M	S	M			

*S-Strong;M-Medium;L-Low

COURSE CODE	P23CST308	CLOUD COMPUTING				L	--	--	C
CORE THEORY - VI						6	--	--	5

Course Objectives:

1. To learn how to use cloud services
2. To implement virtualization
3. To implement task scheduling algorithms
4. Apply Map-Reduce concept to applications.
5. To build Private cloud
6. Broadly educate to know the impact of engineering on legal and societal issues involved.

Unit I:

Introduction to Cloud Computing: Introduction, Historical developments, Building Cloud Computing Environments, **Principles of Parallel and Distributed Computing:** Eras of Computing, Parallel v/s distributed computing, Elements of Parallel Computing, Elements of distributed computing, Technologies for distributed computing. **Virtualization:** Introduction, Characteristics of virtualized environments, Taxonomy of virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples. Logical Network Perimeter, Virtual Server, Cloud Storage Device, Cloud usage monitor, Resource replication, Ready-made environment.

Unit II:

Cloud Computing Architecture: Introduction, Fundamental concepts and models, Roles and boundaries, Cloud Characteristics, Cloud Delivery models, Cloud Deployment models, Economics of the cloud, Open challenges. **Fundamental Cloud Security:** Basics, Threat agents, Cloud security threats, additional considerations. **Industrial Platforms and New Developments:** Amazon Web Services, Google App Engine, Microsoft Azure.

Unit III:

Specialized Cloud Mechanisms: Automated Scaling listener, Load Balancer, SLA monitor, Pay-per-use monitor, Audit monitor, fail over system, Hypervisor, 12 Resource Centre, Multidevice broker, State Management Database. **Cloud Management Mechanisms:** Remote administration system, Resource Management System, SLA Management System, Billing Management System, **Cloud Security Mechanisms:** Encryption, Hashing, Digital Signature, Public Key Infrastructure (PKI), Identity and Access Management (IAM), Single Sign-On (SSO), Cloud-Based Security Groups, Hardened Virtual Server Images

Unit IV:

Fundamental Cloud Architectures: Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture.

Unit V:

Cloud Delivery Model Considerations: Cloud Delivery Models: The Cloud Provider Perspective, Cloud Delivery Models: The Cloud Consumer Perspective, **Cost Metrics and Pricing Models:** Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations, Service Quality Metrics and SLAs: Service Quality Metrics, SLA Guidelines

Text Books:

1. Mastering Cloud Computing Foundations and Applications Programming RajkumarBuyya, Christian Vecchiola, S. Thamarai Selvi Elsevier First 2013 (**Unit I - Chapter 1,2, 3, Unit II - 4**)
2. Cloud Computing Concepts, Technology & Architecture Thomas Erl, Zaigham Mahmood, and Ricardo Puttini Prentice Hall 2013 (**Unit II - Chapter 6, Unit III -8,9,10, Unit IV – Chapter 11, Unit V – Chapter 14,15,16**)

Course Outcomes:

- Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures. K2, K4
- Design different workflows according to requirements and apply map reduce programming model. K2, K3
- Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms. K3, K6
- Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds K6, K5
- Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application K2, K4
- Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing. K1, K2

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		S	S					S		
CO2		S								
CO3		S								
CO4		S						S		
CO5								S		
CO6								S		

***S - Strong; M - Medium; L - Low**

COURSE CODE	P23CST309	SOFTWARE PROJECT MANAGEMENT	L	T	P	C
CORE THEORY – VII			6	-	-	5

Course Objectives:

- To understand the Software Project Planning and Evaluation techniques.
- To plan and manage projects at each stage of the software development life cycle (SDLC).
- To understand about the activity planning and risk management principles.
- To manage software projects and control software deliverables.
- To develop skills to manage the various phases involved in project management and people management.
- To analysis and deliver successful software projects that support organization's strategic goals.

UNIT - I PROJECT EVALUATION AND PROJECT PLANNING

Importance of Software Project Management – Activities – Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT - II PROJECT LIFE CYCLE AND EFFORT ESTIMATION

Software process and Process Models – Choice of Process models – Rapid Application development – Agile methods – Dynamic System Development Method – Extreme Programming– Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points – COCOMO II – a Parametric Productivity Model.

UNIT - III ACTIVITY PLANNING AND RISK MANAGEMENT

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Risk Planning –Risk Management – – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical paths – Cost schedules.

