FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)
74th Rank in India Ranking 2020 (NIRF) by MHRD
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT : COMPUTER SCIENCE

NAME OF THE PROGRAMME : B.Sc. COMPUTER SCIENCE

PROGRAMME CODE : UACS

ACADEMIC YEAR : 2020 - 2021

DEPARTMENT OF COMPUTER SCIENCE

The Board of studies meeting for reviewing the complete Outcome Based Education (OBE) syllabus for the students of B.Sc Computer Science course during the academic year 2020-21 was held on 28.2.2020 at 2.00 pm in the Department of Computer Science.

The members of the Board were

CHAIRMAN:

1. Dr. G. Germine Mary
   Associate Professor & Head
   Dept. of Computer Science
   Fatima College

UNIVERSITY NOMINEE

2. DR. M. Sumathy
   Associate Professor & Head
   Dept. of Computer Science
   Sri Meenakshi Govt. Arts College for Women
   Madurai

EXTERNAL SUBJECT EXPERT

3. Dr. M. Mary Shanthi Rani
   Associate Professor
   Dept. of Computer Science and Applications
   The Gandhigram Rural Institute
   Gandhigram

4. Dr. V. K. Vijayakumar
   Associate Professor & Head

Dept. of Computer Science
Sourashtra College
Madurai

ALUMNAE & SUBJECT EXPERT

5. Ms. K. Sudharani
Associate Professor & Head
Dept. of Computer Science
Madurai Sivakasi Nadar College
Poovandhi

INDUSTRIAL EXPERT

6. Mr. P. Graceson Tony M. Tech
Founder & CEO
SEVENATARA Marketers
11-3/2, 3rd St, Periyar Nagar, Koodal Nagar
Madurai

EXTERNAL EXPERT

7. Thiru. A. Meshach Ponraj
Associate Professor — ABSENT
Dept. of Computer Science
Madurai Kamaraj University
Madurai

MEMBERS

8. Dr. S. Vidya
Associate Professor
Dept. of Comp. Science

9. Dr. K. Rosemary Euphrasia
Associate Professor
Dept. of Comp. Science

10. Dr. A. Vimala
Associate Professor
Dept. of Comp. Science

11. Dr. P. Meenakshi Sundari
Assistant Professor
Dept. of Comp. Science

12. Ms. N. Muthulakshmi
Assistant Professor
Dept. of Comp. Science

13. Dr. S. Arul Jothi
Assistant Professor
Dept. of Comp. Science

14. Dr. T. Vasantha
Assistant Professor
Dept. of Comp. Science

DEAN OF ACADEMIC AFFAIRS

15. Dr. N. Malathi
Assistant Professor
Dept. of Zoology.

28/2/2020

AGENDA

* To review and finalise outcome Based Education based syllabus for all the VI semesters
* To finalise the syllabus for the optional Extra Credit Self Learning Course offered to advanced learners during the III year.

* To pass the strategies followed for the remedial courses
* To pass the examiners list for the end semester practical examination.
* To approve the list of companies and organisations where the students would do their projects / internships.
* To pass the modified CIA component pattern
* To list the MOOC courses in Computer Science to facilitate the choice by students

The members of the board appreciated the incorporation of self study components and e-learning through MOOC, which will enrich the creativity and knowledge of students in the respective subjects

Industrial expert of the board suggested to encourage the students to enroll on relevant developer forum and to form a full stack team.

M. Mary Shyni Rani 28/2/2020

28/2/2020

28/2/2020

P. Moorthy

K. Thangavelu

Thimala

DEPARTMENT OF COMPUTER SCIENCE

2020 - 2021

S.No	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
1.	V	B5ME2	Python Programming	5	5	40	60	100
2.	V	B5ME3	Data Mining And Data Warehousing	5	5	40	60	100
3.	VI	B6ME6	Cloud Computing	5	5	40	60	100
4.	VI	B6ME8	Mobile Computing Using Android	5	5	40	60	100
5.	VI	B6ME9	Big Data Fundamentals	5	5	40	60	100

EXTRA CREDIT COURSE

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
19UGSLB1	SELF LEARNING COURSE for ADVANCED LEARNERS (offered for III UG) DIGITAL IMAGE PROCESSING	-			40	60	100

ELECTIVES – 15 CREDITS

Science

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UACS	B5ME2	Python Programming	Major Elective	5	5

COURSE DESCRIPTION

Python is an interpreted, high-level, general-purpose programming language. it provides constructs that enable clear programming on both small and large scales.

