Course	Structure –	MCA15

Semester	Total Number of Hours	Total Number of Credits
Ι	31	25
II	36	27
III	34	27
IV	36	27
V	28	22
VI	-	15
		143

SEMESTER - I

S. No	Subject Code	Subject Title	L	Т	Р	С	CE	SE	То
1	15MCA2101	IT Fundamentals	4	-	-	4	40	60	100
2	15MCA2102	Programming in C	4	1	-	4	40	60	100
3	15MCA2103	Computer Organization	4	1	-	4	40	60	100
4	15MCA1104	English Language Communication Skills		-	-	3	40	60	100
5	15MCA1105	Probability and Statistics	4	1	-	4	40	60	100
6	15MCA2151	IT Fundamentals Lab	-	-	3	2	40	60	100
7	15MCA2152	C Programming Lab	-	-	3	2	40	60	100
8	15MCA1153	English Language Communication Skills Lab	-	-	3	2	40	60	100
			19	3	9	25	320	480	800

L: LectureT: TutorialP: PracticalC: CreditsCE: Continuous EvaluationSE: Semester End EvaluationTo: Total Marks

S. No	Subject Code	Subject Title	L	Т	Р	С	CE	SE	То
1	15MCA1201	Discrete Mathematics	4	1	-	4	40	60	100
2	15MCA2202	Data Structures using C	4	1	-	4	40	60	100
3	15MCA2203	Computer Networks	4	1	-	4	40	60	100
4	15MCA2204	bject Oriented Programming rough Java 4		1	-	4	40	60	100
5	15MCA2205	Operating Systems	4	1	-	4	40	60	100
6	15MCA2251	Data Structures Lab	-	-	3	2	40	60	100
7	15MCA2252	15MCA2252 Object Oriented Programming through Java Lab		-	3	2	40	60	100
8	15MCA2253	Operating Systems Lab	-	-	3	2	40	60	100
9	15MCA1254 Professional Communication Practice Lab		-	-	2	1	40	60	100
			20	5	11	27	360	540	900

SEMESTER - II

L: LectureT: TutorialP: PracticalCE: Continuous EvaluationSE: Semester End Evaluation

C: Credits **To**: Total Marks

S. No	Sub. Code	Subject Title	L	Т	Р	С	CE	SE	То
1	15MCA2301	Database Management Systems	4	1	-	4	40	60	100
2	15MCA2302	Advanced Java Programming	4	1	-	4	40	60	100
3	15MCA2303	Design and Analysis of Algorithms	4	-	-	4	40	60	100
4	15MCA2304	Web Development	4	1	-	4	40	60	100
5	15MCA2305	ndustrial Management		-	-	4	40	60	100
6	15MCA2351	Database Management Systems Lab	-	-	3	2	40	60	100
7	15MCA2352	Advanced Java Programming Lab	-	-	3	2	40	60	100
8	15MCA2353	Web Development Lab	-	-	3	2	40	60	100
9	15MCA5354	Soft Skills-I (Personality Development Course)	-	-	2	1	40	60	100
			20	3	11	27	360	540	900

SEMESTER – III

L: LectureT: TutorialP: PracticalCE: Continuous EvaluationSE: Semester End Evaluation

C: Credits To: Total Marks

S. No	Sub. Code	Subject Title	L	Т	Р	С	CE	SE	То
1	15MCA2401	Software Engineering	4	1	-	4	40	60	100
2	15MCA2402	Mobile Application Development	4	1	-	4	40	60	100
3	15MCA2403	Data Warehousing and Data Mining	4	1	-	4	40	60	100
4	15MCA1404	Optimization Techniques	4	-	_	4	40	60	100
5	15MCA2405	ELECTIVE – I		-	-	4	40	60	100
6	15MCA2451	.NET Lab	-	2	3	2	40	60	100
7	15MCA2452	Mobile Application Development Lab	-	-	3	2	40	60	100
8	15MCA2453	Data Mining Lab	-	-	3	2	40	60	100
9	15MCA5454	.5454 Soft Skills-II (Campus Recruitment Training)		-	2	1	40	60	100
			20	5	11	27	360	540	900

SEMESTER - IV

ELECTIVE – I

15MCA2405A: Artificial Intelligence

15MCA2405B: High Performance Computing

15MCA2405C: Distributed Systems

15MCA2405D: Computer Graphics

S. No	Sub. Code	Subject Title	L	Т	Р	C	CE	SE	То
1	15MCA2501	Cryptography and Network Security	4	1	-	4	40	60	100
2	15MCA3502	Self - Learning Course A: Database Administration B: Programming in Scala C: E-Commerce D: Struts 2 E: R Programming for Data Science F: Introduction to AngularJS	_	2	_	2	40	60	100
3	15MCA2503	Python Programming	4	1	-	4	40	60	100
4	15MCA2504	ELECTIVE – II	4	1	-	4	40	60	100
5	15MCA2505	ELECTIVE – III	4	1	-	4	40	60	100
6	15MCA2551	Python Programming Lab	-	I	3	2	40	60	100
7	15MCA4552	Mini Project	-	-	3	2	40	60	100
			16	6	6	22	280	420	700

SEMESTER - V

ELECTIVE-II

15MCA2504A: Human Computer Interaction 15MCA2504B: Cloud Computing 15MCA2504C: Web Mining 15MCA2504D: Software Project Management

ELECTIVE-III

15MCA2505A: Big Data Analytics 15MCA2505B: Software Testing Methodologies 15MCA2505C: Information Retrieval Systems 15MCA2505D: Wireless and Mobile Networks

SEMESTER - VI

S. No	Sub. Code	Subject Title	L	Т	Р	С	CE	SE	То
1	15MCA4651	Major Project	-	2	28	15	40	60	100
				2	28	15	40	60	100

L: LectureT: TutorialP: PracticalC: CreditsCE: Continuous EvaluationSE: Semester End EvaluationTo: Total Marks

15MCA2101: IT FUNDAMENTALS

Lecture	:	4 hrs/ week	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

- Understand the roles played by information technology in today's business and define various technology architectures on which information systems are built.
- Understand the significance of computer hardware, software, and computer networks.
- Make the students familiar with e-commerce and its innovative applications, supply chain management, ERP, and Decision Support Systems.
- Understand the concepts of strategic MIS, views of MIS, role and impact on management and organizations of MIS.
- Make the students to understand how to handle system complexity and need for system analysis.

