MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL

&

TAMIL NADU STATE COUNCIL FOR HIGHER EDUCATION

(TANSCHE, CHENNAI)

M.Sc. Computer Science
(2023-2024 Onwards)
(As per TANSCHE Framework)

May, 2023

TANSCHE REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR POSTGRADUATE EDUCATION	
Programme	**M.Sc., Computer Science**
Programme Code	M.Sc. CS
Duration	**PG - Two Years**
Programme Outcomes (Pos)	**PO1: Problem Solving Skill:** Apply knowledge of Management theories and Human Resource practices 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. **PO 9 Multicultural competence** Possess knowledge of the values and beliefs of multiple cultures and a global perspective. **PO 10: 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. **PSO 2 - 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.

PSO 5 – Contribution to the Society
To contribute to the development of the society by collaborating with stakeholders for mutual benefit.

Credit Distribution for PG Programme

Semester–I	Credit	Semester-II	Credit
1.1. Core-I	5	2.1. Core-IV	5
1.2 Core-II	5	2.2 Core-V	4
1.3 Core – III	4	2.3 Core – VI	4
1.4 Elective(Generic / Discipline Centric)- I	3	2.4 Elective(Generic /Discipline Centric) – III	3
1.5 Elective(Generic / Discipline Centric)-II	3	2.5 Elective(Generic / Discipline Centric)-IV	3
Total	**20**	**Total**	**22**

Component wise Credit Distribution

Credits	Sem I	Sem-II	Sem III	Sem IV	Total
Part A	**18**	**18**	**18**	**18**	**72**
Part B **(i)Discipline– Centric/Generic Skill**	**2**	**2**	**2**	**2**	**8**
(ii)Soft Skill	**2**	**2**	**2**	**2**	**10**
(iii)Summer Internship/Industrial Training			**2**		
Part C				**1**	**1**
Total	**22**	**22**	**24**	**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 require students to recall information from the course content • Knowledge questions usually require students to identify information in the text book.
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 combined at a together
Application (K3)	• Students have to solve problems by using/applying a concept learned in the classroom. • Students must use their knowledge to determine a exact response.
Analyze (K4)	• Analyzing the question is one that asks the students to break down something in to 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=20Marks)** Answer ALL questions **Each Question carries 2 marks**
	Two questions from each Unit
	Question 1 toQuestion10
Descriptions/Application (problems)	**Part–B (5x5=25Marks) 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 (3x 10 = 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

PROGRAMME OUTCOMES (PO) - PROGRAMME SPECIFIC OUTCOMES (PSO) MAPPING

PROGRAMME SPECIFIC OUTCOMES (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

Level of Correlation between PO's and PSO's
(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)

Assign the value
1 – Low
2 – Medium
3 – High
0 – No Correlation

M.Sc., Computer Science

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	**Practical**	**CIA**	**ESE**	**Total**
FIRST SEMESTER							
P23CST11	Core1 – **Advanced JAVAProgramming**	5	7	-	25	75	100
P23CST12	Core2 – **Data Structures andAlgorithm**	5	7	-	25	75	100
P23CSP11	Core3 – **Advanced JAVAand Data Structures & Algorithms Lab**	4	-	6	25	75	100
P23CSE1A/ P23CSE1B/ P23CSE1C	Elective 1: **A. Compiler Design / B. Distributed Operating System / C. ObjectOriented Analysis and Design**	3	5	-	25	75	100
P23WSG11	Generic Course – I: **Women Empowerment**	3	5	-	25	75	100
	Total	20	24	6			700
SECOND SEMESTER							
P23CST23	Core5 – **Python Programming**	5	6	-	25	75	100
P23CST24	Core6 – **Computer Networks**	5	6	-	25	75	100
P23CSP22	Core7 – **Python Programming Lab**	4	-	6	25	75	100
P23CSE2A/ P23CSE2B/ P23CSE2C	Subject Based Elective 2: **A. Cryptography and Network Security / B. Digital Electronics and ComputerOrganization / C. Soft Computing**	3	4	-	25	75	100
P23CSG22	Generic Course – II: **CyberSecurity**	3	4	-	25	75	100
P23CSS21	Skill Enhancement Course (NME) – SEC-1: **E – Commerce Technologies**	2	4	-	25	75	100
	Total	22	24	6			700

I-SEMESTER

COURSE CODE	P23CST11	ADVANCED JAVA PROGRAMMING	L	T	P	C
Core I			7	-	-	5

Course Objectives:

The main objectives of this course are to:

