

## **Major changes for MCA**

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 2.1</b>                       | <b>DATA STRUCTURES USING PYTHON</b>  |                              |
| <b>Instruction: 4 periods / week</b> |                                      | <b>Credits: 5</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

## Objectives

The course is designed to meet the objectives of:

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To implement the data structures using python programming

## Outcomes

Students upon completion of this course will be able to:

1. Develop algorithmic solutions to simple computational problems
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into functions.
4. Represent compound data using Python lists, tuples and dictionaries.
5. Apply object oriented concepts

## Unit - I

Python Primer: Python Overview - Objects in Python, Expressions, Operators, and Precedence, Control Flow, Functions, Simple Input and Output, Exception Handling, Iterators and Generators, Additional Python Conveniences, Scopes and Namespaces, Modules and the Import Statement

Object-Oriented Programming: Goals, Principles, and Patterns, Software Development, Class Definitions, Inheritance, Namespaces and Object-Orientation, Shallow and Deep Copying.

Array-Based Sequences: Python's Sequence Types , Low-Level Arrays - Dynamic Arrays and Amortization, Efficiency of Python's Sequence Types , Using Array-Based Sequences - Multidimensional Data Sets

## **Unit – II**

Linked Lists : Linked List – Properties ,Item Insertion and Deletion , Building a Linked List, Linked List as an ADT , Ordered Linked Lists , Doubly Linked Lists , Linked Lists with header and trailer nodes , Circular Linked Lists.

Search Algorithms: Sequential Search, Binary search – Performance of binary search, Insertion into ordered list;

Hash Tables: Introduction, Hashing, Separate Chaining, Hash functions, The Hash Map Abstract Data Type, Applications: Histograms

Sorting Algorithms: Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort.

## **Unit – III**

Stacks: Stack operations, Implementation of stacks as arrays, Linked implementation of stacks, Application of stacks.

Queues: Queue operations – Implementation of Queues as arrays, Linked implementation of Queues, Priority Queue, Application of Queues.

## **Unit – IV**

Trees: Binary Trees, Binary Tree Traversal, Binary Search Tree, Nonrecursive Binary Tree Traversal Algorithms, AVL Trees.

Graphs: Graph Definitions and Notations, Graph Representation, Operations on graphs, Graph as ADT, Graph Traversals, Shortest Path Algorithm, Minimal Spanning Tree.

## **Prescribed Book**

Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, “Data Structures and Algorithms in Python”, John Wiley & Sons, 2013

Rance D. Necaise “Data Structures and Algorithms Using Python “, John Wiley & Sons, 2011

## **Reference Book**

Brad Miller, David Ranum, “Problem Solving with Algorithms and Data Structures”, Release 3.0, 2013.

**Model Paper**  
**MCA 2.1: Data Structures Using Python**

**Time: 3 Hrs**

**Max. Marks: 70**

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**Answer Question No.1 Compulsory:**

**7 x 2 = 14 M**

**Answer ONE Question from each unit:**

**4 x 14 = 56 M**

- 1.a) Define Bag Data Abstraction.
- b) Write about the features of python.
- c) What are the differences between Single and Double Linked List?
- d) Write the complexity of binary search algorithm.
- e) What are the applications of Stack?
- f) Application of AVL Tree.
- g) Define Multigraph.

**UNIT - I**

2. a) Explain about the need for learning python programming and its importance.
- b) What are the different loop control statements available in python? Explain with suitable examples

(or)

- 3.a) List different conditional statements in python with appropriate examples.
- b) Explain about the features and explain about different Object Oriented features supported by Python.

**UNIT – II**

- 4.a) Write procedure to insert an element in an ordered list.
- b) Explain Back tracking with an example.

(or)

- 5.a) Write procedures to delete an element & count number of nodes in Double Linked List.
- b) Explain different collision resolution techniques.

**UNIT - III**

- 6.a) Define Stack. Implement operations on Stack using arrays.
- b) Write the procedure for selection sort.

