

**GOVERNMENT COLLEGE FOR WOMEN  
(AUTONOMOUS)  
KUMBAKONAM**

**Department of Computer Science**

**Programme : M.Sc., Computer Science**

**Programme Code : PSCS**



**SYLLABUS**

**2021 - 2022 - I Year**

**2022 - 2023 - II Year**

**i. Programme Outcomes (PO) :**

On the completion of the M.Sc Computer Science students can work as :	
Programmer / Software Engineer / Web-Designer / System Administrator and Technical Support Engineer / Administration IT sales and marketing / IT Officer / Computer and Information Research Scientist.	
<b>PO 1</b>	To impart knowledge of a broad range of Computer Science skills, tools and mathematical techniques, and the capability of applying them to analyze and design complex problem.
<b>PO 2</b>	Design and Develop computer programs/computer based systems in the field of computer science.
<b>PO 3</b>	To develop research and development activity along with academics
<b>PO 4</b>	A strong foundation to pursue higher education in the field of Teaching and Research
<b>PO 5</b>	Gain Analytical skills in the area of computer science for research fellowship and Lectureship
<b>PO 6</b>	To provide sound academic knowledge technical, analytical and creative skills.
<b>PO 7</b>	To adopt recent trends in IT Industries.

**ii. Programme Specific Outcomes (PSO):**

A graduate with M.Sc Computer Science will have the ability to	
<b>PSO 1</b>	To make them understand fundamental theoretical and practical concepts.
<b>PSO 2</b>	An ability to use current technologies and tools for programming practically.
<b>PSO 3</b>	An ability to apply design and development principles in the implementation of software systems.
<b>PSO 4</b>	Entrusting student interests in building their career in the field of IT by providing the latest technologies.
<b>PSO 5</b>	Students can develop major projects.
<b>PSO 6</b>	It leads a scholar to high-level research.

**GOVERNMENT COLLEGE FOR WOMEN (AUTONOMOUS) KUMBAKONAM**

**(Curriculum – M.Sc., COMPUTER SCIENCE – 2021 - 2022)**

**Department : COMPUTER SCIENCE**

**Programme Code : PSCS**

Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
<b>SEMESTER – I</b>								
CC I	P21CSC101	Mathematical Foundations	6	5	3	25	75	100
CC II	P21CSC102	Object Oriented Analysis and Design & Unified Modeling Language	6	5	3	25	75	100
CC III	P21CSC103	Python Programming	6	5	3	25	75	100
CC IV	P21CSC104P	Practical – Python Programming Lab	5	3	3	40	60	100
MBEC- I	P21CS1MBE1:1	Parallel Processing	5	4	3	25	75	100
	P21CS1MBE1:2	Grid Computing						
	P21CS1MBE1:3	Cloud Computing						
SEC – I	P21CS1SE1	Document Preparation System – Latex	2	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>24</b>				<b>600</b>
<b>SEMESTER – II</b>								
CC V	P21CSC205	Distributed Operating System	5	5	3	25	75	100
CC VI	P21CSC206	Advanced Java Programming	6	5	3	25	75	100
CC VII	P21CSC207	Compiler Design	5	5	3	25	75	100
CCVIII	P21CSC208P	Practical – Advanced Java Programming Lab	5	3	3	40	60	100
MBEC - II	P21CS2MBE2:1	Network Security	5	4	3	25	75	100
	P21CS2MBE2:2	Software Project Management						
	P21CS2MBE2:3	Soft Computing						
EDC	P21CS2ED	1. Cyber Security 2. Fundamentals of Information Technology 3. E-Commerce	2	2	3	25	75	100
SEC - II	P21CS2SE2P	Practical - Document Preparation System – Latex Lab	2	1	2	40	60	100
<b>Total</b>			<b>30</b>	<b>25</b>				<b>700</b>
SSC-I	P212SS1	General Studies for Research Fellowships and Lectureship	-	2	2	-	100	100
NCGPA (Internship)	INT	-		2		-	-	-
<b>SEMESTER – III</b>								
CC – IX	P21CSC309	Advanced Computer Architecture	6	5	3	25	75	100
CC – X	P21CSC310	Data Mining	6	5	3	25	75	100
CC – XI	P21CSC311	Data Analytics	6	5	3	25	75	100
CC – XII	P21CSC312P	Practical – R Programming Lab	6	3	3	40	60	100
MBEC –III	P21CS3MBE3:1	Software Quality Assurance and Testing	6	4	3	25	75	100
	P21CS3MBE3:2	Pervasive Computing						
	P21CS3MBE3:3	Artificial Intelligence						
<b>Total</b>			<b>30</b>	<b>22</b>				<b>500</b>
SSC- II	P21CS3SS2	Computer Science for NET / SET Examinations	-	2	2	-	100	100
<b>SEMESTER – IV</b>								
CC – XIII	P21CSC413	Open Source Technologies	6	6	3	25	75	100
CC – XIV	P21CSC414P	Practical – Open Source Lab	6	3	3	40	60	100
CC – XV (Project)	P21CSPW415	-	12	6	-	-	100	100
MBEC-IV	P21CS4MBE4:1	Deep Learning	6	4	3	25	75	100
	P21CS4MBE4:2	Internet of Things						
	P21CS4MBE4:3	Digital Image Processing						
<b>Total</b>			<b>30</b>	<b>19</b>				<b>400</b>

**Course Structure Abstract for**  
**M.Sc., Programme 2021-2022 onwards**

<b>Part</b>	<b>Course</b>	<b>Total No of Papers</b>	<b>Hours</b>	<b>Credit</b>	<b>Mark</b>
III	Core Course (CC)	14	80	63	1400
III	Core Project	1	12	6	100
III	Major Based Elective Course - IV (MBEC)	4	22	16	400
III	Extra Disciplinary Course (EDC)	1	2	2	100
III	Skill Enhancement (SEC)	2	4	3	200
<b>Total</b>		<b>22</b>	<b>120</b>	<b>90</b>	<b>2200</b>
<b>Extra Credit Courses</b>					
Self Study Course (SSC)		2	-	4	200
NCGPA Course (Internship )		---	-	2	---
Value Added Course		1		2	100
<b>Total</b>		<b>3</b>		<b>98</b>	<b>2500</b>

**Semester - I - Core Paper I – CC - I**  
**MATHEMATICAL FOUNDATIONS**

Theory Hours	: 6	Course Code	: P21CSC101
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

**Course Objective :**

To know the applications of graph theory, computer representations of graph, fundamental ideas of mathematical logic, concepts of set theory and boolean algebra.

**UNIT I**

Mathematical Logic - Introduction-Statements and Notations – Connectives - Negation - Conjunction - Disjunction - Statement Formulas and Truth Tables – Logical Capabilities of Programming Languages - Conditional and Biconditional - Well-Formed Formulas Tautologies -Equivalence of Formulas - Duality Law - Tautological Implications - Formulas With Distinct Truth Table - Functionality Complete Sets of Connectives - Two-State Devices and Statement Logic -Normal Forms - Disjunctive Normal Forms - Conjunctive Normal Forms-Principle Disjunctive Normal Form-Principle Conjunctive Normal Forms-Ordering and Uniqueness of Normal Forms-Completely Parenthesized Infix Notation and Polish Notation – The theory of inference for the statement calculus – validity using truth tables- rules of inference – consistency of premises and indirect method of proof – automatic theorem proving.

**UNIT II**

Set Theory – Introduction - Basic Concepts of Set Theory – Notation - Inclusion and Equality of Sets - The Power Set-Some Operations on Sets - Venn Diagrams - Some Basic Set Identities - The Principle of Specification - Ordered Pairs - and n-tuples - Cartesian Products - Representation of Discrete Structures - Data Structures - Storage Structures - Sequential Allocation - Pointers and Linked Allocation An Application of Bit Represented Sets.

**UNIT III**

Relations and ordering-Relations-Properties of Binary Relations In a Set-Relation Matrix and The Graph of a Relation-Partition and Covering of a Set-Equivalence Relations – Compatibility Relations-Composition of Binary Relations Partial Ordering-Partially Ordered Set: Representation and Associated Terminology-Functions-Definition and Introduction-Composition of Functions-Inverse functions - Binary and n-ary Operation-Characteristics Function of a Set Hashing Functions.

**UNIT IV**

Introduction: What is Graph-Application of Graph-Finite and Infinite Graph-Incidence and Degree-Isolated Vertex, Pendant Vertex and Null Graph-Isomorphism-Subgraphs-Walks, Paths and Circuit-Operation of Graphs-Trees-Some Properties Of Trees-Pendant Vertices in a Tree.

## **UNIT V**

Cut Sets-Fundamental Circuits and Cut Sets-Incidence Matrix-Circuit Matrix-Cut-Set Matrix-Path Matrix-Adjacency Matrix.

### **Text Books :**

UNIT I, II, III : Discrete Mathematical Structures With Applications to Computer Science -  
J.P. Tremblay, R. Manohar  
UNIT IV, V : Graph Theory - Narsingh Deo.

### **Reference Books :**

1. "Discrete Mathematics ", Seymour Lipschutz and Mare Laris Lipson, m2nd Edn.,  
Schaum's outline by Tata Mc GrawHill Publishing Company Ltd, New Delhi 1999.  
2. "Introductory Mathematical Statistics", Erwin Krysizig, Zohn Wiley and sons, New  
York, 1990.

### **Course Outcomes:**

- Ability to apply mathematical logic to solve problems.
- Understand sets, relations, functions, Venn diagrams and discrete structures.
- Able to use logical notations to define and reason about fundamental mathematical concepts such as binary relations partial ordering.
- Able to model and solve real world problems using graphs and trees.
- Understand the different types of matrix in graphs.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

**Semester I - Core Paper II – CC - II**

**OBJECT ORIENTED ANALYSIS AND DESIGN**  
**& UNIFIED MODELING LANGUAGE**

Theory Hours	: 6	Course Code	: P21CSC102
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

**Course Objective :**

To learn the concept of Object-Oriented Methodology for developing a software application and to gain familiarity with Object Oriented Analysis and Design.

**UNIT I**

An overview of object oriented systems development & Life cycle. Various object oriented methodologies.

**UNIT II**

Object oriented analysis – Use cases – Object Classification, relationships, attributes, methods.