COURSE OBJECTIVES

OBJECTIVES :

- To understand why python is a useful scripting language for developers.
- To learn how to design and program python applications.
- To learn how to use lists, tuples, and dictionaries in python programs

UNITS

UNIT I: BASIC OF PYTHON PROGRAMMING (15 HRS)

Features of Python-History of Python-The Future of Python-Writing and Executing First Python Program-Literal Constants-Variables and Identifiers-Data Types- Input Operation-Comments-Reserved Words-Indentation- Operation and Expressions-Expression in Python –Operations on Strings-Other Data Types-Type Conversion.

UNIT II: DECISION CONTROL STATEMENTS (15 HRS)

Introduction to Decision Control Statements-Selection /Conditional Branching Statements-Basic Loop Structure /Iterative Statements-Nested Loops-The Break Statement-The Continue Statement-The Pass Statement-The Else Statement used with Loops. Functions and Modules: Introduction – Function Declaration and Definition-Function Call-Variables Scope and Lifetime-The Return Statement-More On Defining Function-Lambda Functions or Anonymous Functions-Documentation Strings.

UNIT III: PYTHON STRINGS REVISITED (15 HRS)

Concatenating ,Appending ,and Multiplying Strings-String Formatting Operator-Build in String Methods and Functions-Slice Operation-Ord()and Chr() Function-Comparing String-Iteration String –The String Module-Regular Expressions-Metacharacters in Regular Expression. File Handling: File Path-Types of Files-Opening and Closing Files-Reading and Writing Files-File Positions-Renaming and Deleting Files-Directory Methods.

UNIT IV: DATA STRUCTURES (15 HRS)

Sequence-Lists-Functional Programming-Tuple-Sets-Dictionaries Classes and Objects:Classes and Objects-Class Methods and Self Arguments,Constructer-Class Variables and Object Variables-Other Special Methods-Public and Private Data Members-Private Methods-Built in Function-Built in Class Attributes-Garbage Collection-Class Methods-Static Methods

UNIT V: INHERITANCE (15 HRS)

Inheriting Classes in Python-Types of Inheritance-Composition-Abstract Classes and Interfaces-Metaclass. Operator overloading: Introduction-Implementing Operator Overloading-Reverse Adding-Overriding –Getitem-(),Setitem-(),Methods-Overriding the in Operator-Overloading Miscellaneous Function-Overriding the –Call-() Method. Error and Exception Handling: Introduction to Errors and Exceptions-Handling Exceptions-Multiple Except Blocks-Multiple Exceptions in A Single Block-Except Block without Exception –The else Clause- Raising Exception-Instantiating Exceptions-Handling Exception in Invoked Functions.

DYNAMISM :(For CIA Only) (

UNIT II: DECISION CONTROL STATEMENTS

Introduction to Decision Control Statements-Selection /Conditional Branching Statements-Basic Loop Structure /Iterative Statements-Nested Loops-The Break Statement-The Continue Statement-The Pass Statement-The Else Statement used with Loops.

TEXT BOOK:

1. ***Python Programming using Problem Solving Approach,*** ReemaThareja,Published By Oxford Higher Education, 2017.

REFERENCES:

1. ***Problem Solving and Python Programming,*** S.A. Kulkarni, Published By Yesdee,2017
2. ***Python for Software Design How to Think Like a computer scientist****,* Allen B.Downey Cambridge University Press,2018
3. ***Introduction to Programming using Python*** **,**Y.DanielLiang,Published By Pearson,2018.

III B.Sc. Computer Science

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UACS	B5ME3	Data Mining and Data Warehousing	Major Elective	5	5

COURSE DESCRIPTION

Data Mining and Data Warehousing course contains fundamental concepts of Data Mining and data pre-processing, Classification and Clustering algorithms and Data Warehousing concepts.

COURSE OBJECTIVES

- To understand the data pre-processing concepts
- To learn about Association Rule Mining, Mining Frequent Patterns and Classification.
- To understand Cluster Analysis
- To learn about data warehouse

SYLLABUS

UNIT I: INTRODUCTION **(15 Hrs)**

Introduction to Data Mining - its importance — Data Mining on what kind of Data- Data Mining Functionalities-What Kinds of Patterns Can Be Mined – Are All of the Patterns Interesting – Classification of Data Mining Systems – Data Mining Task Primitives.