(or)

- 7.a) What is priority Queue. Write the procedure for implementing the operations on Priority Queue.
- b) Write a C++ program for sorting 'n' elements using Merge Sort technique.

**UNIT - IV**

- 8.a) Write a procedure to find minimum & maximum element in a binary search tree.
- b) Write the non-recursive algorithm for post order.

(or)

- 9.a) Explain Different Graph traversal techniques.

b) Using Kruskal's algorithm develop minimum cost spanning tree for the following graph.

|                                      |   |                              |
|--------------------------------------|---|------------------------------|
| <b>MCA 2.6</b>                       | <b>DATA STRUCTURES USING PYTHON LAB</b> |                              |
| <b>Instruction: 6 periods / week</b> |   | <b>Credits: 3</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b>    | <b>Total :<br/>100 Marks</b> |

### LAB CYCLE

1. Create a class RATIONAL and perform various operations on two Rational numbers using operator overloading.
2. Create a Multidimensional Vector Class and Perform possible operations on Vectors.
3. Program for Sorting 'n' elements Using bubble sort technique.
4. Sort given elements using Selection Sort.
5. Sort given elements using Insertion Sort.
6. Sort given elements using Merge Sort.
7. Sort given elements using Quick Sort.
8. Implement the following operations on single linked list.
  - (i) Creation
  - (ii) Insertion
  - (iii) Deletion
  - (iv) Display
9. Implement the following operations on double linked list.
  - (i) Creation
  - (ii) Insertion
  - (iii) Deletion
  - (iv) Display
10. Implement the following operations on circular linked list.
  - (i) Creation
  - (ii) Insertion
  - (iii) Deletion
  - (iv) Display
11. Program for traversing the given linked list in reverse order.
12. Merge two given linked lists.
13. Implement Stack Operations Using Arrays.
14. Implement Stack Operations Using Linked List.

15. Implement Queue Operations Using Arrays.
16. Implement Queue Operations Using Linked List.
17. Implement Operations on Circular Queue.
18. Converting infix expression to postfix expression by using stack.
19. Write program to evaluate post fix expression.
20. Construct BST and implement traversing techniques recursively.

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 3.6</b>                       | <b>UML LAB</b>                       |                              |
| <b>Instruction: 6 periods / week</b> |                                      | <b>Credits: 3</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

1. The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e. Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

2. Student has to take up another case study of his/her own interest and do the same whatever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned in theory syllabus can be referred for some idea.

3. Design the UML diagrams for the Library management System

4. Design the UML diagram for the Student Marks management System

5. Case Study: Design the UML diagrams for your own project.

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 4.2</b>                       | <b>MACHINE LEARNING</b>              |                              |
| <b>Instruction: 4 periods / week</b> |                                      | <b>Credits: 5</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

### Objectives:

The course is designed to meet the objectives of:

1. To introduce to the students the basic concepts and fundamentals of machine learning
2. To develop skills of implementing machine learning techniques
3. To familiarize the students with latest technologies
4. To implement machine learning solutions to classification, regression and clustering

### Outcomes:

Students upon completion of this course will be able to:

1. Students possess ability to select and implement machine learning techniques
2. To recognize and implement various ways of selecting suitable model parameters for different machine learning techniques
3. Ability to integrate machine learning libraries and mathematical and statistical tools with modern technologies.
4. Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.

## SYLLABUS

### UNIT - I

Introduction - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning

Concept learning and the General to Specific Ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the Candidate-Elimination algorithm, Remarks on version spaces and Candidate-Elimination, Inductive Bias

### UNIT - II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning  
Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibbs



algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks  
The EM algorithm

### **UNIT - III**

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, An Example: learning to classify text, Bayesian belief networks, The EM algorithm

Computational learning theory – Introduction, Probability Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The Mistake Bound Model of Learning