1. Enable the students 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

Unit 1: BASICS OF JAVA

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

Unit 2: REMOTE METHOD INVOCATION

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

Unit 3: DATABASE

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

Unit 4: 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:5   ADVANCEDTECHNIQUES

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

Text Books

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

Reference Books

1. Jim Keogh, "The Complete ReferenceJ2EE",Tata McGraw Hill Publishing Company Ltd,2010.

2. David Sawyer McFarland, "Java Script And JQuery-The Missing Manual", Oreilly Publications, 3rd Edition, 2011.

3. Deitel and Deitel, "Java How to Program",Third Edition, PHI/PearsonEducationAsia.

Related Online Contents [MOOC,SWAYAM,NPTEL,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

Course Outcomes:

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

Understand the advanced concepts of Java Programming	K1,K2
Understand JDBC and RMI concepts	K2,K3
Apply and analyze Java in Database	K3,K4
Handle different event in java using the delegation event model, event listener and class	K5
Design interactive applications using Java Servlet, JSP and JDBC	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	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	P23CST12	DATA STRUCTURES AND ALGORITHM	L	T	P	C
CORE – 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

UNITI: 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 SpanningTrees – Shortest Paths and Transitive Closure – Activity Networks.

UNITII: 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 Sales person 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.

UNITV: 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, Fundamentals 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. S.Sridhar, Design and Analysis of Algorithms, Oxford University Press,2015
6. Ellis Horowitz, SartajSahni, Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms –University Press (India) Private Limited, Second Edition, Reprinted, 2017.

COURSE OUTCOMES

CO1: Describe the dynamicstructures–treesandgraphsanddiscusstheapplicationofthesestructures 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 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	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 – Strongly Correlating - 3 Marks   **M- Moderately Correlating - 2 Marks**

W-Weakly Correlating - 1 Mark

COURSE CODE	P23CSCP11	PRACTICAL : 1. Advanced JAVA and 2. Data Structures &Algorithms	L	T	P	C
CORE - III			-	-	6	4

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 barchart 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 Audio clip 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 Javascript 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 Linked List
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, 10thEdition,New York,2017

Reference Books

1   JimKeogh, "TheCompleteReferenceJ2EE", Tata McGraw Hill Publishing Company Ltd, 2010.

2   David Sawyer McFarland, "JavaScript And JQuery - The Missing Manual",OreillyPublications, 3rd Edition,2011.

Related Online Contents [MOOC, SWAYAM, NPTEL, 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

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	P23CSE1A	CHOICE - I	L	T	P	C
SBE 1		COMPILER DESIGN	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 Code Generation:
The contents of a symbol tables-Data structure for a symbol table-Representing Scope information. Code Optimization-The principal sources of optimization – Loop optimization – The DAG representation of basic blocks –Peep hole Optimization.

TEXTBOOK(S):

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

REFERENCEBOOK(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. GrawHill,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 – Strongly Correlating - 3 Marks   M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P23CSE1B	CHOICE - II	L	T	P	C
SBE 1`		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 indistributed 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'sAlgorithm – 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", McGrawHill, 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 – Strongly Correlating - 3 Marks   **M- Moderately Correlating - 2 Marks**

W-Weakly Correlating - 1 Mark

COURSE CODE	P23CSE1C	CHOICE - III	L	T	P	C
SBE 1		OBJECT ORIENTED ANALYSIS AND DESIGN	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 processing 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.   Ali Bahrami, Object Oriented Systems Development, Irwin McGraw Hill Publications, 2015.

REFERENCEBOOK(S):
1. Grady Booch, Object Oriented Analysis and Design, Pearson, 2009.

COURSE OUTCOMES

CO1:   Describe the basics of Object Oriented concepts   K1

CO2: Analyze the function in g 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 andvarious 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 – Strongly Correlating - 3 Marks   M- Moderately Correlating - 2 Marks W-Weakly Correlating - 1 Mark

SEMESTER II

COURSE CODE	P23CST23	PYTHON PROGRAMMING	L	T	P	C
CORE IV			6	-	-	5

Course Objectives:

The main objectives of this course are to:

1. Presents 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   CODESTRUCTURES

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,PACKAGESANDCLASSES

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   DATATYPES AND WEB

DataTypes: TextStrings–BinaryData.**StoringandRetrievingData:**FileInput/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 MapReduce – Working in the Clouds.