• Expected to identify the basic components of information systems and the capabilities we expect of an information system.

- Expected to understand various input, output technologies, and various software issues.
- Expected to present the basic concepts of e-commerce, B2B, B2C applications.
- Gain a broad view of supply chains and their management, problems in supply chain and solutions.
- Expected to understand structured system analysis and design.

UNIT – I

Introduction: Business and Information Technology: What Is an Information System?

Information Technologies in the Modern Organization: Basic Concepts of Information Systems, Organizations: Structure and IT Support, IT Support at Different Organizational Levels, Managing Information Technology in Organizations, IT People and Careers.

Computer Hardware: The Significance of Hardware, The Central Processing Unit, Computer Memory, Computer Hierarchy, Input Technologies, Output Technologies, Strategic Hardware Issues.

Computer Software: Software History and Significance, Systems Software, Application Software, Software Issues, Programming Languages, Enterprise Software.

UNIT – II

Managing Organizational Data and Information: Basics of Data Arrangement and Access, The Traditional File Environment Databases: The Modern Approach, Database Management Systems, Logical Data Models, Data Warehouses.

Telecommunications and Networks: The Telecommunications System, Networks, Network Communications Software, Network Processing Strategies, Telecommunications Applications.

The Internet, Intranets, and Extranets: What exactly is the Internet? The Evolution of the

Internet, The Operation of the Internet, Services Provided by the Internet, The World Wide Web, Internet Challenges, Intranets, Extranets, Enterprise Information Portals, The Mobile Internet

UNIT – III

APPLYING IT FOR COMPETITIVE ADVANTAGE:

Electronic Commerce: Overview of E-Commerce, Business-to-Consumer Applications, Business-to-Business and Collaborative Commerce Applications, Innovative Application of E-Commerce.

Computer-Based Supply Chain Management and Information Systems Integration: Supply Chains and Their Management, Supply Chain Problems and Solutions, Enterprise Resource Planning (ERP), E-Commerce and Supply Chain Management.

Data, Knowledge, and Decision Support: Management and Decision Making, Data Transformation and Management, Decision Support Systems.

UNIT – IV

STRATEGIC VIEWS OF MANAGEMENT INFORMATION SYSTEMS:

Introduction to Management Information Systems: Management Information System (MIS): Concept, MIS: Definition, Role of the Management Information System, Impact of the Management Information System, MIS and the User, MIS: A Support to the Management, Management Effectiveness and MIS, Organization as a system.

BASICS OF MANAGEMENT INFORMATION SYSTEMS:

Systems Engineering(SSAD):System Concepts, Types of System, Handling System Complexity, Classes of Systems, General Model of MIS, The Need for System Analysis, System Analysis of the Existing System, System Analysis of a New Requirement, System Development Model, Structured System Analysis and Design.

Learning Resources

Text Books:

- Introduction to Information Technology, 2nd edition, Turban, Rainer, Potter, Wiley student edition (Unit-1, Unit-2, Unit-3).
- Management Information Systems, 3rd edition, Waman S Jawadekar, McGrawHill (Unit 4)

Reference Books:

- Information Technology in theory, 1ed, Aksoy, Laura DeNardis, Cengage Learning
- Information Technology: Principles and Applications, Ajoy Kumar Ray, PHI.
- Understanding computers today and tomorrow, 13th edition, Deborah Morley, Cengage Learning
- Management Information Systems, S.Sadagopan, 2ed, PHI.

Lecture :	4 hrs/ week	Internal Assessment:	40
Tutorial :	1 hr/ week	Final Examination:	60
Practical :	-	Credits:	4
Objectives:	 To make the st fundamentals. To make the lea and enable them To make studer and functions. To make the lea and pointers. To expose stude 	udents aware of the modularity concepts a arners understand the concepts in 'C' Progra to develop good programming skills. Its familiar with data types and their sizes, o arners understand the concepts of arrays, r ents working on files.	and programming amming Language control structures, nemory addresses
Learning Outcomes:	 It is expected the using C language It is expected the logical problems It is expected the to store and matched the store and m	that students are capable of solving mathe e. nat students are proficient in writing progra s. nat the learners would develop familiarity in nipulate data in Files.	ematical problems ams in C to solve writing programs

15MCA2102: PROGRAMMING IN C

UNIT – I

Introductory Concepts: Introduction to Computers, Computer Characteristics, Types of Programming Languages, Algorithm, Flow Chart, Writing first program of C.

C Fundamentals: C Character set, Identifiers and Keywords, Data types – Primary, Derived, User Defined Data types, Type Qualifiers, Constants, Variables, Declarations, Statements, Symbolic Constants, Type Conversion Rules

Operators and Expressions: Arithmetic, Relational, Logical, Assignment, Increment and decrement, Conditional, Bitwise and Special Operators, Operator Precedence, The C Preprocessor, I/O functions and Standard Library functions.

Control Statements: Preliminaries, <u>Branching:</u> if statement, if-else statement, Nested if –else statement, else- if statement, switch statement, goto statement. <u>Looping:</u> while statement, do-while statement, for statement. Nested Control statements, break, continue.

UNIT – II

Functions: Basics, User Defined Functions, Elements of User-Defined Functions, Types of functions, Parameter passing – Call by value, Call by reference, Block structure, Header files, Scope rules, Storage classes, Recursive functions.

Arrays and Strings: Introduction, One-dimensional Numeric Arrays - Declaration, Initialization, and Operations; Two dimensional Numeric Arrays - Declaration, Initialization and Operations; Multi dimensional Arrays; 1-D Character Arrays – Declaration and Initialization, Arithmetic Operations on Characters; 2-D Character Arrays and Strings- Operations on Strings, String handling functions; Passing 1-D and 2-D arrays to Functions.