UNIT II: DATA PREPROCESSING AND DATA WAREHOUSING (15 Hrs)

Need to Pre-process the Data - Descriptive Data Summarization – Data Cleaning – Data Integration and Transformation – Data Reduction. Data Warehouse and OLAP Technology : An Overview - What is a Data Warehouse – A Multidimensional Data Model – Data Warehouse Architecture.

UNIT III: MINING FREQUENT PATTERNS (15 Hrs)

Basic Concepts and Road Map - Efficient and Scalable Frequent Itemset Mining Methods: The Apriori Algorithm : Finding Frequent Itemsets Using Candidate Generation- Generating Association Rules from Frequent Itemsets- Improving the Efficiency of Apriori – Mining Frequent Itemsets without Candidate Generation- Mining Frequent Itemsets Using Vertical Data Format – Mining Closed Frequent Itemsets.

UNIT IV : CLASSIFICATION (15 Hrs)

Classification - Prediction – Issues Regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Rule-Based Classification.

UNIT V: CLUSTER ANALYSIS (15 Hrs)

What is Cluster Analysis – Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods.

SELF STUDY:

UNIT II: Data Integration and Transformation – Data Reduction. Data Warehouse and OLAP Technology

UNIT IV: Issues Regarding Classification and Prediction

TEXT BOOK :

Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, 2nd Edition, Morgan Kaufmann Publishers An Imprint of Elsevier, 2009.

Chapters: 1.1 -1.7, 2.1- 2.5, 3.1- 3.3, 5.1-5.2, 6.1 - 6.5, 7.1 – 7.5

REFERENCE BOOKS :

1. ***Data Mining & Data Warehousing***, Udit Agarwal, 1st Edition, S.K.Kataria& sons Publication, 2016.
2. ***Data Warehousing: Concepts, Techniques, Products and Applications***, 3rd Edition, PHI Learning, Delhi, 2012.

3. ***Data Mining: Concepts and Techniques***, Jiawei Han, Micheline Kamber, 3rd Edition, Morgan Kauffmann Publishers, 2011.
4. Data Mining Techniques and Applications: An Introduction, Hongbo DLL, Cengage Lmg Business Press, 2010.

Digital Open Educational Resources (DOER)

1. https://www.tutorialspoint.com/data_mining/index.htm
2. https://data-flair.training/blogs/data-mining-tutorial/
3. https://www.youtube.com/watch?v=PT_D0mgFr-o

III B.Sc. Computer Science

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UACS	B6ME6	Cloud Computing	Major Elective	5	5

COURSE DESCRIPTION

This course presents a top-down view of cloud computing, from applications and administration to programming and infrastructure.

COURSE OBJECTIVES

- To learn distributed communication
- To understand distributed resource management
- To study the basics of cloud computing
- To study about virtualization and cloud resource management

UNITS

UNIT I :Defining Cloud Computing (15 Hrs)

Defining Cloud Computing - Cloud Types – Examining the Characteristics of Cloud Computing – Assessing th Role of Open standards – Understanding Cloud Architecture: Exploring the Cloud Computing Stack. Composability, Infrastructure - Platforms - Virtual Appliances - Communication protocols - Applications - Connecting to the cloud

UNIT II :Understanding Services and Applications by type (15 Hrs)

Defining Infrastructure as a Service - Defining Platform as a Service - Defining Software as a Service - Defining Identity as a Service - Defining Compliance as a Service

UNIT III :Understanding Abstraction and Virtualization (15 Hrs)

Using Virtualization Technologies, Load balancing and Virtualization, Understanding Hypervisors, Understanding Machine Learning, Porting Applications

UNIT IV : Understanding Cloud Security (15 Hrs)

Securing the Cloud -Securing the data - Moving applications to the cloud - Cloud Storage: Definition – Provisioning –Cloud storage - Cloud Backup solutions - Cloud storage Interoperability

UNIT V :Moving applications to the Cloud (15 Hrs)

Applications to the Cloud – Applications and Cloud API Case Study: Google Web Services- Amazon Web Services - Microsoft Cloud Services.

SELF STUDY:

UNIT V: Amazon Web Services - Microsoft Cloud Services.

