VELS

INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)

(Deemed to be University Estd. u/S 3 of the UGC Act, 1956)

PALLAVARAM - CHENNAI

NAAC ACCREDITED WITH 'A' GRADE

Marching Beyond 25 Years Successfully

Master of Computer Applications

MCA

Curriculum and Syllabus

Effective from the year 2020-2021

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

PEO1: To learn the formal and real time applications using the computer programming and the design principle.

PEO2: To experience their software skills with their creative design, develop team culture and to have effective communication in their work.

PEO3: To empower and inculcate entrepreneurship and managerial skills among the students in finding innovative solutions to the real-world problems in collaboration with industry and professional societies.

PEO4: Students exhibit effective work ethics and be able to adapt to the challenges of a dynamic job environment and publish their research finding in indexed conferences and Journals

PROGRAM OUTCOME (PO)

PO1: Computational Knowledge:
Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.

PO2: Problem Analysis:
Identify, formulate, research literature, and solve *complex* computing problems reaching Substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.

PO3: Design /Development of Solutions:
Design and evaluate solutions for *complex* computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Computing Problems:
Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage:

Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to *complex* computing activities, with an understanding of the limitations.

PO6: Professional Ethics:
Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.

PO7: Life-long Learning:
Recognize the need, and have the ability, to engage in independent learning for continual Development as a computing professional.

PO8: Project management and finance:
Demonstrate knowledge and understanding of the computing and management Principles and apply these to one's own work, as a member and leader in a team, to Manage projects and in multidisciplinary environments.

PO9: Communication Efficacy:
Communicate effectively with the computing community, and with society at large, about *complex* computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.

PO10: Societal and Environmental Concern:
Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO1: Be well versed in the various software and logical skills like Java Programming, Python Programming, Database concepts etc.

PSO2: Be competent in the fundamentals of software and hardware concepts and the emerging technologies in networks, recent trends in computer science field.

BOARD OF STUDIES

S. No	NAME	AFFILIATION	ROLE
1.	Dr. P. SWAMINATHAN	DEAN, School of Computing Sciences	Chairman
2.	Dr.P.MAYILVAHANAN	Professor, Department Of Computer Applications	Internal Member
3.	Dr. S. PRASANNA	Professor and HEAD, Department of Computer Applications	Internal Member
4.	Dr. T. KAMALAKANNAN	Professor and HEAD, Department of IT.	Internal Member
5.	Dr. K. KALAISELVI	Professor and HEAD, Department of Computer Science.	Internal Member
6.	Dr. K.R. ANANTH PADMANABAN	Professor & HEAD, Department of Computer Science, SRM Arts and Science College, Chennai	External Member
7.	Dr. P. MAGESH KUMAR	Calibsoft Technologies Pvt Ltd., Chennai.	Industry Member
8.	Mr.R. BALAMURUGAN,	SCOPUS Ltd., Chennai	Alumni Member

DEGREE OF MASTER OF COMPUTER APPLICATIONS
(M.C.A.,) – Two Year Programme

REGULATIONS
(w.e.f., 2020-2021)

1. Conditions for Admission

Candidate who has passed the under-mentioned degree examinations of this University of an examination of other institution recognized by this University as equivalent thereto provided they have undergone the course under 10+2+3 or 11+1+3 or 11+2+2 pattern or under the Open University System, shall be eligible for admission to the M.C.A. Degree Course.

(a)B.C.A., /B.E.S/B.Sc., in Computer science/Mathematics/Physics/Statistics/Applied Science

(b) B.Com/Bachelor of Bank Management/Statistics/B.B.A/B.L.M/B.A., Corporate Secretary-ship/B.A., Economics/ any other Bachelor's Degree in any discipline with Business Mathematics and Statistics or Mathematics/Statistics in Main/Allied level

(c) B.Sc., Chemistry with Mathematics and Physics and allied subjects

(d) B.E/B.Tech.,/M.B.A

(e) A Bachelor's Degree in any discipline with Mathematics as one of the subjects at the Higher Secondary level (i.e. in +2 level of the 10+2 pattern)

2. Duration of the Course

The course duration shall be two years consisting of four semesters. In order to be Eligible for the award of the degree the candidate shall successfully complete the course in a Maximum period of five years reckoned from the date of enrolment for the first semester of the course.

3. Structure of the Course and Evaluation Pattern

The duration of University examination for theory and practical subjects shall be 3 hours. The maximum mark for each theory is 100 with 40 for Continuous Internal Assessment (CIA) and 60 for University Examination. The maximum mark for each practical is 100 with 40 for Continuous Internal Assessment and 60 for University Examination. For project work the mark assigned shall be

Continuous Internal Assessment	50 marks
Dissertation	100 marks
Viva-voice	50 marks

The components for CIA may be tests, seminar, assignment etc.

For the conduct of University Examination in Practical subjects the University will appoint one external examiner one internal examiner who shall normally be the concerned practical in-charge. The University will set the questions and distribute to the department. The examiners will conduct the examinations and award the marks on the same day and forward to the University. The Head of the department will coordinate and provide the laboratory and other facilities for conducting the examination.

Project work can be carried out individually in an R&D section of any Industry or University or in the Institute in which candidate is studying. The project Work/Dissertation report shall be submitted through the guides/supervisors to the Head of the Department and then to the University not later than 31st May/31st December. If he/she fails to submit the project Work/Dissertation within the stipulated date for a particular semester, he/she may be permitted with approval of the Head of the Department to submit the Project Work/Dissertation report during the succeeding semester, within the maximum period of FIVE years from the date of admission to the first semester. Project/Dissertation evaluation and Viva-Voce shall be conducted by one external examiner and one internal examiner who shall normally be the project guide.

COURSES OF STUDY AND SCHEME OF ASSESSMENT

(MINIMUM CREDITS TO BE EARNED: 90)

Code No.	Code No	Course	Hours/Week Lecture	Tutorial	Practical	Credits
SEMESTER 1						
CORE	20CMCA11	Mathematical Foundations of Computer Science	4	1	0	5
CORE	20CMCA12	C Programming and Data Structures	4	1	0	5
CORE	20CMCA13	Relational Database Systems	4	0	0	4
CORE	20CMCA14	Operating Systems	3	0	0	3
CORE	20CMCA15	Software Engineering	3	0	0	3
SEC	20----------	Soft skill/Personality Development	2	0	0	2
CORE	20PMCA11	C Programming and Data Structures Laboratory	0	0	4	2
CORE	20PMCA12	Relational Database Systems Laboratory	0	0	4	2
			20	2	8	26
SEMESTER 2						
CORE	20CMCA21	Computer Communication and Networks	4	0	0	4
CORE	20CMCA22	Programming in Java	4	0	0	4
CORE	20CMCA23	Data Science	4	0	0	4
DSE	20_____	Discipline Specific Elective – I	3	0	0	3
DSE	20_____	Discipline Specific Elective – II	3	0	0	3
SEC	20----------	Soft skill/Personality Development	2	0	0	2
CORE	20PMCA21	Java Programming and Networks Laboratory	0	0	4	2
CORE	20PMCA22	Data Science Laboratory	0	0	4	2
CORE	20PMCA33	Internship/In plant Training	0	0	2	2
			20	0	10	26

VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES

Programme: MCA – MASTER OF COMPUTER APPLICATIONS

Code No.	Code No	Course	Hours/Week			
			Lecture	Tutorial	Practical	Credits
SEMESTER 3						
CORE	20CMCA31	Advanced Java Programming	4	1	0	5
CORE	20CMCA32	Financial and Management Accounting	4	1	0	5
CORE	20CMCA33	Cloud Computing	4	0	0	4
CORE	20CMCA--	Discipline Specific Elective III	3	0	0	3
CORE	20CMCA--	Discipline Specific Elective IV	3	0	0	3
SEC	20----------	Soft skill/Personality Development	2	0	0	2
CORE	20PMCA31	Advanced Java Programming Laboratory	0	0	4	2
CORE	20PMCA32	Internet of Things and Cloud Laboratory	0	0	4	2
			20	2	8	26
SEMESTER 4						
Core	20MCA41	Main Project	0	0	24	12

CA - Continuous Assessment

SEE - Semester End Examination

Total Credits to complete the course : 90

Total Credits to Complete the Course : 90
Total Marks : 2600

Following are the reviews to be noted by all the FINAL year M.C.A students in connection with their MAIN PROJECT. The following is the distribution of the main project marks.

Each review will carry equal distribution of Internal Assessment marks. Students who do not make it on the respective allotted reviews will be liable to lose their internal assessment marks allotted for that review.

Reviews	Details to Submit
1st Review	Company Profile, Project Title, Software Used (Front and Back end)& Confirmation letter
2nd Review	**PPT** Presentation about the Project and its salient features
3rd Review	**PPT** Presentation of Abstract & explanation of Project with tables, forms and analysis report.
4th Review	**PPT** Presentation of complete flow of project with Design Tools. Live Demo if Possible
5th Review	Submission of **Final Project Dissertation** in the Prescribed Format (2 copies) + 1CD

Note: Rough documentation should be shown to the respective guide before binding.

SCHEME OF EXAMINATION

Course	Duration in Hours	Internal Marks	External Marks	Total	Passing Minimum	
					External	Aggregate
All Theory And Practical Courses	3 hrs	40	60	100	30	50
Mini Project	3 hrs	40	60	100	30	50
Project Work	-	50	100+50	200	-	100

5. Passing Requirements

a) For all subjects the passing requirement is as follows: i) candidate secures not less than 50% of marks in University examination (U.E) and not less than 50% in aggregate of the total maximum marks prescribed in each theory & practical, and in Project work minimum 50% each in dissertation and Viva-Voce examination and not less than 50% in aggregate of the total maximum marks prescribed, shall be declared to have passed in the respective subject.

b) A candidate who passes in all subjects and in the project work earning 120 credits within the maximum period of five years reckoned from the date of admission to the course shall be declared to have qualified for the degree.

c) The relative overall performance of the candidate shall be determined by the overall percentage of Marks obtained in all subjects evaluated as follows:

$$AM = \frac{\text{Sum of all marks}}{\text{Sum of maximum marks}} \times 100$$

This score shall be entered in the transcript given to the candidate on successful completion of the course calculated to two decimal points.

6. Requirements for proceeding to Subsequent Semesters:

a) If a candidate fails in a particular subject (Other than Project work) he/she may reappear for the University examination in the subject in subsequent semesters and obtain passing marks.

b) In the event of failure in Project Work, the candidate shall reregister for Project Work and redo the Project Work in a subsequent semester and resubmit the dissertation afresh for evaluation. The internal assessment marks shall be freshly allotted in this case.

Provided in the case of candidate who has attendance of less than 75% overall in a semester shall not be permitted to take the University examination. However, it shall be open to the Academic Registrar/Dean to grant exemption to a candidate if he/she possess 65% or more attendance but less than 75% after paying the required condonation fee to the University for valid reasons and such exemptions should not under any circumstances be granted for attendance below 65%. Candidates who have less than 65% and those who have less than 75% but have not got the exemption as above, has to repeat the semester from the next academic year.

7. Classification of successful candidates

a) A Candidate who qualifies for the Degree and secure (CIA + External) of not less than 75% shall be declared to have passed the examination in FIRST CLASS WITH DISTINCTION provided he/she has passed the examination in every subject he/she has registered as well as in the project work in the first appearance.

b) A candidate who qualifies for the degree as per the regulations for passing requirements and secures a weighted average of not less than 60% shall be declared to have passed the examination in FIRST CLASS.

c) All other successful candidates shall be declared to have passed in SECOND CLASS.

d) Only those candidates who have passed all the papers including practical and project work in the first appearance shall be considered for the purpose of RANKING.

8. Procedure in the Event of Failure:

a) If a candidate fails in a particular subject (other than project work) he/she may reappear for the University examination in the subsequent semesters and obtain passing marks.

b) In the event of failure in the project work the candidate shall register for project work and redo the project work in a subsequent semester and resubmit the dissertation afresh for evaluation. The internal assessment marks shall be freshly allotted in this case.

9. Grading system

The term grading system indicates a seven (7) point Scale of evaluation of the performances of students in terms of marks obtained in the CIA and External examinations, grade points and letter grade.

Grade	Grade point	Percentage equivalent
'O' = Outstanding	5.50 – 6.00	75 – 100
'A' = Very Good	4.50 – 5.49	65 – 74
'B' = Good	3.50 – 4.49	55 – 64
'C' = Average	3.00 – 3.49	50 -54
'D' = Below Average	1.50 – 2.99	35 – 49
'E' = Poor	0.50 - 1.49	25 – 34
'F' = Fail	0.00 – 0.49	0 - 24

MCA – MASTER OF COMPUTER APPLICATIONS

List of Discipline Specific Elective Courses

DSE001	Blockchain Technologies
DSE002	Ethical Hacking
DSE003	Big Data with R
DSE004	Full Stack Development
DSE005	Introduction to Machine Learning
DSE006	E-Learning Techniques
DSE007	Software Testing
DSE008	Deep Learning Techniques and Applications
DSE009	Game Programming Techniques
DSE010	Multimedia Technologies
DSE011	Data Visualization Techniques
DSE012	UNIX Programming
DSE013	C# and .NET Programming
DSE014	Software Project Management
DSE015	Digital Image Processing and Applications
DSE016	Data Warehousing and Data Mining Techniques
DSE017	Software Quality Assurance
DSE018	IoT Based Smart Systems
DSE019	Object Oriented Analysis and Design
DSE020	Artificial Intelligence
DSE021	Computer Graphics
DSE022	Wireless Sensor Networks & Protocols
DSE023	Next Generation Networks
DSE024	Cyber Security
DSE025	Embedded Systems and Internet of Things

List of Generic Elective Courses

20GEC01	Soft Skill – I
20GEC02	Soft Skill – II
20GEC03	Personality Development

Syllabus
Core Courses

20CMCA11 Mathematical Foundations of Computer Science 4 1 0 5

Course Objective: To study and understand the concepts of Solving System of Equations-Eigen Values and Eigen Vectors, Functions - injective, surjective and bijective functions, functionally complete set of connectives - Normal forms - Proofs in Propositional calculus - Predicate calculus, Equivalence of DFA and NFA-Equivalence of NFA and Regular Languages.

Unit 1 MATRIX ALGEBRA 12

Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

Unit II BASIC SET THEORY 12

Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations- Properties of relations - Matrices of relations - Closure operations on relations - Functions - injective, surjective and bijective functions.

Unit III MATHEMATICAL LOGIC - 12

Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws- Some more connectives - Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus - Predicate calculus.

Unit IV. FORMAL LANGUAGES - 12

Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma for Regular Languages-Context Free Languages.

Unit V. FINITE STATE AUTOMATA - 12

Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA)-Equivalence of DFA and NFA-Equivalence of NFA and Regular Languages.

Total No. of Periods: 60 hrs

COURSE OUTCOME: At the end of this course the students will be able to,

CO1: Solve problems using Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors, Inverse and Cayley Hamilton Theorem.