**UNIT III**

The Importance of modeling - Principles of modeling - Object Oriented modeling - Overview of the UML - A Conceptual Model of the UML – Architecture - Software Development Life Cycle - Basic Structural Modeling – Classes – Relationships - Common mechanisms – Diagrams - Class diagrams.

**UNIT IV**

Basic Behavioral Modeling – Advanced Behavioral Modeling - Events and signals - state machines - Processes and Threads - State chart diagrams.

**UNIT V**

Architectural Modeling – Components – Deployment – Collaborations - Patterns and Frameworks - Component Diagrams - Deployment Diagrams - Systems and Models.

**Text Book(s)**

1. Bahrami Ali, “Object oriented systems development”, Irwin McGrawHill, 2005  
Unit – I : Chapter 1,2,3      Unit – II : Chapter - 6,7,8
2. Booch Grady, Rumbaugh James, Jacobson Ivar ,“The Unified Modeling Language” – user Guide, Pearson Education, 2006 (ISBN 81-7758-372-7)  
Unit - III : Section 1 - (Chapter-1,2,3), Section 2 - (Chapter- 4,5,6,7,8).  
Unit - IV : Section 4 - (Chapter-15,16,17,18,19), Section 5-(Chapter-20,21,22,24).  
Unit - V : Section 6 - (Chapter-25,26,27,28,29,30,31)

### **Course Outcomes:**

- Defines the basic concepts of object oriented systems and methodologies
- Specify, Analyze and design the use case driven requirements and explains about various object oriented methodologies
- Illustrate modeling principles, structure and relationships
- Model the event driven state of object and Explain about processes ,threads and chart diagrams
- Identify, analyze the subsystems, various components and collaborate them interchangeably.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)



## Semester I - Core Paper III – CC III

### PYTHON PROGRAMMING

Theory Hours	: 6	Course Code	: P21CSC103
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

The course is designed to provide Basic knowledge of python. Python programming is intended for software engineers, system analysts, program managers user support personnel who wish to learn the python programming language.

#### **UNIT I**

**BASICS** – Python – Variables – Executing Python from the command line – Editing python files – python reserved words – Basic syntax – commands – Standard Data types – Relational Operator – Logical Operators – Bitwise Operators – Simple Input and Output.

#### **UNIT II**

**CONTROL STATEMENTS** – Control flow and syntax – Indenting – If Statement – Statements and Expressions – String Operations – Boolean Expressions – While loop-break and continue- for loop.

**LISTS:** List-list slices - list methods – list loop- mutability-aliasing-cloning lists- list parameters.

**TUPLES:** Tuple assignment, tuple as return value- sets- Dictionaries.

#### **UNIT III**

**FUNCTIONS:** Definition- passing parameters to a function- Built-in-functions- Variable Number of Arguments- Scope- Type conversion- Type coercion- Passing Functions to a Function- Mapping Functions in a Dictionary- Lambda- Modules- Standard Modules- sys-math-time-dir-help Function.

#### **UNIT IV**

**ERROR HANDLING:** Run time Errors- Exception Model- Exception Hierarchy- Handling Multiple Exceptions- Data Streams- Access modes Writing- Data to a file Reading- Data from a File- Additional File methods- Using pipes as Data Streams- Handling IO Exceptions- Working with Directories.

#### **UNIT V**

**OBJECT ORIENTED FEATURES:** Classes principles of Object orientation- Creating Classes- Instance Methods- File Organization- Special methods- Class Variables- Inheritance Polymorphism- Type identification- Simple Character Matches- Special characters- Character classes- Quantifiers- Dot character- Greedy matches- Grouping- Matching at Beginning or End- Math Objects- Substituting-Splitting a string- Compiling Regular Expressions.

### **Text Books :**

- 1) Mark Summerfield- Programming in Python 3: A Complete introduction to the Python Language, Addison- Wesley Professional, 2009.
- 2) Martin C.Brown, - Python : The Complete Reference, McGraw- Hill, 2001.

### **Reference Books :**

1. Allen B. Downey, “ Think Python: How to Think Like a Computer Scientist”, 2<sup>nd</sup> edition, Updated for Python 3, Shroff / O’Reilly Publishers, 2016
2. Guido van Rossum and Fred L. Drake Jr, - An introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. Wesley J Chun, - Core Python Applications Programming||, Prentice Hall, 2012.

### **Course Outcomes:**

- Explain the basic concepts of python variables, standard data types and operations.
- To understand the control statements and the usage list and tuples.
- Describe the concepts of function, built in function, mapping functions in a dictionary.
- Understand the concept of various Error handling & Exceptions.
- Implement object oriented concepts.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester I - Core Paper IV – CC IV

### **PYTHON PROGRAMMING LAB**

Theory Hours	: -	Course Code	: P21CSC104P
Practical Hours	: 5	Credits	: 3
Exam Hours	: 3	Marks	: CIA ESE 40 60

#### **Course Objective :**

The course focuses on developing the python programming to do a variety of programming tasks where the students are encouraged to develop application using pygame.

#### **List of Practicals :**

1. Write a python program that displays the following information : Your name, Full address, Mobile number, College name, Course subjects.
2. Write a python program to find the largest three integers using if – else and conditional operator.
3. Write a python program that asks the user to enter a series of positive numbers (The user should enter a negative number to signal the end of the series) and the program should display the numbers in order and their sum.
4. Write a python program to find the product of two matrices. [A]m<sub>x</sub>p and [B]p<sub>x</sub>r.
5. Write recursive functions for GCD of two integers.
6. Write recursive functions for the factorial of positive integer.
7. Write recursive functions for Fibonacci sequence up to given number n.
8. Write recursive functions to display prime number from 2 to n.
9. Write a python program that writes a series of random number to a file from 1 to and display.
10. Write a python program to sort a given sequence: String, List and Tuple.
11. Write a python program to make a simple calculator.
12. Write a python program for Linear Search.
13. Write a python program Binary Search.
14. Write a python program to implement merge sort.
15. Write a python program to find the sum of array of numbers.
16. Write a python program to find the distance between two points.
17. Write a python program for inheritance.
18. Write a python program to slice a given list.
19. Write a python program to count the number of words.
20. Write a python program to copy a file.
21. Write a python program to check the given password is correct or not.

### **Course Outcomes :**

- Describe the number, math functions, strings, list and tuples in python.
- Implement conditionals loop for python programs.
- Express different decision making statements and functions.
- Interpret object oriented programming in python.
- Understanding and summarize different file handling operations.

### **Question Paper Pattern**

All the Programs are considered from the given list.

Internal – 40

External – 60.

## Semester I – MBEC – I - Paper I

### PARALLEL PROCESSING

Theory Hours	: 5	Course Code	: P21CS1MBE1:1
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective :**

To introduce the basic concepts of Parallel Processing, Memory and Input-Output subsystems.

#### **UNIT I**

Introduction to Parallel Processing : Evolution of Computer Systems – Parallelism in Uniprocessor systems – Parallel Computer Structures – Architectural Classification Schemes – Parallel Processing Applications.

#### **UNIT II**

Memory and Input – Output Subsystems : Hierarchical Memory Structure – Virtual Memory Systems – Memory Allocation and Management – Cache Memories and Management.

#### **UNIT III**

Principles of pipelining and Vector Processing : Pipelining – Instruction and Arithmetic pipelines – Principles of Designing pipelined processors – Vector processing Requirements – Vectorization and Optimization Methods.

#### **UNIT IV**

SIMD Array processors – SIMD Interconnection Networks – Parallel Algorithms for Array processors – Associative Array processing.

#### **UNIT V**

Functional Structures – Interconnection Networks – Multiprocessor Operating Systems – Multiprocessor Scheduling Strategies – Parallel Algorithms for Multiprocessors.

#### **Text Book :**

Computer Architecture and Parallel Processing “ Kai Hwang”, “ Faye’ A. Briggs”.

#### **Reference :**

1. “Programming massively Parallel Processors” by Kirk.
2. “An introduction to parallel programming” by Pacheco.
3. “ Parallel Computers : Architecture and Programming” by V. Rajaraman and C. Sivaram murthy.
4. “ Computer, Architecture and Parallel Processing” by Bharat Bhushan Agarwal and Sumit Prakash tayal.

### **Course Outcomes:**

- Elaborate advanced concept of Parallel Processing.
- Describe the Parallel Programming platforms, principles and design algorithms
- Demonstrate the basic communication operations and algorithms
- Explain the organization of basic computer its design and the design of control unit
- Demonstrate the working of central processing Unit and RISC and CISC architecture.
- Describe the operations and language of the register transfer, micro operations and input output organization
- Understand the organization of memory and memory management hardware.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester I – MBEC – I - Paper II

### GRID COMPUTING

Theory Hours	: 5	Course Code	: P21CS1MBE1:2
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective :**

To impart the knowledge in Grid computing organization, Anatomy, Road Map and Grid services.

#### **UNIT I**

Introduction: Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures.

#### **UNIT II**

Grid Computing organization and their Roles : Organizations Developing Grid Standards, and Best practice Guidelines, Global Grid Forum (GCF), # Organization Developing Grid Computing Toolkits and Framework #, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based solutions.

#### **UNIT III**

Grid Computing Anatomy : The Grid Problem, The conceptual of virtual organizations, Grid Architecture and relationship to other distributed technology.

#### **UNIT IV**

The Grid Computing Road Map : Autonomic computing, Business on demand and infrastructure virtualization, Service-Oriented Architecture and Grid, #Semantic Grids#.

#### **UNIT V**

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

#### **Text Book :**

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

#### **Books for Reference :**

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

**Course outcomes:**

- Defines the concepts of Grid and its applications.
- Gives an exposure about Grid standards and explains the concept of Grid based solutions.
- Illustrates an idea about Virtual organizations, Grid Architecture and specifies how it is associated with distributed technology.
- Provides an clear idea about autonomic computing, Service-oriented architecture and semantic grids.
- Specifies how the grid service Architecture combines with web service architecture, it also specifies the relationship between web services and Grid services.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)



## Semester I – MBEC – I - Paper III

### CLOUD COMPUTING

Theory Hours	: 5	Course Code	: P21CS1MBE1:3
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

To impart the knowledge in cloud computing infrastructure, service, monitoring and management applications.