UNIT - IV PROJECT MANAGEMENT AND CONTROL

Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring – Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control – Software Configuration Management – Managing contracts – Contract Management.

UNIT - V STAFFING IN SOFTWARE PROJECTS

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham – Hackman job characteristic model – Stress – Health and Safety – Ethical and Professional concerns – Working in teams – Decision making – Organizational structures – Dispersed and Virtual teams – Communications genres – Communication plans – Leadership.

TEXT BOOK (S)

1. Bob Hughes, Mike Cotterell and Rajib Mall: "Software Project Management" – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES

1. Pressman R S, —"Software Engineering - A Practitioner,,s Approach", Tata McGrawHill Book Company, 2010.
2. Robert K Wysocki, Robert Beck Jr and David B Crane, —"Effective Project Management, Traditional, Agile, Extreme", John Wiley & Sons Inc, 2011.
3. Gopalaswamy Ramesh, —"Managing Global Software Projects", Tata McGraw- Hill Education, 2003.
4. Robert K. Wysocki "Effective Software Project Management" – Wiley Publication, 2011.
5. Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India),

COURSE OUTCOMES

- Describe the basic concepts of software project management with its life cycle K1,K2
- Understand the project estimation and evaluation techniques to real world problem K2,K3
- Apply Key project management system techniques like PERT,CRM K3, K4
- Identify project risk, monitor and track project deadlines K5, K6
- Apply different techniques in monitoring and control of project K3
- Work in teams to evaluate the different modes of communication among people K6

K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create

Mapping with Programming Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	M	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S
CO6	S	S	S	S	S	S	S	M	S	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CST310	DATA SCIENCE& ANALYTICS	L	T	P	C
CORE – VIII			6	-	-	4

Course Objectives:

- To understand the fundamental big data analysis to process data.
- To understand the computational approaches to Modeling, Feature Extraction
- To understand the need and application of Map Reduce
- To understand the various search algorithms applicable to Big Data
- To analyze and interpret streaming data document and transfer the results and effectively communicate the findings using visualization techniques.
- To develop the fundamental knowledge and understand concepts to become a data science professional.

UNIT - I INTRODUCTION TO BIG DATA ANALYTICS

Big Data Overview – State of the Practice in Analytics – Key Roles for the New Big Data Ecosystem – Example of Big Data Analytics – Data Analytics Life Cycle – Data Analytics Lifecycle Overview – Discovery – Data Preparation – Model Planning – Model Building – Communication Results – Operationalize – GINA.

UNIT - II BASIC DATA ANALYTICS METHOD USING R

Introduction to R – Exploratory Data Analysis – Statistical Methods for Evaluation – Advanced Analytical Theory and methods: Clustering – Overview – K-Means –Additional Algorithms – Advanced Analytical Theory and Methods: Association Rules – Apriori Algorithm – Evaluation of Candidate Rules – Application of Association Rule – Validation and Testing

UNIT - III ADVANCED ANALYTICAL THOERY AND METHODS: REGRESSION

Linear Regression – Logistic Regression – Reasons to choose and cautions – Additional Regression Models – Classification – Decision Trees –Naïve Bayes – Diagnostics of Classifiers – Additional Classification Methods – Time Series Analysis – Overview – ARIMA Model – Additional Methods.

UNIT - IV ADVANCED ANALYTICAL THEORY AND METHODS: TEXT ANALYSIS

Text Analysis Steps – Example – Collecting Raw Text – Representing Text – TFIDF – Categorizing – Determining Sentiments – Gaining Insights – Map Reduce and Hadoop – Analytics for Unstructured Data – The Hadoop Ecosystem – NoSQL.

UNIT - V TECHNOLOGY AND TOOL: IN-DATABASE ANALYTICS

SQL Essentials – In-Database Text Analysis – Advanced SQL – The Endgame – Organizational an Analytics projects – Creating the Final Deliverables – Data Visualization Basics.

TEXT BOOK (S)

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data -by EMC Education Services – First Edition – 2015 – Wiley Publications.