CO2: Solve problems using Laws of set theory - Permutation and Combination - Relations-Properties of relations - Functions - injective, surjective and bijective functions.

CO3: Apply the logical structure of proofs and work symbolically with connectives and quantifiers to produce logically valid, correct and clear arguments, Perform set operations on finite and infinite collections of sets and be familiar with properties of set operations, Determine equivalence relations on sets and equivalence classes, Work with functions and in particular bijections, direct and inverse images and inverse functions.

CO4: Explain and manipulate the different concepts in automata theory and formal languages such as formal proofs, regular expressions, regular languages, context – free grammars and explain the power and the limitations of regular languages, context – free languages.

CO5: To develop a strong background in reasoning about finite state automata and formal languages. Understanding minimization of deterministic and non-deterministic finite automata.

TEXT BOOKS:

1. Kenneth H.Rosen, “Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002 (Unit 1,2 & 3).

2. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2002. (Unit 4,5)

REFERENCES:

1. A.Tamilarasi&A.M.Natarajan, "Discrete Mathematics and its Application", Khanna Publishers, 2nd Edition 2005.

2. M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing Company, 2nd Edition,1989.

20CMCA12 C Programming and Data Structures 4 1 0 5

Course Objective:

This course introduces the basic concepts of programming in C and various programming statements of the C languages. This Course introduces Data structures and types of data structures namely linear and non-linear types.

UNIT – I INTRODUCTION 12

Program development steps: Algorithm, flowchart, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, Operators, expressions, type conversions, conditional expressions, Input-output statements

statements and blocks: if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels, programming examples.

UNIT – II ARRAYS AND FUNCTIONS 12

Arrays – types: one- dimensional, multi-dimensional, Designing structured programs: Functions, user defined functions, standard library functions, recursive functions, C program examples.

UNIT – III STRUCTURES AND UNIONS 12

Derived types: structures, nested structures, self-referential structures, unions, typedef, pointers-dynamic memory managements functions, command line arguments, C program examples.

UNIT – IV LINEAR DATA STRUCTURES 12

Introduction to data structures: Linear Data structures – Array, Stack, Queue - Applications of Array :Searching - Linear and binary search methods, sorting- Application of stack: Postfix evaluation.

UNIT – V NON-LINEAR DATA STRUCTURES 12

Non Linear Datatypes: Trees- Binary tress, terminology, representation, traversals, graphs-terminology, representation, graph traversals (DFS& BFS)

TOTAL No. of Periods: 60 hrs.

COURSE OUTCOME:

At the end of this course the students will be able to,

CO1: Define the various operators and library functions in C.

CO2: Write programs using the various control structures and functions.

CO3: Solve problems using arrays and strings.

CO4: Develop programs based on pointers.

CO5: Implement types of data structures in C.

TEXT BOOKS:

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F.Gilberg, Third edition, Thomson
2. DataStructures Using C - A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson education.

REFERENCES:

1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press Programming in C - Stephen G. Kochan, III Edition, and Pearson Education.

20CMCA13 RELATIONAL DATABASE SYSTEMS 4 0 0 4

Course Objective:

To introduce basic concepts of RDBMS, to introduce basic concepts of SQL, to introduce the concept of transaction processing, to implement the database normalisation using normal forms

UNIT I INTRODUCTION TO DATABASE SYSTEMS 12

Overview – Data Models – Database System Architecture – Entity Relationship Model Basic Concepts – Constraints – keys – Design Issues – Entity Relationship Diagram – Weak Entity Sets – Extended E–R Features – Design of an E–R Database Schema – Reduction of E–R Schema to Tables –UML.

UNIT II RELATIONAL MODEL 12

Relational Algebra – Extended Relational Algebra Operations – Modification of Database – views – SQL Background – Basic Structure – Set Operations – Aggregate Functions – Null Values – Nested Sub queries – views – Joined Relations – Data– Definition Language – Embedded SQL – QBE.

UNIT III NORMAL FORMS 12

Integrity and Security Domain Constraints – referential Integrity – Assertions – Triggers – Security and Authorization – Authorization in SQL – Encryption and Authentication. Relational – Database Design Pitfalls in relational – Database Design – Function Dependencies– Decomposition – Desirable Properties of Decomposition – Normal Forms – Boyce – Codd Normal Forms.

UNIT IV FILE ORGANIZATION 12

Storage and File Structures Overview of Physical Storage media – magnetic Disks – RAID – Tertiary Storage – Storage Access – File Organization – Organization of Records in Files – Data – Dictionary Storage – Indexing and hashing.

UNIT V Oracle, SQL and PL/SQL 12

Introduction to Oracle – DDL,DML and DCL – Aggregate functions – sub queries – join Operations – Views – PL/SQL Block – decision making and Control Structures – Procedure – functions – Sequences – Cursors and Triggers – Example Database Programs.

TOTAL : 60 Hrs.

Course Outcome:

CO1: Demonstrate the basic elements of a relational database management system.

CO2: Identify data models for relevant problems.

CO3: Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.

CO4: Apply normalization for the development of application software's.

CO5: Design and implement a full real size database system

Text Books:

1. A.Silberchatz, H.Korth, Subarshan, "Database System Concepts", McGraw – Hill Higher Education, 5th Edition, 2012.
2. Koch and Liney, "Oracle9iThe Complete reference", McGraw–Hill, 2002.

References:

1. C.J.Date, "An Introduction to Database Systems", Pearson Education, Seventh Edition, 2003.
2. Elmasri, Navathe, "Fundamentals of Database Systems, Addison Wesley", 3rd Edition, 2000.
3. Jeffrey D. Ullman, Jenifer Wisdom, "A First Course in Database Systems", Pearson Education Asia, 2001.
4. Bipin C. Desai, "An Introduction to Database Systems", Galgotia Publications Pvt. Limited, 2001.
5. Oracle Database Handbook (Oracle Press) 2007.

20CMCA14 OPERATING SYSTEMS 3 0 0 3

COURSE OBJECTIVE

To provide an understanding of the major operating system components. To describe the services an operating system provides to users, processes and other systems. To describe various features of processes including scheduling, creation and termination. To present both software and hardware solutions of the critical section problems. To explain the functions of file system and performance aspects of I/O hardware and software.

UNIT I INTRODUCTION TO OPERATING SYSTEMS 9

Operating System – Role of an Operating System – Types of Operating System – Major OS Components – Operating System Operations – Operating System Services – System calls – System Programs – Operating System Structure – Process Concept – Process Scheduling – Operations on Processes – Interprocess Communication.

UNIT II THREADS AND CPU SCHEDULING 9

Threads – Multithreading Models – Thread Libraries – Threading Issues – Basic Concepts of Scheduling – Scheduling Criteria – Scheduling Algorithms – FCFS – SJF – Round Robin – Multiprocessor Scheduling – Real-Time CPU Scheduling.

UNIT III PROCESS SYNCHRONIZATION 9

Background – Critical Section Problem – Synchronization Hardware – Mutex Locks – Semaphores – Semaphores Usage – Semaphores Implementation – Monitors – Monitors Usage – Dining Philosophers Solutions Using Monitors – Implementation of Monitor Using Semaphores.

UNIT IV MEMORY MANAGEMENT 9

Background – Swapping – Contiguous Memory Allocation – Paging – Segmentation – Virtual Memory – Demand Paging – Copy-on-Write – Page Replacement Policies: FIFO, Optimal, LRU – Allocation of Frames – Thrashing.

UNIT V I/O SYSTEMS 9

I/O Hardware – Application I/O Interface – Kernel I/O Subsystem – Communication with I/O devices – STREAMS.

TOTAL : 45 HRS

COURSE OUTCOME

CO1: Describe how operating systems have evolved over time from primitive batch systems to sophisticated multi-user systems.

CO2: Understand the basic concepts of operating system process control, synchronization, and scheduling.

CO3: Explain the basic structure and functions of operating systems.

CO4: Identify the problems related to process management and synchronization and apply learned methods to solve basic problems.

CO5: Demonstrate knowledge in applying system software and tools available in modern operating systems.

TEXT BOOKS:

1. Silberschatz, Abraham, Greg Gagne and Peter B. Galvin, "Operating System Concepts", Ninth Edition, Wiley, 2012.
2. William Stallings, "Operating Systems: Internals and Design Principles", Seventh Edition, Pearson Education, 2013.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Adison Wesley, 2009.

REFERENCES:

1. Russ Cox, Frans Kaashoek and Robert Morris, "xv6: A Simple, Unix – like Teaching Operating System", Revision 11. (https://pdos.csail.mit.edu/6.828/2018/xv6/book-rev11.pdf)
2. B. Molay, "Understanding Unix/Linux Programming: A Guide to Theory and Practice", Third Edition, Prentice Hall, 2003.
3. H. M. Deital, P. J. Deital, D. R. Choffnes, "Operating Systems", Third Edition, Pearson Education, 2015.

20CMCA15 SOFTWARE ENGINEERING 3 0 0 3

COURSE OBJECTIVE

To understand the concepts of software processes, process models and fundamental process activities. To understand the fundamental concepts of requirements engineering & requirements specification and documents. To be aware of testing processes, techniques and debugging to solve program defects. To learn how to use software metrics, manage risk, apply basic software quality assurance practices to ensure that software designs, development, and maintenance meet or exceed applicable standards.

UNIT 1 PROCESS 9

Product and Process – Evolution Process and Activities – Software Development Lifecycle Models: Waterfall Model – Incremental Models – Evolutionary Models – Spiral Model – Unified model – Prototype model – Agile methods.

UNIT II SOFTWARE REQUIREMENTS 9

Functional and Non-Functional Requirements – Software Requirements Document – Requirements Specification – Requirements Engineering Processes – Requirements Elicitation & Analysis – Requirements Validation – Requirements Management.

UNIT III ANALYSIS AND DESIGN 9

Analysis Modeling Approaches: Scenario Based Modeling – UML Models – Data Modeling Concepts: Class Based Modeling, Flow Oriented Modeling – Design Process and Concepts– Design Model – Architectural Design – Pattern Based Design – Web App Design – Real Time Software Design – System Design – Data flow Oriented Design – Designing for Reuse- User Interface Design: Interface analysis, Interface Design – Component level Design: Designing Class Based Components, Traditional Components.

UNIT IV SOFTWARE TESTING 9

Software Testing Strategies – White Box Testing – Black Box Testing – Basis Path Testing – Control Structure Testing – Regression Testing – Unit testing – Integration Testing – Validation Testing – System testing – Art of Debugging.

UNIT V MANAGEMENT AND METRICS 9

Software Configuration Management – Project management concepts – Process and Project Metrics – Software Cost Estimation – Project scheduling – Risk Management – Software Quality Assurance – Maintenance and Re – engineering – CASE Tools.

Total : 45 hrs.

COURSE OUTCOME:

CO1: Understand of the role and impact of software engineering in contemporary business, global, economic, environmental and societal context.

CO2: Elicit the requirements for real, time problems. Analyze and use open source tools for project designing.

CO3: Develop User Interface design for the given system.

CO4: Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools.

CO5: Estimate the cost of software and apply software management principles.

TEXT BOOKS :

1. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", Seventh Edition, McGraw Hill International edition, 2009.
2. Ian Sommerville, "Software Engineering, Ninth Edition", Pearson Education, 2008.
3. Watts S.Humphrey, "A Discipline for Software Engineering", Pearson Education, 2007.

20PMCA11 C Programming and Data Structures Laboratory 0 0 4 2

Course Objective:

This lab provides detailed knowledge of Arrays, Pointers, Stack Operations, Doubly Linked list, Graphs and Recursion. Also provide knowledge in Prefix, Post Fix Expression evaluation and tree Traversal techniques using C programming

Write a C program for the followings:

1. Implement PUSH, POP operations of stack using Arrays.
2. Implement PUSH, POP operations of stack using Pointers.
3. Implement add, delete operations of a queue using Arrays.
4. Implement add, delete operations of a queue using Pointers.
5. Conversion of infix to postfix using stack operations
6. Postfix Expression Evaluation.
7. Prefix Expression Evaluation
8. Addition of two polynomials using Arrays and Pointers.
9. Creation, insertion, and deletion in doubly linked list.
10. Binary tree traversals (in-order, pre-order, and post-order) using linked list.
11. Depth First Search for Graphs using Recursion.
12. Breadth first Search for Graphs using Recursion.

Course Outcomes:

CO1: Create basic operations of PUSH, POP of stack using Arrays and pointers.

CO2: Write simple and complex operations of Prefix and postfix in stack.

CO3: To evaluate postfix and prefix operations using C Program.

CO4: Use advanced features such as Binary tree traversals using linked list, stored procedures.

CO5: Create and manipulate Depth First Search and Breadth first search for graphs.

20PMCA12 RELATIONAL DATABASE SYSTEMS LABORATORY 0 0 4 2

Course Objective: This course will help students **to** learn and implement important commands in SQL, usage of nested and joint queries, procedures and procedural extensions of databases and to understand design and implementation of typical database applications.

EXPERIMENTS

1. Create a database table, add constraints (primary key, unique, check, Not null), insert rows, update and delete rows using SQL DDL and DML commands.
2. Create set of tables, add foreign key constraints and incorporate referential integrity.
3. Query the database tables using different 'where' clause conditions and also implement aggregate functions.
4. Query the database tables and explore sub queries and simple join operations.
5. Query the database tables and explore natural, equi and outer joins.
6. Write user defined functions and stored procedures in SQL.
7. Execute complex transactions and realize DCL and TCL commands.
8. Write SQL Triggers for insert, delete, and update operations in database table.
9. Create View and index for database tables with large number of records.
10. Develop a simple GUI based database application and incorporate all the above-mentioned features.

TOTAL: 60 PERIODS

Course Outcome:

CO1: Create databases with different types of key constraints.

CO2: Write simple and complex SQL queries using DML and DCL commands.

CO3: Realize database design using 3NF and BCNF.

CO4: Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.

CO5: Create and manipulate data using NOSQL database.

20CMCA21 COMPUTER COMMUNICATIONS AND NETWORKS 4 0 0 4

Course Objective:

This course will help to understand the network fundamentals and to explore network layer protocols. This course will explore the various application layer functionalities and the link layer services and data communication fundamentals.

UNIT I NETWORKS FUNDAMENTALS 12

Components -Data Representation –Data Flow - Networks- Distributed Processing- Network Criteria -Physical Structures - Network Models -Categories of Networks, Interconnection of Networks: The OSI Model- TCP/IP Protocol Suite- Addressing

UNIT II NETWORK LAYER 12

Network Layer: Logical addressing, Internetworking, IPv4, IPv6, Transition from IPv4 TO IPv6, Tunneling, address mapping, ICMP, IGMP, forwarding, Uni-cast routing protocols, multicast routing protocols.