Instance-Based Learning- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

### **Unit- IV**

Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators

Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming

#### **TEXT BOOKS:**

Machine Learning – Tom M. Mitchell, - MGH

#### **REFERENCE BOOKS:**

1. Introduction to Machine Learning,- EthemAlpaydin, - PHI
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

Model Paper  
**MCA 4.2: MACHINE LEARNING**

**Time: 3 Hrs**

**Max. Marks: 70**

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**Answer Question No.1 Compulsory:**

**7 x 2 = 14 M**

**Answer ONE Question from each unit:**

**4 x 14 = 56 M**

1. a) Write the issues of machine learning.
- b) What is an unbiased learner?
- c) Define Hypothesis space search
- d) What is sampling theory?
- e) Write about Bayes optimal classifier
- f) What is regression?
- g) What is the use of genetic algorithm?

**Unit-I**

- 2 a. What is Machine Learning? Explain different perspective and issues in machine learning.
- b. Describe the Find-s algorithm. Explain how to find a maximally specific hypothesis.

**OR**

- 3 a. List and explain the steps to design a learning systems in detail.
- b. Illustrate the candidate elimination algorithm with suitable example.

**UNIT-II**

- 4 a. Describe the Inductive Bias in decision tree learning.
- b. Write about handling training examples with missing attribute values.

**OR**

- 5 a. Explain about estimating hypothesis accuracy.
- b. Write a note on practical considerations in comparing learning algorithms

**UNIT - III**

- 6 a. Write Bayes theorem. What is the relationship between Bayes theorem and the problem of concept learning?
- b. Explain Maximum Likelihood Hypothesis for predicting probabilities.

**OR**

- 7 a. Explain Naïve Bayes Classifier with an Example.
- b. Explain the EM Algorithm in detail. (08 Marks.)

**UNIT-IV**

- 8 a. Define the following terms  
i) Error of a Hypothesis. ii) Optimal Mistake Bounds iii) Weighted-Majority Algorithm
- b. Explain about sample complexity for finite hypothesis spaces

**OR**

- 9.a. Explain the K – nearest neighbour algorithm for approximating a discrete – valued function with pseudo code
- b. Write about locally weighted regression.

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 4.7</b>                       | <b>MINI PROJECT</b>                  |                              |
| <b>Instruction: 6 periods / week</b> |                                      | <b>Credits: 3</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

|                                      |   |                              |
|--------------------------------------|---|------------------------------|
| <b>MCA 5.1</b>                       | <b>Essentials of Big Data Analytics</b> |                              |
| <b>Instruction: 4 periods / week</b> |   | <b>Credits: 4</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b>    | <b>Total :<br/>100 Marks</b> |

## Objectives

The course is designed to meet the objectives of:

1. The main goal of this course is to help students learn, understand, and practice big data analytics
2. The study of modern computing big data technologies and scaling up machine learning techniques focusing on industry applications
3. conceptualization and summarization of big data and machine learning, trivial data versus big data, big data computing technologies, machine learning techniques, and scaling up machine learning approaches

## Outcomes

Students upon completion of this course will be able to:

1. Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications.
2. Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.
3. Ability to integrate machine learning libraries and mathematical and statistical tools with modern technologies like hadoop and mapreduce.

## Syllabus

**UNIT – I:** Getting an overview of Big Data: Introduction to Big Data, Structuring Big Data, Types of Data, Elements of Big Data, Big Data Analytics, Advantages of Big Data Analytics. Introducing Technologies for Handling Big Data: Distributed and Parallel Computing for Big Data, Cloud Computing and Big Data, Features of Cloud Computing, Cloud Deployment Models, Cloud Services for Big Data, Cloud Providers in Big Data Market.

**UNIT – II:** Understanding Hadoop Ecosystem: Introducing Hadoop, HDFS and MapReduce, Hadoop functions, Hadoop Ecosystem. Hadoop Distributed File System- HDFS Architecture, Concept of Blocks in HDFS Architecture, Namenodes and Datanodes, Features of HDFS. MapReduce. Introducing HBase - HBase Architecture, Regions, Storing Big Data with HBase, Combining HBase and HDFS, Features of HBase, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume, Oozie.