REFERENCES

1. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
2. Eric Sammer, "Hadoop Operations", O'Reilly, 2012.
3. Sadalage, Pramod J. "NoSQL distilled", 2013

COURSE OUTCOMES

- Describe the basic concepts of Data science and Big data analytics K1,K2

- Understand the basics tools and method using R for data analytics K2,K3
- Apply the regression technique to reduce the data sizeand analysis K3, K4
- Identify text analysis methods and implementations K5, K6
- Apply different techniques and monitoring the analytical tools K3
- To evaluate the different visualization techniques. K6

K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**-Create

Mapping with Programming Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	M	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S
CO6	S	S	S	S	S	S	S	M	S	M

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSE35	Digital Image Processing LAB	L	--	--	C
ELECTIVE – V PRACTICAL			3	--	--	3

List of Programs

1. Display of Gray scale Images.
2. Histogram Equalization.
3. Design of Non-linear Filtering.
4. Determination of Edge detection using Operators.
5. 2-D DFT and DCT.
6. Filtering in frequency domain.
7. Display of colour images.
8. Conversion between colour spaces.
9. DWT of images.
10. Segmentation using watershed transform

COURSE CODE	P23CSE36	WEB DESIGNING USING HTML LAB	L	--	--	C
NME PRACTICAL - VI			3	--	--	2

Objectives:

- To be prepared of Web Designing
- To understand various aspects of designing a web page
- To practice creation of website with list and marquees
- To know how to create frames and forms in webpage
- To learn how to incorporate all elements in a webpage

Design a Web Page by applying the following HTML Controls

1. head, title, body, H1, H2
2. Text formatting tags (Bold, Italic, Underline, etc.,)
3. Ordered List
4. Unordered list
5. Definition List
6. Marquee on Images
7. Font styles and body colors
8. Hyperlink
9. Tables
10. Frames
11. Forms
12. Style Sheets

SEMESTER – IV

SEMESTER – IV						
COURSE CODE	P23CST411	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	L	T	P	C
CORE THEORY - IX			6	-	-	5

Course Objectives:

- To train the students to understand different types of AI agents.
- To understand various AI search algorithms.
- Fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation.
- To introduce the basic concepts and techniques of machine learning and the need for Machine learning techniques for real world problem
- To provide understanding of various Machine learning algorithms and the way to evaluate the performance of ML algorithms

UNIT - I INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II ADVANCED SEARCH

Advanced Search: Constructing Search Trees, Stochastic Search, AO* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III MACHINE LEARNING

Machine-Learning: Introduction. Machine Learning Systems, Forms of Learning: Supervised and Unsupervised Learning, reinforcement – theory of learning – feasibility of learning – Data Preparation– training versus testing and split.

UNIT - IV SUPERVISED LEARNING

Supervised Learning: Regression: Linear Regression, multi linear regression, Polynomial Regression, logistic regression, Non-linear Regression, Model evaluation methods. Classification: – support vector machines (SVM), Naïve Bayes classification

UNIT - IV UNSUPERVISED LEARNING

Unsupervised learning Nearest neighbor models – K-means – clustering around medoids – silhouettes – hierarchical clustering – k-d trees ,Clustering trees – learning ordered rule lists – learning unordered rule . Reinforcement learning- Example: Getting Lost -State and Action SpacesReinforcement learning- Example: Getting Lost -State and Action Spaces

TEXT BOOK (S):

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, PrenticeHall, 2010.
2. MACHINE LEARNING An Algorithmic Perspective 2nd Edition,Stephen Marsland,2015, by Taylor & Francis Group, LLC
3. Introduction to Machine Learning ,The Wikipedia Guide

REFERENCES:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
 2. George F. Luger, 2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.
 3. Introduction to Machine Learning, Second Edition, Ethem Alpaydm, the MIT Press, Cambridge, Massachusetts, London, England.
 4. Machine Learning , Tom M. Mitchell, McGraw-Hill Science, ISBN: 0070428077
- Mother Teresa Women's University, Kodaikanal-624101

5. Understanding Machine Learning: From Theory to Algorithms, c 2014 by ShaiShalevShwartz and Shai Ben-David Published 2014 by Cambridge University Press.

COURSE OUTCOMES:

- Understand the informed and uninformed problem types and apply search strategies to solve them. K1, K2
- Apply difficult real life problems in a state space representation so as to solve those using AI techniques like searching and game playing. K3,K4
- Apply machine learning techniques in the design of computer systems K2,K3
- To differentiate between various categories of ML algorithms K4,K5
- Design and make modifications to existing machine learning algorithms.K6

Mapping with Programming Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	M	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S
CO6	S	S	S	S	S	S	S	M	S	M

*S-Strong; M-Medium; L-Low

SEMESTER – IV

COURSE CODE	P23CSP412	WEB APPLICATION DEVELOPMENT & HOSTING PRACTICAL	L	T	P	C
CORE PRACTICAL - III			-	-	6	5

Course Objectives:

- To acquaint the students with the basis of networking and to develop the understanding of the web Architecture.
- To enable the students to enhance their knowledge of client-server Architecture.
- To prepare the students to develop static and dynamic websites.
- To familiarize the students with the web programming languages and photo editing software.
- To make the students capable of publishing a website independently.
- To develop the skills which will help the students to do the following:

Graphics Designing, Website Designing, Website Development, Web Applications.