UNIT – III

Pointers: Fundamentals, Declaration and Initialization of Pointer Variables, Pointer Arithmetic and Scale Factor, Pointers and One dimensional arrays, Pointers and Multidimensional Arrays, Dynamic Memory Allocation, Pointers and Character arrays, Array of Pointers, Ragged Arrays, Passing Pointer to a Function, Functions returning pointers, Pointers to Functions, More About Pointers.

UNIT – IV

Structures and Unions: Declaration and Initialization of Structures, Accessing structure members, copying and comparing structure variables, typedef, Nested Structures, Arrays of Structures, Passing Structures to Functions, Pointers to Structures, Self-Referential Structures, Unions, bit-fields.

Data Files: Opening and Closing a Data File, Creating a Data File, Processing a Data File, Unformatted Data files, Random Access Files, Command Line Arguments.

Learning Resources

Text Book:

• Programming with C (Schaum's Outlines) by Byron.C.Gottfried, Tata McGraw-Hill

Reference Books:

- Programming in ANSI C by Balaguruswamy TMH.
- C Programming, A Problem-Solving Approach by Behrouz A.Forouzan, Prasad, Richard F.Gilberg ,Cengage Learning
- Let us C (Third Edition) by Yashavant Kanetkar.
- The C programming Language by Kernighan and Ritchie, Prentice Hall.

15MCA2103: COMPUTER ORGANIZATION

Lecture	:	4 hrs/ week	Internal Assessment:	40
Tutorial	:	1 hr/ week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

- To make the students aware of basic hardware and software concepts of computer organization.
 - To make the learners familiarize with the organization and architecture of modern computing systems with an emphasis on performance.
 - To make the students realize and learn the working of system buses, internal and external memory, computer arithmetic, instruction sets, and CPU structure/function.
 - To expose the students the concepts of micro programmed control and Input-Output organization.

Learning Outcomes:

- It is expected that the students are able to design CPU control units, arithmetic and logic units, input/output sub-systems, design memory systems and comprehend working principles of different kinds of cache memories.
- It is expected that the students would have good exposure with concepts like categorize cost, performance issues and design trade-offs considered in designing a computer processor including memory.
- It is expected the students understand the representation of data, addressing modes, instructions sets.
- It is expected that the students are familiar with the inner workings of a computer and ability to analyze the hardware and software issues related to computers and the interface between the two.

UNIT – I

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits.

Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.

Data Representation: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes.

UNIT – II

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions.

Microprogrammed Control: Control Memory, Address Sequencing, Microprogram Example, Design of Control Unit.

UNIT – III

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Reduced Instruction Set Computer.

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Arithmetic Operations.

UNIT – IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Memory Management Hardware.

Learning Resources

Text Book:

• Computer System Architecture --- M. Morris Mano, 3rd edition, Pearson Education/PH

Reference Books:

- Computer Organization, 5th ed., Hamacher, Vranesic and Zaky, TMH, 2002
- Computer Organization & Architecture: Designing for Performance, 7th Ed., William Stallings, PHI, 2006
- Digital Logic and Computer Systems Organization--- V.Rajaraman, T.Radhakrishnan PHI, 2006

15MCA1104: ENGLISH LANGUAGE COMMUNICATION SKILLS

Lecture	:	3 hrs/ week	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	-	Credits:	3

- **Objectives:** This course endeavors to expose the learners to a combination of skill-oriented activities with special reference to corporate communication. Specific objectives are:
 - To train the learners in the elements of the administrative and professional compilation skills including the style, format etc.
 - To expose learners to the processes and procedures of interpersonal communication.
 - To make the learners aware of the processes of employing relevant communicative patterns for academic and/or professional environments.
 - To develop a professional-level reading skill for understanding, interpreting and analyzing textual data.
 - To offer understanding in the processes of Technical communication skills.

Learning Outcomes:

- Acquire proficiency in administrative and professional compilation skills.
 - Attain practice in Interpersonal Communication.
 - Acquire authentic understanding in the elements of functional English for authentic use of language in any given academic and/or professional environment.
 - Enhance Reading skills, along with a wide range of Vocabulary.
 - Acquire competence in Technical communication skills.

UNIT – I

Basic Features of English. Parameters of Communication. Elements of Non-verbal communication. Barriers to Effective communication. Professional Letter- Business, Complaint, Explanation and Transmittal.

UNIT – II

Speech acts- Extending Invitation, Reciprocation, Acceptance, Concurrence, Disagreeing without being disagreeable. Verbal Analogies. Confusables. Idiomatic expressions. Phrasal Collocations.

UNIT – III

A basic List of 500 words – Over view.

Exposure through Reading Comprehension-Skimming, Scanning.

Understanding the textual patterns for tackling different kinds of questions and Taming Regression.

Functional English with special reference to Concord, Prepositions and Pronoun-referent analysis.

UNIT – IV

Guided writing. Essay Writing- Descriptive, Reflective and Analytical. Technical Proposal writing. Technical Report writing. Synopsis & Thesis writing- overview.

Learning Resources

Text Books:

- TM Farhathullah, Communication skills for Technical Students, I Edition, Orient Longman, 2002.
- 'Krishna', English Language Communication Skills, I Edition, Duvvuri Publications, 2008.
- B.S. Sarma, Structural Patterns & Usage in English, IV Edition, Poosha Series, , 2008.
- Eclectic Learning materials offered by the Department.

Reference Books:

- Randolph Quirk, Use of English, Longman, I Edition (1968) Reprinted 2004.
- Thomson A.J & A.V, Martinet, Practical English Grammar, III Edition Oxford University Press,2001.
- Thomas Eliot Berry, The most Common Mistakes in English, TMH, First Paper Back 1971, (reprinted) 2010.
- John Langan, College Writing Skills, McGraw Hill, IX Edition, 2014.
- Selinkar, Larry et al, English for Academic and Technical Purposes, I edition, Newbury House Publishers, 1981.
- Martin Cutts, Oxford guide to Plain English, 7th Impression Oxford University Press, 2011.