**UNIT- III:** Understanding MapReduce Fundamentals and HBase: The MapReduce Framework ,Exploring the features of MapReduce, Working of MapReduce, Techniques to optimize MapReduce Jobs, Hardware/Network Topology, Synchronization, File system, Uses of MapReduce, Role of HBase in Big Data Processing- Characteristics of HBase. Understanding Big Data Technology Foundations: Exploring the Big Data Stack, Data Sources Layer, Ingestion Layer, Storage Layer, Physical Infrastructure Layer, Platform Management Layer, Security Layer, Monitoring Layer, Visualization Layer

**UNIT – IV:** Storing Data in Databases and Data Warehouses: RDBMS and Big Data, Issues with Relational Model, Non – Relational Database, Issues with Non Relational Database, Polyglot Persistence, Integrating Big Data with Traditional Data Warehouse, Big Data Analysis and Data Warehouse.

**Prescribed TextBooks:**

1. BIG DATA, Black Book TM, DreamTech Press, 2016 Edition.
2. Seema Acharya, SubhasniChellappan , “BIG DATA and ANALYTICS”, Wiley publications, 2016

**Reference Book:**

1. Nathan Marz and James Warren, “BIG DATA- Principles and Best Practices of Scalable RealTime Systems”, 2010

## Model Paper

### MCA 5.1 : Essentials of Big Data Analytics

**Time: 3 Hrs**

**Max. Marks: 70**

**Answer Question No.1 Compulsory:**

**7 x 2 = 14 M**

**Answer ONE Question from each unit:**

**4 x 14 = 56 M**

- 1.a) list out types of Data
- b) What is distributed computing
- c) Write Hadoop functions
- d) write short notes on HDFS
- e) what is the need of platform management layer
- f) What is role of HBase in Big data
- g) What are the issues with relational model.

#### UNIT – I

2. a) What is Big Data? Explain how big data processing differs from distributed processing
- b) Explain features of cloud computing

OR

3. Explain various technologies for handling Big Data

#### UNIT – II

4. Explain Hadoop Distributed File System in detail.

OR

5. a) Explain how Combining HBase and HDFS.
- b) Write Features of HDFS

#### UNIT – III

6. Explain the map reduce framework with an example.

OR

7. Explain the big data stack in detail.

#### UNIT – IV

8. a) what are the issues with relational model and with non relational models.
- b) write short notes on polygot persistence.

OR

9. Explain how Integrating Big Data with Traditional Data Warehouse with an example.

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 5.4.1</b>                     | <b>INTERNET OF THINGS</b>            |                              |
| <b>Instruction: 4 periods / week</b> |                                      | <b>Credits: 4</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

### **Objectives:**

The course is designed to meet the objectives of:

1. To introduce the concept of IoT
2. To introduce the concept of M2M
3. To understand the logical design
4. To make them familiar with IoT devices, endpoints and designing

### **Outcomes:**

Students upon completing of enough this will be able to:

- :
1. Familiarized with IoT Terminology.
  2. Understand the concept of IoT
  3. Understand various IoT protocols
  4. Gain knowledge about the domain of IoT in real time

## **SYLLABUS**

### **Unit – I**

Introduction to Internet of Things, Introduction, physical design, logical design, IoT enabled technologies, IoT levels & deployment templates. Domain specific IoTs, Introduction, home automation, cities, environment, energy, retail, logistics, agriculture, Industry and health & lifestyle.

### **Unit – II**

IoT and M2M, Introduction, M2M, difference between IoT and M2M, SDN and NFV for IoT, IoT system management with NETCONF-YANG, need for IoT systems management, SNMP, network operator requirements, NETCONF, YANG .

### **Unit – III**

IoT platforms design methodology, Introduction, IoT design methodology, case study, motivation fir using Python. IoT Systems – Logical design using python, introduction, phython data types and strucutes, control flow, functions, modules, packages, file handling, date/time operations, classes and packages.