#### **UNIT I**

Defining Cloud Computing - Cloud Types - The NIST model -The Cloud Cube Model - Deployment models - Service models - Examining the Characteristics of Cloud Computing - Paradigm shift - Benefits of cloud computing - Disadvantages of cloud computing - Assessing the Role of Open Standards - Assessing the Value Proposition - Measuring the Cloud's Value - Early adopters and new applications - The laws of cloudonomics - Cloud computing obstacles - Behavioral factors relating to cloud adoption - Measuring cloud computing costs - Specifying Service Level Agreements.

#### **UNIT II**

Exploring the Cloud Computing Stack - Composability - Infrastructure - Platforms - Virtual Appliances - Communication Protocols - Applications - Connecting to the Cloud - The Jolicloud Netbook OS - Chromium OS: The Browser as an Operating System - Understanding Services and Applications by Type - Defining Infrastructure as a Service (IaaS) - IaaS workloads - Pods, aggregation, and silos - Defining Platform as a Service (PaaS) - Defining Software as a Service (SaaS) - SaaS characteristics - Open SaaS and SOA - Salesforce.com and CRM SaaS - Defining Identity as a Service (IDaaS) - What is an identity? - Networked identity service classes- IDaaS interoperability

#### **UNIT III**

Understanding Abstraction and Virtualization - Using Virtualization Technologies - Load Balancing and Virtualization - Advanced load balancing - The Google cloud - Understanding Hypervisors - Virtual machine types - VMware vSphere - Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance - Capacity Planning - Capacity Planning - Defining Baseline and Metrics - Baseline measurements - System metrics - Load testing - Resource ceilings - Server and instance types - Network Capacity - Scaling.

#### **UNIT IV**

Using Google Web Services - Exploring Google Applications - Surveying the Google Application Portfolio - Indexed search - The dark Web - Aggregation and disintermediation - Productivity applications and services - Enterprise offerings - AdWords - Google Analytics - Google Translate - Exploring the Google Toolkit -The Google APIs- Working with the Google App Engine

## UNIT V

Using Amazon Web Services - Understanding Amazon Web Services - Amazon Web Service Components and Services - Working with the Elastic Compute Cloud (EC2) - Amazon Machine Images - Pricing models - System images and software - Creating an account and instance on EC2 - Working with Amazon Storage Systems - Amazon Simple Storage System (S3) - Amazon Elastic Block Store (EBS) - CloudFront - Understanding Amazon Database Services - Amazon SimpleDB - Amazon Relational Database Service (RDS) - Choosing a database for AWS.

### Text Book:

1. Arshdeep Bahga, Vijay Madiseti, "Cloud Computing: A Hands-On Approach" Universities press (India) pvt limited 2016.

### Books for Reference:

1. Micheal Miller "Cloud Computing Web based application that change the way you work and collaborate online". Pearson edition, 2008.
2. Kris Jamsa "Cloud Computing SaaS, PaaS, IaaS, Virtualization, Business Models, Security, And more". Jones & Bartlett Student Edition, 2014.

### Course Outcomes:

- Defines the characteristics of cloud computing along with concepts and Technologies.
- Gives an exposure about cloud services and platforms.
- Illustrates an idea about cloud application design Methodologies along with design storage approaches .
- Provides an clear idea about how python is implemented in cloud .
- Specifies the concepts of Big Data Analytics along with cloud security.

### Question Paper Pattern

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

**Semester I – Skill Enhancement (Theory) – SEC - 1**

**DOCUMENT PREPARATION SYSTEM - LATEX**

Theory Hours	: 2	Course Code	: P21CH1SE1
Practical Hours	: -	Credits	: 2
Exam Hours	: 2	Marks	: CIA ESE 25 75

**Course Objective :**

To inculcate professional training required to become a scholar in Computer Science.

**UNIT I**

Basic Structure of Latex 2e – Input file structure – Layout – Editors – Forward search – Inverse Search – Compiling - Conversion to various formats.

**UNIT II**

Typesetting simple documents – sectioning – Titles – page layout – listing – enumerating – quote letter formats.

**UNIT III**

Using package amsmath typing equations labeling and refreing.

**UNIT IV**

Figure inclusion – Table inclusion.

**UNIT V**

Bibliography – Index typing – Beamer presentation Styles.

**Text Book :**

1. Leslie Lamport, LATEX : A Document preparation System, Addison – Wesley, Reading, Massachusetts, second edition, 1994.

**Reference Books:**

1. Tobias Oetiker, Hubert Partl, Irence hyna and Elisabeth Schlegl., The (Not So) Short Introduction to LATEX2e, Samurai Media Limited (or available online at <http://mirrors.ctan.org/info/lshort/English/lshort.pdf>)

### **Course Outcomes:**

- Ability to know about Basic commands in Latex.
- Develop knowledge about document preparation.
- Familiarize with figure inclusion and typing of equations, bibliography and index.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

**Semester II - Core Paper V – CC V**

**DISTRIBUTED OPERATING SYSTEM**

Theory Hours	: 5	Course Code	: P21CSC205
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

**Course Objective :**

To provide fundamental concepts in the design of the Unix Operating System and Design Principles that is applicable to distributed operating system.

**UNIT I**

Distributed Computing Systems: Evolution – Models – Distributed Operating System – Issues in designing DOS – Distributed Computing environment

**UNIT II**

Communication in Distributed System : Protocols – Features of a Good Message Passing System – Issues in IPC by Message Passing – Synchronization – Buffering – Process addressing – Failure handling – Group Communication – Synchronization : Clock Synchronization – Event ordering – Mutual Exclusion – Deadlock .

**UNIT III**

Security: Potential Attacks to Computer systems – Cryptography – Authentication – Access control – Digital Signatures – Design Principles.

**UNIT IV**

File System Structure : History – System structure – User perspective Internal Representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path to an inode – Super block – Inode Assignment to a new file – Allocation of Disk blocks  
System Calls for the file system: Open – Read – Write – Close – File creation – Creation of special files – Change Directory, root owner and mode – stat and fstat - pipes – dup – mounting and unmounting file systems – link and unlink.

**UNIT V**

Interprocess Communication: Process tracing – System V IPC – Sockets Multiprocessor Systems: Problem of multiprocessor systems – solution with master and slave processors – solution with semaphores.

**Text Book :**

1. UNIT I, II, & III: Pradeep K. Sinha, “Distributed System Concepts and Design”, PHI Pvt. Ltd, 1998
2. UNIT IV & V: Marice J Bach, “The Design of UNIX OS”,

**Reference Book:**

1. Andrew S. Tanenbaum, “Modern Operating Systems”
2. W. Richard Stevens, “UNIX Network Programming”

**Course Outcomes:**

- To provide hardware and software issues in modern distributed systems.
- To get knowledge in distributed architecture, naming synchronization, consistency and replication, fault tolerance security and distributed file systems.
- To get knowledge about deadlock, mutual exclusion, event ordering.
- To know about shared memory techniques.
- Discuss about how cryptography helps to achieve common security goals (data secrecy, message integrity, non-repudiation).
- Have sufficient knowledge about file access.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester II - Core Paper VI – CC VI

### ADVANCED JAVA PROGRAMMING

Theory Hours	: 6	Course Code	: P21CSC206
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

To obtain the basic knowledge of object oriented programming, concepts of basic JAVA, advanced JAVA Server side Scripting (JSP) and to understand the detail idea of JAVA programming

#### **UNIT I**

JDBC: Java API for Database Connectivity: Introduction to JDBC – Connecting to a Remote Database – Performing Database Queries and Updates – The JDBC API – Advanced Techniques.

#### **UNIT II**

**Networking:** Networking Basics – Java and the Net - InetAddress – TCP/IP client sockets– URL – URL Connection – TCP/IP Server sockets – A Caching Proxy HTTP Server - Data grams – InetAddress and Inet6Address – The URI Class

#### **UNIT III**

Images: File Formats – Image Fundamentals – Image Observer – Double Buffering – Media Tracker – Image Producer – Image Consumer – Image Filter – Cell Animation – Additional Imaging Classes. New I/O, Regular Expressions, and Other Packages: The Core Java API Packages – New I/O Packages – Regular Expression Processing – Reflection – RMI – Text Formatting.

#### **UNIT IV**

Java Beans: What is a Java Bean? – Advantages of Java Beans – Application Builder Tools – Using the Bean Developer Kit – JAR Files – Introspection – Developing a Simple Bean Using the BDK – Using Bound Properties – Using the Bean Info Interface – Constrained Properties – Persistence – Customizers – The Java Bean API – Using Bean Builder.  
A Tour of Swing: JApplet – Icons and Labels – Text Fields – Buttons – Combo Boxes – Tabbed Panes – Trees – Tables - AWT Classes Working with Graphics, Color and Font.

#### **UNIT V**

**Servlets:** Background – The Life Cycle of a Servlet – Using Tomcat For Servlet Development – A simple Servlet – The Servlet API – The javax.servlet Package – Reading Servlet Parameters – The javax.servlet.http Package – Handling HTTP Requests and Responses – Using Cookies – Session Tracking – Security Issues.

#### **Text Book(s):**

1. “Java 2 Programming Bible”, Aaron Walsh, Justin Couch and Daniel H. Steinberg – IDG Books India (P) Ltd, First Edition 2000 (UNIT I: Chapter – 16).
2. “The Complete Reference: Java 2”, Herbert Schildt, Tata McGraw Hill, 2002. (Chapter – 18,19,20,23,24,25,26,27)

### **Reference Books:**

1. Deitel & Deitel, “Java How to Program”, Prentice Hall, 5<sup>th</sup> Edition, 2002.
2. Peter Hagggar, “Practical java: Programming Language Guide”, Addison – Wesley Pub Co, 1<sup>st</sup> Edition, 2000.
3. Bruce Eckel, “Thinking in Java”, Pearson Education Asia, 2<sup>nd</sup> Edition, 2000.

### **Course Outcomes:**

- To learn the internet programming student should be able to using Java Applets.
- To know how to apply event handling on AWT and swing components.
- To learn access DB through Java programs using Java Data Base (JDBC).
- Create dynamic web pages using Servlets & JSP.
- To make a reusable Software component using Java Bean.
- To learn fundamental image concepts image consumer, image filter, cell animation, additional imaging, classes.
- To describe regular expression and other packages API & RMI.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)



## Semester II - Core Paper VII – CC VII

### COMPILER DESIGN

Theory Hours	: 5	Course Code	: P21CSC207
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

To acquire the knowledge about the compiler design and to understand the different phases of Compiler.