Web resources:

- www.britishcouncil.org/learning-english-gateway.htm up dated 2014
- pdfstuff.blogspot.com/2013/.../the-oxford-guide-to-english-usage-pdf.ht
- www.cambridgeapps.org/ up dated 2014

Lecture	:	4 hrs/ week	Internal Assessment:	40
Tutorial	:	1 hr/ week	Final Examination:	60
Practical	:	-	Credits:	4
Objectives	:	 To equip the students with a modeling in the presence of u To develop an intuition a phenomena and to make applications that may be useful and the student of the studen	working knowledge of probabi ncertainties. nd an interest in students students understand theore il in real life.	lity, statistics, and towards random etical issues and
Learning Outcomes:	:	 It is expected that the studer of events and Expectations such as games of chance. It is expected that the study appropriate to consider the r Exponential distribution. It is expected that the study reliability in simple hardware It is expected that the study derive estimators which exhibit It is expected that the study hypothesis and carryout appropriate It is expected that the study 	ats are capable enough to calc of random variables for elem ents would recognize situation elevance of the Normal distrib ents are able to compute fa and software applications. ts, given a distribution, apply h it desirable properties. dents, given a sample situat opriate tests to check its accept ents recognize circumstances	ulate probabilities nentary problems ns in which it is pution and/or the ult coverage and pasic principles to ion, formulate a ability. under which it is

15MCA1105: PROBABILITY AND STATISTICS

UNIT – I

Probability: Sample spaces and Events, Basic set theory, Definition of probability, Axioms of probability, Addition theorem, Multiplication theorem, conditional probability, Baye's Theorem. Random Variables: Introduction, Types of random variables, Probability distribution function, Probability density function, Joint distribution function, Joint density function, Conditional distribution and density functions, Independent random variables.

appropriate to investigate relationships between variables.

UNIT – II

Statistical Analysis: Mathematical Expectation, Variance, Skew, Moments, Moment generating function, Characteristic function. Probability Distributions: Binomial distribution, Poisson distribution, Uniform distribution, Normal distribution, Exponentional distribution, Gamma distribution, Weibull distribution.

UNIT – III

Testing of Hypothesis :Introduction of sampling, Test of Statistical hypothesis(Large sample tests): Introduction, Statistical hypothesis, Procedure of testing hypothesis, Type I and Type II errors, Two tailed and one tailed tests of hypothesis, Large sample tests. Test of Statistical hypothesis (Small sample tests): Introduction, Students t -distribution. F-test for equality of population variances, Chi-square distribution.

UNIT – IV

Correlation, Regression and Random process: Correlation analysis, Methods of studying correlation, Rank correlation, Regression analysis. Random Stochastic Processes: Random process, Classification, Statistics of random process, Stationary random process, Ergodic random process.

Learning Resources

Text Book:

• Probability, Statistics and Random process Dr.K.Murugesan & P.Gurusamy by Anuradha Agencies, Deepthi publications.

Reference Books:

- Miller and Freund's Probability and Statistics for Engineers, 7 th Edition, Richard A. Johnson, PHI.
- Introduction to Probability and Statistics, Fourth Edition. Susan Milton, Jesse C.Arnold, TMH.
- Probability and Statistics for M.C.A. by T.K.V.Iyengar, B.KrishnaGandhi, S.Ranganatham, M.V.S.S.N.Prasad, S.Chand &Company Ltd.

15MCA2151: IT FUNDAMENTALS LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/ week	Credits:	2

Objectives: • To make students familiar with MS-Office.

- To make the students understand the layout of a computer system.
- To make the students understand the installations of operating systems.
- To provide students the basic knowledge in creating web pages.

Learning Outcomes:

- It is expected that the students could create documents.
- It is expected the students are able to design professional presentations.
- It is expected that learners are capable of designing a database to store data.
- It is expected the students are able to work with spreadsheets.
- It is expected that the students are able to assemble a PC and install an operating system.
- It is expected that the students could design static web pages.

LIST OF PROGRAMS

LAB CYCLE - I

- 1. a) Create a document using Headers and Footers, Page Numbers, Date and Time, Symbols and Special Characters, Footnote and Comments in MS-Word.
 - b) Create a document by inserting Pictures, Charts, Tables, WordArt, AutoShapes and Hyperlink in MS-Word.
 - c) Write Curriculum Vitae in MS-Word
- 2. a) Create a presentation using themes
 - b) Create an animated presentation

LAB CYCLE – II

- 3. Create employees salary sheet and apply the following functions and options. Functions -SUM(), AVERAGE(), MAX(), MIN(), COUNT(), ROUND() and If() Options – Filter and Sorting
- 4. Prepare various charts (Line, Bar, Column, and Pie) for the given data.

	2011	2012	2013	2014
Product A	90	120	150	200
Product B	175	150	220	240
Product C	230	210	250	200

- 5. Generate a form on Student Database.
- 6. Generate a report on Employee Database.

LAB CYCLE – III

- 7. Disassemble and assemble a computer system with necessary peripherals and check the working condition of the PC.
- 8. Install windows operating system and check if all the device drivers (graphics, sound, network etc.) are installed.
- 9. PC to PC Communication using LAN cable.

LAB CYCLE – IV

- 10. Write a HTML coding to demonstrate text formatting----Bold, Italic, Emphasized, Marked, Small, Deleted, Inserted, Subscripts, Superscripts.
- 11. a) Write a HTML coding to demonstrate image tag with attributes and image maps with attributes.

b) Write a HTML coding to demonstrate anchor tag with attributes and image as a hyperlink.

- 12. a) Write a HTML coding to demonstrate table tag with attributes.b) Write a HTML coding to demonstrate list tag with attributes.
- 13. Develop static pages of an online book store using frames. The website should consist the following pages.

Home page, Registration and user Login, User Profile Page, Books, Catalog, Shopping Cart, Payment By credit card

Learning Resources

Text Books:

- Microsoft Office 2003 For Dummies--Wallace Wang
- Web Technology: A Developer's Perspective- By N. P. Gopalan, J. Akilandeswari

Online Recourses:

- http://www.w3schools.com/html/
- http://www.tutorialspoint.com//html5/index.htm

Lecture :	-		Internal Assess	ment:	40
Tutorial :	-		Final Examina	ation:	60
Practical :	3 hrs/	week	Cr	edits:	2
Objectives:	 T T te T re u 	o provide students a com udents who have no back o make students unders esting. o make learners proficie ecognizing and understar nderstanding of the steps	prehensive introduct sground in computer stand the principles nt in developing the nding the syntax and involved in compilin	ory course that i programming. of good progra logic for the g construction of ag, linking and de	is intended for m design and iven problem, f C code, and ebugging.

15MCA2152: C PROGRAMMING LAB

Learning **Outcomes:**

- It is expected that the students could construct a C program (Write, Edit, Compile, Link and Execute).
- It is expected that the students are proficient in writing Programs using selection, control statements, functions, arrays, pointers, structures and files.
- It is expected that the students are able to convert design, analysis to C program statements.
- It is expected that learners are capable of analyzing complex problem, design, implement and execute the program.

LIST OF PROGRAMS

LAB CYCLE - I

- 1. Write a C program to find the area of a triangle.
- 2. Write a C program which takes two real operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*,/,%). Use Switch statement.
- 3. Write a C program to find the roots of a quadratic equation. (else if ladder)
- 4. Write a menu driven program to find whether the given number is i) Prime
 - ii) Perfect iii) Armstrong
- 5. Write a C program to find the largest and smallest number in a list of integers using loops.
- 6. Write a C program that reads integers until user presses 'n' (no). If it encounters 'n' as input, then it should display:
 - the total number of even and odd integers
 - Average value of even integers
 - Average value of odd integers.
- 7. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1 subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- 8. Write a C program to generate all the prime numbers between n1 and n2, where n1, n2 are user inputs.
- 9. Write a C program to convert i) Binary to Decimal ii) Decimal to Binary.

LAB CYCLE – II

10. Write a menu driven program to compute sin(x), cos(x) for 'n' terms using series evaluation, where 'x'(in degrees) and 'n' are user inputs.

$$Sin(x) = x + x^3/3! + x^5/5! + \dots$$

 $\cos(x) = 1 - x^2/2! + x^4/4! - \dots$

- 11. Write a program that uses a recursive function to find the GCD of two given integers.
- 12. Write a menu driven program with options (Using one dimensional array) i)to insert an element into array ii)to delete an element iii)to sort elements iv)to print elements
- 13. Write a menu program that uses functions to perform the following:
- i) Multiplication of Two Matrices ii) transpose of a matrix
- iii) Checking symmetricity of a square matrix.
- 14. Write a C program to determine if the given string is a palindrome or not using user defined functions.
- 15. Write a C program that uses functions to perform the following operations: i)To insert a sub-string into the given main string from a given position.
 - ii) To delete 'n' characters from a given position in a given string.
- 16. Write a C program to sort given 'n' strings.

LAB CYCLE – III

- 17. a)Write a program to reversed a given string, use pointer notation.
- b)Write a program that will return the length of a character string. You are not allowed to use the **strlen** C library function. (**Note: Use "Pointers" concept**)
- 18. Write a C program (With dynamic memory allocation and pointer expressions) to print elements in reverse order.
- 19. Write a C program to find the position of biggest and smallest elements in a given matrix using dynamic memory allocation using pointer expressions.
- 20. Write a C program to find factorial of given number using pointer to function method.

LAB CYCLE – IV

- 21. Write a C program to find gross and net income of 'n' employees (eno, ename, gender, basic, da, hra) using structures with union implementation for gender.
- 22. Write a C program to reverse the text in the data file using fseek() & ftell() functions.
- 23. Write a C program to read name and marks of n number of students and store them in a file. If the file previously exits, add the information of n students (use command line arguments)

Learning Resources

- Programming with C (Schaum's outlines) by Byron.C.Gottfried, Tata Mcgraw-Hill
- Programming in ANSI C by Balaguruswamy TMH.
- C Programming, A Problem-Solving Approach by Behrouz A.Forouzan, Prasad, Richard F.Gilberg ,Cengage Learning
- Let us C (Third Edition) by Yashavant Kanetkar.
- Programming with C by K.R.Venugopal & Sundeep R.Prasad, TMH.
- The C programming Language by Kernighan and Ritchie, Prentice Hall.

MCA15 Regulations 15MCA1153: ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/ week	Credits:	2

Objectives: • To enable the learners to standardize the pronunciation of speech sounds including accentuation

- To make the learners get acquainted with scientific processes of articulation
- To develop awareness of the processes of listening comprehension
- To train the learners in public speaking skills
- To offer insights into the elements of employment oriented communication

Learning Outcomes:

- Acquire competence in the scientific processes of articulation
 - Develop insights into the elements of listening comprehension
 - Develop understanding about the patterns of communication with special reference to standardization of pronunciation
 - Develop the skills of public speaking in both across the table communication and public address
 - Be aware of the elements of employment- oriented communication

LIST OF CYCLES

Cycle -I

- 1. An overview of English Phonetics- Speech Mechanism including organs of speech, Air stream Mechanisms, Insights into the process of articulation.
- 2. Types and Processes of Listening comprehension.

Cycle-II

- 3. Vowels& Consonants- Phonetic Transcription using IPA symbols including stress (Accentuation).
- 4. Patterns of Connected speech (2 sessions)

Cycle-III

- 5. Elements of Public Speaking including Group Discussion.
- 6. Seminar talks vis-à-vis Power point presentation.

Cycle-IV

- 7. Résumé Preparation
- 8. Types and processes of Interviews

Learning Resources

Text Books:

- Martin Cutts, Oxford Guide to Plain English, 7th Impression, OUP, 2011.
- Exercises in Spoken English, Prepared by Department of Phonetics and Spoken English, CIEFL, OUP, 21st Impression, 2003.

Reference Books:

- Stephen R Covey, The 7 Habits of Highly Effective people, II edition, (Pocket Books) Simon & Schuster UK Ltd, 2004.
- Martin Cutts, Oxford Guide to Plain English, 7th Impression, OUP, 2011.
- Eclectic Learning Materials offered by the Department.

E-resources and other digital material:

- ODll Language Learner's Software, 27-6-2012 Orell Techno Systems.
- Visionet Spears Digital Language Lab software Advance Pro, 28-01-2015.
- www.natcorp.ox.ac.uk, British National Corpus, XML edition 2007.

Lecture :	4 hrs/ week	Internal Assessment:	40
Tutorial :	1 hr/ week	Final Examination:	60
Practical :	-	Credits:	4

15MCA1201: DISCRETE MATHEMATICS

Objectives: • To make students understand the basics of Computer Science and Computer Engineering.

- To expose students how to symbolize, read and understand the logical arguments also construct the logical arguments.
- To make students analyze relations binary, partial order.
- To introduce students on the topics like counting techniques and fundamentals in graph theory.

• It is expected that the students would develop familiarity with various concepts like Statements, Validate the arguments, verify the proofs and construct proofs.

- It is expected that the learners would appreciate relations, analyzes binary relations, reflexive, symmetric, transitive and partial ordered relations.
- It is expected that the students would differentiate Lattices and poset.
- It is expected that the students understand different types of counting techniques and applies.
- It is expected that the learners are capable enough in solving different types of recurrence relations and apply wherever necessary.
- It is expected the students gain knowledge about graphs and graph coloring.

UNIT – I

Propositional logic: Fundamentals of logic, Truth tables, Tautologies, Logical inferences, Methods of an implication, Pigeon hole principle, Normal forms: DNF, CNF, PDNF, and PCNF.

First order logic and other methods of proof, Rules of inference for quantified propositions.

UNIT – II

Set Theory and Relations: Introduction, relations and ordering, Properties of binary relations, Equivalence relations, compatibility relations, partial ordering, Hasse diagrams, Lattices.

Elementary Combinatorics: Basic of counting, Combinations and permutations, enumeration of combinations and permutations, Enumerating combinations and permutations with repetitions, Binominal Coefficients, The binomial and multinomial theorems.

UNIT – III

Recurrence Relations: Generating functions of sequences, calculating coefficients of generating functions, recurrence relations, solving recurrence relations by substitution and generating, the method of characteristic roots, Solutions of inhomogeneous equations.

UNIT – IV

Graph Theory: Basic of concepts, isomorphism and sub graphs, trees and their properties, spanning trees, binary tree, planar graphs, Euler formula, multi graphs and Euler circuits, Hamiltonian graphs, chromatics numbers.

Learning Resources

Text Books:

- Discrete Mathematics for Computer Scientists and Mathematicians Joe L.Mott, Abraham Kandel, Theodore P. Baker; PHI
- Discrete Mathematical Structures with Applications to Computer Science- J.P.Tembly, R. Manohar; TMH

Reference Books:

- Discrete Mathematical and its Applications-Kenneth H. Rosen, TMH
- Elements of discrete Mathematics- C L Liu, D. P. Mohapatra, TMH

15MCA2202: DATA STRUCTURES USING C

Lecture	:	4 hrs/ week	Internal Assessment: 40
Tutorial	:	1 hr/ week	Final Examination: 60
Practical	:	-	Credits: 4

- **Objectives:** To introduce the students the fundamentals of Data Structures, Abstract concepts and how these concepts are useful in problem solving.
 - To make the students understand and use the process of abstraction using a programming language such as 'C'.
 - To develop the students towards analyzing step by step and develop algorithms to solve real world problems and also implementing various data structures viz. Stacks, Queues, Linked Lists, Trees and Graphs.
 - To expose the students on various searching & sorting techniques.

Learning Outcomes:

- Able to implement appropriate data structure for a given application.
 - Comprehend the terms "abstract data type", and "data structures", and how data structures and algorithms have to be blended carefully to obtain efficient implementations.
 - Appreciate trade-offs involved in choosing static versus dynamic data structures also implementation of stacks, queues and linked lists, trees, Graphs and their applications.
 - Understand the context of searching and sorting and identify the tradeoffs involved in selecting the most efficient data structures and sorting techniques.
 - Identify balanced search trees like AVL trees and B-Trees and the methods like single rotation/double rotation for insertion and deletion operations, their implementation and complexity.

UNIT – I

Introduction: Basic Concepts, Algorithm Specification Data Abstraction, Performance Analysis.-Space Complexity, Time Complexity.

Linked lists: Singly Linked Lists, Sparse matrices, Doubly Linked List, Circularly Linked List Operations- insertion, deletion, traversal.

Stacks: Definition and examples, Representing Stacks in C, Application of Stacks, Examples: Infix, Postfix, and Prefix, Recursion, Towers of Hanoi Problem,

UNIT – II

Queues: Queue and Its Sequential Representation, Queue as an abstract data type, Implementation of Queues, Applications of Queues, Types of Queues, Circular Queue - Implementation and operations.

Trees: Introduction, Terminology, Representation of Trees.

Binary Trees: Properties of binary trees, binary tree representation, Complete Binary Tree, Expression trees construction and evaluation.

Binary Tree Traversals: Inorder, Preorder and Postorder.-recursive and non recursive.

UNIT – III

Binary Search Trees: Definition, Searching a Binary Search Trees (BST), Insertion into a binary search tree, Deletion from a binary search tree.

Efficient Binary and Multi Search Trees: AVL trees-rotations, insertion, deletion, Introduction to m-way Search Trees, B-Trees - insertion, deletion.

Hashing: Hash Function, Collision Resolution Strategies.

UNIT – IV

Graphs: Terminology, Graph Representations Adjacency Matrices, Adjacency List, Adjacency Multi list.

Elementary Graph Operations: Depth First Search and Breadth First Search. **Searching:** Sequential search, Binary Search, Comparison and analysis. **Sorting:** Insertion Sort, Selection, Bubble Sort, Heap Sort, and Merge Sort.

Learning Resources

Text Books:

- Horowitz Sahni and Anderson-Freed "Fundamentals of Data Structures in C", Second Edition, Universities Press.
- Yedidyah Langsam, Moshe J. Augenstein and Aaron M. Tenenbaum "Data Structures using C and C++", Second Edition, Pearson Education.

Reference Books:

- Mark Allen Weiss, "Data structure and Algorithm Analysis in C", Addison Wesley Publication.
- Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication.
- Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill.
- G A V Pai, "Data Structures and Algorithms", TMH.

15MCA2203: COMPUTER NETWORKS

Lecture	:	4 hrs/ week	Internal Assessment: 4	0
Tutorial	:	1 hr/ week	Final Examination: 6	0
Practical	:	-	Credits: 4	1

- **Objectives:** To make the students familiarize with the concept of computer networks, types, application of networks.
 - To make the students understand the layered organization and structuring of computer networks using OSI and TCP/IP reference model.
 - To train the learners to compare different Transmission Media and their characteristics, functionality of the Data Link Layer.
 - To make the learners understand the methods for detecting and correcting errors in transmission.
 - To make the students aware of the functioning of various routing algorithms.
 - To expose the learners on DNS.

Learning It is expected the students know the importance of Reference Models. It is expected that the students are aware of Transmission Media Wire

- It is expected that the students are aware of Transmission Media, Wireless Transmission and realize its importance.
- It is expected that the students understand the concept of sliding window protocols.
- It is expected that the students know the IEEE Standards and principles used by TCP/IP applications.
- It is expected that the learners are familiar with Domain Name System.

UNIT – I

INTRODUCTION

Uses of Computer Networks: Business Applications, Home Applications, Mobile Users, Social Issues. **Network Hardware:** Personal Area Networks, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Internetworks. **Network Software:** Protocol Hierarchies, Design Issues for the Layers, Connection Oriented and Connectionless Services, Service Primitives, The relationship of Services to Protocols. **Reference Models:** The OSI Reference Model, The TCP/IP Reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP reference model.

PHYSICAL LAYER

Guided Transmission Media: Magnetic Media, Twisted Pair, Coaxial Cable, Power Lines and Fiber Optics.

UNIT – II

DATA LINK LAYER

Data Link Layer Design Issues: Services Provided to the Network Layer, Framing, Error Control and Flow Control. **Error Detection and Correction:** Error-Correcting Codes, Error-Detecting Codes. **Elementary Data Link Protocols:** A Utopian Simplex Protocol, A simplex

Stop-and–Wait Protocol for an Error Free Channel, A simplex Protocol for a Noisy channel. **Sliding Window Protocols:** A One-Bit sliding Window Protocol, A Protocol using Go Back N and Selective Repeat.

THE MEDIUM ACCESS CONTROL SUBLAYER

Ethernet: Classic Ethernet Physical Layer, Classic Ethernet MAC sublayer Protocol, Ethernet Performance, Switched Ethernet, Fast Ethernet, Gigabit Ethernet

Data Link Layer Switching: Repeaters, Hubs, Bridges, Switches, Routers and Gateways, Virtual LANs.

UNIT – III

THE NETWORK LAYER

Network Layer Design Issues: Store and Forward Packet Switching, Services provided to the Transport Layer, Implementation of Connectionless Services, Implementation of Connection Oriented Services, Comparison of Virtual Circuit and Datagram Networks.

Routing Algorithms: The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing.

Congestion Control Algorithms: Approaches to Congestion Control, Traffic-Aware Routing, Congestion Control, Traffic Throttling, Load Shedding.

The Network Layer in the Internet: The IP Version 4 Protocol, IP address.

UNIT – IV

THE TRANSPORT LAYER

The Transport Service: Services provided to the Upper Layers, Transport Services Primitives, and Berkeley Sockets. **Elements of Transport Protocols:** Addressing, Connection Establishment, Connection Release, Flow Control. **The Internet Transport Protocols: UDP:** Introduction to UDP, Remote Procedure Call.

The Internet Transport Protocols: TCP: Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP segment header, TCP connection establishment, TCP connection release, Modeling TCP connection management, TCP Transmission Policy, TCP congestion Control, TCP Timer Management, Wireless TCP and UDP, Transactional TCP.

THE APPLICATION LAYER

DNS - The Domain Name System: The DNS Name Space, Resource Records, Name Servers.

Learning Resources

Text Book:

• **Computer Networks** --- Andrew S. Tanenbaum, 5th Edition, PHI.

Reference Books:

- Behrouz A Forouzan, **"Data Communications and Networking"**, Fourth Edition, TMH (2007)
- James F. Kurose, Keith W. Ross, "Computer Networking", Third Edition, Pearson Education
- Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", Cengage Learning (2008)

15MCA2204: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

T		T 1 A
Lecture :	4 hrs/ week	Internal Assessment: 40
Tutorial :	1 hr/ week	Final Examination: 60
Practical:	-	Credits: 4
Objectives:	 To make the students unders programming and developing Jat To expose the students to objectasses, objects, methods, proper inheritance, encapsulation, and response to train the learners to imple polymorphism, including interpackages. To make the students to design in Java methods. To make the students to under Files and I/O Streams, Applets, 	tand the fundamentals of Java va applications. ect-oriented concepts, including rties, abstraction, polymorphism nore. ement and use inheritance and erfaces and abstract classes appropriate Exception Handling estand the concepts of Threads Networking in java.
Learning Outcomes:	 It is expected that the students debug, and document well-struct It is expected that the students we control structures to implement java classes from spee It is expected that the learners of from predefined class libraries. It is expected that the student handling of inheritance, and techniques and working with Packages, Exceptions and Threat It is expected that the student student streams, Networking Packages and streams an	are competent enough to write ured Java applications. rould apply decision and iteration at algorithms and the learners cifications. effectively create and use objects s have proficient knowledge in polymorphism as programming h Interfaces, Abstract Class ds. cs would work with Files, I/C and Applets.
UNIT – I		
History & Evolution of Ja	ava: Java's Lineage, The Birth of Moo	lern Programming: C, C++: The

Next Step, The Creation of Java, How Java Changed the Internet, Java Applets, Security, Portability, Java's Magic: The Byte code, The Java Buzzwords.

An Overview of Java: Object-Oriented Programming, Two Paradigms, Abstraction, The Three OOP Principles, A First Simple Program, Lexical Issues.