UNIT III TRANSPORT LAYER 12

Transport Layer: Process to process delivery, UDP and TCP protocols, SCTP, data traffic, congestion, congestion control, QoS, integrated services, differentiated services, QoS in switched networks

UNIT IV APPLICATION LAYER 12

Application Layer – Domain name space, DNS in Internet, Remote Logging, Telnet, electronic mail, FTP, WWW, HTTP, SNMP, Multi-media, Network security

UNIT V FUNDAMENTALS OF DATA COMMUNICATION 12

Communication Model – Data communications – Data Transmission: Concepts and Terminology, Analog and Digital Transmission, Transmission Impairments – Signal Encoding Techniques: Digital Data and Digital Signals – Multiplexing: FDM, TDM, Multiple Channel Access.

Total No. of Periods: 60 Hrs.

Course Outcomes:

CO1: Describe the fundamentals of networking

CO2: Identify the networking protocol for reliable communications

CO3: Select suitable transport layer protocols for network applications

CO4: Design new application layer protocols for various applications.

CO5: Identify suitable signal encoding techniques for various scenarios

REFERENCES

1. Behrouz A. Forouzan , “Data Communications and Networking “, Fourth Edition TMH,2006.
2. Andrew S Tanenbaum “Computer Networks”, 4th Edition, Pearson Education.
3. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, Seventh Edition, Pearson Education, 2017.
4. Larry L. Peterson and Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers, 2011.
5. William Stallings, “Data and Computer Communications”, Tenth Edition, Pearson, 2014.
6. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, “Computer Networks: An Open Source Approach”, McGraw-Hill, 2012

20CMCA22 PROGRAMMING IN JAVA 4 0 0 4

Course Objective: This subject will help to improve the analytical skills of object oriented programming. It gives formal introduction to Java programming language and helps in learning GUI based application development and network programming.

UNIT 1: INTRODUCTION TO JAVA 12

History of Java, Features of Java, Java Development Kit (JDK), Security in Java Keywords; Working of Java; Including Comments; Data Types in Java; Primitive Data Types; Abstract / Derived Data Types; Variables in Java; Using Classes in Java; Declaring Methods in Java, Code to Display Test Value; The main() Method, Operators, Arithmetic Operators, Increment and Decrement Operators, Comparison Operators, Logical Operators, Operator Precedence.

UNIT 2 CONTROL STATEMENTS, ARRAYS AND STRINGS 12

Control Flow Statements, If-else Statement, Switch Statement, For Loop, While Loop, Do…While Loop, Break Statement Continue Statement.

Arrays; String Handling; Special String Operations; Character Extraction; String Comparison; Searching Strings; String Modification; StringBuffer methods.

UNIT 3: INHERITANCE, PACKAGE AND INTERFACE 12

Inheritance, Types of Relationships, What is Inheritance?, Significance of Generalization, Inheritance in Java, Access Specifiers, The Abstract Class; Packages, Defining a Package, CLASSPATH; Interface, Defining an Interface, Some Uses of Interfaces, Interfaces versus Abstract Classes

UNIT 4: MULTITHREADING EXCEPTION HANDLING & APPLETS 12

Multithreading - Thread Life cycle - Runnable interface, Thread synchronization Definition of an Exception; Exception Classes; Common Exceptions; Exception Handling Techniques

Applets: What are Applets?; The Applet Class; The Applet and HTML; Life Cycle of an Applet; The Graphics Class; Painting the Applet; User Interfaces for Applet; Adding Components to user interface; AWT (Abstract Windowing Toolkit) Controls

UNIT 5: NETWORKING IN JAVA 12

Networking in Java; Manipulating URLs – Reading web pages – Using stream sockets – Datagrams – Broadcasting – Multicasting – Chat application.

Total Hrs : 60

Course Outcomes:

CO1: Understand the structure and model of the Java programming language

CO2: Implement object oriented concepts of Java programming

CO3: Solve the inter-disciplinary applications using the concept of inheritance.

CO4: Design and development of applications using multithreading, applets

CO5: Create distributed applications using networking

References

1. "Core and Advanced Java, Black Book", Dreamtech Press, 2018.
2. Paul J. Deitel, Harvey Deitel, "Java How to Program", Eleventh Edition, Pearson, 2017.
3. Cay S. Horstmann, "Core Java Volume I & II", Pearson Education, 2018.
4. Herbert Schildt , "Java The Complete Reference", Eighth Edition, Tata McGraw Hill, 2011.
5. Balagurusamy, E. Programming with JAVA. Vol. 6. McGraw-Hill Education, 2019.
6. Paul Dietel, Harvey Dietel, Abbey Dietel, "Internet and World Wide Web", Fifth Edition, Pearson Education, 2012.

20CMCA23 Data Science 4 0 0 4

Course Objective

To provide strong foundation for data science and application area related to it and understand the underlying core concepts and emerging technologies in data science.

Unit-1 Introduction 12

Definition – Data Science – Why Data Science – Data Scientist – Data Science Process – Data Preparation – Data Exploration – Data Modelling-

Unit-2 Application areas 12

Big Data – Characteristics of big data – general Techniques for Big Data - Machine Learning – Definition- Key Elements of machine learning - types machine learning algorithms- Deep Learning – Definition - Feed Forward Networks – Optimization for deep learning algorithms- Applications for Data Science**.**

Unit-3 R Programming 12

Introduction to R : Why R – Installing R - evolution of R- IDE environment for R- Basic Concepts of R:Variables – Reserved Words- Operators – Data types -Input and Output in R- Vectors, Programming fundamentals : conditional, loops, functions -debugging in R.

Unit-4 Data and working with data 12

R Data Structures: Array, Matrix, List, Data frames – Loading Data Frames –- working with Data: Reading CSV and Excel files – Reading text files – writing and saving data objects in R

Unit-5 strings and dates 12

String and Dates: String Operations in R – Regular Expressions- Dates in R- Ethics and Tools: Data Science ethics – future Trends of Data science – Data Science Tools.

Total No. of Periods:60 hrs.

Course Outcome

CO1: Understand the fundamental concepts of data science

CO2: Evaluate the data analysis techniques for applications handling large data

CO3: Write programs in R

CO4: Perform data analysis in R

CO5: understand the ethics and tools for data science.

Books for study

1. “Practical Data Science with R”. Nina Zumel, John Mount. Manning, 2014
2. “Data Science for business”, F. Provost, T Fawcett, 2013

3. R cookbook: proven Receipes for data analysis, statistics and graphics, O'Reilly cookbook by teetor.

Reference books

1. Introducing Data Science, Davy Cielen, Arno D. B. Meysman, Mohamed Ali, Manning Publications Co., 1st edition, 2016.

20PMCA21 JAVA PROGRAMMING AND NETWORKS LABORATORY 0 0 4 2

Course Objective: To understand and apply the fundamentals of core Java and to implement inheritance, polymorphism, interfaces, multithreading, networking. Developing applications using client side and server side programming.

EXPERIMENTS

1. Program to define a structure of a basic JAVA program.
2. Program to define operators, arrays and control structures.
3. Program to define class and constructors. Demonstrate constructors.
4. Program to define class, methods and objects.
5. Program to demonstrate method overloading.
6. Program to define inheritance and show method overriding.
7. Program to demonstrate Packages.
8. Program to demonstrate Exception Handling.
9. Program to demonstrate Multithreading.
10. Program to demonstrate Applet structure
11. Program to demonstrate Network Programming.
12. Java socket programming
    a. Implementation of chat client-server application.
    b. Implementation of simple http client/server application.
13. Reading websites using URL class

Course Outcomes

CO1: Identify classes, objects, members of a class and relationships among them needed for a specific problem

CO2: Write Java application programs using OOP principles and proper program structuring Demonstrate the concepts of polymorphism and inheritance

CO3: Create Java programs to implement error handling techniques using exception handling

CO4: Design and develop GUI based applications

CO5: Develop chat and file transfer applications

20PMCA22 DATA SCIENCE LABORATORY 0 0 4 2

Course Objective:

This course is designed to introduce implementation of R programming language. Introduction to R: basic commands, graphics, indexing data, loading data. To evaluate the Common R Packages for Linear, Quadratic equation, Built-in functions. The students can understand the art of programming using R Tool.

1. Write a function that takes 3 numbers a, b, and c as inputs and returns the smallest number of the three.
2. Use the function paste to create the following character vectors of length 30: (a) ("label 1", "label 2", ..., "label 30"). Note that there is a single space between label and the number following. (b) ("fn1", "fn2", ..., "fn30"). In this case, there is no space between fn and the number following
3. Suppose A = $\begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$.
   Check that A 3 = 0 where 0 is a 3 × 3 matrix with every entry equal to 0.
   Replace the third column of A by the sum of the second and third columns.
4. Create a vector of coefficients for a quadratic equation, using the sample function. Here, we draw a sample of size 3 from −20, −19, . . . , 19, 20 with replacement coeffs <- sample(-20:20,3,replace=T).
5. Does the equation have real roots? Compute the discriminant coeffs[2]^2-4*coeffs[1]*coeffs[3].
6. Prepare to plot the equation, by constructing a regularly spaced vector for the horizontal axis x <- seq(-3,3,length=200).
7. Construct a 2×2 data frame, X say. Experiment with X^(1:K), where K takes values 1:4. How does the recycling rule behave? What happens if you remove the brackets from the command?
8. The function system. Time returns timings for R operations. Examine the help system about this function. For a 107 ×2 matrix, X, and vector y of length 107/2 compute (a number of times) Xty using matrix multiplication and the function cross product. Which is quicker?
9. Generate a matrix of size n × p. Use the function as.data.frame to coerce the matrix to a data frame. Which object requires more storage space?
10. Write a loop structure to scan through an integer vector to determine the index of the maximum value. The loop should terminate as soon as the index is obtained. (Don't worry about ties). Of course, this is not a good way to do this! Examine the help for the rank, sort and order functions.

Course Outcome:

CO1: Demonstrate to use R in any OS (Windows / Mac / Linux).

CO2: Able to work with R packages and their installation.

CO3: Demonstrate functions and mathematical built-in function.

CO4: Understand to produce effective plot graph for the given data set.

CO5: Implement and assess relevance and effectiveness of storage function in R tool.

19CMST21 Advanced Java Programming 4 0 0 4

Course Objective:

This course gives an insight into advanced features of Java viz., RMI and JSP. To develop network programs in Java. To understand Concepts needed for distributed and multi-tier applications. To learn the concepts of Java Servlets and Database connectivity.

Unit I – Abstract Window Toolkit (AWT) and Swings 12

Applets- Architecture, Basics, skeleton, simple applets, Requesting and Repainting HTML applet tag, passing parameters to applets- Graphics- Font,-Colorclasses Swing-JApplet, JFrame, JComponent Differences between Component and Container,Icons, JLabel, JTextField, JButton, JCheckBox, JRadioButton,JComboBox

Unit II Remote Method Invocation 12

RMI- Overview – RMI Architecture - Developing Application with RMI Declaring and implementing remote interfaces –Stub and Skelton –registering Remote objects – writing RMI server –client- EJB Introduction Entity bean –session bean –EJB Transaction.

Unit III Java Server Pages 12

JSP Introduction to JSP - JSP life cycle - Attributes in JSP - JSP elements - Directives - Declarations - Expressions - Script let - Action Elements - using session Object and Cookies- Working with Java Mail - usage of use Bean Tag.

Unit IV Java Database Connectivity 12

Presentation to JDBC CONNECTION settings – The Concept of JDBC – JDBC Driver Types – JDBC Packages – A Brief Overview of the JDBC Process – Database Connection – Associating the JDBC/ODBC Bridge with the Database – Statement Objects – Result Set.

Unit IV Servlets 12

Background, The Life Cycle of a Servlet & the JSDK-A Simple Servlet – The Servlet API – Role Play-Servlet Concept – The javax. servlet Package – Reading Servlet Parameters, The javax.servlet.http Package – Handling HTTP Request and Responses – Using Cookies – Session Tracking.

Total : 60 hrs.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Demonstrate the principles of Java Web Server

CO2: Understandability in java messaging services transactions

CO3: Understand the concept of Remote Method Invocation Implementation.

CO4: Demonstrate the usage of ORB protocol and servlets concepts.

CO5: Gain knowledge about Enterprise Java Bean design and implementation along with tips and tricks to develop EJB .

Text books :

1. Naughton and H.Schildt, (2007), "Java 2-The complete reference", Fifth Edition McGraw Hill.
2. K. SOMASUNDARAM, "Advanced Programming in Java 2: Updated to J2SE6 with Swing, Servlet and RMI: 1
3. Jim Keogh, (2002), "The Complete Reference J2EE", Tata McGraw Hill Edition, New Delhi.
4. Marty Hall, Larry Brown, (2004), "Core Servlets and Java Server Pages", 2nd Edition, Pearson Education.

Books for References:

1. J2EE 1.4 Bible,J.McGovern,RAdatia,Y.Fain,Wiley-dreamtech India Pvt.Ltd, NewDelhi,2003.
2. Inside Servlets, D. R.Callaway, Addison Wesley, Boston,1999.
3. Java Beans from the Ground Up,JosephO"Neil, Tata McGraw Hill, New Delhi.
4. Enterprise JavaBeans, TomValesky,Addison Wesley,1998.
5. Core Java Vol II Advanced Features, Cay S Horstmann& Gary Cornell, Addison Wesley.

20CMCA32 Financial and Management Accounting 4 1 0 5

Course Objective:

Describe the system of accounting standards and principles, prepare a balance sheet, income statement, and a statement of cash flows using both the indirect and direct method. account for short term investments and receivables, including bad debts, account for the purchase, depreciation, or a premium by the effective interest method, including interest payments for full and partial periods.

Unit I: Principles of Accounting 12

Principle of double entry – assets and liabilities, accounting records and systems – trial balance and preparation of final statements – trading, manufacturing profit and loss accounts – Balance sheet including adjustments (Simple problems only)

Unit II: Analysis and interpreting accounts and financial statements 12

Ratio analysis – use of ratios interpreting the final accounts (trading a/c's and loss a/c & balance sheet) – final accounts to ratios as well as ratios to final accounts.

Unit III: Break-even Analysis and Marginal Costing 12

Meaning of variable cost and fixed cost- Cost Volume Profit (CVP) analysis – calculation of breakeven point, profit planning, sales planning and other decision – making analysis involving break-even analysis – computer accounting and algorithm (Differential cost analysis to be omitted)

Unit IV: Budget Forecasting 12

Preparation and characteristics of functional budgets, production, sales, purchases, cash and flexible budgets.

Unit V: Project Appraisal 12

Method of capital investment decision making: Payback period, ARR method, Discounted Cash Flows (DCF), Net Present Values (NPV), Internal Rate of Return (IRR), Sensitivity analysis and cost of capital.

TOTAL : 60 hrs.

Course Outcomes

CO1: To Define bookkeeping and accounting.

CO2: To Explain the general purposes and functions of accounting.

CO3: To Explain the differences between management and financial accounting.

CO4: To Describe the main elements of financial accounting information – assets, liabilities, revenue and expenses.

CO5: To Identify the main financial statements and their purposes.

Text Books:

1. Reddy and Murthy, “Management Accounting”
2. Reddy and Hari Prasad Reddy, “Financial and Management Accounting”

20CMCA33 CLOUD COMPUTING 4 0 0 4

Course Objective:

This course introduces the basic concepts of Cloud computing. It provides the overview of technologies used in cloud computing. To understand the concept of the cloud architecture and its services. To provide the information on cloud platforms and its security. To get familiar with the tools and software's used in the cloud computing.