LIST OF PROGRAMS**30hours**

1. Develop a website for your college using advanced tags of HTML.
2. Write names of several countries in a paragraph and store it as an HTML document, world.html. Each country name must be a hot text. When you click India (for example), it must open india.html and it should provide a brief introduction about India.
3. Develop a HTML document to i) display Text with Bullets / Numbers - Using Lists ii) to display the Table Format Data
4. Develop a Complete Web Page using Frames and Framesets which gives the Information about a Hospital using HTML.
5. Write a HTML document to print your Bio-Data in a neat format using several components.
6. Develop a HTML document to display a Registration Form for an inter-collegiate function.
7. Using HTML form accept Customer details like Name, City, Pin code, Phone number and Email address and validate the data and display appropriate messages for violations using PHP (Eg. Name is Mandatory field; Pin code must be 6 digits, etc.).
8. Write a program to accept two numbers n1 and n2 using HTML form and display the Prime Numbers between n1 and n2 using PHP.

Text Books

Ivan Bayross, "Web Enabled Commercial Applications Development Using HTML, JavaScript, DHTML and PHP", BPB Publications, 4th Revised Edition, 2010.

Reference Books

A.K. Saini and Sumint Tuli, "Mastering XML", First Edition, New Delhi, 2002.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

<https://www.tutorialspoint.com/xml/index.htm>

https://www.tutorialspoint.com/internet_technologies/websites_development.htm

<https://www.youtube.com/watch?v=PlxWf493en4>

Course Outcomes:

On the successful completion of the course, student will be able to:

1. Understand & implement the basic HTML tags to create static webpages K1,K2
2. Capable of using hyperlinks,frames,images
3. , tables in a webpage K2,K3
4. Able to write dynamic web applications using HTML forms K4,K5
5. Must be able to write dynamic web applications in PHP&HTMLtags using XAMP. K5,K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create

MappingwithProgrammingOutcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSE46A	DATA COMPRESSION	L	T	P	C
ELECTIVE - VI			4	-	-	3

Course Objectives:

- To introduce students to basic applications, concepts, and techniques of Data Compression.
- To develop skills for using recent data compression software to solve practical problems in a variety of disciplines.

- To gain experience doing independent study and research.

UNIT - I

Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

UNIT - II

The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Huffman coding: Lossless image compression, Text compression, Audio Compression.

UNIT - III

Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression - The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression - UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markov Compression.

UNIT - IV

Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Nonuniform Quantization.

UNIT - V

Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizers. Structured Vector Quantizers.

Textbooks:

1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers
2. Elements of Data Compression, Drozdek, Cengage Learning
3. Introduction to Data Compression, Second Edition, Khalid Sayood, The Morgan Kaufmann Series
4. Data Compression: The Complete Reference 4th Edition by David Salomon, Springer
5. Text Compression 1st Edition by Timothy C. Bell, Prentice Hall

COURSE OUTCOMES:

- Describe the evolution and fundamental concepts of Data Compression and Coding Techniques. K1, K2
- Apply and compare different static coding techniques (Huffman & Arithmetic coding) for text compression. K2, K3
- Apply and compare different dynamic coding techniques (Dictionary Technique) for text compression. K2, K3
- Evaluate the performance of predictive coding technique for Image Compression. K2, K3
- Apply and compare different Quantization Techniques for Image Compression. K2, K3

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Mapping with Programming Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10

C01	S	S	M	S	S	S	M	M	S	S
C02	S	S	S	S	S	S	S	M	S	S
C03	S	S	S	S	S	S	S	M	S	S
C04	S	S	S	S	S	S	S	M	S	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSE46B	R PROGRAMMING	L	T	P	C
ELECTIVE - VI			4	-	-	3

UNIT I INTRODUCTION OF R-LANGUAGE

Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.