#### **UNIT I**

Introduction to the phase of the Compilers – Lexical Analysis, Regular expression, Non-Deterministic automata, deterministic automata equivalent to NFA – Minimizing the states of DFA – implementation of Lexical analyzer

#### **UNIT II**

Syntax Analysis – Top down parsing concepts – Bottom up parsing, handle pruning, shift reducing parsing.

#### **UNIT III**

Intermediate code generation: syntax directed definition, construction of syntax trees – Top down translation, bottom up evaluation of inherited and attributed recursive evaluations, assigning space of compiler construction time – Type checking .

#### **UNIT IV**

Storage Organization: Storage organization, storage allocation strategies, parameter parsing – Symbol tables – Dynamic storage allocation, Intermediate languages – Representation of declarations – Assigning statement, Boolean expressions – Back Patching, procedure calls.

#### **UNIT V**

Code generation & Optimization: Design of a code generators – Run time storage management, basic blocks and flow graphs, register allocation & assignment, DAG representation of basic blocks, peep hole optimization, code optimization – the principle source of optimization, optimization of basic blocks, global data flow analysis, loop optimization

#### **Text Books:**

1. “Compilers Principles Technical and Tools” – Alfred Aho, Ravi
2. “Compiler construction Principle” – Dhamdare

#### **Reference Book:**

1. “Compiler Design” – Reinhard Wilhelm 1995 edition.

### **Course Outcomes:**

- To describe the design of a compiler including its phases and components.
- To make the lexical analysis of program.
- To demonstrate the flow of control using directed a cyclic graph.
- To introduce different translation language.
- To understand the importance of code optimization.
- To know about compiler generation tools and techniques.
- To describe the role of compiler in ensuring the security, privacy and integrity of data.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester II - Core Paper VIII - CC VIII

### ADVANCED JAVA PROGRAMMING LAB

Theory Hours	: -	Course Code	: P21CSC208P
Practical Hours	: 5	Credits	: 3
Exam Hours	: 3	Marks	: CIA ESE 40 60

#### Course Objective :

- Gain knowledge about basic Java language syntax and semantics to write Java program and use concepts such as variables, control and iterative execution methods etc.
- Understand the fundamentals of OOP in Java including defining classes, object, invoking met and example understand the principles of interfaces, packages, multithreading.
- To learn experience of designing implementing and debug graphical user interfaces in AWT using applet and different user events.

#### List of Practicals :

1. Write a Program for implementing simple calculator using Swing controls.
2. Create a Japplet using swing control, which will create the layout shown below and handle necessary events.

Format

Enter your Name:
Enter your Age:
Select your Software:* Oracle *Visual Basic *Java
Select your city:*Delhi *Mumbai *Chennai
Ok                  Cancel

3. Use JDBC Connectivity and create Table, insert and update data.
4. Write a program in Java to implement a Client/ Server application using RMI.
5. Write a program in Java to create a Cookie and set the expiry time of the same.
6. Write a program in Java to create Servlet to count the number of visitors to a web page.
7. Write a program in Java to create a form and validate a password using Servlet.
8. Develop a Java Bean to demonstrate the use of the same.
9. Write a program in Java to convert an image in RGB to a Grayscale image.
10. Develop Chat Server using Java.

**Course Outcomes:**

- Learn the internet programming, using Java Applets.
- Learn event handling on AWT and swing components.
- Learn to access database through Java Programs using Java Data Base connectivity (JDBC).
- Create dynamic web pages, using servlets and JSP.
- Create a reusable Software component using Java Bean.

**Question Paper Pattern**

All the Programs are considered from the given list.

Internal – 40

External – 60.

## Semester II – MBEC – II - Paper I

### NETWORK SECURITY

Theory Hours	: 5	Course Code	: P21CS2MBE2:1
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

To learn the security issues in computer networks. To learn about the threats in Network and Internet security.

#### **UNIT I**

Introduction: Security Trends – The OSI Security Architecture- Security Attacks – Security Services – Security Mechanisms – A Model for Network Security – Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography.

#### **UNIT II**

Block ciphers and the Data Encryption Standard: Block cipher principles – The Data Encryption Standard – The Strength of DES – Differential and Linear Cryptanalysis – Block Cipher Design Principles- Public-Key Cryptography and RSA: principles of Public key Cryptosystems – The RSA Algorithm.

#### **UNIT III**

Authentication Applications: Kerberos – X.509 Authentication Service – Public-key Infrastructure – Electronic Mail Security: Pretty Good Privacy – S/MIME.

#### **UNIT IV**

IP Security: IP Security Overview – IP Security Architecture – Authentication Header – Encapsulating Security Payload – Combining Security Associations – Key Management – Web Security: Web Security Considerations – Secure Socket Layer and Transport Layer Security – Secure Electronic Transaction.

#### **UNIT V**

Intruders: Intruders – Intrusion Detection – Password Management – Malicious Software: Viruses and Related Threats – Virus Countermeasures – Distributed Denial of Service Attacks – Firewalls: Firewall Design Principles – Trusted Systems – Common Criteria for Information Technology Security Evaluation.

#### **Text Book:**

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Fourth Edition, 2003

#### **Reference Books:**

1. Johannes A. Buchaman , Introduction to cryptography, Springer-Verlag.
2. Atul kahate , Cryptography and Network Security, TMH.

### **Course Outcomes:**

- Describe network security services and mechanisms.
- To understand the fundamental of cryptography to provide confidentiality, integrity and authenticity, Symmetrical and Asymmetrical cryptography.
- To understand the various key distribution and management schemes.
- Able to know about Data integrity, Authentications, Digital Signature and Various security applications IPSec, Firewall IDC, Web Security, Email Security and malicious software etc.
- To design security applications in the field of IT.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester II – MBEC - II - Paper II

### SOFTWARE PROJECT MANAGEMENT

Theory Hours	: 5	Course Code	: P21CS2MBE2:2
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective :**

To introduce the basic concepts of Software Project Management and the various phases in Software Management Framework.

#### **UNIT I**

Software Management Renaissance: Conventional Software Management – Evolution of Software Economics – Improving Software Economics – The Old Way and the New.

#### **UNIT II**

A Software Management Process Framework: Live-Cycle Phases – Artifacts of the Process – Model-Based Software Architectures – Work Flows of the Process – Check Points of the Process.

#### **UNIT III**

Software Management Disciplines–I: Iterative Process Planning – Project Organizations and Responsibilities – Process Automation.

#### **UNIT IV**

Software Management Disciplines – II: Project Control and Process Instrumentation – Tailoring the Process

#### **UNIT V**

Risk Management : Introduction – Risk – Categories of risk – A framework for dealing with risk – Risk Identification – Risk assessment – Risk Planning – Risk Management – Evaluating risks to schedule – Applying the PERT Technique – Monte Carlo Simulation – Critical Chain Concepts

#### **Text Books:**

1. "Software Project Management" - Walker Royce - Pearson Education
2. "Software Project Management" - Bob Hughes & Mike Cotterell - Fourth Edition - 2008 - ISBN: 978 - 0 - 07 - 061985-2

### **Course Outcomes:**

- To identify the impact of IT projects on the performance of the organizations.
- To understand manage and develop IT infrastructure in different projects.
- To develop strategies to calculate risks factors involved in IT projects.
- To use project management software to control the design implementation, closure, and valuation of IT projects.
- To estimate, plan, calculate, and adjust project variables.
- Apply project management practices to launch new programs initiatives, products, services and events relative to the needs of stakeholders.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)



## Semester I – MBEC- II - Paper III

### SOFT COMPUTING

Theory Hours	: 5	Course Code	: P21CS2MBE2:3
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

To provide necessary Mathematical background for understanding and implementing Soft Computing Techniques such as neural networks, fuzzy systems and genetic algorithm.

#### **UNIT I**

Fuzzy Set Theory : Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

#### **UNIT II**

Optimization: Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

#### **UNIT III**

Genetic Planning: evolving plans, evolving heuristics, evolving planners, optimising plans. Ant Colony Optimization: Basic method for the TSP, local search, application to bin packing. Applications: engineering optimisation; scheduling and timetabling; data-mining; neural net design; etc. Some further ideas: co-evolution; evolvable hardware; multi-level Gas; polyploid GAs.

#### **UNIT IV**

Neuro Fuzzy Modeling : Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

#### **UNIT V**

Application of Computational Intelligence: Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

**Text Books:**

1. J.S.R. Jang, C.T. Sun and E. Mizutani, “Neuro Fuzzy and Soft Computing”, PHI, Pearson Education, 2004.
2. M. Mitchell: An Introduction to Genetic Algorithms. MIT Press, 1996.
3. W.Banzhaf, P.Nordin, R.E.Keller, F. D. Francone: Genetic Programming:An Introduction. Morgan Kaufmann, 1998.

**Reference Books:**

1. Timothy J. Ross, “Fuzzy Logic with Engineering Application, “ Mc Graw Hill, 1977.
2. Davis E. Goldberg, “Genetic Algorithms Search, Optimization and Machine Learning”, Addison Wesley, 1989.
3. S. Rajasekaran and G.A.V. Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003. Emereo Pty Limited, July 2008.
4. Ahmar, Abbas, “Grid Computing A Practical Guide to technology and Applications”, Charles River media, 2003.

**Course Outcomes :**

- To provide necessary Mathematical background for understanding and implementing Soft Computing Techniques such as neural networks, fuzzy systems and genetic algorithm.
- To understand the fundamental theory and concepts of neural networks, identify different neural network architecture, algorithm, application and their limitations.
- To understand appropriate learning rules for each of the architecture and learn several neural network paradigm and its applications.
- Comprehended the fuzzy logic and the concept of fuzziness involved in various system and fuzzy set theory.
- Contestant the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems and fuzzy logic.
- Reveal different application of these models to solve engineering and other problems.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester II – EDC - Paper I

### CYBER SECURITY

Theory Hours	: 2	Course Code	: P21CS2ED
Practical Hours	: -	Credits	: 2
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

To give the concepts of Cyber security basics and provides safe internet.