### **Unit – IV**

IoT physical Devices and endpoints, IoT devices, Raspberry Pi, Raspberry Pi interfaces, programming Raspberry Pi with Python. Case Studies Illustrating IoT Design, home automation, cities, environment, agriculture and productivity applications.

**Prescribe Book**

Internet of Things – A Hands-On Approach, ArsdeepBahga&VijayMadisetti, Universities Press

**Reference Books**

The Internet of Things: Enabling Technologies, Platforms, and Use Cases, Pethuru Raj and Anupama C. Raman, CRC Press.

IoT Fundamentals : Networking Technologies, Protocols and Use Cases for the Internet of Things , David, Hanes &Salgueiro Gonzalo, Pearson



## Model Paper

### MCA 5.4.1 Internet of Things

Max. Marks: 70

Time : 3 Hrs

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**Answer Question No.1 Compulsory:**

**7 x 2 = 14 M**

**Answer ONE Question from each unit:**

**4 x 14 = 56 M**

1. Define these terms
  - a) Internet of Things
  - b) IoT Levels
  - c) SDN
  - d) M2M
  - e) Python Functions
  - f) IoT Devices
  - g) Applications of IoT
  - h) Process specification

#### UNIT – I

2.
  - a. Explain physical design of Internet of Things?
  - b. Describe communication models of IoT

**(OR)**

3. Discuss about three major application area of IoT.

#### UNIT – II

4.
  - a. Differentiate IoT and M2M.
  - b. Explain IoT system management with NETCONF-YANG.

**(OR)**

5.
  - a. Explain SNMP?
  - b. Discuss about network operator requirements.

#### UNIT - III

6.
  - a. Explain domain model specification?
  - b. Discuss about operational view specification?

**(OR)**

7. Explain python data types, classes and packages.

#### UNIT – IV

8.
  - a. Explain Raspberry Pi board.
  - b. Explain Raspberry Pi Interfaces.

**(OR)**

9. Design an IoT for Home automation and agriculture.

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 5.4.2</b>                     | <b>MOBILE COMPUTING WITH ANDROID</b> |                              |
| <b>Instruction: 4 periods / week</b> |                                      | <b>Credits: 4</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

### **Objectives:**

The course is designed to meet the objectives of:

1. To introduce the concept of mobile android
2. To introduce the concept of different views of android.
3. To understand the designing aspects of android mobiles
4. To make them familiar with SMS, email, service, binding and deploying APks

### **Outcomes:**

Students upon completing of enough this will be able to:

1. Familiarized with mobile android Terminology.
2. Understand and building interfaces
3. Understand and creating menus
4. Gain knowledge about the publishing, deploying APK files and Eclipse.

## **SYLLABUS**

### **Unit – I**

What is Android? Features of Android, Architecture of Android, Eclipse, Android SDK, ADT, Creating Android virtual devices, Creating Application and Anatomy application. Understanding Activities – Applying styles and themes to activity, hiding the activity title, displaying a dialog window, displaying a progress dialog. Linking Activities using intents. Calling built-in applications using intents.

### **Unit – II**

Understand the components of a screen, Adapting to display orientation, managing changes to screen orientation, creating the user interface programmatically, listening for UI notifications. Basic views, pickers views, list views. Using images views to display pictures, using menus with views and some additional views.

### **Unit – III**

User preferences, persisting data to files, creating and using databases, sharing data in android, using a content provider, creating your own content provider, SMS messaging, e-mails and networking.

**Unit – IV**

Creating own services, communicating between a service and an activity, binding activities to services, publishing, deploying APF files and eclipse.

**Prescribe Book**

Beginning Android 4 Application Development, Wei-MengLee, Wiley

**Reference Books**

Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox).

## Model Paper

### MCA 5.4.2 Mobile Computing with Android

Time : 3 Hrs

Max. Marks: 70

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**Answer Question No.1 Compulsory:**

**7 x 2 = 14 M**

**Answer ONE Question from each unit:**

**4 x 14 = 56 M**

1. Define the terms
  - a. Android
  - b. Intent Filter
  - c. Persist Activity State
  - d. Import
  - e. Options menu
  - f. Sharing data in android
  - g. Service
  - h. Package Explorer

#### Unit – I

2.
  - a. Explain features of android?
  - b. What are the tools for android application development? Explain them.