UNIT II FUNCTIONS AND STRUCTURES

R Programming Structures, Control Statements, Loops, - Looping Over Non-vector Sets, If-Else, Arithmetic and Boolean Operators, Default Values for Argument, Return Values, Functions with No Pointers in R, Recursion, Sorting and Searching

UNIT III R-BASE GRAPHICS

Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function Customizing Graphs, Saving Graphs to Files.

UNIT IV T-TESTING

Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions , Basic Statistics, Correlation and Covariance, T-Tests,-ANOVA.

UNIT V LINEAR OPTIMIZATION

Linear Models, Simple Linear Regression and Multiple Regression, Generalized Linear Models,

TEXT BOOKS:

1. The Art of R Programming, Norman Matloff, Cengage Learning: Efficient R Programming: A Practical Guide to Smarter Programming 1st Edition - Colin Gillespie & Robin Lovelace - First Edition.
2. Jared P. Lander, R for Everyone: Advanced Analytics and Graphics, Second Edition 2017.

REFERENCES:

1. R Cookbook, Paul Teetor, Oreilly: R Cookbook [R CKBK] [Paperback] R Cookbook [RKBK] [Paperback] Mar 31, 2011 by Paul Teetor.
2. R in Action, Rob Kabacoff, Manning: R in Action: Data Analysis and Graphics with R Nov 5, 2018 | Unabridged by Robert Kabacoff and Dale Ogden

Course Outcomes:

- Understand the fundamentals, standards of Functions and capabilities of R Language. K1,k2
- Learning the basic R-Language Constructs k1,k2
- To demonstrate Simulation in R-Language, Math functions and files processing k3,k4
- To know the Principals of Graphics and R-Base Graphics k1,k2
- To develop applications and Performing T-Testing k2,k6
- To Design and build Linear optimization k2,k3

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

MappingwithProgrammingOutcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S				S				M	M
CO2	M		M		M					S
CO3	M									S
CO4	M				S					S
CO5	S				M				S	S
CO6	S				M				M	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSE46C	PHOTO DESIGNING	L	T	P	C
ELECTIVE - VI			4	-	-	3

UNIT I Introduction

Getting into Photoshop: Introduction-Best in Photoshop 7.0-Photoshop Interface-Saving the File-Importing Existing File.

UNIT II Editing and Retouching

Editing and Retouching: Working with Selections-Getting started with the Selection tool-Selection with Rectangle Marquee Tool-Selection with Elliptical Marquee Tool-Moving a Selection-Moving with Keyboard Shortcut-Selection with the Magic Wand-Selection with Lasso Tool-Adding and Subtraction Selection-Selection with the Magnetic Lasso-Transforming a Selection-Combining Selection Tools-Cropping the Completed Image-Quick Mask tool to make Selection-Enabling the Quick Mask Mode-Adjusting Quick Mask Setting-Patch Tool-Paint Tools-Image Color Adjustments.

UNIT III Photoshop

Making Artistic use of Photoshop: Painting Tools-Working with Brushes-Drawing-Eraser Tool-Brushes Palette-Pen Tool-Selecting an Image with Pen Tool-Editing and Cleaning Tools-Clone Stamp Tool-Healing Brush-Image Resizing.

UNIT IV Tools of Photoshop

Building Original Artwork: Layers-Creating a Layer-Layer Mask-Transform-Custom shapes>Create Your own Custom shapes.

Unit V: Applications of Photoshop

Transforming Images with Filters: Filters-Text Tool-Text Wrap-Try it.

Text Book:

J. Jenitha, A. Diana, "Adobe Photoshop 7.0 - A Novice Guide" ACCA Publication, 2012.

Reference Book:

1. Deke McClelland, Laurie Ulrich Fuller Robert C. Fuller, "Photoshop CS2 Bible", Photoshop® CS2 Bible, Professional Edition, 2005.
2. "Photoshop CS6 in Simple Steps", Kogent Learning Solutions Inc, Dreamtech Press, 2013.