Unit I -Fundamentals of Cloud Computing 12

Cloud computing concepts and its Definition – Characteristics of Cloud -Types of Cloud Services – Parallel computing – Distributed Computing Cloud Types and its Layers

Unit II- Technologies in Cloud 12

Service oriented Architecture – Virtualization – Virtualization types – Implementation Levels of virtualizations -– Web Technology – Multitenant Technology – Service Technology.

Unit III - Architecture of Cloud and its Services 12

Cloud Architecture – Public cloud – private cloud – Hybrid cloud – Types of Services in Cloud – Infrastructure as a Service (IAAS) - Platform as a Service (Paas) - Software-as-a-Service (SaaS)- Cloud Storage – pros and cons of Cloud Storage - Virtualization concepts – Disaster Recovery mechanism.

Unit IV – Cloud Platforms and its Security 12

Resource management in Cloud – Scheduling – Scheduling Map reduce algorithms - cloud resource management policies - overview of cloud security -Security issues – security principles – security in Virtual machine – standards in Cloud Security.

Unit – V Tools and software in cloud 12

Apache Cloud Stack- OpenStack- ManageIQ- Cloudify- Hadoop Framework – Google App - Map Reduce – Virtual Box – Nimbus – Develop applications based on tools and software in cloud.

TOTAL: 60 hrs.

Course Outcomes:

CO-1: To understand the concepts of Cloud computing.

CO-2: To examine various technologies in cloud.

CO-3: To identify and apply knowledge in architectures of infrastructure.

CO-4: To analyze the fundamental and advance architectures in cloud services.

CO-5: To apply the security models in the cloud environment.

Text Books:

1. Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, “Cloud Computing: Concepts, Technology and Architecture”, Prentice Hall, U.S.A., 2013.

2. Rajkumar Buyya, James Broberg, Andrzej Goscinsky, “Cloud Computing Principles and Paradigms”, Wiley India Pvt. Ltd., 2011.

Reference Books:

1. George Reese, “Cloud Application Architectures”, Shroff O’Reilly, ISBN: 8184047142, 2009.

2. Michael Miller, “Cloud Computing Web Based Applications That Change The Way You Work and Collaborate Online”, Pearson Education, 2009.

3. PrasantaPattnaik, ManasKabat,“Fundamentals of Cloud Computing”, S.Chand (G/L) & Company Ltd; First edition (2014).

4. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.

5. Tim Mather, Subra Kumaraswamy, and Shahed Latif,"Cloud Security and Privacy", O‘Reilly Media, Inc., 2009.

6. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", McGraw-Hill Osborne Media, 2009.

20PMCA31 ADVANCED JAVA PROGRAMMING LABORATORY 0 0 4 2

Course Objective: This course gives practical training in HTML to Servlet Communication, JSP Beans used to create JSP program, RMI to create Web Services, Email creation and manipulation, Web applications and Session management is done by students.

List of Experiments:

1. HTML to Servlet Communications
2. Servlet to HTML Communication
3. Applet to Servlet Communication
4. Servlet to Applet Communication
5. Designing online applications with JSP
6. Creating JSP program using JavaBeans
7. Working with Enterprise JavaBeans
8. Performing Java Database Connectivity and storing the students Marks.
9. Creating Web services with RMI.
10. Creating and Sending Email with Java
11. Building web applications for any Departmental Store.
12. Finding Compound Interest and Simple Interest using Session Management.

Course Outcome (CO): At the end of this course, the students will be able to

CO 1: Designing HTML pages to demonstrate Java Servlets, JSP, Bean and EJB programs.

CO 2: Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and Http Session in Servlet.

CO 3: Learn the fundamental of connecting to the database.

CO 4: Demonstrate JSP (page attributes, action tags and all basic tags) and types of EJB application.

CO 5: Learn to design and code web applications.

20PMCA32 Internet of Things and Cloud Laboratory 0 0 4 2

Course Objective: This course gives practical training in Cloud and IOT used to create the applications development. IOT programs are implemented using Arduino lab. Cloud concepts are used for storing the information.

List of Experiments:

1. IoT Implementation using ARDUINO Lab
   Introduction of Sensors and Actuators.
2. Introduction of Arduino Mega2560.
3. Reading Switches and Blinking LED.
4. Temperature Sensor (LM35) Interfacing with Arduino Mega2560.
5. Wi-Fi (ESP8266) Interfacing with Arduino Mega2560.
6. Controlling Sensor data using Cloud.(things speak)
7. Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
   Find procedure to run the virtual machine of different configuration. Check how many Virtual machines can be utilized at particular time.
8. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
9. Install a C compiler in the virtual machine and execute a sample program.
10. Show the virtual machine migration based on the certain condition from one node to the other.

Course Outcome (CO): At the end of this course, the students will be able to

CO 1: Designing IOT based Applications using sensors and actuators.

CO 2: Implementing different kinds of sensors for real world systems.

CO 3: To Learn how to implement the IOT with cloud and develop the applications.

CO 4: To Demonstrate concepts of Virtual machines in the cloud environment.

CO 5: To understand the Cloud services available for the web applications.

Discipline Specific Electives

DSE001	Blockchain Technologies
DSE002	Ethical Hacking
DSE003	Big Data with R
DSE004	Full Stack Development
DSE005	Introduction to Machine Learning
DSE006	E-Learning Techniques
DSE007	Software Testing
DSE008	Deep Learning Techniques and Applications
DSE009	Game Programming Techniques
DSE010	Multimedia Technologies
DSE011	Data Visualization Techniques
DSE012	UNIX Programming
DSE013	C# and .NET Programming
DSE014	Software Project Management
DSE015	Digital Image Processing and Applications
DSE016	Data Warehousing and Data Mining Techniques
DSE017	Software Quality Assurance
DSE018	IoT Based Smart Systems
DSE019	Object Oriented Analysis and Design
DSE020	Artificial Intelligence
DSE021	Computer Graphics
DSE022	Wireless Sensor Networks & Protocols
DSE023	Next Generation Networks
DSE024	Cyber Security
DSE025	Embedded Systems and Internet of Things

DSE001 BLOCK CHAIN TECHNOLOGIES 3 0 0 3

Course Objectives:

Understand the structure of a block chain and why/when it is better than a simple distributed database, Evaluate the setting where a block chain-based structure may be applied, its potential and its limitations, Understand how block chain systems (mainly Bitcoin and Ethereum) work, Design, build, and deploy smart contracts and distributed applications,

UNIT I INTRODUCTION 9

Introduction of block chain- the basic terms about block chain-advent of block chain technology- evolution of block chain technology –block chain mechanism -the advantages introduced by the block chain technology -challenges of block chain adoption -Distinguish different types of block chains.

UNITII BITCOIN 9

Transactions, blocks, mining, scripting, attacks on mining-Building blocks: Hash functions, signature schemes, zero-knowledge proofs, consensus algorithms- Proof of work, proof of stake, proof of burn, proof of storage-Distinguish Proof-of-Work and Proof-of-Stake concepts -- Byzantine Fault Tolerance- Sharding - Layer 2 approaches

UNIT III SMART CONTRACTS 9

Basic terms about smart contract -the advent of smart contract - the smart contract mechanism- Restate the advantages introduced by the smart contract -challenges of smart contract - different applications of smart contract -Implement hands-on the smart contract using solidity and Ethereum

UNIT IV PRIVACY ISSUES 9

Anonymity, mixing techniques, privacy with ZK-Snarks.-Permissioned block chains: Distributed consensus, sharing algorithms, privacy issues.

UNIT V SCALING ISSUES 9

Sharding - Layer 2 approaches Lightning networks, Payment networks. Platforms and ledgers: Ethereum, Ripple, Hyper ledger, Algorand, etc –Block chain applications Government- Identity management-Auto executing contracts-Three signature escrow- Triple entry account- Elections and voting.

TOTAL : 45 HRS.

Course Outcome:

CO1: Blockchain technology landscape

CO2: Understand the block chain technology, its benefits and challenges

CO3: Applications and implementation strategies

CO4: Explain Bit coin security practices

CO5: State-of-the-art, open research challenges, and future directions

TEXTBOOKS

1. A. Narayanan, J. Bonneau, E. Felten, A. Miller, S Goldfeder, J. Clark: Bitcoin and Cryptocurrency Technologies, Princeton University Press. 2017.

2. A. M. Antonopoulos: Mastering Bitcoin: Programming the Open Blockchain, O'Reilly, 2017.

REFERENCES

1.Draft version of "S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.

2.J.A.Garay et al, the Bitcoin backbone protocol - analysis and applications eurocrypt 2015 lncs vol 9057, (volii), pp 281-310

3.R.Pass et al, Analysis of blockchain protocol in asynchronous networks , eurocrypt 2017,

DSE002 ETHICAL HACKING 3 0 0 3

Course Objectives:

To understand and analyze Information security threats & countermeasures To perform security auditing & testing To understand issues relating to ethical hacking To study & employ network defense measures To understand penetration and security testing issues

UNIT I ETHICAL HACKING OVERVIEW & VULNERABILITIES 9

Understanding the importance of security, Concept of ethical hacking and essential Terminologies Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit. Phases involved in hacking.

UNIT II FOOTPRINTING & PORT SCANNING 9

Foot printing - Introduction to foot printing, Understanding the information gathering methodology of the hackers, Tools used for the reconnaissance phase. Port Scanning - Introduction, using port scanning tools, ping sweeps, Scripting Enumeration-Introduction, Enumerating windows OS & Linux OS.

UNIT III SYSTEM HACKING 9

Aspect of remote password guessing, Role of eavesdropping ,Various methods of password cracking, Keystroke Loggers, Understanding Sniffers ,Comprehending Active and Passive Sniffing, ARP Spoofing and Redirection, DNS and IP Sniffing, HTTPS Sniffing.

UNIT IV HACKING WEB SERVICES & SESSION HIJACKING 9

Web application vulnerabilities, application coding errors, SQL injection into Back-end Databases, cross-site scripting, cross-site request forging, authentication bypass, web services and related flaws, protective http headers Understanding Session Hijacking, Phases involved in Session Hijacking, Types of Session Hijacking and Session Hijacking Tools.

UNIT V HACKING WIRELESS NETWORKS 9

Introduction to 802.11, Role of WEP, Cracking WEP Keys, Sniffing Traffic, and Wireless DOS attacks, WLAN Scanners, WLAN Sniffers, Hacking Tools, and Securing Wireless Networks.

TOTAL : 45 Hrs.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand vulnerabilities, mechanisms to identify vulnerabilities/threats/attacks

CO2: Perform penetration & security testing

CO3: Become a professional ethical hacker

CO4: Implement real-world hacking techniques to test system security Apply

CO5: Employ complex tools to identify and analyze your company's risks and weaknesses

TEXT BOOKS

1. CEH official Certfied Ethical Hacking Review Guide, Wiley India Edition, 2015.
2. Bill Nelson, Amelia Phillips, Christopher Steuart, “Guide to Computer Forensics and Investigations”, Delmar Cengage Learning, 2015.

REFERENCES:

1. Kimberly Graves, "Certified Ethical Hacker", Wiley India Pvt Ltd, 2010

2. Michael T. Simpson, "Hands-on Ethical Hacking & Network Defense", Course Technology, 2010

3. Rajat Khare, "Network Seuciryt and Ethical Hacking", Luniver Press, 2006

4. Ramachandran V, BackTrack 5 Wireless Penetration Testing Beginner’s Guide (3rd ed.). Packt Publishing, 2011

5. Thomas Mathew, "Ethical Hacking", OSB publishers, 2003

DSE003 BIG DATA WITH R 3 0 0 3

COURSE OBJECTIVES:

Be exposed to big data , Learn the different ways of Data Analysis, Be familiar with data streams and Learn the basic understanding of R programming, data structures, functions, how to work with packages, files and know about the data visualization and data management techniques using R tool.

UNIT I: INTRODUCTION TO BIG DATA 9

Analytics – Nuances of big data – Value – Issues – Case for Big data – Big data options Team challenge – Big data sources – Acquisition – Nuts and Bolts of Big data. Features of Big Data -Security, Compliance, auditing and protection - Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety – Data Appliance and Integration tools.

UNIT II: DATA ANALYSIS 9

Evolution of analytic scalability – Convergence – parallel processing systems – Cloud computing –grid computing – map reduce – enterprise analytic sand box – analytic data sets – Analytic methods –analytic tools – Cognos – Microstrategy - Pentaho. Analysis approaches – Statistical significance –business approaches – Analytic innovation – Traditional approaches – Iterative

UNIT III: PREDICTIVE ANALYTICS AND VISUALIZATION 9

Predictive Analytics – Supervised – Unsupervised learning – Neural networks – Kohonen models –Normal – Deviations from normal patterns – Normal behaviours – Expert options – Variable entry -Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory- IBM for Big Data – Map Reduce Framework - Hadoop – Hive - – Sharding – NoSQL Databases - S3 -Hadoop Distributed file systems

UNIT IV: INTRODUCTION TO R 9

Overview of R programming - Evolution of R - Applications of R programming – Basic syntax - Basic Concepts of R, Control flow of R -R packages - Data Reshaping: Joining Columns and Rows in a Data Frame - Merging Data Frames - Melting and Casting.

UNIT V: DATA VISUALIZTION AND DATA MANAGEMENT USING R 9

Data visualization in R and Data Management - Bar Chart, Dot Plot, Scatter Plot (3D), Spinning Scatter Plots, Pie Chart - Histogram (3D) [including colorful ones], Overlapping Histograms – Boxplot, Plotting with Base and Lattice Graphics Missing Value Treatment - Outlier Treatment - Sorting Datasets - Merging Datasets - Binning variables.

Total =45 hrs.

Course Outcome:

CO1: Compare and contrast various soft computing frameworks.

CO2: Design distributed file systems and Apply Stream data model.

CO3: To know how to work with files in R.

CO4: To study about data visualization and data management techniques.

CO5: Use R to create sophisticated figures and graphs.

TEXT BOOKS:

1. Frank J Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS BusinessSeries, 2012.

2. Colleen Mccue, “Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis”,Elsevier, 2007

3. Michael Berthold, David J. Hand,” Intelligent Data Analysis”, Springer, 2007.

4. Norman Matloff , “The Art of R Programming-a tour of statistical software design”, William Pollock, 2011.

5. Paul Teetor “R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics”, O'Reilly Cookbooks, O'Reilly Media , 2011.

REFERENCES:

1. AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge UniversityPress, 2012.

2. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams withAdvanced Analytics”, Wiley and SAS Business Series, 2012.

3. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, “Understanding Big Data: Analytics for EnterpriseClass Hadoop and Streaming Data”, McGraw Hill, 2011.

4. Pete Warden, Big Data Glossary, O’Reilly, 2011.

5. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier,Reprinted 2008.
6. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007.