TEXT BOOK

***Cloud Computing Bible*,** BarrieSosinsky, Wiley India Pvt. Ltd.- 2011

Chapters: 1,3,4,5,12,14

REFERENCE BOOKS

1. ***Cloud Computing with Windows Azure Platform***, Roger Jennings, Wiley India Pvt. Ltd2009.
2. ***Cloud Computing*,** Bloor R., Kanfman M., Halper F. Judith Hurwitz, " Wiley India Edition, 2010
3. ***Cloud Computing Implementation Management and Strategy***, JohnRittinghouse& James Ransome, CRC Press, 2010
4. **Cloud Computing: Concepts and Practice**, Naresh Kumar Sehgal and Pramod Chandra P.Bhatt, Springer, 2018

III B.Sc. Computer Science

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UACS	B6ME8	Mobile Computing using Android	Major Elective	5	5

COURSE DESCRIPTION

This Course provides overview of coverage of various wireless networks and explains how different stations work with agents to connect mobile world.

COURSE OBJECTIVES

- To enable the students to understand the OS, protocols and security used in mobile technology
- To introduce the concept of mobile computing and provide a foundation for research

SYLLABUS

UNIT I: MOBILE COMMUNICATIONS AN OVERVIEW [15 HRS]

Mobile Communication –Mobile Computing-Mobile Computing Architecture-Mobile Devices-Mobile System Networks-Data Dissemination – Mobile Management-Security.

UNIT II: MOBILE DEVICES AND SYSTEM [15 HRS]

Cellular Network and Frequency Reuse-Mobile Smart Phones, Smart Mobiles, and Systems-Handled Pocket Computers-Handled Devices.GSM and Other 2G Architectures:

GSM-Services and System Architecture-Radio Interfaces of GSM-Protocols of GSM-Localization –Call Handling.

UNIT III:INTRODUCTION TO ANDROID OPERATING SYSTEM [15 HRS]

Android-open handset alliance-android ecosystem-android version – android activity-features of android-android architecture-stack linux kernel.

UNIT IV: CONFIGURATION OF ANDROID ENVIRONMENT [15 HRS]

Operating System-Java JDK-Android SDK-Android Development Tools(AVD)-Emulators-Dalvik Virtual Machine-Difference Between Java Virtual Machine and Dalvik Virtual Machine.

UNIT V: ANDROID USER INTERFACE [15 HRS]

Linear Layout-Absolute Layout-Frame Layout-Relative Layout-Table Layout.

Designing Your User Interface with View:

Text View-Button-Image Button-Edit Text-Check Box-Toggle Button-Radio Button and Radio Group-Progress Bar-Autocomplete Text View-Spinner-List View-Grid View-Image View-Scroll View-Custom Toast Alert-Time And Date Picker.

SELF STUDY :

UNIT IV : Operating System-Java JDK-Android SDK, Difference Between Java Virtual Machine and Dalvik Virtual Machine

TEXT BOOK

1. ***MOBILE COMPUTING*** –Raj Kamal ,Second Edition,2014, Oxford University Press, 2014
2. ***ANDROID***-Prasanna Kumar Dixit,Vikas Publishing House Pvt Ltd, 2014

REFERENCE BOOKS

1. ***MOBILE COMPUTING Technology ,Application and Service Creation*** – Asoke K

Talukder, Ph.D. ,Second Edition ,Tata Mc Graw Hill Education Private Limited, 2011

2. ***ANDROID APPLICATION DEVELOPMENT(with kitkat support)***Black Book,

Pradeep Kothari, Published By Dreanlech, 2017

3. ***BEGINNING ANDROID 4 APPLICATION DEVELOPMENT ,***Wei-Meng Lee Published By WileY, 2016

III B.Sc. Computer Science

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDS
UACS	B6ME9	Big Data Fundamentals	Major Elective	5	5

COURSE DESCRIPTION

Big Data Fundamentals consists of Big Data: Concepts and Terminology, Big data Adoption and Planning, Enterprise Technologies and Big Data Business Intelligence and its Storage Technology.

COURSE OBJECTIVES

- To Understand the fundamental concepts of Big data
- To interpret Big data Adoption and Planning and Big data Storage Concept
- To Understand Big data and Processing Concepts and Big Data Analysis Techniques

SYLLABUS

UNIT I : INTRODUCTION (15 Hrs)

Understanding Big Data: Concepts and Terminology - Big Data Characteristics - Different types of data.Business Motivations and Drivers for Big data Adoption: Marketplace Dynamics - Business Architecture - Business Process Management - Information and Communications Technology - Internet of Everything - Case Study Example.

UNIT II : ADOPTION AND PLANNING (15 Hrs)

Big data Adoption and Planning Considerations: Organization Prerequisites - Data Procurement – Privacy – Security – Provenance - Limited Realtime Support - Distinct Performance Challenges - Distinct Governance Requirements - Distinct Methodology – Clouds - Big Data Analytics Lifecycle - Case Study Example.