Text Books

1   BillLubanovic,"IntroducingPython",O'Reilly,FirstEdition-SecondRelease,2014.

2   MarkLutz," Learning Python", O'Reilly, Fifth Edition, 2013.

ReferenceBooks

1   David M. Beazley, "Python Essential Reference", Developer's Library, Fourth Edition, 2009.

2   Sheetal Taneja, Naveen Kumar, "Python Programming - A Modular Approach", Pearson Publications.

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.	Understand the basic concepts of Python Programming	K1,K2
2.	Understand File operations, Classes and Objects	K2,K3
3.	Acquire Object Oriented Skills in Python	K3,K4
4.	Develop web applications using Python	K5
	Develop Client Server Networking applications	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	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	P23CST24	COMPUTER NETWORKS	L	T	P	C
CORE V			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. Foruzan, "Data communication and Networking", Tata McGraw-Hill, Fifth Edition, 2013
2. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Morgan Kauffmann Publishers Inc., Third Edition, 2003.

Reference Book(s):

1. James F. Kuross, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Addison Wesley, ThirdEdition,2004.
2. Pete Loshin, "IPv6: Theory, Protocol and Practice", ELSEVIER, Morgan Kauffmann Publishers Inc., Second edition, 2004
3. William Stallings, "Data and Computer Communication", Pearson Education, Sixth Edition, 2000.
4. Andrew S. Tannenbaum, "Computer Networks", Pearson Education, Fourth Edition, 2003
5. D.E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), Pearson Education, Second Edition, 2003.
6. W. Richard Stevens, "UNIX Network Programming Vol-I", Pearson Education, Second Edition, 1998.

Course Outcomes:

CO1   Acquire knowledge on computer networks and able to define the functions of each layer in the OSI and TCP/IP model. This helps to compare with different networks and plan how to select good transmission media.   K1 K2 K3 K4

CO2   Able to illustrate communication satellites and telephone network structure, acquire thorough knowledge on data link layer concepts, design issues and protocols and apply them to categorize different error detection and correction techniques to minimize errors.
K1 K2 K3 K4

CO3   Acquaint with the fundamentals of data link protocols and identify various elementary data link protocols for framing, error control, flow control and multiple access protocols to access a shared network channel.   K1 K2 K3

CO4   Understand the network layer concepts, apply design issues and protocols to analyze routing and congestion control algorithms to direct internet traffic efficiently, performance evaluation
K1 K2 K3 K4 K5 K6

CO5   Define transport layer design issues, connection management and protocols, analyze cryptography method of protecting information and categorize encryption and decryption techniques to secure and protect data during communication.
K1 K2 K3 K4 K5

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	P23CSP22	PRACTICALII: PYTHON PROGRAMMING LAB	L	T	P	C
CORE VI			-	-	6	4

Course Objectives:

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
5.

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,FirstEdition-SecondRelease,2014.

2   MarkLutz,"Learning Python", O'Reilly, Fifth Edition, 2013.

1   David M. Beazley, "Python Essential Reference", Developer's Library, Fourth Edition,2009.

2   Sheetal Taneja, Naveen Kumar, "Python Programming-A Modular Approach", Pearson Publications.

ReferenceBooks

Related Online Contents[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

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	P23CSE2A	CHOICE 1	L	T	P	C
SBE3		CRYPTOGRAPHY AND NETWORK 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 – EI Gamal – 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 – Firewalls 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. IPSecurity: 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).

Text Book(s):

1. William Stallings, Cryptography and Network Security, 6 th Edition, Pearson Education, March, 2013.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.

Reference Book(s):

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata McGraw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles P Fleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI, 2002.
6. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.

COURSEOUTCOMES

CO1: Understand the Number Theory	K1
CO2: Understand the basics of Cryptography	K2
CO3: Understand Hash Functions and Cryptography	K3
CO4: Understand Security Procedure and System Security K3	
CO5: Understand the various Security Services	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 – Strongly Correlating - 3 Marks   **M- Moderately Correlating - 2 Marks W-Weakly Correlating - 1 Mark**

COURSE CODE	P23CSE2B	CHOICE II	L	T	P	C
SBE3		DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION	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 gate 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

TEXT BOOKS:

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

REFERENCE BOOKS:
1. P. K. Sinha&PritiSinha - Computer Fundamentals - BPB Publications, 2007.
2. Dr. Anita Goel - Computer Fundamentals- Pearson Education, 2010.
3. Alexis Leon - Fundamentals of Information Technology - Vikas Publication, 2009
4. P.S.Manoharan - Digital Principles & System Design –-Revised Edition-Charulatha Publication, 2017.

COURSE OUTCOMES:

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 computers 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 – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P23CSE2C	CHOICE – III	L	T	P	C
SBE3		SOFT COMPUTING	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 problem 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.

UNITII: 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.