#### **UNIT I:**

Cyber security basics-Steps to Improve Computer Security-Stay safe from spyware threats with a specialized security solution-Keeping Windows operating system and vulnerable applications up to date-Use a standard user account in Windows operating system to go online-UAC- Going online with a secure browser-About trust public and free Wi-fi networks-log out- posting private information on your social media accounts-accessing Questionable web locations.

#### **UNIT II:**

Internet Security Myths-Internet Security Myths That You Need To Forget-Master basic security terms: Essential cyber security terms-Antispyware Software-Antivirus Software-Cyber-Attack-Drive-bydownload-Exploit-Keylogging-Malvertising-Malware-Patching-Phishing-Ransomware-Social engineering-Spam-Trojan-URL or web content filtering-Virus-Vulnerability-Zero-Day virus.

#### **UNIT III:**

Mastering password security: The 7 Deadly Sins of Password Management- creating a good password in easy steps-safely store your passwords-Next-generation anti-hacking tools-Steps to Bulletproof Your Digital Security.

#### **UNIT IV:**

Guidelines for safe internet browsing-safe browsing-tips for buying online-clearing cache for browsers: Clearing cache for Chrome Browsers above version 10-9.3.2 Clearing cache for Chrome Browsers from version 1 to 9-Clearing cache for Safari for iOS, iPhone and iPad-Clearing cache for Safari for Mac OS x-Clearing cache for Safari for windows.

#### **UNIT V:**

Wireless security: what is Wireless LAN?- major issues with WLAN-Email and social media security : Safe browsing guidelines for social networking sites.

#### **REFERENCES :**

1. [https://heimdalsecurity.com/pdf/cyber\\_security\\_for\\_beginners\\_ebook.pdf](https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf)(Unit I, II, III)
2. <http://www.uou.ac.in/sites/default/files/slm/FCS.pdf>(Unit IV, UNIT V).

### **Course Outcomes:**

- Ability to know about cyber security basics
- Develop knowledge about internet security myths.
- Gain through understanding about password security.
- Familiarize with safe internet browsing.
- Provide clear expose about wireless security.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester II – EDC - Paper II

### FUNDAMENTALS OF INFORMATION TECHNOLOGY

Theory Hours	: 2	Course Code	: P21CS2ED
Practical Hours	: -	Credits	: 2
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective :**

To obtain knowledge about the concepts of information technology.

#### **UNIT I :**

Introduction to information technology: The practical user- information technology & your life- Info tech is all-pervasive: Cell phones, Email, the internet, & the e-world- the “All-purpose machine”: The varieties of computers- Understanding your computer building your own pc: how computers work: Three key concepts- Custom-built desktop computer: Basic knowledge of how a computer works- Processing & memory hardware: Inside the system cabinet-Storage hardware: hard drive & CD/DVD drive- output hardware: video & sound cards, monitor, speakers,& printer- Communications hardware/software: MODEM.

#### **UNIT II:**

The Internet & The world wide web: connecting to the Internet: Narrowband, broadband, & access providers- Narrowband (Dial-up modem): Low speed but inexpensive& widely available- High-speed phone lines- Problem for telephone internet connections: the last mile- cable modem- Satellite wireless connections- Other Wireless Connections: Wi-Fi & 3G- Internet access providers- How does the internet work- The world wide web- The face of the web: Browsers, websites, & web pages- How the browser finds things: URLs- The nuts & bolts of the web: HTML & Hyperlinks- Using your browser to get around the web- Web portals- Search services & search engines- Four web search tools- Email & other ways of communicating-Over the net: Two ways to send & receive email- How to use email- Sorting your email- attachments- instant messaging- the online gold mine: telephony: telephony: the internet telephone & videophone Multimedia, webcasting, blogs, e-commerce,& the social web- The Intrusive Internet: snooping, spamming, Spoofing, Phishing, Pharming, Cookies, & Spyware.

#### **UNIT III:**

Communications, networks, & safeguards: From the Analog to the Digital age- Networks- Wired communications media- Wireless communications media- Cyber threats, Hackers, & Safeguards.

#### **UNIT IV:**

Personal Technology- Convergence, Portability& Personalization-Portable Media Players- High-tech radio: Satellite, HD, & Internet- Digital cameras- Personal digital assistants & Tablet PCs- The new television- Smart phones.

#### **UNIT V:**

SECURITY ISSUES: Threats to Computers & Communications Systems - SECURITY: Safeguarding Computers & Communications- QUALITY-OF-LIFE ISSUES: The Environment, Mental Health, Child Protection & the Workplace.

**Text Book:**

Using Information Technology : A practical introduction to Computers & Communications – William Sawmer – Edition-9e Complete.

**Reference Books:**

1. Information Technology Today-S.Jaiswal
2. Information Technology-Alexis Leon
3. Using Information Technology-Brain K.William Sawyer
4. Introduction to Information Technology-ITL Education Solution Ltd.

**Course Outcomes**

- On the completion of the course the student will be able to
- Understand the basic concepts of Internet along with storage devices
- Develop knowledge about Internet & World Wide Web.
- Get a clear exposure about communication Media and network
- Obtaining idea about Personal Technology such as Digital Camera, PDA and phones.
- Students can gain knowledge about Security issues, safeguarding from computers and communication devices.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester II – EDC - Paper III

### E-COMMERCE

Theory Hours	: 2	Course Code	: P21CS2ED
Practical Hours	: -	Credits	: 2
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective :**

To give the concepts of E-Commerce and their applications of Business.

#### **UNIT I**

Introduction to Electronic Commerce : What is Electronic Commerce ? – Benefits of Electronic Commerce – Impact of Electronic Commerce - Applications of Electronic Commerce Technologies.

#### **UNIT II**

E-Commerce in India – E- Commerce in banking – Electronic Payments – Online Business.

#### **UNIT III**

Electronic Credit Cards - Electronic Data Interchange(EDI) – Supply Chain Management – Payment Security – Computer Crimes.

#### **UNIT IV**

Electronic Commerce: Search Engines and Directory Services – Internet Advertising.

#### **UNIT V**

Cyber Laws : Privacy protection Act – Electronic Communication Privacy Act - Electronic Communication Service – Digital Signature method of the Recognition – Keypair method of Recognition – Arrest without warrant – Recognition of Electronic records – Indian IT Acts – USA Privacy Policy – Taxation of E-Commerce – Information Technology Act -2000 – Information Technology Security guidelines – Information Technology Acts – 2003.

#### **Text Books :**

1. Electronic Commerce – Bharat Bhaskar – The MCGrawhill Second edition. (Unit I & IV)
2. Internet & E-Commerce – C. Nellai Kannan (Units – II, III & V).

#### **Reference Book :**

Introduction to E- Commerce – Martin Katz.

### **Course Outcomes :**

- To get basic idea of E-Commerce and its benefits and applications.
- To know about the uses of E-Commerce in banking and how to do online business.
- To learn how to pay online securely and to get knowledge computer crimes.
- To know about the search engine used In E-Commerce and how to advertise in Internet.
- To acquire knowledge of cyber laws regarding E-Commerce.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)



## Semester II – Skill Enhancement Course – II

### DOCUMENT PREPARATION SYSTEM - LaTeX LAB

Theory Hours : -	Course Code : P21CS2SE2P
Practical Hours : 2	Credit : 1
Exam Hours : 2	Marks : CIA ESE 40 60

#### List of Programs:

1. Creating a LaTeX Document.
2. Mathematical Environments in LaTeX.
3. Table Creation in LaTeX.
4. Graphics in the LaTeX Document.
5. MS-Excel Chart in the LaTeX Document.
6. Landscape Figure in LaTeX Environment.
7. Thesis preparation using LaTeX Documents.

#### **Question Paper Pattern**

All the Programs are considered from the given list.

Internal – 40

External – 60.

**Semester III – Core Paper – IX – CC IX**

**ADVANCED COMPUTER ARCHITECTURE**

Theory Hours	: 6	Course Code	: P21CSC309
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

**Course Objective :**

To gain substantial knowledge about the architecture of computer and to understand the concepts of CPU, Cache, I/O and different processors.

**UNIT I**

Parallel Computer Models – The state of Computing- Multiprocessors and Multicomputers - Multivector and SIMD computers-PRAM and VLSI Models.

**UNIT II**

Program and Network Properties : Conditions of Parallelism-Program Partitioning and Scheduling – Program Flow Mechanisms – System Interconnect Architectures – Principles of Scalable Performance - Performance Metrics and Measures - Speedup Performance Laws-Scalability Analysis and Approaches : Scalability Metrics and Goals.

**UNIT III**

Processors and Memory Hierarchy – Advanced Processor Technology- Superscalar and Vector Processors – Memory Hierarchy Technology – Virtual Memory Technology.

**UNIT IV**

Bus, Cache, and Shared Memory – Backplane Bus systems-Cache Memory Organizations – Shared Memory Organizations - Sequential and Weak Consistency Models.

**UNIT V**

Pipelining and Superscalar Techniques –Linear Pipeline Processors- Nonlinear Pipeline Processors-Instruction Pipeline Design - Arithmetic Pipeline Design - Superscalar and Super pipeline Design.

**Text Book :**

“Advanced Computer Architecture”- Parallelism, Scalability, Programmability – Kai Hwang - Tata McGraw – Hill - Edition 2001.

**Reference Book :**

D.A.PATTERSON, J.L.HENNESSY – “ Computer Architecture : A Quantitative Approach ”, Harcourt Asia, Morgan Kaufmann, 1999.

### **Course Outcomes:**

- Understand the concepts of parallel processing and its applications.
- Implement the Hardware for arithmetic operations.
- Analyze the performance of different scalar components.
- Develop the pipelining concept for a given set of instructions.
- Distinguish the performance of pipelining and non-pipelining environment in a processor.

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester III - Core Paper – X – CC X

### DATA MINING

Theory Hours	: 6	Course Code	: P21CSC310
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective :**

To reveal the principles of data retrieval from large databases through data mining. To acquire knowledge in different mining principles To acquire knowledge in prediction and classification.