DSE004 FULL STACK DEVELOPMENT 3 0 0 3

COURSE OBJECTIVES:

To get an overview of the full stack software and web development, To understand the object oriented structure and user interface programming through Python and to gain knowledge of web development using Flask Framework and learn the web application deployment in real time scenarios.

UNIT I OBJECT ORIENTED APPROACH IN PYTHON 9

Classes – Class Coding Basics: Instances – Behavior Methods – Operator Overloading – Customizing Behavior Methods – Constructors – Polymorphism – Inheritance.

UNIT II USER INTERFACE APPLICATIONS IN PYTHON AND VERSION CONTROL SYSTEM 9

Wxpython Installation – Menus and Toolbars – Layout Management – Wxpython Events – Wxpython Dialogs – Widgets – Graphics – Collaborative Version Control Systems – Git Commands – Real Time Usage of Git Commands.

UNIT III FLASK FRAMEWORK FOR WEB DEVELOPMENT 9

Flask Basics – Routes – Templates – Control Flow – Inheritance – Forms – Modules – Connection with Databases – Relational Database versus NoSQL – Modeling – Mapping Classes to Mongodb – Building Data Layer with Mongo Engine.

UNIT IV REAL TIME DEPLOYMENT OF WEB APPLICATION 9

Deploy Web Applications with Flask and MongoDB – Example Applications – Blogs – Forums – Auto Evaluation of Student Assignments – Deployment Using AWS or Google Cloud or Heroku.

UNIT V DEPLOYMENT OF SOFTWARE IN LINUX AND WINDOWS PLATFORM 9

Deployment in Ubuntu Distribution – Creation of .Deb Executable File – Deployment in Windows – Creation of Standalone Executable – Test Cases.

Total No. of Periods: 45 hrs.

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

CO1. Understand the object oriented approach in Python.

CO2. Develop GUI applications with Python.

CO3. Use the collaborative version control system, git.

CO4. Package the developed code in Linux and Windows environment.

CO5. Deploy the developed web application using Flask in real time scenarios such as AWS.

REFERRENCES:

1. Mark Lutz, “Learning Python”, Fifth Edition, O’ Reilly 2013.

2. http://zetcode.com/wxpython/

3. Scott Chacon and Ben Straub, “Pro Git”, Free e-book under Creative commons, Second Edition, Apress, 2016.

4. Miguel Grinberg, “Flask Web Development Developing Web Applications with Python”, OReilly, 2014. 5. Karl Seguin, “The Little Mongo DB Book”, https://github.com/karlseguin/the-littlemongodb-book.

6. Gareth Dwyer, “Flask by Example”, Packt Publishers, 2016.

7. https://aws.amazon.com/education/awseducate/

8. http://packaging.ubuntu.com/html/packaging-new-software.html

9. http://www.pyinstaller.org/ 10. https://pypi.org/project/py2exe/0.9.2.0/

DSE005 INTRODUCTION TO MACHINE LEARNING 3 0 0 3

Course Objective: This course will make the students to understand the basic concepts of machine learning. This will help the student to appreciate supervised learning with their applications, unsupervised learning like clustering and EM algorithms, reinforcement learning, representation learning, deep learning, neural networks and other technologies.

UNIT I INTRODUCTION 9

Machine Learning – Types of Machine Learning – Supervised Learning – Unsupervised Learning – Basic Concepts in Machine Learning – Machine Learning Process – Weight Space – Testing Machine Learning Algorithms

UNIT II SUPERVISED LEARNING 9

Linear Models for Regression – Linear Basis Function Models – Bayesian Linear Regression – Common Regression Algorithms – Simple Linear Regression – Multiple Linear Regression – Linear Models for Classification – Common Classification Algorithms – k-Nearest Neighbors – Decision Trees – Random Forest model – Support Vector Machines.

UNIT III UNSUPERVISED LEARNING 9

Mixture Models and EM – K-Means Clustering – Dirichlet Process Mixture Models – Spectral Clustering – Hierarchical Clustering – The Curse of Dimensionality – Dimensionality Reduction – Principal Component Analysis – Latent Variable Models(LVM).

UNIT IV GRAPHICAL MODELS 9

Bayesian Networks – Conditional Independence – Markov Random Fields – Learning – Naive Bayes Classifiers – Markov Model – Hidden Markov Model.

UNIT V ADVANCED LEARNING 9

Reinforcement Learning – Representation Learning – Neural Networks – Active Learning – Ensemble Learning – Bootstrap Aggregation – Boosting – Gradient Boosting Machines – Deep Learning.

TOTAL: 45 PERIODS

Course Outcome:

CO1: Choose and implement classification or regression algorithms for an application using an open source tool.

CO2: Analyse the results of a real time application when implementing generative algorithms.

CO3: Implement typical clustering algorithms for different types of applications using a tool.

CO4: Design and implement an HMM for a sequence model type of application.

CO5: Implement appropriate learning algorithms for any real time application using an open source tool.

REFERENCES:

1. EthemAlpaydin, “Introduction to Machine Learning”, Third Edition, Prentice Hall of India, 2015.
2. Christopher Bishop, “Pattern Recognition and Machine Learning”, Springer, 2006.
3. Stephen Marsland, “Machine Learning – An Algorithmic Perspective”, Second Edition, CRC Press, 2014.
4. Tom Mitchell, “Machine Learning”, McGraw-Hill, 2017.
5. Trevor Hastie, Robert Tibshirani, Jerome Friedman, “The Elements of Statistical Learning”, Second Edition, Springer, 2008.
6. Fabio Nelli, “Python Data Analytics with Pandas, Numpy, and Matplotlib”, Second Edition, Apress, 2018.
7. Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012

DSE006 E-LEARNING TECHNIQUES 3 0 0 3

Course Objective: This course will make the students to learn the various E-learning approaches, components and the types of design models of E-Learning. This course will also help to explore the models for E-learning courseware development and E-learning authoring tools.

UNIT I INTRODUCTION 9

Need for E-Learning – Approaches of E-Learning – Components of E-Learning – Synchronous and Asynchronous Modes of Learning – Quality of E-Learning – Blended Learning: Activities, Team and Technology – Work Flow to Produce and Deliver E-Learning Content – Basics of Design Thinking**.**

UNIT II DESIGNING E-LEARNING COURSE CONTENT 9

Design Models of E-Learning – Identifying and Organizing E-Learning Course Content: Needs Analysis – Analyzing the Target Audience – Identifying Course Content – Defining Learning Objectives – Defining the Course Sequence – Defining Instructional Methods – Defining Evaluation and Delivery Strategies – Case Study.

UNIT III CREATING INTERACTIVE CONTENT 9

Preparing Content: Tips for Content Development and Language Style – Creating Storyboards: Structure of an Interactive E-Lesson – Techniques for Presenting Content – Adding Examples – Integrating Multimedia Elements – Adding Examples – Developing Practice and Assessment Tests – Adding Additional Resources– Courseware Development – Authoring Tools – Types of Authoring Tools – Selecting an Authoring Tool.

UNIT IV LEARNING PLATFORMS 9

Types of Learning Platforms – Proprietary Vs. Open – Source LMS – LMS Vs LCMS – Internally Handled and Hosted LMS – LMS Solutions – Functional Areas of LMS.

UNIT V COURSE DELIVERY AND EVALUATION 9

Components of an Instructor-Led or Facilitated Course – Planning and Documenting Activities – Facilitating Learners Activities – E-Learning Methods and Delivery Formats – Using Communication Tools for E-Learning – Course Evaluation.

TOTAL: 45 PERIODS

Course Outcome:

CO1: Distinguish the phases of activities in the models of E-learning.

CO2: Identify appropriate instructional methods and delivery strategies.

CO3: Choose appropriate E-learning authoring tools.

CO4: Create interactive E-Learning courseware.

CO5: Evaluate and manage the E-learning courseware.

REFERENCES:

1. Clark, R. C. and Mayer, R. E, "eLearning and the Science of Instruction", Third Edition, John Wiley, 2016.
2. Means, B., Toyama, Y., and Murphy, R, "Evaluation of Evidence – Based Practices in Online Learning: A Meta – Analysis and Review of Online Learning Studies", Centre for Learning Technologies, 2010.
3. Crews, T. B., Sheth, S. N., and Horne, T. M, "Understanding the Learning Personalities of Successful Online Students", Educause Review, 2014.
4. Johnny Schneider, "Understanding Design Thinking, Lean and Agile", O'Riley Media, 2011.
5. Madhuri Dubey, "Effective E – learning Design, Development and Delivery", University Press, 2011.

DSE007 SOFTWARE TESTING 3 0 0 3

Course objective:

To introduce the basics and necessity of Software testing, to introduce various testing techniques along with software production, and to introduce the concepts of Software bugs and its impact

UNIT I INTRODUCTION 9

Software testing background – software bugs- cost of bugs-software testing realities- Testing Axioms – Precision and Accuracy-verification and validation- quality and reliability-testing and quality assurance.

UNIT II SOFTWARE TESTING METHODOLOGY 9

Functional testing, Structural testing – Static and Dynamic testing – low level specification test techniques – Equivalence Partitioning – Data testing – State Testing –formal reviews – coding standards and guidelines – code review checklist– data coverage- code coverage.

UNIT III SOFTWARE TESTING TECHNIQUES 9

Configuration testing –Compatibility tests – foreign language testing – usability testing – testing the documentation - testing for software security – website testing.

UNIT IV AUTOMATED TESTING AND TEST TOOLS 9

Benefits of automation and tools – viewers and monitors – drivers – stubs – stress and load tools – analysis tools- software test automation – random testing –beta testing

UNIT V TEST DOCUMENTATION 9

Goal of Test Planning – test phases – test strategy – resource requirements – test schedule – writing and tracking test cases- Bug tracking systems – metrics and statistics- risks and issues

TOTAL: 45 Hours

COURSE OUTCOME

Upon Completion of the course, the students should be able to:

CO1 : Discuss the concepts of software testing

CO2 : Explain the testing techniques

CO3 : Perform automated testing using test tools

CO4 : Document the testing procedures

TEXT BOOKS:

1.Glenford J.Myers, Tom Badgett, Corey Sandler, “The Art of Software Testing”, 3rd edition, John Wiley & Sons publication, 2012.

2. Ron Patton, “Software testing”, second edition, Pearson education, 2009.

REFERENCE BOOKS:

1 Boris Beizer, “Software testing techniques”,DreamTech Press,2009.

2.Srinivasan Desikan, Gopalaswamy Ramesh, “Software testing- Principles and Practices”, Pearson education, 2009

DSE008 DEEP LEARNING TECHNIQUES AND APPLICATIONS 3 0 0 3

Course Objective:

To understand the basics of machine leaning and deep learning and to apply the Machine learning principles. To study the deep learning architectures. Explore and create deep learning applications with tensor flow.

UNIT-I: INTRODUCTION 9

Introduction to different types of learning, Supervised and Unsupervised learning – Reinforcement learning- Basics of Neural Network – Limits of Traditional Computing – Machine Learning – Neuron – FF Neural Networks – Types of Neurons – Softmax output layers

UNIT-II: TENSOR FLOW 9

Tensor flow – Variables – Operations – Placeholders – Sessions – Sharing Variables – Graphs – Visualization

UNIT-III: CONVOLUTION NEURAL NETWORKS 9

Convolution Neural Network – Feature Selection – Max Pooling – Filters and Feature Maps – Convolution Layer –Applications

UNIT-IV: RECURRENT NEURAL NETWORKS 9

Recurrent Neural Network – Memory cells – sequence analysis – word2vec- LSTM - Memory augmented Neural Networks – NTM-– Application

UNIT-V: REINFORMENT LEARNING 9

Reinforcement Learning – MDP – Q Learning – Applications

Total No. of Periods: 45hrs.

COURSE OUTCOMES:

Students will be able to:

CO1: Interpret the basics of Machine learning.

CO2: Design and develop machine leaning applications

CO3: Analyze the various applications of Convolution Neural Networks, Artificial Neural Networks, Recurring Neural Networks

CO4: Explore, Evaluate different neural networks

CO5: Apply the concepts of deep leaning in real life problems

TEXTBOOK:

1. R.Rojas and J. Feldman, Neural Networks: A Systematic Introduction (1st ed.), Springer, 1996.
2. Nikhil Buduma, Nicholas Locascio, “Fundamentals of Deep Learning: Designing NextGeneration Machine Intelligence Algorithms”, O'ReillyMedia, 2017.

REFERENCES:

1. Ian Goodfellow, Yoshua Bengio, Aaron Courville, ”Deep Learning (Adaptive computation and Machine Learning series”, MITPress, 2017.
2. E. Alpaydin, Introduction to Machine Learning, Prentice Hall of India, 2006.
3. B. Yegnanarayana, Artificial Neural Networks, Prentice-Hall of India, 2006
4. S. Haykin, Neural Networks: A Comprehensive Foundation (2nd ed.), Prentice Hall, 1999

DSE009 GAME PROGRAMMING TECHNIQUES 3 0 0 3

Course objective:

To understand the concepts of Game design and development, learn the processes, mechanics and issues in Game Design, be exposed to the Core architectures of Game Programming, Know about Game programming platforms, frame works and engines and Learn to develop games.

UNIT I 3D GRAPHICS FOR GAME PROGRAMMING 9

3D Transformations, Quaternions, 3D Modeling and Rendering, Ray Tracing, Shader Models, Lighting, Color, Texturing, Camera and Projections, Culling and Clipping, Character Animation, Physics-based Simulation, Scene Graphs.

UNIT II GAME ENGINE DESIGN 9

Game engine architecture, Engine support systems, Resources and File systems, Game loop and real-time simulation, Human Interface devices, Collision and rigid body dynamics, Game profiling.

UNIT III GAME PROGRAMMING 9

Application layer, Game logic, Game views, managing memory, controlling the main loop, loading and caching game data, User Interface management, Game event management.

UNIT IV GAMING PLATFORMS AND FRAMEWORKS 9

2D and 3D Game development using Flash, DirectX, Java, Python, Game engines - Unity. DX Studio,

UNIT V GAME DEVELOPMENT 9

Developing 2D and 3D interactive games using DirectX or Python – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL: 45 Hrs.

COURSE OUTCOME:

Upon completion of the course, students will be able to

CO1 Discuss the concepts of Game design and development.
CO2 Design the processes, and use mechanics for game development.
CO3 Explain the Core architectures of Game Programming.
CO4 Use Game programming platforms, frame works and engines.
CO5 Create interactive Games.

TEXT BOOKS:

1. Mike Mc Shaffrfy and David Graham, "Game Coding Complete", Fourth Edition, Cengage Learning, PTR, 2012.
2. Jason Gregory, "Game Engine Architecture", CRC Press / A K Peters, 2009.
3. David H. Eberly, "3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics" 2 nd Editions, Morgan Kaufmann, 2006.

REFERENCES:

1. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", 2 nd Edition Prentice Hall / New Riders, 2009.
2. Eric Lengyel, "Mathematics for 3D Game Programming and Computer Graphics", 3 rd Edition, Course Technology PTR, 2011.
3. Jesse Schell, The Art of Game Design: A book of lenses, 1 st Edition, CRC Press, 2008.