**(OR)**
3.
  - a. What are the languages used to develop android applications?
  - b. Discuss about passing data to an activity.

#### Unit –II

4.
  - a. Describe linear, table and frame layouts.
  - b. Explain different orientations?

**(OR)**
5. Explain the working of radio button and checkbox?

#### Unit – III

6. Create a DBA helper class. Explain it with an example.

**(OR)**
7.
  - a. Discuss about projections, filtering and sorting in content provider?
  - b. Explain how to insert and delete records into and from a content provider.

#### Unit –IV

8. Explain how to create a service in the background?

**(OR)**
9.
  - a. Write about the feature of eclipse.
  - b. How to publish an android application.

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 5.5.2</b>                     | <b>OPEN SOURCE TECHNOLOGIES</b>      |                              |
| <b>Instruction: 4 periods / week</b> |                                      | <b>Credits: 4</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

### **Objectives:**

The course is designed to meet the objectives of:

1. To create the awareness and importance of Open Source Systems.
2. To familiarize the student with basics of open source Systems.
3. To bring insight into different Open Source technologies.
4. Basic concepts of PHP language and developing web applications.
5. PHP Browser Handling and form data access.
6. Creation of database driven web applications.
7. Ajax for partial rendering.
8. The use of XML and RSS with PHP.

### **Outcomes:**

Students upon completion of this course will be able to:

- Develop web applications using Apache, PHP, and MySQL and apply the OOP concepts.
- Create database driven web applications.
- Create powerful web applications using Ajax.
- Create images at the web server.
- Manipulate XML documents using PHP and Create RSS

## **SYLLABUS**

### **UNIT – I**

Essential PHP  
Operators and Flow Control  
Strings and Arrays.

### **UNIT – II**

Reading Data in Web Pages  
PHP Browser-HANDLING Power.

### **UNIT – III**

Object Oriented Programming  
Advanced Object Oriented Programming  
File Handling.

#### **UNIT – IV**

Working with Databases

Sessions, Cookies, and FTP

Ajax

#### **UNIT – V**

Advanced Ajax

Drawing Images on the Server

XML and RSS.

#### **Prescribed Book**

1. Steven Holzner, “PHP: The Complete Reference”, TATA McGraw Hill, 2015.

#### **Reference Books**

1. W. Jason Gilmore, “Beginning PHP and MySQL: From Novice to Professional”, Apress.
2. Steve Suehring, Tim Converse, Joyce Park, “PHP 6 and MySQL 6 Bible”, Wiley Publishing, Inc.

## Model Paper

### MCA 5.5.2: Open Source Technologies

Time: 3 Hrs

Max. Marks: 70

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**Answer Question No.1 Compulsory:**

**7 x 2 = 14 M**

**Answer ONE Question from each unit:**

**4 x 14 = 56 M**

1. Define the terms
  - a) Command line PHP
  - b) PHP ternary operator
  - c) Arrays
  - d) Loops in PHP
  - e) HTTP Headers
  - f) Access modifier
  - g) Session
  - h) GET & POST

#### UNIT – I

2.
  - a. Explain creating development environment.
  - b. Write about PHP data types.
3. Discuss String functions and formatting text strings

(OR)

#### UNIT – II

4.
  - a. Differentiate Text Field with Text Area. Write a program to justify them.
  - b. Explain Check boxes and radio buttons handling
5. Describe data validation and explain client side data validation.

(OR)

#### UNIT - III

6.
  - a. Describe classes and objects
  - b. Explain constructors with an example
7. Define Interface and explain how to create an interface.