UNITIII: 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**.**

UNITIV: 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.

UNITV: 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.Sivanandam and S.N.Deepa, Principles of Soft computing, Wiley India Edition, 2nd Edition, 2013.

2. Simon Haykin, Neural Networks, Pearson Education, 2003.

3. John Yen & Reza Langari, Fuzzy Logic – Intelligence Control & Information , Pearson Education, New Delhi, 2003.

4. N.P.Padhy, Artificial Intelligence and Intelligent Systems Oxford University Press,2013.

COURSE OUTCOMES

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 systems to be
appropriate with specific real time problems   K4
CO4: Use genetic algorithms to combinatorial optimization problems   K1
CO5: Discuss the Optimization techniques Swam Intelligence and Antcolony
optimization 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	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 – Strongly Correlating - 3 Marks   **M- Moderately Correlating - 2 Marks**
                                                W- Weakly Correlating - 1 Mark

COURSE CODE	P23CSG22	CYBER SECURITY	L	T	P	C
SBE4			4	-	-	3

Course Outcomes:

a. Analyze and evaluate the cyber security needs of an organization.

b. b) Determine and analyze software vulnerabilities and securitysolutions to reduce the risk of exploitation.

c. c) Measure the performance and troubleshoot cyber security systems.

Unit-1: Introduction to Cyber Security

Introduction, Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, Access Control and Cryptography. Web attack: Browser Attacks, Web Attacks Targeting Users, Obtaining User or Website Data, Email Attacks. Network Vulnerabilities: Overview of vulnerability scanning, Open Port / Service Identification, Banner /Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit. Networks Vulnerability Scanning (Netcat, Socat), Network Sniffers and Injection tools.

Unit-2: Network Defense tools

Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding. VPN: the basic of Virtual Private Networks. Firewall: Introduction, Linux Firewall, Windows Firewall. Snort: Introduction Detection System.

Unit-3 : Web Application Tools

Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel. Application Inspection tools – Zed Attack Proxy, Sqlmap, DVWA, Webgoat. Password Cracking and Brute-Force Tools: John the Ripper, L0htcrack, Pwdump, HTC-Hydra.

Unit-4 : Introduction to Cyber Crime, law and Investigation

Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyber world. Internet crime and Act: A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT

Unit-5 : Firewalls and Spyware

Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.

Text Book:

1. Nina Godbole, Sunit Belapure, "Cyber Security: Understanding Cyber crimes, Computer Forensics andLegal Perspectives", First Edition, Wiley India, 2011.

REFERENCES :

1. Charles Pfleeger, Shari Pfleeger, Jonathan Margulies, "Security in Computing", Fifth Edition, Prentice Hall, New Delhi, 2015.

COURSE OUTCOMES: CO1:

Understand the fundamentals of networks security, security architecture, threats and vulnerabilities

CO2: Apply the different cryptographic operations of symmetric cryptographic algorithms CO3: Apply the different cryptographic operations of public key cryptography

CO4: Apply the various Authentication schemes to simulate different applications.

CO5: Understand various cyber crimes and cyber security.

MAPPING OF COs WITH POs AND PSOs :

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 – Strongly Correlating - 3 Marks   M- Moderately Correlating - 2 Marks

W- Weakly Correlating - 1 Mark

COURSE CODE	P23CSS21	E-COMMERCE TECHNOLOGIES	L	T	P	C
NME			4	-	-	3

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 - DigitalToken-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.

TEXT BOOK:

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.   Kamalesh 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",   UBS Publications, 15th Anniversary

Edition, 2012.
4.   Ritendra Goel, "e-commerce", New Age International
        Publishers,2016.

WEB REFERENCES:
1.   https://www.tutorialspoint.com/e_commerce/e_commerce_
        tutorial.pdf
2.   https://www.javatpoint.com/online-marketing
https://www.geeksforgeeks.org/e-commerce/

COURSE OUTCOMES

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 the users.   K1, **K2, K3**

CO2 Learn the various business models and fundamental framework of E-commerce and **apply 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**.**   **K1 K2 K3K4 K5**

CO4 Explain the various modes of payment system available in electric payment system and able to **compare** them. Assignment can be given to **apply** the concepts.
                                                                                K1 K2 K3 K4

CO5 Illustrate the various network infrastructure and communication strategy for ecommerce. Seminar with **PPT** presentation can be given to **apply** the concepts learned
                                                                                K1 K2 K3 K4 K5 K6

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 – Strongly Correlating - 3 Marks   M- Moderately Correlating - 2 Marks

W- Weakly Correlating - 1 Mark