DSE010 MULTIMEDIA TECHNOLOGIES 3 0 0 3

Course objective:

To understand the concepts of multimedia, Learn the processes, mechanics and issues in multimedia platform, Game Design, be exposed to various tools of multimedia, Know about multimedia audio, video & image formats, Learn to shoot ,edit video and delivering to www.

Unit I Introduction to Multimedia 9

Definitions - CD-ROM and the Multimedia Highway - where to use Multimedia - introduction to Making Multimedia: The stages of a Project - What you need - Macintosh and Windows Production Platforms: The Macintosh Platform - The Windows Multimedia PC platform - Hardware Peripherals Connection - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices.

Unit II Basic Tools 9

Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image - Editing Tools - Helpful Accessories - Making Instant Multimedia: Linking Multimedia Objects - Office Suites - Word Processors - Spread sheets - Databases - Presentation Tools. Multimedia Authoring Tools.

Unit III Text 9

The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext - Multimedia System Sounds - Digital Audio - Making MIDI Audio - Audio File Formats

Unit IV Images 9

Making Still Images - Color - Image File Formats. Animation: The Power of Motion - Principles of Animation - Making Animations That Work - Video: Using video - How video works - Broadcast Video Standards - Integrating Computers and Television - Shooting and Editing Video - Video Tips - Recording Formats - Digital Video.

Unit V Planning and Costing **9**

Disc Technology - Wrapping It Up - Delivering on the World Wide Web. Project planning - Estimating - RFPs and Bid proposals - Designing and producing: Designing - Producing - Content and Talent: Acquiring Content - Using content created by others Testing - Preparing for Delivery – Compact.

TOTAL: 45 Hours

COURSE OUTCOME

Upon completion of the course, students will be able to

CO1 Discuss the concepts of multimedia.
CO2 Design the processes, and use mechanics for multimedia platforms.
CO3 Explain the tools of multimedia.
CO4 Know about usage of multimedia audio, video & image formats.
CO5 Know to shoot, edit video and delivering to www.

TEXT BOOKS:

1. Tay Vaughan - Multimedia : Making it work - Fourth Edition - Tata McGraw-Hill Edition - 1999.
2. Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London- 1991.
3.John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.

REFERENCE BOOK:

1. John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.

2. Multimedia Systems by Ralf Steinmetz and Klara Nahrstedt.

3. Multimedia Systems, Standards, and Networks" by A Puri and T Chen.

DSE011 DATA VISUALISATION TECHNIQUES 3 0 0 3

Course objective:

To understand the concepts of different types of visualization and how humans perceive information. Learn the processes, mechanics in implementing principles of design and color to make effective visualizations, learn how to visualize graphs, be exposed to visualization dashboards, and to apply techniques from user-interface design to create an effective visualization system.

UNIT I The Computer and the Human 9

Defining data visualization Visualization workflow-describing data visualization workflow-process in practice

UNIT II Visualization of Numerical Data 9

Data Representation: chart types: categorical, hierarchical, relational, temporal & spatial; 2-D: bar charts, Clustered bar charts, dot plots, connected dot plots, pictograms, proportional shape charts, bubble charts, radar charts, polar charts, Range chart

UNIT III Visualization **of Non-Numerical Data 9**

Range chart, Box-and-whisker plots, univariate scatter plots, histograms word cloud, pie chart, waffle chart, stacked bar chart, back-to-back bar chart.

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UNIT IV Visualization Dashboard 9

Visualization system for large datasets and dashboards, Tools for dashboard, graph data visualization; Annotation

UNIT V 2**-D & 3-D DATA VISUALISATION 9**

Relevant 2-D charts. 3-D: surfaces, contours, hidden surfaces, pm3d coloring, 3D mapping; multi-dimensional data visualization

TOTAL : 45 Hours.

COURSE OUTCOME:

Upon completion of the course, students will be able to

CO1 Discuss the concepts of what data visualization is, how it's used, and how Computers display information.

CO2 Implement principles of design and color to make data visualizations more Effective

CO3 Learn how to visualize graphs that depict relationships between data items.

CO4 Use and designing own visualization system for large datasets and dashboards

CO5 To interpret visualization system.

TEXT BOOKS

1. Andy Kirk, Data Visualization A Handbook for Data Driven Design, Sage Publications, 2016
2. Philipp K. Janert, Gnuplot in Action, Understanding Data with Graphs, Manning Publications, 2010.

REFERENCE BOOKS

1. Information Dashboard Design-Displaying data for at-a-glance monitoring-Stephen Few
2. Beautiful Visualisation, Looking at data through the eyes of experts by Julie steele

DSE012 UNIX PROGRAMMING 3 0 0 3

Course Objective:

To study and understand the UNIX architecture, file systems, basic commands. To understand Shell programming and analyze various system calls and processes.

UNIT I: Introduction to UNIX 9

Architecture of UNIX, Features of UNIX , UNIX Commands – man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, env . Environment Variables**:** PATH, LOGNAME, SHELL, USER.

UNIT II: UNIX Utilities 9

Introduction to UNIX file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities ,Networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin
Text processing utilities and backup utilities , tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio.

UNIT III: Introduction to Shell 9

UNIX Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Shell/Environment Customization, Filters, grep, sed, awk, Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk .

UNIT IV: File Management 9

File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask

UNIT V: Process Management 9

Categories of process, Parent & Child process, Zombie and Orphan process, mechanism of init(), termination of a process, process control mechanism 12

Text Books:

1. UNIX and Shell Programming; Behrouz A. Forouzan, Richard F. Gilberg; Thomson
2. UNIX: Concepts and Applications; Sumitava Das; TMH

Reference

1. UNIX for Programmers and Users; Graham Glass, King Ables; Pearson Education
2. UNIX Programming Environment; Kernighan and Pike; PHI/Pearson Education
3. The Complete Reference UNIX; Rosen, Host, Klee, Farber, Rosinski; TMH
4. Your UNIX – The Ultimate Guide; Sumitava Das; TMH
5. Design of UNIX Operating System; Maurice Bach; PHI

COURSE OUTCOME:

At the end of this course the student will be able to

CO1 : Describe the architecture of multi user OS UNIX and its basic features and commands.

CO2 : Interpret and apply UNIX Commands and utilities in Linux/UNIX systems.

CO3 : Illustrate Shell Programming and to write Shell Scripts

CO4 : Design and develop UNIX File I/O operations.

CO5 : Ability to understand and interpret UNIX Processes.

DSE013 C# AND .NET PROGRAMMING 3 0 0 3

Course Objective:

This course is designed to provide the knowledge of Dot Net Frameworks along with ASP.Net and C# . Understand HTML controls, web server controls and validation controls. Understand session management and cookies. Familiarize with the Connected DO.NET Architecture and Disconnected ADO.NET Architecture.

UNIT I- BASIC CONCEPTS OF .NET TECHNOLOGIES 9

.NET Framework Architecture - Common Language Runtime -Common type systems - .NET Framework Class Library- Garbage Collection– Globalization - Assemblies - Global Assembly cache (GAC)-Versioning - Introduction to Visual Studio Environment.

UNIT – II C# LANGUAGE FUNDAMENTALS 9

C# Language Fundamental – Arrays -Object Oriented programming in C# -I/O –Properties- Indexers- Exception Handling –Delegates- Events – Composition

UNIT –III ADVANCED C# 9

Generics - Generic Delegate and Interfaces –Reflection –Attributes -Class Library -String Multithreading -Collection – Iterator -Asynchronous Callback -Security.

Unit –IV ADO.NET PROGRAMMING 9

Fundamentals -ADO.NET- Connection Oriented Architecture -Data Adapter -Connectionless – Datasets – Typed Un typed – Concurrency- Transactions and locks- Data source controls- Data binding – Data grid.

UNIT V – ASP.NET 9

Web Server concepts - ASP. NET Page - Page Directive – Code Behind – ASP.NET Controls – HTML Controls- Validation Controls- Data Binding Repeater – DataGrid - Web.Configuration File- Request Response Objects Session Management –Cookies – URL Rewriting

Total : 45 hrs.

Course Outcome

CO1: Learn about developed by MS Microsoft

CO2: Understand .NET framework and the use of C# basics, Objects and Types, Inheritance

CO3: Develop, implement and creating Applications with C#.

CO4: Create a Web form with server controls and Display dynamic data from a data source by using Microsoft ADO.NET and data Binding

CO5: Create distributed data-driven applications using the .NET Framework, C#, SQL Server and ADO.NET

REFERENCES

1. C. Stephen Perry, Stephen Walther, Atul Kahate , Joseph Mayo," Essentials of .Net Related Technologies: With a focus on C# , XML, ASP .NET and ADO.NET", First Edition, Pearson Education.
2. Schildt, Herbert, "C#: The Complete Reference", Second Edition, McGraw-Hill, 2008.
3. Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner, "Professional C# and .NET 4.5", Wiley, 2012.
4. Andrew Troelsen, "Pro C# 5.0 and the .NET 4.5 Framework", Apress publication, 2012.
5. Ian Gariffiths, Mathew Adams, Jesse Liberty, "Programming C# 4.0", O'Reilly, Sixth Edition, 2010.
6. Templeman, J., & Vitter, D. (2002). Visual Studio. NET: The. NET Framework Black Book. Coriolis.

DSE014 SOFTWARE PROJECT MANAGEMENT 3 0 0 3

Course Objective:

To define and highlight importance of software project management. To formulate strategy in managing projects. To estimate the cost associated with a project. To plan, schedule and monitor projects for the risk management. To define the software management metrics. To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.

UNIT-I: INTRODUCTION 9

Introduction to Competencies – Product Development Techniques – Management Skills – Product Development Life Cycle – Software Development Process.

UNIT-II: DOMAIN PROCESSES 9

Managing Domain Processes – Project Selection Models – Project Portfolio Management – Financial Processes – Selecting a Project Team – Goal and Scope of the Software Project – Project Planning.

UNIT-III: SOFTWARE ESTIMATION 9

Tasks and Activities – Software Size and Reuse Estimating – The SEI CMM – Problems and Risks – Cost Estimation – Effort Measures –COCOMO. A Regression Model – COCOMO II

UNIT-IV: SCHEDULING ACTIVITIES 9

Project Management Resource Activities – Organizational Form and Structure – Software Development Dependencies – Brainstorming – Scheduling Fundamentals – PERT and CPM.

UNIT-V: SOFTWARE QUALITY ASSURANCE 9

Quality Requirements – The SEI CMM – Guidelines – Challenges – Quality Function Deployment – Building the Software Quality Assurance – Plan – Software Configuration Management Principles – Requirements .

Total No. of Periods: 45 Hrs.

Course Outcome:

CO1: Critically evaluate alternative standards, models and techniques aimed at achieving quality assurance in a variety of software development environments.

CO2: Propose and defend innovative solutions to software quality assurance and measurement problems in the context of various software development environments.

CO3: Interpret and apply various software cost estimation techniques.

CO4: Prepare a software quality plan for a software project - to include sections on change management, configuration management, defect elimination, validation and verification and measurement.

CO5: Discuss the role of software quality assurance in improving the software development process

Text Book:

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, "Quality Software Project Management", Pearson Education, Asia, 2002.

References:

1. PankajJalote, "Software Project Management in Practice", Addison Wesley, 2002.
2. Hughes, "Software Project Management, 3rdEdition", Tata McGrawHill, 2004.

DSE015 DIGITAL IMAGE PROCESSING AND APPLICATIONS 3 0 0 3

Course Objectives:

To learn the basic concepts of digital image processing and various image transforms.To familiarize the student with the image enhancement techniques.To expose the student to a broad range of image processing techniques and their applications in real-world applications of image processing.

UNIT I FUNDAMENTALS OF IMAGE PROCESSING 9

Introduction – Applications of Image Processing – Steps in Image Processing Applications – Digital Imaging System – Sampling and Quantization – Pixel Connectivity – Distance Measures – Colour Fundamentals and Models – File Formats – Image Operations.

UNIT II IMAGE ENHANCEMENT 9

Image Transforms: Discrete Fourier Transform – Fast Fourier Transform – Discrete Cosine Transform – Image Enhancement in Spatial and Frequency Domain – Grey Level Transformations – Histogram Processing –Spatial Filtering – Smoothing And Sharpening – Frequency Domain: Filtering in Frequency Domain.

UNIT III IMAGE RESTORATION AND MULTI-RESOLUTION ANALYSIS 9

Multi Resolution Analysis: Image Pyramids – Multi Resolution Expansion – Wavelet Transforms – Image Restoration – Image Degradation Model – Noise Modeling – Blur – Order Statistic Filters – Image Restoration Algorithms.

UNIT IV IMAGE SEGMENTATION AND FEATURE EXTRACTION 9

Image Segmentation – Detection of Discontinuities –Edge Operators –Edge Linking and Boundary Detection – Thresholding – Region based Segmentation – Image Features and Extraction – Image Features – Types of Features – Feature Extraction – SIFT, SURF and Texture – Feature Reduction Algorithms.

UNIT V IMAGE PROCESSING APPLICATIONS 9

Image Classifiers – Supervised Learning – Support Vector Machines, Image Clustering – Unsupervised Learning – Hierarchical and Partition based Clustering Algorithms – EM Algorithm.

TOTAL: 45 PERIODS

Course Outcomes

On completion of the course, the students will be able to:

CO1: Implement basic image processing operations.

CO2: Apply and develop new techniques in the areas of image enhancement and restoration.

CO3: Understand the image segmentation algorithms.

CO4: Apply classifiers and clustering algorithms for image classification and clustering.

CO5: Design and develop an image processing application that uses different concepts of image processing.

REFERENCES:

1. Rafael Gonzalez, Richard E. Woods, “Digital Image Processing”, Fourth Edition, Pearson Education, 2018.

2. S. Sridhar, “Digital Image Processing”, Second Edition, Oxford University Press, 2016.

3. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI, 2011.

4. Milan Sonka, Vaclav Hlavac, Roger Boyle, “Image Processing Analysis and Machine Vision”, Fourth Edition, Cengage India, 2017.

DSE 016 DATA WAREHOUSING AND DATA MINING TECHNIQUES 3 0 0 3

COURSE OBJECTIVE

To get exposed to the concepts of data warehousing architecture and implementation. To conceptualize data mining and the need for pre-processing and to analyze the mining techniques for realistic data. To characterize the kinds of patterns that can be discovered by association rule mining. To implement classification and clustering techniques on large datasets and to identify business applications and trends of data mining.

UNIT I DATA WAREHOUSE 9

Data Warehousing – Operational Database Systems versus Data Warehouses –. Multidimensional Data Model – Schemas for Multidimensional Databases – OLAP operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools

UNIT II DATA MINING & DATA PREPROCESSING 9

Introduction to KDD Process – Knowledge Discovery from Databases – Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III ASSOCIATION RULE MINING 9

Introduction – Data Mining Functionalities – Association Rule Mining – Mining Frequent Item sets with and without Candidate Generation – Mining Various Kinds of Association Rules – Constraint – Based Association Mining.