#### **UNIT I**

Introduction: Why data Mining? – What is Data Mining? - What kind of Data can be mined? – What kind of Data can be mined? - Which Technologies are used? – Which kinds of Applications are Targeted? – Major Issues in Data Mining – Getting to know your data: Data objects and Attribute Types – Basic Statistical Descriptors of data – Data Visualization – Measuring Data Similarity and Dissimilarity – Data Preprocessing: Data Preprocessing: An Overview – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

#### **UNIT-II**

Data Warehousing and Online Analytical Processing : Data warehouse: Basic concepts – Data warehouse Modeling: Data Cube and OLAP – Data Warehouse Design and Usage – Data warehouse implementation – Data generalization by attribute oriented induction – Mining Frequent Patterns, Associations And Correlations :Basic Concepts And Methods: Basic concepts – frequent itemset mining methods – which patterns are interesting? – pattern evaluation methods.

#### **UNIT III**

Classification: Rule Based Classification – Model evaluation and selection – Techniques to improve classification accuracy – Classification: Advanced Methods: Classification by Backpropagation – Support vector machines – Classification using frequent patterns – Lazy learners (or learning from your neighbors) – Other classification methods – Addition topics regarding classification.

#### **UNIT IV**

Cluster Analysis: Basic Concepts and methods: Cluster Analysis – Partitioning methods – Hierarchical methods – Density based methods – Grid based methods – Evaluation of Clustering.

#### **UNIT V**

Outlier Detection: Outliers and Outliers Analysis – Outlier Detection methods – Statistical Approaches – Proximity based approaches – Cluster based approaches – Classification based approaches – Mining contextual and collective outliers – Outlier detection in high dimensional data.

#### **Text Book :**

1. Data mining Concepts and techniques – Jiawei Han, Micheline Kamber, Jian Pei, Third Edition, MK Publications. UNIT I (Chapter 1, 2 & 3), UNIT II (Chapter 4& 6), UNIT III (Chapter 8 & 9), UNIT IV (Chapter 10), UNIT V (Chapter 12)

**Reference Books:**

1. Insight to data Mining Theory and Practice, K.P.Soman & Shyam Diwakar and V.Ajay, Prentice Hall of India, 2006 (ISBN – 81-201-2897-3)
2. Introduction to Data mining with case studies, G.K.Gupta, Prentice Hall India, 2006 (ISBN 81-203-3053-6).

**Course Outcomes :**

- Discuss the types of data to be mined and present a general classification of data mining tasks.
- Discuss the techniques for pre-processing data before mining concepts such as the cleaning integrations, redirection, transformations & data discretization.
- Provide solid introduction to data ware housing, OLAP, and data generalization, then provide the methods for mining frequent patterns, associations & correlation.
- It discusses the ways of classifications data; Basic concepts and discuss the advanced methods of classifications such as Bayesian belief networks. Back propagation, support vector machines, lazy learners.
- This unit describes the partitioning, hierarchical, density based methods, and grid based methods and evaluation of clustering.
- It describes several major approaches to the detection of anomalies, such as outlier detection, statistical approaches. Proximity based, clustering based and classifications based methods.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester III - Core Paper – XI – CC XI

### DATA ANALYTICS

Theory Hours	: 6	Course Code	: P21CSC311
Practical Hours	: -	Credits	: 5
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

The main goals to help students to learn understand and practice big data analytics.

#### **UNIT I**

Introduction to Big Data : Introduction – Importance of Big Data – Understanding the waves of managing Data – Big Data Management Architecture – Examining Big Data Types : Structured Data and Unstructured Data – Integrated Data types into Big Data Environment – Distributed Computing – Need of Distributed Computing Big Data.

#### **UNIT-II**

Technology Foundation for Big Data : Big Data Technology Components Exploring the Big Data stack - Big Data Analytics - Big Data Applications – Understanding the Basics of Virtualization – The importance and Virtualization to Big Data – Network Virtualization – Processor and Memory Virtualization – Data and Storage Virtualization – Examining the Cloud and Big Data – Making use of the Cloud for Big Data.

#### **UNIT III**

Big Data Management : RDBMS are Importance in a Big Data Environment – Non-Relational Database – Key Value Pair Database – Document Database – Columnar Database – Graph Database – Spatial Database – Map Reduced Fundamentals – Exploring the world of Hadoop – Explaining Hadoop – HDFS Hadoop Map Reduce.

#### **UNIT IV**

Analytics and Big Data : Using Big Data to get Results – Basic Analytics - Advanced Analytics – Operationalized Analytics – Modifying Business Intelligence Products to handle Big Data - Big Data Analytics Solution – Understanding Text Analytics and Big Data : Exploring Unstructured Data – Understanding Text Analytics - Text Analytics Tools for Big Data.

#### **UNIT V**

Big Data Implementation : Integrating Data Sources – Identifying the Data you Need – Understanding the Fundamentals of Big Data Integration – Defining Traditional ETL - Understanding ELT, Extract, Load and Transform – Prioritizing Big Data Quality – Best Practices for Data Integration in a Big Data world.

**Text Book :**

1. “Big Data for Dummies” – by Judith Hurwitz, Alan Nugent- Dr. Fern Halper and Marcia Kaufman.

**Reference Books:**

1. Big Data Fundamentals Concepts, Drivers & Techniques – Thomas Erl, Pearson India.
2. BIG DATA IN PRACTICE – Bernard Marr, Wiley.
3. BIG DATA .. AND ANALYTICS – Seema Acharya, Subhashini Chellappan, Wiley.

**Course Outcomes:**

- To understand the basic concepts of big data.
- Understand Sqoop architecture and uses table to load real-time data and RDBMS table / Query on the HDFS able to write scripts for exporting data from HDFS onto RDMS table.
- Understand the key issues in Big Data management and its associated application in intelligent business and scientific computing.
- Acquire fundamental enabling techniques and scalable algorithms like Hadoop Map Reduce, in Big Data Analytics.
- Achieve adequate perspective of Big Data analytics in various application like recommend or systems, social media application.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester III - Core Paper XII - CC XII

### R PROGRAMMING LAB

Theory Hours : -	Course Code : P21CSC312P
Practical Hours : 6	Credits : 3
Exam Hours : 3	Marks : CIA ESE 40 60

#### Course Objective:

To understand the basics of R Programming.

#### List of Practicals :

1. Write a Program that prints 'Hello World' to the screen.
2. Write a Program that asks the user for a number n and prints the sum of the umbers 1 to n.
3. Write a Program that Prints a Multiplication table for number up to 12.
4. Write a function that returns the largest element is a list.
5. Write a function that computers the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble sort.
8. Implement linear search.
9. Implement binary search.
10. Implement matrices Addition, Subtraction and Multiplication.

#### Course Outcomes:

- To get the Practical Knowledge of basics of R Programming.
- To implement sorting Algorithm
- To implement linear and binary searches
- To identify and implement appropriate control structures to solve a Particular Programming problem.

#### **Question Paper Pattern**

All the Programs are considered from the given list.

Internal – 40

External – 60.



**Semester III – MBEC III - Paper -I**

**SOFTWARE QUALITY ASSURANCE AND TESTING**

Theory Hours	: 6	Course Code	: P21CS3MBE3:1
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

**Course Objective :**

To facilitate the intakes to obtain knowledge in analyzing the program flow and identify bugs over it in a systematic approach. This paper provides skills to preparing test cases and use cases and test the programs through manual and automated tools.

**UNIT I**

Principles of Testing – Software Development Life Cycle Models

**UNIT II**

White Box Testing-Integration Testing-System and acceptance testing.

**UNIT III**

Testing Fundamentals -2 & Specialized Testing: Performance Testing Regression testing-Testing of Object Oriented Systems-Usability and Accessibility Testing.

**UNIT IV**

Test Planning, Management, Execution and Reporting.

**UNIT V**

Software Test Automation-Test Metrics and Measurements

**Text Book :**

Software Testing - Srinivasan Desikan, Gopaldaswamy Ramesh, Pearson Education 2006.

**Reference Books :**

1. Introducing Software testing-Louis Tamres, Addison Wesley Publications, First Edition.
2. Software testing, Ron Patten, SAMS Techmedia, Indian Edition 2001.
3. Software Quality-Producing Practical, Consistent Software - Mordechai BenMenachem, Gary S Marliss, Thomson Learning, 2003.

## **Course Outcomes :**

- Learn the principles of testing and software development life cycle methods.
- Discuss the various levels of techniques, such as white box testing, Integration, System and white box testing.
- It provide testing fundamentals and specialized testing, such as performance, Regression, object oriented systems, usability & Accessibility testing.
- Describe fundamental concepts in Software testing for test plan, Test management, Execution and reporting.
- Apply the different approaches of software test automation, Test metrics and measurement

### **Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester III – MBEC III - Paper -II

### PERVASIVE COMPUTING

Theory Hours	: 6	Course Code	: P21CS3MBE3:2
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective :

To create awareness about the architecture and functioning of Pervasive Computing.

#### **UNIT I**

Pervasive Computing: Past, Present and Future Pervasive Computing-Pervasive Computing Market-m-Business-Application examples: Retail, Airline check-in and booking-Sales force automation-Health care-Tracking-Car information system-E-mail access via WAP.

#### **UNIT II**

Device Technology: Hardware-Human Machine Interfaces-Biometrics-Operating Systems-Java for Pervasive devices .

#### **UNIT III**

Device Connectivity: Protocols-Security-Device Management Web Application Concepts: WWW architecture-Protocols-Transcoding-Client authentication via internet .

#### **UNIT IV**

WAP and Beyond: Components of the WAP architecture-WAP infrastructure-WAP security issues-WML-WAP push-Products-i-Mode-Voice Technology: Basics of Speech recognition- Voice Standards-Speech applications-Speech and Pervasive Computing .

#### **UNIT V**

PDA: Device Categories-PDA operation Systems-Device Characteristics-Software Components-Standards-Mobile Applications-PDA Browsers Pervasive Web Application architecture: Background-Scalability and availability-Development of Pervasive Computing web applications-Pervasive application architecture .

#### **Text Book :**

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006

**Reference Book :**

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006 .