COURSE OUTCOMES (CO):

CO1: Understand the different dimensions of digital data. K1
 CO2: Apply the concept of data classification on different types of data. K2
 CO3: Analyze the characteristics of different patterns of data. K3
 CO4: Implement the concept of big data in different scenarios. K4
 CO5: Utilize relevant applications of tools and technology in the creation, reproduction, and distribution of visual messages. K4

K1-Remember; K2-Understand; K3-Analyze; K4-Evaluate; K5-Evaluate; K6-Create

MappingwithProgrammingOutcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	S	M	M	S	S	M	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	M	S	M	S	S	S	M	M
CO4	M	S	M	M	S	M	M	S	S	S
CO5	S	M	M	S	M	M	S	M	M	S

*S-Strong; M-Medium; L-Low

COURSE CODE	P23CSS402	MOBILE APPLICATION DEVELOPMENT LAB	L	T	P	C
SEC - 2			4	-	-	2

1. Installation of Android studio.
2. Development Of Hello World Application
3. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button
4. Create a screen that has input boxes for User Name, Password, and Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout)
5. Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity
6. Design an android application Send SMS using Intent
7. Create an android application using Fragments
8. Design an android application Using Radiobuttons
9. Design an android application for menu.
10. Create a user registration application that stores the 65 user details in a database table.

P23WSG11 - WOMEN EMPOWERMENT

(Generic Elective - Common Paper for all PG Programmes in I Semester)

Unit 1: Fundamentals of Women's Studies Meaning and Definition of the concept of Women's studies - Need and Scope - Women's studies as an academic discipline - Women's Studies – International Women's Year 1975 - International Women's Decade 1975 - 1985; Towards Equal Status 1976 – Current trends Importance of women's education – Life Skill Education to build capacity - Education as a tool of Women Empowerment - Obstacles to Women Education – Social, Economic, Cultural and other factors, limitations of Formal system of education.

Unit 2: Issues of Women Girl Children and Women in Society: Social Networking- impact and consequences of networking - NCW: Initiatives to overcome Women's issues - Ministry of Home Affairs and Networking with State Women Commissions: Cyber Crime Prevention against Women and Children (CCPWC)-challenges - efforts & effective measures to prevent crime against women and children - Motherhood - Single Parent - Widows – Multiple Roles of Women - Role conflict, Role change - Social Responsibility and Gender Empowerment.

Unit 3: Achievement and Rights of Women Gender Equality: Achievement of Women - Educational, Political, Economic, Social - Panchayat Raj - Political role and participation - National and International Levels; Women's Rights - Property Rights - Redressal mechanism at different levels - Rights of Women with Disability: Case Studies on Women Achievers in the field of politics, education, arts science, law etc.

Unit 4: Empowerment of Women Empowerment of Women: Alternative approaches - Women in Development (WID) - Women and Development (WAD) – Women's Development- Definition, Meaning and Scope, Gender and Development (GAD), Human Development Index (HDI) vs Gender Development Index (GDI). -Role of Govt. and NGOs - Help line numbers in promoting women's empowerment - National and International Funding Agencies in promoting research on women.

Unit 5: Women Entrepreneurship Women Entrepreneurship:– Types of Entrepreneurs Opportunities and Risk – Micro finance- Entrepreneurship Skill and Competencies - Women Entrepreneurship Development in India: TRYSEM –NABARD – NMEW - Support to STEP – TREAD – Rural Entrepreneurship Development Programme –Gramia Bank –Mahila bank and supportive measures- Industrial Development Bank of India (IDBI) – Small Industries Development Bank of India-SHG and Entrepreneurship opportunities

References

1. Rani Sandhya, "Development of Women – Issues and Challenges", Discover Publishing House Pvt Ltd, New Delhi, 2012.
2. Anil Kumar Jha, "Gender Inequality and Women Empowerment", Axis Books, New Delhi, 2012.
3. Nandal Santosh, "Women and Development", A Mittal Publications, New Delhi, 2012
4. Rao Pulla, "Political Empowerment of Women in India – Challenges and Strategies", ABD Publishers, New Delhi, 2012.
5. Jenny Edwards, Andrea Cornwall, et al., "Feminisms, Empowerment and Development: Changing Women's Lives", Kindle Edition, 2014.
6. Elson Diane, et al. "Gender Equality and Inclusive Growth: Economic Policies to Achieve Sustainable Development", UN Women, 2019
7. Priyanka Sharma Gurnani, "Women Entrepreneurship – Emerging Dimension of Entrepreneurship in India" Education Publishing House, New Delhi, 2016.

Course Outcomes

On successful completion of the course teacher educators will be able to

CO1: Gain knowledge about the concept, need and scope of women's studies.

CO2: Acquaint and analyze issues of women in various contexts.

CO3: Understand changing role of women in society and issues related to it.

CO4: Understand the importance of women's education.

CO5: Comprehend empowerment of women and their achievement.