UNIT IV CLASSIFICATION & PREDICTION 9

Classification versus Prediction – Data Preparation for Classification and Prediction – Classification by Decision Tree – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V CLUSTERING 9

Cluster Analysis – Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Model Based Clustering Methods – Clustering High-Dimensional Data – Constraint Based Cluster Analysis – Outlier Analysis.

TOTAL: 45 HRS

COURSE OUTCOME

CO1: Design, create and maintain data warehouses.

CO2: Apply data mining techniques and methods to large data sets.

CO3: Evaluate various mining techniques on complex data objects.

CO4: Evolve multidimensional intelligent model from typical system.

CO5: Discover the knowledge imbibed in the high dimensional system.

CO6: Understand various tools of data mining and their techniques to solve the real time problems.

REFERENCES:

1.Jiawei Han, Micheline Kamber, “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2012.

2.K. P. Soman, Shyam Diwakar, V. Ajay, “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.

3.G. K. Gupta, “Introduction to Data Min Data Mining with Case Studies”, Eastern Economy Edition, Prentice Hall of India, Third Edition, 2014.

4.Colleen Mccue, “Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis”, Second Edition, Elsevier, 2015.

5.Anand Rajaraman, Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2014.

6.Ian H. Witten, Eibe Frank, Mark A. Hall, “Data Mining: Practical Machine Learning Tools and Techniques”, Third Edition, Morgan Kaufmann, 2011.

7.George M. Marakas, “Modern Data Warehousing, Mining and Visualization: Core Concepts”, Prentice Hall, 2002.

8.Bruce Ratner, “Statistical and Machine Learning Data Mining: Techniques for Better Predictive Modeling and Analysis of Big Data”, Second Edition, CRC Press, 2012.

DSE017 SOFTWARE QUALITY ASSURANCE 3 0 0 3

COURSE OBJECTIVE

To gather knowledge on quality management, documentation and controlling for software quality. To provide knowledge on standards, models and tools used for quality management. To perform measurement and assessment of software quality. To introduce the basics and necessity of software testing along with software production.

UNIT I INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE 9

Need for Software Quality – Quality Challenges – Software Quality Assurance (SQA) – Definition and Objectives – Software Quality Factors – McCall's Quality Model – SQA System and Architecture – Software Project Life Cycle Components – Management of SQA components – Pre-Project Software Quality Components – Contract Review – Development and Quality Plans.

UNIT II SQA COMPONENTS AND PROJECT LIFE CYCLE 9

Software Development Methodologies – Quality Assurance Activities in the Development Process – Verification, Validation and Qualification – Reviews: Objectives – Formal design Review – Peer Review – Quality of Software Maintenance Components – Pre-Maintenance Software Quality Components – Maintenance Software Quality Assurance Tools – Assuring the Quality of External Participants Contributions: Objectives, Types, Risks and Benefits – Tools: CASE Tools and Their Effect on Software Quality.

UNIT III SOFTWARE QUALITY INFRASTRUCTURE 9

Procedures and Work Instructions – Supporting Quality Devices – Templates – Checklists – Staff Training and Certification – Corrective and Preventive Actions – Configuration Management – Software Change Control – Configuration Management Audit – Documentation Control – Storage and Retrieval.

UNIT IV SOFTWARE QUALITY MANAGEMENT, METRICS & STANDARDS 9

Project Process Control – Computerized Tools – Software Quality Metrics – Objectives of Quality Measurement – Process Metrics – Product Metrics – Implementation – Limitations of Software Metrics – Cost Of Software Quality – Classical Quality Cost Model – Extended Model – Application of Cost Model. Quality Management Standards – ISO 9001 And ISO

9000-3 – Capability Maturity Models (CMM & CMMI) – Project Management Responsibilities – SQA Units and Other Actors in SQA Systems.

UNIT V SOFTWARE TESTING 9

Definition and Objectives – Software Testing Strategies – Software Test Classifications – White Box Testing: Data Processing, Calculation Correctness Tests, Mccabe's Cyclomatic Complexity Metrics, Software Qualification and Reusability Testing, Advantages and Disadvantages of White Box Testing – Black Box Testing: Equivalence Classes for Output Correctness Tests, Revision Factor Testing Classes, Transition Factor Testing Classes, Advantages and Disadvantages of Black Box Testing – Implementation: The Testing Process – Test Case Design – Automated Testing – Alpha and Beta Site Testing Programs.

TOTAL: 45 PERIODS

COURSE OUTCOMES

CO1: Learn document control and manage software quality with the aid of tools and Standards.

CO2: Distinguish between various software quality models.

CO3: Measure and assess software quality through process and product metrics.

CO4: Distinguish between the software quality standards.

CO5: Perform automated testing using test tools.

CO6: Document the testing procedures.

TEXT BOOK & REFERENCE BOOK:

1. Daniel Galin, "Software Quality Assurance: From theory to implementation", Pearson Education, 2004.
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson Education, 2002.
3. Mordechai Ben-Menachem, Garry S. Marliss, "Software Quality", BSP, Second Edition, 2014.
4. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003.
5. Glenford J. Myers, Tom Badgett, Corey Sandler, "The Art of Software Testing", Third Edition, John Wiley & Sons, 2012.
6. Ron Patton, "Software testing", Second Edition, Pearson Education, 2009.

7. Srinivasan Desikan, Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2009.

DSE018 IoT Based Smart Systems 3 0 0 3

Course Objective:
The purpose of this course is to impart knowledge on IoT Architecture and various protocols, study their implementations. To incorporate the IOT concepts and develop smart systems

UNIT I – Fundamentals of IOT 9

IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management-Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics.

UNIT II – REFERENCE ARCHITECTURE 9

IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

UNIT III – IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS 9

PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15) – Wireless HART-ZWave - Bluetooth Low Energy- Zigbee Smart Energy-DASH7 - Network Layer-IPv4- IPv6-6LoWPAN- 6TiSCH-ND-DHCP-ICMP-RPL- CORPL-CARP

UNIT IV – TRANSPORT & SESSION LAYER PROTOCOLS 9

Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) – Session LayerHTTP, CoAP - XMPP- AMQP - MQTT

UNIT V – SERVICE LAYER PROTOCOLS & SECURITY 9

Service Layer -oneM2M, ETSI M2M, OMA, BBF – Security in IoT Protocols – MAC 802.15.4 , 6LoWPAN, RPL, Application Layer . Design smart system using IOT components.

Total: 45 hrs.

Course Outcomes:

CO1: To Understand the Architectural Overview of IoT

CO2: To Understand the IoT Reference Architecture and Real World Design Constraints

CO3: To Understand the various IoT Protocols (Datalink, Network, Transport, Session, Service)

CO4: To gain knowledge how to design IOT based Applications

CO5: To demonstrate the concepts of networks and sensors in the real time applications

Text Books:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI.

3. . Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1 st Edition, VPT, 2014.

REFERENCES

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer

2. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Wiley Publications

3. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

DSE019 Object Oriented Analysis and Design 3 0 0 3

Course Objective:

The course objective is to understand the object orientation software development process, use case model, user interface and various testing methods.

UNIT I INTRODUCTION **9**

System Development – Object Basis – Development Life Cycle – Methodologies – Patterns – Unified Approach – UML.

UNIT II USE CASE MODELS **9**

Use–Case Models – Object relations – Attributes – Methods – Class and Object responsibilities.

UNIT III CASE DESIGN **9**

Design Processes – Design Axioms – Class Design – Object Storage – Object Interpretability – Case Studies.

UNIT IV USER INTERFACE DESIGN **9**

User Interface Design – View layer Class – Micro–Level Processes – View Layer Interface – Case Studies.

UNIT V TESTING **9**

Quality Assurance Tests – Testing Strategies – Test Cases – test Plants – Continuous testing – Debugging Principles – Measuring User Satisfaction – Case Studies.

Total : 45 HOURS

Course Outcomes:

At the end of this course the student will be able to

CO1: understand the formal object–oriented analysis and design processes.

CO2: understand the risks inherent to large–scale software development.

CO3: Develop the skills to determine which processes and OOAD techniques should be applied to a given project.

CO4: Develop an understanding of the application of OOAD practices.

CO5: Analyse the various testing strategies in Object oriented software development.

Text Books

1. Ali Bahrami, “Object Oriented Systems Development”, McGraw Hill International Edition, 1999.

Reference Book

1. Grady Booch, “Object Oriented Analysis and design”, Addison Wesley, 2nd, Edition, 1999.

2. Brett McLaughlin, Gary Pollice, David West"Head First Object-Oriented Analysis and Design-A Brain Friendly Guide to OOA&D", O'Reilly Media, November 2006.
3. Craig Larman " Applying UML and Patterns: An Introduction to Object-oriented Analysis and Design and the Unified Process", Prentice Hall Professional, 2002

DSE020 ARTIFICIAL INTELLIGENCE 3 0 0 3

Course Objective:

To understand the basic concepts of Artificial Intelligence, fuzzy systems and NLP. To understand the various search techniques of AI. To analyze the various knowledge representation and their importance. To familiarize the AI programming using PROLOG.

UNIT-I: INTRODUCTION AND PROBLEM SOLVING 9

Various definitions of AI, Introduction to AI applications and AI techniques, Production systems, control strategies, reasoning - forward & backward chaining, Intelligent Agents

UNIT-II: SEARCH AND GAME PLAYING 9

Breadth first search, depth first search, iterative deepening, uniform cost search, hill climbing, simulated annealing, genetic algorithm search, heuristic search, Best first search, A* algorithm, AO* algorithm, Minmax & game trees, refining minmax, Alpha – Beta pruning, constraint satisfaction

UNIT-III: KNOWLEDGE REPRESENTATION 9

Representations and mappings, Approaches to knowledge Representation, Procedural versus Declarative knowledge; Predictive Logic: Representing Simple facts, Instance and Isa relationships in Logic, Proposition versus Predicate Logic, Computable Functions and Predicates- not, Rules of Inferences and Resolution-not, Forward versus Backward Reasoning, Logic Programming and Horn Clauses

UNIT-IV: AI PROGRAMMING LANGUAGES 9

(PROLOG): Introduction, How Prolog works, Backtracking, CUT and FAIL operators, Built –in Goals, Lists, Search in Prolog.

UNIT-V: APPLICATIONS OF ARTIFICIAL INTELLIGENCE 9

Fuzzy sets/systems, Natural language processing,Speech recognition, Computer vision and Expert sytems

Total : 45 hrs.

COURSE OUTCOME:

CO1: Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

CO2: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3: Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

CO4: Demonstrate profIciency IN developing applications in an 'AI language'

CO5: Able to apply various searching and game playing techniques.

CO6: Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

TEXT BOOK:

1. Stuart Russel and Peter Norvig: Artificial Intelligence – A Modern Approach, 2nd Edition Pearson Education
2. Elaine Rich and Kevin Knight: Artificial Intelligence, Tata McGraw Hill 2nd Ed.

REFERENCE:

1. N.P. padhy: Artificial Intelligence and Intelligent Systems, Oxford Higher Education, Oxford University Press
2. R. Akerkar, Introduction to Artificial Intelligence, Prentice-Hall of India, 2005
3. George F Luger: Artificial Intelligence- Structures and Strategies for complex Problem Solving, 4 th Ed. Pearson Education
4. Ivan Bratko :PROLOG Programming 2nd Ed., Pearson Education

DSE 021 COMPUTER GRAPHICS 3 0 0 3

Course Objectives:

To equip students with the fundamental knowledge and basic technical competence in the field of computer graphics. To emphasize on implementation aspect of Computer Graphics Algorithms. To prepare the student for advance areas like Image Processing or Computer Vision or Virtual Reality and professional avenues in the field of Computer Graphics.

UNIT I Fundamentals of Graphics 9

Survey of computer graphics, Overview of graphics systems – Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software; Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.

UNIT II TWO DIMENSIONAL GRAPHICS 9

Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two-dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

UNIT III THREE DIMENSIONAL GRAPHICS 9

Three dimensional concepts; Three dimensional object representations – Polygon surfaces- Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces. TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.

UNIT IV ILLUMINATION AND COLOUR MODELS 9

Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive colour concepts – RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model; Colour selection.

UNIT V ANIMATIONS & REALISM **9**

ANIMATION GRAPHICS: Design of Animation sequences – animation function – raster animation – key frame systems – motion specification –morphing – tweening. COMPUTER GRAPHICS REALISM: Tiling the plane – Recursively defined curves – Koch curves – C curves – Dragons – space filling curves – fractals – Grammar based models – fractals – turtle graphics – ray tracing

Total No. of Periods : 45 hrs.

Course Outcomes :

CO 1 : To Understand the basic concepts of Computer Graphics.

Co 2: To Demonstrate various algorithms for scan conversion and filling of basic objects and Their comparative analysis.

CO 3: To apply geometric transformations, viewing and clipping on graphical objects.

CO 4: To Explore solid model representation techniques and projections.

CO 5: To understand visible surface detection techniques and illumination models.

TEXT BOOKS:

1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,"Computer Graphics: Principles and Practice", , 3rd Edition, Addison- Wesley Professional,2013.
2. Donald Hearn and Pauline Baker M, "Computer Graphics", Prentice Hall, New Delhi, 2007.

REFERENCES:

1. Donald Hearn and M. Pauline Baker, Warren Carithers,"Computer Graphics With Open GL", 4th Edition, Pearson Education, 2010.
2. Jeffrey McConnell, "Computer Graphics: Theory into Practice", Jones and Bartlett Publishers, 2006.

3. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010.
4. William M. Newman and Robert F.Sproull, “Principles of Interactive Computer Graphics”, Mc GrawHill 1978.
5. http://nptel.ac.in/

DSE022 Wireless Sensor Networks & Protocols 3 0 0 3

Course Objective:

To learn Wireless Sensor Network fundamentals and to understand the different routing protocols. To have an in-depth knowledge on sensor network architecture and design issues. To understand the transport layer and security issues possible in sensor networks and to have an exposure on programming platforms and tools

UNIT I INTRODUCTION 9

Introduction to wireless sensor Networks - Challenges for Wireless Sensor Networks- Enabling Technologies for Wireless Sensor Networks- WSN application examples - Single-Node Architecture - Hardware Components

UNIT II SENSOR NETWORKS & ARCHITECTURES 9

Energy Consumption of Sensor Nodes -Network Architecture - Sensor Network Scenarios- Transceiver Design Considerations- Optimization Goals and Figures of Merit.

UNIT III WSN NETWORKING CONCEPTS AND PROTOCOLS 9

MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols and Wakeup Concepts - S-MAC, The Mediation Device Protocol, Contention based protocols - PAMAS, Schedule based protocols – LEACH, IEEE 802.15.4 MAC protocol, Routing Protocols Energy Efficient Routing, Challenges and Issues in Transport layer protocol.

UNIT IV SENSOR NETWORK SECURITY 9

Network Security Requirements - Issues and Challenges in Security Provisioning- Network Security Attacks- Layer wise attacks in wireless sensor networks- possible solutions for Jamming- tampering- black hole attack - flooding attack. Key Distribution and Management- Secure Routing – SPINS- reliability requirements in sensor networks.

UNIT V SENSOR NETWORK PLATFORMS AND TOOLS 9

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms – TinyOS- nesC,-CONTIKIOS, Node-level Simulators – NS2 and its extension to sensor networks, COOJA, TOSSIM, Programming beyond individual nodes – State centric programming.

TOTAL:45 hrs.

Course Outcomes:

CO1: To Know the basics of Wireless Sensor Networks

CO 2: To Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement

CO3: To Apply the knowledge to identify appropriate physical and MAC layer protocols

CO 4 : To Understand the transport layer and security issues possible in Ad hoc and sensor networks.

CO 5: To Be familiar with the OS used in Wireless Sensor Networks and build basic modules.

TEXT BOOKS:

1. Holger Karl , Andreas willig, ―Protocol and Architecture for Wireless Sensor Networks‖, John wiley publication, Jan 2006.

REFERENCES:

1. Feng Zhao, Leonidas Guibas, ―Wireless Sensor Networks: an information processing approach‖, Elsevier publication, 2004.

2. Charles E. Perkins, ―Ad Hoc Networking‖, Addison Wesley, 2000.

3. I.F. Akyildiz, W. Su, Sankarasubramaniam, E. Cayirci, ―Wireless sensor networks: a survey, computer networks, Elsevier, 2002, 394 - 422.

DSE024 NEXT GENERATION NETWORKS 3 0 0 3

COURSE OBJECTIVE

To learn the fundamentals of 5G internet. To understand the concept of small cells in 5G mobile networks.To learn the mobile clouds in 5G network context.To understand the role of cognitive radios in 5G networks and to learn the security issues in 5G networks.

UNIT I PERVASIVE CONNECTED WORLD AND 5G INTERNET 9

Historical Trend of Wireless Communications – Evolution of LTE Technology to Beyond 4G –5G Roadmap – Ten Pillars of 5G – Internet of Things and Context Awareness – Networking Reconfiguration and Virtualization Support – Mobility – Quality of Service Control– Emerging Approach for Resource over Provisioning.

UNIT II SMALL CELLS FOR 5G MOBILE NETWORKS 9

Introduction to Small Cells – Capacity Limits and Achievable Gains with Densification – Mobile Data Demand – Demand vs. Capacity – Small Cell Challenges.

UNIT III COOPERATION FOR NEXT GENERATION WIRELESS NETWORKS 9

Introduction – Cooperative Diversity and Relaying Strategies: Cooperation and Network Coding, Cooperative ARQ MAC Protocols – PHY Layer Impact on MAC Protocol Analysis: Impact of Fast Fading and Shadowing on Packet Reception for QoS Guarantee, Impact of Shadowing Spatial Correlation – Study: NCCARQ, PHY Layer Impact.

UNIT IV MOBILE CLOUDS AND COGNITIVE RADIO 9

Introduction – The Mobile Cloud – Mobile Cloud Enablers – Network Coding – Overview of Cognitive Radio Technology in 5G Wireless – Spectrum Optimization using Cognitive Radio – Relevant Spectrum Optimization Literature in 5G – Cognitive Radio and Carrier Aggregation – Energy Efficient Cognitive Radio Technology.

UNIT V SECURITY AND SELF ORGANISING NETWORKS 9

Overview of Potential 5G Communications System Architecture – Security Issues and Challenges in 5G Communications Systems – Self Organising Networks: Introduction, Self Organising Networks in UMTS and LTE, The Need for Self Organising Networks in 5G, Evolution towards Small Cell Dominant HetNets.

TOTAL : 45hrs.

COURSE OUTCOMES

CO1: Compare the 5G network with older generations of networks.

CO2: Identify suitable small cells for different applications in 5G networks.

CO3: Simulate 5G network scenarios.

CO4: Connect applications to mobile cloud.

CO5: Design applications with 5G network support.

REFERENCES:

1. Jonathan Rodriguez, “Fundamentals of 5G Mobile Networks”, Wiley, 2015.
2. Yin Zhang, Min Chen, “Cloud Based 5G Wireless Networks – Springer Briefs in Computer Science”, Springer, 2016.
3. Athanasios G. Kanatas, Konstantina S. Nikita, Panagiotis (Takis) Mathiopoulos, “New Directions in Wireless Communications Systems: From Mobile to 5G”, CRC Press, 2017.

DSE025 CYBER SECURITY 3 0 0 3

COURSE OBJECTIVE

- To provide an understanding of computer forensics fundamentals.
- To analyze various computer forensics technologies.
- To identify methods for data recovery.
- To apply the methods for preservation of digital evidence.
- To learn about the types of attacks and remedial actions in the context of systems, networks, images and videos.

UNIT I INCIDENT AND INCIDENT RESPONSE 9

Introduction to Security Threats: Introduction, Computer Crimes, Computer Threats and Intrusions, Telecommunication Fraud, Phishing, Identity Theft, Cyber Terrorism and Cyber War – Need for Security: Information Security, OS Security, Database Security, Software Development Security – Security Architecture – Introduction to Incident – Incident Response Methodology – Steps – Activities in Initial Response Phase After Detection of an Incident.

UNIT II FILE STORAGE AND DATA RECOVERY 9

File Systems – FAT, NTFS, NTFS Encrypting File System – Forensic Analysis of File Systems – Storage Fundamentals – Initial Response and Volatile Data Collection from Windows System – Initial Response and Volatile Data Collection from UNIX System – Forensic Duplication – Tools – Discovery of Electronic Evidence – Identification of Data – Reconstructing Past Events – Networks.

UNIT III NETWORK AND EMAIL FORENSICS 9

Network Evidence – Types of Network Monitoring – Setting Up a Network Monitoring System– Network Data Analysis – Email Clients – Email Tracing – Internet Fraud – Spam Investigations Mobile Forensics – Subscriber Identity Module (SIM) Investigations – Wireless Device Investigations – PDA Investigations.

UNIT IV SYSTEM FORENSICS 9

Data Analysis: Analysis Methodology – Investigating Live Systems (Windows and Mac OS) – Hacking: Investigating Hacker Tools – Ethical Issues – Cybercrime. Forensic and Investigative Tools – Forensic Equipments for Evidence Collection – Post Exploitation.

UNIT V IMAGE AND VIDEO FORENSICS **9**

Recognizing a Graphics File – Data Compression – Locating and Recovering Graphics Files- Identifying Unknown File Formats – Copyright Issues with Graphics – Fraud using Image and Video – Detection of Fraud in Images and Video.

TOTAL No. of PERIODS : 45 hrs.

COURSE OUTCOMES:

CO1: Recognize attacks on systems.

CO2: Design a counter attack incident response and incident-response Methodology.

CO3: Illustrate the methods for data recovery, evidence collection and data Seizure.

CO4: Understand network and email attacks and forensic investigation with Tools.

CO5: Use forensic tools and collect evidences of a computer crime.

REFERENCES:

1. Kevin Mandia, Jason T. Luttgens, Matthew Pepe, “Incident Response and Computer Forensics”, Tata McGraw-Hill, 2014.
2. Bill Nelson, Amelia Philips, Christopher Stueart, “Guide to Computer Forensics and Investigations”, Cengage Learning, 2018.
3. John R. Vacca, “Computer Forensics”, Firewall Media, 2009.
4. Eoghan Casey, “Handbook Computer Crime Investigation's Forensic Tools and Technology”, Academic Press, 2001.
5. Davide Cowen, “Computer Forensics: A Beginners Guide”, McGraw-Hill, 2011.
6. Rafay Baloch, “Ethical Hacking and Penetration Testing Guide”, Auerbach Publications, 2014.

SOFT SKILL – I 2 0 0 2

Course Objective

To help the students understand interpersonal skills, to support them in building interpersonal skills, to better the ability to work with others.

UNIT I PRONUNCIATION 6

1. An Introduction to Phonetics
2. Sounds – Vowel Sounds, Consonant Sounds and Diphthongs
3. Speaking with the right pronunciation
4. Regional Slant and how to overcome the slant
5. Standard Pronunciation and Received Pronunciation (R.P.)
6. Correcting common errors of pronunciation

DRILL IN LANGUAGE LAB

UNIT II SPEAKING 6

Learning to talk

Different attitude–different concept–different orientation according to the situation, aim and talk

1. Familiar Topics
2. Brain – storming, just a minute
3. Thinking Together
4. Finding the right word, Expressions, Usage, Mannerisms, Postures, Body–Language, Eye– Contact, Gestures.
5. Presenting points
6. Overcoming hesitations, Shyness and Nervousness

   [From a word to a sentence and then to a short speech]
7. Speech – Rhythm

   –Rising and falling Tone

   –Accent

   –Intonation

   –Word stress, Syllable Stress and Sentence Stress.

UNIT III DRILLING IN THE LANGUAGE LAB 6

8. Preparing a speech on a given Subject
9. Pattern of a speech to suit the audience

–addressing the audience, slowly introducing the topic, defining the topic, points 1,2,3,…and if there is a draw–back mention it, Conclusion 'Thank You'.

10. Choose the right word for right meaning– expression to suit the thought
11. Words – Derivatives, synonyms & Antonyms

DRILLING WITH DIFFERENT TOPICS FROM FAMILIAR TO UNFAMILIAR

UNIT IV WRITING SKILLS[creative Writing] 6

I Narration and Story – Telling

1) Narrating an incident, Cogency and Readability
2) Choosing the Tense
3) Plan of a story [Introducing the story, characters, incidents and proper end]

DRILL IN LANGUAGE LAB

II Reports

1) Agenda of a meeting
2) Circulars & Internal Memos
3) Reports of Meetings
4) Reports of Experiments
5) Business Report
6) Reporting for the media
7) Writing Press Reports
8) Conflict resolution – Adopting an agreed resolution

UNIT V READING [READING TO UNDERSTAND] 6

1) Reading with pauses
2) Reading with Intonation
3) Reading in a classroom
4) Reading to an assembly of Business men / Scientists
5) Quoting
6) Slogans in the reading material
7) Training for a News Reader/Corporate Spokesperson

Function of Commonly used Tenses

The function of the Parts of Speech in daily use in the corporate world

TOTAL: 30 HOURS

References:

www.tatamcgrawhill.com

www.dictionary.cambridge.org

www.wordsmith.org

SOFT SKILL – II 2 0 0 2

Course Objective

To help the students understand Speaking skills, to support them in building communication skills, to better the ability to work with others.

UNIT I SPEAKING **6**

1) Speaking at an Interview – "Interviews"
2) Meeting People
3) Exchanging Greetings
4) Introducing Oneself
5) Introducing people to others
6) Debates and Group Discussions
7) At the Interview for a Job

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UNIT II TELEPHONE CONVERSATION **6**

1) Etiquette & Manners
2) Answering the Telephone
3) Asking for someone
4) Taking and leaving messages
5) Making Enquiries

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UNIT III PRESENTATION **6**

1) Presenting a matter for discussion
2) Presenting a problem for Support
3) Presenting a product among customers and inventors
4) Slogans for advertising
5) Proverbs Re–defined
6) Saying 'No' without saying 'No'
7) Presenting a paper at a seminar/conference

DRILLING IN PRESENTATION [EXERCISES]

UNIT IV WRITING SKILLS **6**

1) Letters [Different types of Letters]

2) Developing an argument, story or an article from hints

3) Note – Making

4) Drafting

5) Summary Writing

–Method of Summarizing

–Summarizing paragraphs, Essays, Stories, Incidents,

Long articles, Speeches.

UNT V LISTENING SKILLS [LISTENING AND TAKING NOTES] **6**

1) Listening in a class – room

2) Listening to a Public – speaker

3) Listening to a Scientists

4) Listening to the news to pick–out the points

5) Listening in Corporate offices

6) Listening to a recorded speech – cassette of C.D.

7) The importance of listening in Business houses

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VI PERSONALITY

1) Personality – An Introduction –Roles of Heredity and Learning Identity Clothing/Speech/Age/Success/Reputation/Aspirations and Achievements.

2) Attitude

- Advantages of positive attitude Thought and Action
- Appearance
- Facial Expressions
- Dress Code
- Posture
- Gesture
- Know the impressions created.

3) Presenting Oneself – [Manner and matter]

- Timing * Being true to type
- Knowledge * Punctuality

- Skill and Competence * Self – confidence
- Communication * Assurance
- Behaviour
- Avoiding Anxiety
- Shrewdness

4) Path to greatness

- Self Confidence
- Self-Motivation
- Leadership Qualities
- Be Innovative and Original / Creativity

5) The Impact of appearance

- Essentials of a good appearance
- Cleanliness and morals
- Importance of dress
- Overcome shyness / fear and Anxiety
- positive thinking
- career planning
- Etiquette & Manners
- Speech
- Character
- Integrity
- Wisdom
- Courage

6) Interpersonal Skills

- Team work
- Concept of leadership
- The Virtues of a Leader
- Decision making

- Time Management

Text Books:

–Newspapers and Magazines

–Write to Communicate – GeethaNagaraj

–Spoken English – "A Self Leaning Guide to Conversation Practice", 34th Reprint, Tata McGraw Hill–New Delhi.

–Powell, In Company – Macmillan

–Personality Development – Elizabeth B. Hurlock

TOTAL: 30 HOURS

References:

www.tatamcgrawhill.com

www.dictionary.cambridge.org

www.wordsmith.org

PERSONALITY DEVELOPMENT **2 0 0 2**

Course Objective: To make aware about the importance of personality and development in the business world. To make the students follow the good personality and create a good relationship with others.

UNIT I **6**

Introduction to Personality Development – Importance of Soft skills – Soft Skills for work place – First Impression – General Appearance – Posture – Cleanliness – Confidence and its usage.

UNIT II **6**

Grooming – Attire – Attitude – Stability & Maturity Development – Strength & Weakness/ Goal Settings – Kinesis – Motivation &Self–Motivation

UNIT III **6**

Basic etiquette – Email etiquette – Business etiquette – Telephone etiquette – Meeting etiquette – Adjustment of Role & Leadership – Team Management & Development.

UNIT IV **6**

Stress Management – Time Management – Event Management – Change Management – Seminars & Conference organizing – Conflict Resolution – The Art of Delegating Effectively – Enhancing Personal Effectiveness.

UNIT V **6**

Concept of Motivation - Significance - Internal and External Motives - Importance of Self-Motivation- Factors Leading to demotivation - Theories to Motivation.

TOTAL: 30 HOURS

Course Outcome :

CO-1: Develop the personality skills

CO-2: To build the confidence level

CO-3: Evaluate the students skulls through SWOT analysis K

CO-4: Develop the self awareness and self esteem

CO-5: Improve the motivation skills

REFERENCE BOOKS

1. Managing Soft Skills And Personality--B N GhoshMcgraw Hill Publications
2. Principles and Practices of Management Shejwalkar and Ghanekar McGraw Hill Latest
3. Time management for Busy people – Roberta roesch, TatamcGraw-Hill Edition
4. Personality Development --Dr V M Selvaraj, Bhavani Publications