UNIT III : BIG DATA BUSINESS INTELLIGENCE (15 Hrs)

Enterprise Technologies and Big Data Business Intelligence: Online Transaction Processing(OLTP) - Online Analytical Processing(OLAP) - Extract Transform Load(ETL) - Data Warehouses - Data Marts- Traditional BI- Big Data BI- Case Study Example. Big Data Storage Concepts: Clusters - File Systems and Distributed File Systems - NoSQL – Sharding – Replication - Sharding and Replication - CAP Theorem – ACID – BASE - Case Study Example.

UNIT IV : BIG DATA PROCESSING CONCEPTS (15 Hrs)

Big Data Processing Concepts: Parallel Data Processing - Distributed Data Processing – Hadoop - Processing Workloads – Cluster - Processing in Batch Mode - Processing in Realtime Mode - Case Study Example.

UNIT V: STORAGE TECHNOLOGY (15 Hrs)

Big Data Storage Technology: On-Disk Storage Devices – NoSQL Databases - In-Memory Storage Devices -Case Study Example. Big Data Analysis Techniques: Quantitative Analysis - Qualitative Analysis - Data Mining - Statistical Analysis - Machine Learning - Semantic Analysis - Visual Analysis - Case Study Example.

SELF STUDY

UNIT I : Information and Communications Technology - Internet of Everything - Case Study Example.

UNIT III :- Data Warehouses - Data Marts- Traditional BI- Big Data BI- Case Study Example.

TEXT BOOK

Big Data Fundamentals Concepts, Driver & Techniques, Thomas Erl,WajidKhattak and Paul Buhler, 3rd Edition, Pearson publication, 2018. Chapters : 1-8

REFERENCE BOOKS

1. ***Big Data Strategies*** , Pam Baker ,1st edition , Cengage Learning India Private Limited, 2016.
2. ***Big Data,*** Dr. Anil Maheshwari, 1stedition , Published by McGraw Hill Education (India) Private Limited, 2017.

3. ***Big Data and Analytics***, Seema Acharya andSubhashiniChellappan, 2nd edition, Wiley India Private Limited, 2017.

Digital Open Educational Resources (DOER)

1. https://www.tutorialspoint.com/big_data_analytics/index.htm
2. https://www.guru99.com/bigdata-tutorials.html
3. https://www.youtube.com/watch?v=KcecJfxbd-4

EXTRA CREDIT COURSE

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
19UGSLB1	**SELF LEARNING COURSE** **for ADVANCED LEARNERS (offered for III UG)** **DIGITAL IMAGE PROCESSING**	-	2		40	60	100

COURSE DESCRIPTION

The course helps to learn the fundamental concepts of digital image processing

COURSE OBJECTIVES

- To inculcate ideas and create interest in processing images techniques.
- To expose students to current applications in the field of digital image processing.

SYLLABUS

UNIT I : Introduction

Introduction- Definition of Digital Image Processing- The Origins of Digital Image Processing – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of an Image Processing System.

UNITII :Digital Image Fundamentals

Image Sensing and Acquisition – Image Sampling and Quantization – image interpolation - Some Basic Relationships between Pixels – An Introduction to the Mathematical Tools Used in Digital Image Processing.

UNITIII: Intensity Transformations And Spatial Filtering

Background-Some Basic Intensity Transformation Functions – Fundamentals of Spatial Filtering – Smoothing Spatial Filters – Sharpening Spatial Filters.

UNIT IV: Image Restoration And Reconstruction

A Model of the Image Degradation/Restoration Process-Noise Models - Restoration in the Presence of Noise Only-Spatial Filtering.

UNITV: Image Segmentation

Segmentation Fundamentals -Point,Line and Edge Detection.

TEXT BOOK

Digital Image Processing, Rafael.C.Gonzalez and Richard E.Woods,3rdEdition, Pearson Publications, 2014.

REFERENCE BOOKS

1. ***Fundamentals of Digital image processing***, Anil Jain, PHI Learning Pvt Ltd. 2011.
2. ***Digital Image Processing & Analysis***, B.Chanda, D.DuttaMajumder, 2nd Edition, PHI Learning Pvt Ltd. 2013.
3. ***Digital Image Processing***, Chaturvedi, 1st Edition, Vayu Educaton India Publisher, 2013.

Digital Image Processing: Principles and Applications, Wilhelm **Burger and Mark J. Burge,** 2nd Edition, Springer

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