Major changes for M.Sc. Computer Science

MCS 305.2	Blockchain Technology	
Instruction: 4 periods / week		Credits: 4
Internal : 30 marks	University Exam: 70 marks	Total : 100 Marks

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 2nd 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 Question Paper

MCS 305.2: Blockchain Technology

Time: 3Hrs **Max.Marks: 70**

Answer Question No.1 Compulsory: **7 x 02 = 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.

MCS 402.1	INTERNET OF THINGS	
Instruction: 4 periods / week		Credits: 5
Internal : 30 marks	University Exam: 70 marks	Total : 100 Marks

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 successfully completing this module 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, retial, 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 for using Python. IoT Systems – Logical design using python, introduction, python data types and structures, 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 and agriculture& productivity applications.

Prescribe Book

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

Reference Books

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

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

Model Paper

MCS 402.1 :Internet of Things

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 02 = 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 IoTamd M2M.
b. Explain IoT system management with NETCONF-YANG.
(OR)

5. a. Explain SMNP?
b. Discuss about network operator requirements.

UNIT - III

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

MCS 403.1	MACHINE LEARNING	
Instruction: 4 periods / week		Credits: 4
Internal : 30 marks	University Exam: 70 marks	Total : 100 Marks

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 clusteing

Outcomes:

Students successfully completing this module 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 issuesin 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 SpaceSearch, 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

MCS 403.1: MACHINE LEARNING

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) 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?
h) Write about temporal difference learning

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.

MCS 403.2	MOBILE COMPUTING WITH ANDROID	
Instruction: 4 periods / week		Credits: 4
Internal : 30 marks	University Exam: 70 marks	Total : 100 Marks

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 successfully completing this module 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

MCS 403.2 Mobile Computing with Android

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. 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.