(OR)

#### UNIT – IV

8. How to access databases in PHP?
9.
  - a. Describe cookies and setting a cookies
  - b. Explain the creation of XMLHttpRequest Object

(OR)

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 5.5.3</b>                     | <b>BLOCK CHAIN TECHNOLOGY</b>        |                              |
| <b>Instruction: 4 periods / week</b> |                                      | <b>Credits: 4</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

### **Objectives:**

The course is designed to meet the objectives of:

1. To introduce the concept of Blockchain
2. To overcome the problems of centralization
3. To introduce the concept of Bitcoin
4. To make them familiar with Bitcoin network, payments, clients and APIs.

### **Outcomes:**

Students successfully completing this module will be able to:

1. Familiarized with Blockchain Terminology.
2. Understand the concept of Blockchain, Bitcoin
3. Understand de-centralization
4. Gain knowledge about the domain of blockchain in real time.

## **SYLLABUS**

### **Unit – I**

Blockchain , the growth of blockchain technology, distributed systems, the history of blockchain and Bitcoin, types of blockchain. Decentralization , methods of decentralization , routes of decentralization, blockchain and full ecosystem decentralization, smart contracts, Decentralized organizations and platforms for decentralization.

### **Unit – II**

Symmetric Cryptography , working with the OpenSSL command line, cryptographic primitives. Public Key Cryptography, asymmetric cryptography, public and private keys and financial markets and trading.

### **Unit – III**

Introducing Bitcoin, Bitcoin, digital keys and addresses, transactions, blockchain, mining. Alternative Coins. Limitations of Bitcoin



**Unit – IV**

Bitcoin Network and payments, The Bitcoin network, wallets, Bitcoin payments, innovation in Bitcoin, Bitcoin Clients and APIs.

**Prescribe Book**

Mastering Blockchain 2<sup>nd</sup> Edition, Imran Bashir, PACKT Publication

**Reference Books**

Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press, 2016.

## Model Paper

### MCA 5.5.3:Block Chain Technology

Time: 3 Hrs

Max. Marks: 70

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Answer Question No.1 Compulsory:

7 x 2 = 14 M

Answer ONE Question from each unit:

4 x 14 = 56 M

#### 1. Explain the following terms.

- a. Blockchain
- b. Electronic Cash
- c. Centralization
- d. Digital Key
- e. API
- f. Double spending
- g. Bitcoin address

#### UNIT-I

2. a. Explain the types of Blockchain?  
b. Describe smart contracts?

(OR)

1. Explain methods of decentralization.

#### UNIT-II

4. a. Explain working with the OpenSSL command line.  
b. Explain digital Signatures.

(OR)

5. a. How asymmetric cryptography is used in blockchain?  
b. Explain the terms : public key and private key.

#### UNIT-III

6. a. Explain various interactive picture construction techniques.  
b. Describe Bitcoin. Explain how Bitcoin works?

OR

7. Explain the limitation of blockchain?

#### UNIT-IV

8. How to pay with Bitcoin and Bitcoin cash?

OR

9. a. Describe wallets.  
b. Describe Bitcoin mining.

|                                      |                                      |                              |
|--------------------------------------|--------------------------------------|------------------------------|
| <b>MCA 5.7</b>                       | <b>BIG DATA ANALYTICS LAB</b>        |                              |
| <b>Instruction: 6 periods / week</b> |                                      | <b>Credits: 3</b>            |
| <b>Internal :<br/>30 marks</b>       | <b>University Exam:<br/>70 marks</b> | <b>Total :<br/>100 Marks</b> |

### LAB CYCLE

1. Implement the following Data structures in Java
  - a) Linked Lists
  - b) Stacks
  - c) Queues
  - d) Set
  - e) Map
  
2. (i) Perform setting up and Installing Hadoop in its three operating modes:
  - a. Standalone
  - b. Pseudo distributed
  - c. Fully distributed
 (ii) Use web based tools to monitor your Hadoop setup.
  
3. Implement the following file management tasks in Hadoop:
  - Adding files and directories
  - Retrieving files
  - Deleting files
  
4. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
  
5. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.
  
6. Implement Matrix Multiplication with Hadoop Map Reduce
  
7. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.
  
8. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes