**MCA-31 WEB DEVELPOMENT**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-** Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives:**

1. To impart the basic concepts of Web Technologies
2. To understand various client side technologies
3. To create web pages
4. To create dynamic applications on web through server side.

**Course Learning Outcomes:**

1. Be able to use the HTML programming language
2. Be able to use the Design Programs.
3. Publishes the site he/she designed
4. Uses Domain Name and services.
5. Be able to make changes on the Site.
6. Updates on the site when needed.

**Unit I**

Introduction: Concept of Internet, World Wide Web, URL, Web Server, Web Browser, HTML, HTTP, SMTP, POP3, MIME, IMAP. Web site design principles, planning the site and navigation,

**Unit II**

HTML and CSS: History of HTML, Structure of HTML Document: Text Basics, Document: Images and Multimedia, Links and webs, Document Layout, Cascading Style Sheet: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins.

**Unit III**

XML: Introduction of XML- Features of XML, Structure of XML document, The XML Declaration, Element Tags- Nesting and structure, XML text and text formatting element, Table element, Mark-up Element and Attributes, Document Type Definition (DTD), types. XML Objects.

**Unit IV**

PHP: PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code

**Text/Reference books:**

1. Steven Holzner,”HTML Black Book”, Dreamtech Press India Pvt. Ltd. 2000.

2. Developing Web Applications, 2ed by Savaliya, Wiley India Ltd

3. Web Technologies, Black Book, Dreamtech Press India Pvt. Ltd.

4. Web Applications: Concepts and Real World Design, Knuckles, Wiley-India

5. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML

 and Ajax, Black Book by Kogent, Wiley India Ltd.

6. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.

**MCA-32 IOT AND CLOUD COMPUTING**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-** Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives:**

1. The course presents a top-down view of cloud computing, from applications and administration to programming and infrastructure.
2. The topic introduces students with various concepts like cloud systems, How Cloud Computing Works, Service Models.
3. The Internet is evolving to connect people to physical things and also physical things to other physical things all in real time. It’s becoming the Internet of Things (IoT).
4. The course enables student to understand the basics of Internet of things. It introduces some of the application areas where Internet of Things can be applied. Students will learn about the middleware for Internet of Things.
5. To understand the concepts of Web of Things.

**Course Learning Outcomes:**

1. Describe the evolution that has led to cloud computing and discuss the importance of IoT devices.
2. Identify the Components that form part of IoT Architecture.
3. Evaluate the appropriate protocol for communication between IoT.
4. Discover the fundamentals of Cloud Computing and explain the deployment methods of Cloud Computing.
5. Describe the architecture of Cloud systems.
6. Implement and secure your own cloud service.

**Unit I**

Internet of Things – Overview and characteristics of IoT, Layered Architecture (3 & 5 Layered) of IoT, Physical Design and Logical Design, Domain specific IoT, Security Issues of IoT,

**Unit II**

Communication challenges related to IoT, Enabling technologies for IoT, Applications of IoT – Home Automation, Smart cities, Social Life and Entertainment, Health & Fitness, Smart Environment and Agriculture, Supply Chain and Logistics, Energy conservation, Design considerations in an IoT systems.

**Unit III**

Introduction to Cloud Computing: Evolution of cloud computing, Characteristics of Cloud Computing, Web Services deliver from the cloud - IaaS, PaaS, SaaS, Types of cloud - Public private and hybrid cloud.

**Unit IV**

Introduction to virtualization, Resource Virtualization - Server, Storage, Network, Load Balancing and Virtualization, Hypervisors and its types, Service Oriented Architecture (SOA), Overview of Security Issues, Challenges and Risks of Cloud.

**Text/Reference books:**

1. Internet of Things-Architectures and Design principles- Raj Kamal, McGraw Hill Education
2. Cloud computing a practical approach - Anthony T. Velte , Toby J. Velte Robert

Elsenpeter, TATA McGraw- Hill , New Delhi – 2010

1. Cloud Computing: Web-Based Applications That Change the Way You Work and
2. Collaborate Online - Michael Miller - Que 2008
3. Cloud computing for dummies- Judith Hurwitz , Robin Bloor , Marcia Kaufman
4. Fern Halper, Wiley Publishing Inc, 2010
5. Cloud Computing (Principles and Paradigms), Edited by Rajkumar, Buyya James

**MCA-33(i) LINUX AND SHELL SCRIPT**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-** Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives:**

1. This course will prepare students to develop software in and for Linux/UNIX environments.
2. This include basic operating system concepts, effective command line usage, shell programming.
3. The C language, programming development tools, system programming, network programming (client-server model and sockets), and GUI programming.

**Course Learning Outcomes:**

1. Understanding the basic set of commands and utilities in Linux/UNIX systems.
2. To learn to develop software for Linux/UNIX systems.
3. To learn the C language and get experience programming in C.
4. To learn the important Linux/UNIX library functions and system calls.
5. To understand the inner workings of UNIX-like operating systems.
6. To obtain a foundation for an advanced course in operating systems.

**Unit-I**

Unix Operating System, Knowing Your Machine, Linux and GNU, The Unix Architecture, Unix/Linux features, Command Usage, General Purpose Utilities- cal, date, echo, printf, bc, script, Email basics, passwd, who, uname, tty, stty, file system. Linux Startup, Accounts, accessing Linux – starting and shutting processes, logging in and lagging out.

**Unit-II**

**Handling Ordinary Files** - cat, cp, rm, mv, more, lp, file, wc, od, cmp, comm, diff, gzip and gunzip, tar, zip and unzip etc., tee

**Basic File Attributes**- ls, file permissions, Directory Permissions, vi editor, The process, More file Attributes.

**Unit-III**

Simple Filters- pr, head, tail,cut, paste, sort, uniq, tr etc.

Filters using Regular Expressions- grep and sed.

**Unit-IV**

awk- An advanced filter- Simple filtering, splitting into fields, variables and expressions etc

perl- The master Manipulator- perl preliminaries, chop function, string handling functions, split, join, for each.

Process Control- pipe, signal, kill process

**Text/Reference Books:**

1. Sumitabha dass,*Your Unix – The Ultimate Guide*, TMH.
2. John Goerzen,*Linux Programming Bible*, IDG Books, New Delhi.
3. Aho, Hopcoft and Ullman, the *Design and Analysis of Computer Algorithms,* Addison Wesley.
4. Yaswant Kanetkar, “*Unix Shell Programming”, BPB Publication.*

**MCA-33(ii) ANDROID SOFTWARE DEVELOPMENT**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-** Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives:**

1. Covers introductory mobile application development for the Android Operating System using XML and Java.
2. Includes developing simple applications that could run on Android phones and tablets. Covers Android application development phases, terminologies, application design, and coding.

**Course Learning Outcomes:**

1. Install and configure Android application development tools.
2. Design and develop user Interfaces for the Android platform.
3. Save state information across important operating system events.
4. Apply Java programming concepts to Android application development.

**Unit-I**

Android Application Development: Android Application Development: Getting started with Android, Mastering Android Development tools: Using Android Documentation, Debugging Applications with DDMS, Working with Android Emulator.

**Unit-II**

Building Android Applications: Designing typical Android Application, Using the Application Context, Working with Activities, Working with intents, Dialogs, Fragments, Logging application information.

**Unit-III**

Managing Application Resources: Working with Simple Resource values, Draw Table Resources, Layouts, Files; Configuring the Android Manifest file and basic application Settings.

**Unit-IV**

Development of Application: Registering activities, designating the launch activity, Managing Application permissions, designing an application framework.

**Text/Reference Books:**

1. Burton Michael, Android App Development for Dummies, 3rd Edition, 2015, Wiley

2. Padmini, Android App Development: A Complete Tutorial For Beginners, 2016,eBooks2go

**MCA-34(i) NETWORK SECURITY**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-**Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives:**

1. identify, analyse and remediate computer security breaches by learning and implementing the real-world scenarios in Network Security
2. Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an Organization.
3. Understand key terms and concepts in Cryptography, Governance and Compliance.

**Course Learning Outcomes:**

1. Analyse and evaluate the cyber security needs of an organization.
2. Determine and analyse software vulnerabilities and security solutions to reduce the risk of exploitation.
3. Measure the performance and troubleshoot cyber security systems.
4. Design and develop security architecture for an organization.

**Unit I**

Overview and Security Attacks: Introduction to Network Secuity, Principals of Security, Security Approaches, Security Threats, Types Of Attacks, Virus, Worms, Trojan Horse, Logic Bombs, DoS, Malware , Major attacks of history , Data Security ,Phishing , Trapping.

**Unit II**

Authentication and Cryptography: Overview of Authentication, Authentication of People, Message Authentication, Public Key Infrastructure, Digital Signature, Kerbros, Overview of Cryptography, Application Of Cryptography, Data Encryption Standard, Advance Encryption Standard.

 **Unit III**

IP and Web Security: IP Security Overview, Architecture, Authentication Header, Encapsulation Security Payload, Key Management, IKE, Web Security Considerations, Secure Socket Layer, Transport Layer Security, Secure Electronic Transaction, Web issues.

**Unit IV**

System and Email Security: Intruders, Intrusion Detection, Password Management, Malicious Software, Firewalls, Firewall Design Principles, Firewall Configurations, Trusted Systems, Email Security, PEM, S/MIME, PGP.

**Reference Books:**

1. Cryptography And Network Security, Principles And Practice Sixth Edition, William Stallings, Pearson
2. Cryptography & Network Security, Forouzan, Mukhopadhyay, McGrawHill
3. Cryptography and Network Security, Atul Kahate, TMH
4. Information Systems Security, Godbole, Wiley India
5. Information Security Principles and Practice, Mark Stamp, Willy India

**MCA-34(ii) WIRELESS NETWORK**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-**Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives:**

1. To provide an overview of Wireless Network area and its applications.
2. To explain the various terminology, principles, protocols and mobile communication technologies used in wireless network.
3. To enhance the student’s knowledge in the perspective field of wireless network.

**Course Learning Outcomes:** At the end of this course students will be able to:

1. Explain working of different wireless Network technologies.
2. Demonstrate application of different protocols for wireless communication technologies.
3. Analyse the performance of different technologies in different scenarios/situations.
4. Develop learning and research skills by undertaking a comprehensive study of research topic in wireless network.

**UNIT-I**

MULTIPLE RADIO ACCESS: Medium Access Alternatives: Fixed-Assignment for voice oriented networks, random access for data oriented networks, Handoff and Roaming Support, Security and Privacy.

**UNIT-II**

WIRELESS WANS:First Generation Analog, Second Generation TDMA- GSM, Short Messaging Service in GSM, Second Generation CDMA- IS-95,GPRS, Third Generation Systems- WCDMA,CDMA2000, Introduction to LTE.

**UNIT-III**

WIRELESS LANSIntroduction to Wireless LANs- IEEE 802.11 WLAN-Architecture and Services, Physical Layer, MAC Sublayer, MAC Management Sublayer, Other IEEE 802.11standards, Wi-Max standard.

**UNIT-IV**

ADHOC AND SENSOR NETWORKS:Characteristics and Applications of MANET, Routing Protocols- Table-driven and Source-initiated on Demand routing protocols, Hybrid protocols.Wireless Sensor Networks- Classification. Wireless PANs- Architecture of Bluetooth systems.

**Text/Reference Books:**

1. Vijay. K. Garg, *Wireless Communication and Networking*, Morgan Kaufmann Publishers.
2. Kaveth Pahlavan, Prashant Krishnamurthy, *Principles of Wireless Networks*, Pearson Education.
3. Adrian Farrel, Bruce S. Davie, P.Z & Larry L. Peterson, *Wireless Networking Complete*, Morgan Kaufmann Publishers.
4. C. Siva Ram Murthy and B. S. Manoj, *Ad hoc Wireless Networks*, Pearson Education.
5. William Stalling, *Wireless Communications and Networks*, Pearson/Prentice Hall of India.

**MCA-35(i) DISCRETE MATHEMATICS**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-** Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives**:

1. Introduce concepts of mathematical logic for analyzing propositions and proving theorems.
2. Use sets for solving applied problems, and use the properties of set operations algebraically.
3. Work with relations and investigate their properties.

**Course Learning Outcomes**:

1. Analyze logical propositions via truth tables and Prove mathematical theorems using mathematical induction.
2. Understand sets and perform operations and algebra on sets.
3. Identify functions and determine their properties.
4. Define graphs, digraphs and trees, and identify their main properties.

**Unit-I**

Group And Subgroups: Group axioms, Permutation groups, Subgroups, Co-sets, Normal subgroups, Semigroups, FREE Semi-groups, Applications, modular arithmetic, error correcting codes, grammars , language, Finite State Machine.

**Unit-II**

Graphs: Directed and undirected graphs, chains , Circuits , Paths, Cycles, connectivity, Adjacency & incidence matrices, Minima's path Application (Flow charts and state transition graphs, algorithms for determining cycle and minimal paths, polish notations and trees, flows in network).

**Unit-III**

Lattice; and Boolean algebra: Relational to Partial ordering, Lattices and Hasse diagram, Axiomatic definition of boolean algebra as algebraic structures with two operations basic results truth values and truth tables. Algebra of propositional function. The Boolean algebra of truth values, Application (Switching circuits, Gate circuits).

**Unit-IV**

Finite Fields: Definition Representation, Structure, Internal domain Irreducible polynomial, Polynomial roots, splitting field.

**Text/Reference Books:**

1. Alan Doerr, Kenneth Levaseur, Applied Discrete Structures for Computer Science, Galgotia publication pvt. ltd.
2. Seymour Lipschutz, Marc Lars Lipson, Discrete mathematics, McGraw-Hill international editions, Schaum's series.
3. Bernard Kolman, Robert C. Busbym, Discrete Mathematical structures for computer science, Prentice-Hall of India pvt. ltd.
4. Kennech G. Rosen: Discrete mathematics and its applications, McGraw-Hill internal editions, Mathematics series.

**MCA-35(ii) THEORY OF COMPUTATION**

**L/T - 4 Total Credits – 4 Internal - 30 Marks**

 **External – 70 Marks**

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

## Course Learning Objectives:

1. Introduce students to the mathematical foundations of computation including automata theory
2. The theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
3. Enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

## Course Learning Outcomes:

1. Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving.
2. Explain the models of computation, including formal languages, grammars and automata, and their connections.
3. Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
4. Solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.

 **Unit- I**

Regular sets and regular expressions; Deterministic and Non-Deterministic finite automata, equivalence of deterministic and non-deterministic finite automata, Kleen’s characterization theory for sets accepted by finite automata, Regular grammar, state minimization, Mealy and Moore Machine, Problem based on pumping lemma.

**Unit-II**

 Context Free Language, Context Free Grammar. Pushdown Automata - Deterministic push-down and Non-deterministic push-down automata. Closure properties of push-down automata. Derivations, Relationship between derivation and derivation trees, Simplification of CFG. Chomsky normal form (CNF), Greibach normal form (GNF). Closure properties of CFL.

**Unit –III**

Introduction to compiler and phases. Lexical Analyzer. Linear Bound Automata. Context Sensitive Language. Context Sensitive Grammar. Closure properties of CSL.

**Unit –IV**

Turing machine, Construction of Turing machine, other models of Turing machine-Multi tape Turing machine, Multidimensional Turing Machines, Halting problem, Chomsky hierarchy of languages. Recursive and Recursively Enumerable Language.

**Text/Reference Books:**

1. KLP Mishra & N Chandrasekaran, Theory of Computer Science: Automata, Languages and Automata, PHI.
2. Peter Linz, An Introduction to Formal Languages and Automata, Jones & Bartlett.
3. Hop croft, J.E. & Ullman, J.D, Formal Language and their relation to Automata, Addison-Wesley.
4. Zoha Mauna , Mathematical theory of computation, Wiley.
5. John Minsky, Mathematical theory of computation, PHI.
6. M. Greenberg, Introduction to Automata Theory, Addison Wesley.

**MCA-35(iii) COMPILER CONSTRUCTION**

**L/T - 4 Total Credits – 4 Internal - 30 Marks External – 70 Marks**

**Note:-**Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

**Course Learning Objectives:**

1. This Course describes the theory and practice of compilation, in particular.
2. the lexical analysis, parsing and code generation and optimization phases of compilation,
3. Design a compiler for a concise programming language.

**Course Learning Outcomes:**

1. Understand the major phases of compilation and to understand the Lex & YAAC tool.
2. Develop the parsers and experiment the knowledge of different parsers design without automated tools.
3. Construct the intermediate code representations and generation.
4. Apply for various optimization techniques for dataflow analysis.

**Unit I**

Introduction to Compilation:Introduction to Compilers, Interpreters, Assemblers, phases of compilation, analysis synthesis model of translation, compiler construction tools. Lexical Analysis: Process of lexical analysis, finite state automata, DFA and NFA recognition of regular expressions, LEX.

**Unit II**

Syntax Analysis:Process of syntax analysis, types of grammars, top-down and bottom-up parsing techniques, Parser generator.

**Unit III**

Intermediate Code Generation:Intermediate Languages, generating intermediate code for declarative statement, Assignment statement, Boolean expression, and case statement. Code Optimization: Introduction to code optimization, potential cases of code optimization, optimization of basic blocks, loops in flow graphs, code improving transformation.

**Unit IV**

Code Generation:Issues in the design of a code generation the target machine, dynamic storage management, translating basic blocks, a simple code generator, peephole optimization, directed acyclic graphs and basic blocks code generation from directed acyclic graphs. Overview of syntax directed translation scheme.

**Text/Reference Books:**

1. Aho, Ullman, & Sethi , Compilers: Principles, Techniques & Tools, Addison Wesley
2. Aho & Ullman, Principles of Compiler Design, Narosa Publications.
3. Henk Alblas , Practice & Principles of Compiler Building with C.
4. Trembley & Sorenson, Principles of Compiler Design, McGraw Hill.