**Course Outcomes:**

- To afford a disclosure on the technologies, tools and gadgets of pervasive computing.
- To learn the pervasive computing web based applications.
- To get clear idea about WAP architecture and security.
- To know about speech application in pervasive computing.
- To be familiar with different voice standards.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester III – MBEC III - Paper -III

### ARTIFICIAL INTELLIGENCE

Theory Hours	: 6	Course Code	: P21CS3MBE3:3
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective :**

To introduce basic Principles, Techniques and Advanced topics of Artificial Intelligence.

#### **UNIT I**

**Problems and Search** : What is Artificial Intelligence ? – The problems, problem spaces and search – Heuristic search techniques.

#### **UNIT II**

**Knowledge Representation** : Knowledge Representation issues – using predicate logic - Representing Knowledge using rules.

#### **UNIT III**

**Symbolic Reasoning under uncertainty** : Introduction to non monotonic reasoning – logics for non monotonic reasoning – implementation issues – augmenting a problem – solver – implementation – depth-first search, breadth-first search – Statistical Reasoning : Probability and Bayes’ Theorem – certainty factors and rule based systems – Bayesian networks – Dempster – Shafer Theory – Fuzzy Logic.

#### **UNIT IV**

Weak Slot-and-Filler Structures : Semantic nets – Frames - Strong Slot-and-Filler Structures : Conceptual dependency – scripts – CYC - Game Playing : The Minimax search procedures – adding Alpha – beta cutoffs.

#### **UNIT V**

**Advanced Topics** : Natural Language processing : Introduction – syntactic processing – semantic analysis – Discourse and pragmatic processing – statistical NLP – spell checking – Expert systems : Representing and using domain knowledge – Expert system shells – Explanation – Knowledge acquisition.

#### **Text Book :**

1. Artificial Intelligence, Third Edition , Elaine Rich, Kevin Knight, Shivashankar B Nair, McGraw Hill Education (India) Private Ltd, 2009.

**Reference Book :**

1. Artificial Intelligence - A Modern Approach, Third Edition – Stuart J. Russell Peter Norvig, Pearson India Education services pvt ltd, 2016.

**Course Outcomes:**

The student should be able to

- Identify the AI based problems, search techniques.
- Know the knowledge representation issues, predicate logic and rules.
- Learn the concepts of symbolic reasoning and statistical reasoning.
- Acquire the knowledge about slot-and - filler structures and game playing procedures.
- Discuss on natural language processing and expert systems.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester III – SSC - Paper II

### SELF STUDY COURSE

## COMPUTER SCIENCE FOR NET/SET EXAMINATION

### Objective :

To impart the knowledge in computer science subjects

### Course Outcomes:

- To get depth knowledge in Discrete structures and optimization and Computer System Architecture.
- To make the skills in programming languages and computer graphics.
- To know about data base management systems and system software and operating systems.
- To learn about data structures and algorithms & Theory of computation and compilers.
- To get knowledge about data communication network and Artificial Intelligence.

### UNIT I

**Discrete Structures and Optimization :** Mathematical Logic - Sets and Relations - Counting, Mathematical Induction and Discrete Probability - Group Theory - Graph Theory - Boolean Algebra – Optimization.

**Computer System Architecture:** Digital Logic Circuits and Components - Data Representation - Register Transfer and Microoperations - Basic Computer Organization and Design - Programming the Basic Computer - Microprogrammed Control - Central Processing Unit - Pipeline and Vector Processing - Input-Output Organization - Memory Hierarchy – Multiprocessors.

### UNIT II

**Programming Languages and Computer Graphics :** Language Design and Translation Issues - Elementary Data Types - Programming in C- Object Oriented Programming - Programming in C++ - Web Programming - Computer Graphics - 2-D Geometrical Transforms and Viewing - 3-D Object Representation, Geometric Transformations and Viewing.

**Database Management Systems :** Database System Concepts and Architecture - Data Modeling – SQL - Normalization for Relational Databases - Enhanced Data Models - Data Warehousing and Data Mining - Big Data Systems – NOSQL.

### UNIT III

**System Software and Operating System :** System Software - Basics of Operating Systems - Process Management – Threads - CPU Scheduling – Deadlocks - Memory Management - Storage Management - File and Input/Output Systems – Security - Virtual Machines - Linux Operating Systems - Windows Operating Systems - Distributed Systems.

**Software Engineering :** Software Process Models - Software Requirements - Software Design - Software Quality - Estimation and Scheduling of Software Projects - Software Testing - Software Configuration Management.

## UNIT IV

**Data Structures and Algorithms :** Data Structures - Performance Analysis of Algorithms and Recurrences - Design Techniques - Lower Bound Theory - Graph Algorithms - Complexity Theory - Selected Topics - Advanced Algorithms.

**Theory of Computation and Compilers :** Theory of Computation - Regular Language Models - Context Free Language - Turing Machines (TM) - Unsolvable Problems and Computational Complexity - Syntax Analysis - Semantic Analysis - Run Time System - Intermediate Code Generation - Code Generation and Code Optimization.

## UNIT V

**Data Communication and Computer Networks :** Data Communication - Computer Networks - Network Models - Functions of OSI and TCP/IP Layers - World Wide Web (WWW) - Network Security - Mobile Technology- Cloud Computing and IoT.

**Artificial Intelligence (AI) :** Approaches to AI - Knowledge Representation – Planning - Natural Language Processing - Multi Agent Systems - Fuzzy Sets - Genetic Algorithms (GA) - Artificial Neural Networks (ANN).

### Reference Books :

UGC NET/SET related objective type questions  
Previous year NET/SET Question Bank.

100 questions from each unit.  
Total Number of questions : 500

### Question Paper Pattern

Section A(MCQ) -  $50 \times 2 = 100$ (From each Unit ten questions)



## Semester IV – Core Paper XIII – CC XIII

### OPEN SOURCE TECHNOLOGIES

Theory Hours	: 6	Course Code	: P21CSC413
Practical Hours	: -	Credits	: 6
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Objective :**

To understand open source, Server Side Script and database concept. To gain knowledge in developing application using PHP and MySQL. To gain knowledge in Linux administration and developing application based of Linux.

#### **UNIT - I**

Open Source - Introduction : Open Source – Open Source vs. Commercial Software – Linux: Introduction - Download and Install - Decisions, Decisions – Linux Partition Sizes - Accounts - Security - Basic UNIX: Shell - Owner, Groups, Permissions, Ownership - Processes - PATH and Environment - Commands-Basic File System Essentials - Useful Programs.

#### **UNIT - II**

Apache Web server: Starting and Stopping and Restarting Apache-Configuration - Securing Apache - Create the Web Site-Apache Log Files.

#### **UNIT - III**

My SQL: Commands - Database Independent Interface - Tables – Loading and Dumping Database.

#### **UNIT - IV**

PHP: Embedding PHP into HTML -Configuration - Language Syntax: Variables - Data Types - Web variables - Operators - Flow Control Constructs Writing PHP Papers.

#### **UNIT - V**

Built in PHP function - Important Functions - Array Functions – String Functions - Other Functions - PHP and MySQL: MySQL Functions.

#### **Text Book :**

James Lee and Brent Lee “Open Source Development with LAMP -Using Linux, Apache, My SQL ,Perl and PHP”, Pearson Education , 2009.

#### **Reference Book :**

Json Gerner, Elizabeth Naramore, Morgan Owens and Matt Warden, “Professional LAMP -Using Linux, Apache, My SQL and PHP5Web development”, Wiley Publisher,2006.

**Course Outcomes :**

- To learn how to install & configure Linux OS and some of the basic Linux administration commands.
- To know how to configure and secure apache.
- To learn about basis MYSQL commands and some of the administrative details.
- To know how to configure PHP and its basics.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester IV – Core Paper XIV – CC XIV

### OPEN SOURCE LAB

Theory Hours	: 6	Course Code	: P21CSC414P
Practical Hours	: -	Credits	: 3
Exam Hours	: 3	Marks	: CIA ESE 40 100

#### Course Objective :

To gain practical knowledge in Linux, MySQL and PHP.

#### PHP

- 1) Write a PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
- 2) Write a PHP program that adds products that are selected from a web page to a shopping cart.
- 3) Write a PHP program to access the data stored in a MY SQL table.
- 4) a) Write a PHP program interface to create a database and to insert a table into it.  
b) Write a PHP program using classes to create a table.  
c) Write a PHP program to upload a file to the server.
- 5) Write a PHP program to create a directory, and to read contents from the directory.

#### LINUX

#### **Write Shell Programs for the following using the Linux Operating System**

- 1) Write a shell program to find the details of a user session.
- 2) Write a shell program to change the extension of a given file.
- 3) Check whether the given number is prime or not.
- 4) Find the biggest of given two numbers.
- 5) Write a program to check the given number is odd or even.
- 6) Write a program to generate Fibonacci Series.
- 7) Write a program to prepare electric bill for domestic consumers.

For first 100 UNITS - Rs.0.75/ UNIT

For next 100 UNITS - Rs.1.50/UNIT

Above 200 UNITS - Rs.3.00/UNIT.

Prepare the bill for the following format:

Customer No. -----  
Customer Name -----  
Pre.Reading -----  
Cur.Reading -----  
UNITS Consumed -----  
Charge -----  
Signature

- 8) Write a program to prepare a Payroll with Basic Pay, DA, Allowances, PF and GP.

- 9) Using Case Statement, write a program to check the files ending with vowels.
- 10) Write a program to sort the numbers in ascending and descending order.
- 11) Write a menu driven program to print Bio-data for five persons.

## **MY SQL LAB**

1. Create a MySQL table and write queries to add, insert, delete and modify the data.
2. Consider the following relations:

STUDENT (snum: integer, sname: string, major: string, level: string, age: integer)

CLASS (name: string, meets at: string, room: string, d: integer)

ENROLLED (snum: integer, cname: string)

FACULTY (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

Write the following queries. No duplicates should be printed in any of the answers.

- i. Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof.Anand.
- ii. Find the names of all classes that either meet in room R18 or have five or more Students enrolled.
- iii. Find the names of all students who are enrolled in two classes that meet at the same time.
- iv. Find the names of faculty members who teach in every room in which some class is taught.
- v. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

3. The following relations keep track of airline flight information:

FLIGHTS (no: integer, from: string, to: string, distance: integer, Departs: time, arrives: time, price: real)

AIRCRAFT (aid: integer, aname: string, cruisingrange: integer)

CERTIFIED (eid: integer, aid: integer).

EMPLOYEEES (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; Every pilot is certified for some aircraft, and only pilots are certified to fly.

Write each of the following queries.

- i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80, 000.
- ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of the aircraft for which she or he is certified.
- iii. Find the names of pilots whose salary is less than the price of the cheapest route from Chennai to California.
- iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.

v. Find the aids of all aircraft that can be used on routes from Chennai to New Delhi.

4. The following tables are maintained by a book dealer.

AUTHOR (author-id:int, name:string, city:string, country:string)

PUBLISHER (publisher-id:int, name:string, city:string, country:string)

CATALOG (book-id:int, title:string, author-id:int, publisher-id:int, category-id:int, year:int, price:int)

CATEGORY (category-id:int, description:string)

ORDER-DETAILS (order-no:int, book-id:int, quantity:int)

i. Create the above tables by properly specifying the primary keys and the foreign keys.

ii. Enter at least five tuples for each relation.

iii. Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.

iv. Find the author of the book which has maximum sales.

v. Demonstrate how you increase the price of books published by a specific publisher by 10%.

5. Consider the following database for a banking enterprise

BRANCH(branch-name:string, branch-city:string, assets:real)

ACCOUNT(accno:int, branch-name:string, balance:real)

DEPOSITOR(customer-name:string, accno:int)

CUSTOMER(customer-name:string, customer-street:string, customer-city:string)

LOAN(loan-number:int, branch-name:string, amount:real)

BORROWER(customer-name:string, loan-number:int)

i. Create the above tables by properly specifying the primary keys and the foreign keys

ii. Enter at least five tuples for each relation

iii. Find all the customers who have at least two accounts at the Main branch.

iv. Find all the customers who have an account at all the branches located in a specific city.

v. Demonstrate how you delete all account tuples at every branch located in a specific city.

### **Course Outcomes:**

- To gain practical knowledge of using Linux commands.
- To write simple programs in Linux.
- To manipulate data in MYSQL database.
- To get basic ideas of using XAMPP server.
- To write PHP programs with MYSQL connectivity.

### **Question Paper Pattern**

All the Programs are considered from the given list.

Internal – 40

External – 60.

## Semester IV – MBEC IV – Paper - I

### DEEP LEARNING

Theory Hours	: 6	Course Code	: P21CS4MBE4:1
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### **Course Objective:**

To introduce major deep learning algorithms and their applications to solve real world problems.

#### **UNIT - I**

Introduction : Historical trends in Deep Learning . Machine Learning Basics : Learning algorithms Supervised Learning algorithms, Unsupervised Learning algorithms, Challenges Motivating Deep Learning.

#### **UNIT - II**

Deep Forward Networks : Learning XOR, Gradient based learning, Hidden Units, Architecture Design, Back Propagation and other Differentiation Algorithms.

#### **UNIT - III**

Convolutional Networks: The Convolutional Operation, Motivation, Pooling, Convolution and Pooling as an infinitely strong prior, variants of the Basic Convolution Function, Structured outputs, Data types, Efficient Convolution Algorithms.

#### **UNIT - IV**

Autoencoders : Undercomplete Autoencoder - Regularized Autoencoders - Representational power – Layer size and Depth - Stochastic Encoders and Decoders - Denoising Autoencoders – Learning Manifolds with Autoencoders – Contractive Autoencoders - Predictive Sparse Decomposition – Applications of Autoencoders.

#### **UNIT - V**

Applications : Large scale Deep Learning – Computer vision – Speech Recognition - Natural Language Processing – Other Applications.

#### **Text Book :**

Deep Learning – Ian Goodfellow, Yoshua Bengio & Aaron Courville, MIT Press, 2016.

**Reference Books :**

1. Fundamentals of Deep learning and Computer Vision by Nikhil singh Paras Ahuja, BPB Publications.
2. A Practical Approach for Machine Learning and Deep Learning Algorithms : Tools and Techniques using MATLAB and Python by Abhishek Kumar Pandey, Pramod Singh Rathore, Dr. S. Balamurugan.

**Course Outcomes :**

- To identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.
- To appreciate the use of Deep Learning Applications.
- To understand and implement Deep Learning Architecture.
- To understand the role of Deep Learning in Machine Learning Applications.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester IV – MBEC - IV – Paper - II

### INTERNET OF THINGS

Theory Hours	: 6	Course Code	: P21CS4MBE4:2
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective:

To know the communication technologies in IoT, IoT protocols and web of things.

#### **UNIT - I**

Introduction: Defining Internet of Things – IoT : A Web 3.0 View – Ubiquitous IoT Applications : Important Vertical IoT Applications - Telematics and Intelligent Transport Systems – Smart Grid and Electric Vehicles – Smarter Planet and Smart Buildings – Four Pillars of IoT : The Horizontal, Verticals, and Four Pillars – M2M: The Internet of Devices – RFID : The Internet of Objects – WSN : The Internet of Transducers – SCADA : The Internet of Controllers.

#### **UNIT- II**

The DNA of IoT : DCM : Device, Connect, and Manage – Device : Things that Talk – Connect : Via Pervasive Networks : Wired Networks - Wireless Networks- Satellite IoT. Protocol Standardization for IoT : Web of Things versus Internet of Things – Two Pillars of the Web – IoT Protocol Standardization Efforts : M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization.

#### **UNIT - III**

The Cloud of Things : The Internet of Things and Cloud Computing – Mobile Cloud Computing- MAI versus XaaS : The Long Tail and the Big Switch – The Cloud of Things Architecture: Four Deployment Models – Vertical Applications – Fifteen Essential Features – Four Technological Pillars – Three Layers of IoT Systems – Foundational Technological Enablers.

#### **UNIT - IV**

The BACnet™ Protocol : United States – Europe – Internetworking – Technology :Physical Layer - Link Layer – Network Layer – Transport and Session Layer – Presentation and Application Layers – BACnet Security – BACnet Over Web Services – The LonWorks® Control Networking Platform : Standardization – Technology – Web Services Interface for LonWorks Networks :Echelon SmartServer – A REST Interface for LonWorks .

#### **UNIT - V**

KNX : The Konnex / KNX Association – Standardization – KNX Technology Overview – Physical Layer – Data Link and Routing Layers, Addressing – Transport Layer – Application Layer – KNX Devices, Functional Blocks and Interworking – Device Configuration – ZigBee : Development of the Standard – ZigBee Architecture – Association – The ZigBee Network Layer – The ZigBee APS Layer – ZigBee Security.



**Text Books :**

1. The Internet of Things in the Cloud: A Middleware Perspective-Honbo Zhou–CRC Press 2012  
**Unit I - 1.3,1.4, 2.2, 3.1, 3.2, 3.3, 3.4 & 3.5.**  
**Unit II - 4.1, 4.2, 4.3, 6.1 & 6.2. Unit III – 9.1, 9.2, 9.3 & 9.4.**
2. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key Applications and Protocols.  
**Unit IV – 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3 & 4.4.**  
**Unit V – 6.1, 6.2, 6.3, 6.4, 7.1, 7.2, 7.3, 7.4, 7.5 & 7.7.**

**Reference Books:**

1. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles - (Eds.) – Springer – 2011.
2. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010.
3. The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier Hersent, Omar Elloumi and David Boswarthick - Wiley -2012

**Course Outcomes:**

- To Understand the different architectures for IoT.
- To learn various protocols at the different layers for IoT.
- To Understand the different business models for IoT.
- To develop a middle ware for IoT.
- To develop Applications of IoT in Industrial Contacts.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)

## Semester IV – MBEC IV – Paper - III

### DIGITAL IMAGE PROCESSING

Theory Hours	: 6	Course Code	: P21CS4MBE4:3
Practical Hours	: -	Credits	: 4
Exam Hours	: 3	Marks	: CIA ESE 25 75

#### Course Objective:

To learn the fundamental concepts of Digital Image Processing. To study basic image Processing Operations.

#### **UNIT I**

Introduction And Digital Image Fundamentals: Introduction - What is Image Processing- examples of fields that uses DIP Fundamentals step in DIP. Digital image fundamentals – image sensing and acquisition, Image sampling and quantization – Basic relationship between pixels.

#### **UNIT II**

Image Enhancement Techniques: Some basic intensity transformation functions – Histogram processing - Fundamental steps of spatial filtering – smoothing spatial filters.

#### **UNIT III**

Image Restoration: Model of Image Degradation/restoration process – noise models – restoration in the presence of Noise only Spatial filtering.

#### **UNIT IV**

Image Compression : Fundamentals – Coding redundancy – Spatial and temporal redundancy – Irrelevant information. Some basic compression methods: Huffman coding – arithmetic coding – LZW coding – Run Length coding – Bit-plane coding.

#### **UNIT V**

Image Segmentation And Representation : Morphological image processing : preliminaries – Erosion and Dilation. Fundamentals – point, line, and Edge detection: Line Detection – Basic edge detection – More advanced techniques for Edge detection – Edge linking and boundary detection – Thresholding.

#### **Text Book :**

Digital Image Processing, Third Edition, Rafael C.Gonzalez and Richard E. Woods, Pearson Education, 2008. Chapters:1.1, 1.3, 1.4, 2.3, 2.4, 2.5, 3.2-3.5, 5.1-5.3, 8.1.1, 8.1.2, 8.2.3-8.2.5, 8.2.7, 9.1, 9.2, 10.1, 10.2.3, 10.2.5-10.2.7, 10.3

**Reference Books :**

1. Fundamentals of Digital Image Processing, Anil K. Jain, Prentice Hall of India, 1989.
2. Digital Image Processing and Analysis, B. Chandra and D. Dutta Majumder, PHI, New Delhi, 2006.

**Course Outcomes:**

- Analyze general terminology of digital image processing
- Examine variety types of images, intensity transformations and spatial filtering.
- Develop Fourier transform for image processing in frequency domain.
- Evaluate the methodologies for image segmentation, restoration etc.
- Implement image process and analyze algorithms.
- Apply image processing algorithms in practical applications.

**Question Paper Pattern**

Section A -  $10 \times 2 = 20$  (From each Unit two questions)

Section B -  $5 \times 5 = 25$  (From each Unit 2 Question with Either OR type)

Section C -  $3 \times 10 = 30$  (Each Unit one question)