Data Types, Variables and Arrays: The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, A Closer Look at Literals, Variables, Wrapper Classes ,Type Conversion and Casting, Arrays.

Operators: Arithmetic Operators, Bitwise Operators, Relational Operators, Boolean Logical Operators.

Control Statements: Java's Selection Statements, Iteration Statements, Nested Loops, Jump Statements.

Introducing Classes: Class Fundamentals, Declaring Objects, new operator, Assigning Object

Reference Variables, Introducing Methods, Constructors, The this Keyword, Instance Variable Hiding, Garbage Collection.

A Closer Look at Methods and Classes: Overloading Methods, Overloading Constructors, Using Objects as Parameters, Returning Objects, Recursion, Introducing Access Control, Understanding static, final, String Class, Command-Line Arguments.

UNIT – II

Inheritance: Inheritance Basics, Superclass Variable-Reference a Subclass Object ,Using super keyword, Creating a Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Using final with Inheritance.

Packages and Interfaces: Defining a Package, Access Protection, Importing Packages, Defining an Interface, Implementing Interfaces, Variables in Interfaces, Extending Interfaces.

Exception Handling: Exception-Handling Fundamentals, Exception-Handling Mechanisms, Java's Built-in Exceptions, User Defined Exceptions.

UNIT – III

Multithreaded Programming: Concepts of Multi Threading, Creating a Thread by Implementing Runnable interface and Extending Thread class, Creating Multiple threads, Using isAlive() and join(), Thread Priorities, Synchronization, Interthread Communication, Deadlock, Suspending, Resuming, and Stopping threads.

Input/Output: Exploring java.io - The Java I/O Classes and Interfaces, File, Directories, Stream Classes, The Byte Streams-InputStream, OutputStream, FileInputStream, FileOutputStream Buffered Byte Streams, DataInputStream and DataOutputStream, RandomAccessFile,The Character Streams-Reader Writer FileReader, FileWriter, BufferedReader, PrintWriter, Serialization.

UNIT – IV

Networking: Networking Basics, The Networking Classes and Interfaces, InetAddress Factory Methods, Instance Methods ,TCP/IP Client Sockets, URL, URLConnection, TCP/IP Server Sockets, Datagrams.

The Applet Class: Applet Basics, The Applet Class, Applet Architecture, An Applet Skeleton, Applet Initialization and Termination, A Simple Banner Applet, Using the Status Window, The HTML APPLET Tag, Passing Parameters to Applets, getDocumentBase() and getCodeBase().

Learning Resources

Text Book:

• **"The Complete Reference Java"**, Seventh Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.

Reference Books:

- JAVA How to program, Eighth Edition, Paul Deitel, Harvey Deitel, PHI Learning Pvt.Ltd., New Delhi
- **Core Java 2,** Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
- **Core Java 2,** Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
- Thinking in Java, 3rd Edition, Bruce Eckel
- Object Oriented Programming through JAVA, P. Radha Krishna

Web Resources

- http://download.oracle.com/javase/tutorial/index.html
- http://www.deitel.com/Tutorials/Freetutorialsandarticles/tabid/1575/Default.aspx
- http://www.javaj2ee.net/core-java-video-tutorial
- http://www.coderanch.com/forums/f-33/java
- http://www.javacertificate.net/
- http://oopweb.com/Java/Documents/IntroToProgrammingUsingJava/VolumeFram es.html
- http://www.herongyang.com/Java/
- http://www.javavideotutes.com/lessons/
- http://www.archive.org/details/arsdigita_04_java

15MCA2205: OPERATING SYSTEMS

Lecture	:	4 hrs/ week	Internal Assessment: 40)
Tutorial	:	1 hr/ week	Final Examination: 60)
Practical	:	-	Credits: 4	

Objectives: • To make the students recognize the importance of scheduling algorithms.

- To make the students understand the relationship of critical sections, semaphores and inter process communication to concurrent programming.
- To make the students proficient in memory management techniques and virtual memory concepts.
- To make the learners proficient in handling I/O in a computer system.
- To expose the students to the features of an operating system related to protection and security.

• It is expected that the students appreciate operating system design concepts and familiar with the implementation of these concepts.

- It is expected that the students are familiar with various operating system concepts as they are applied to memory, process, file system and I/O device management.
- It is expected that the students recognize OS support for virtual memory, disk scheduling, I/O, and file systems.

UNIT – I

Introduction: What Operating Systems Do, Computer System Organization, Computer system Architecture, Operating System Structure, Operating System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special purpose Systems, Computing Environments.

System Structure: Operating System Services, User Operating System Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, Operating System Structure, Virtual Machine, Operating System Generation, System Boot.

UNIT – II

Process Concept: Overview, Process Scheduling, Operations on Processes, Interprocess Communication, Communication in Client Server Systems.

Multithreaded Programming: Overview, Multithreading Models, Thread Libraries, Threading Issues.

Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Thread Scheduling.

Synchronization: Background, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores- Classical Problems of Synchronization; Monitors.

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Memory Management Strategies: Background, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation.

Virtual Memory Management: Background, Demand Paging, Copy on Write, Page Replacement, Allocation of Frames, Thrashing.

UNIT – IV

File System: File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.

Implementing File Systems: File System Structure, File System Implementation, Directory Implementation.

Secondary Storage Structure: Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap Space Management.

Learning Resources

Text Book:

• Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, **"Operating System Principles"**, Seventh Edition, Wiley.

Reference Books:

- William Stallings, "Operating Systems Internals and Design Principles", Fifth Edition, Pearson Education (2007)
- Flynn/McHoes, "Operating Systems", Cengage Learning (2008).
- Deitel & Deitel, "Operating Systems", Third Edition, Pearson Education (2008).

15MCA2251: DATA STRUCTURES LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/ week	Credits:	2

- **Objectives:** To make the students upgrade and enhance theoretical skills and to provide the hands on experience in the subject.
 - To make the students aware of defining and building various data structures.
 - To make the learners understand applicability for the various data structures.
 - To make the students proficient in implementing algorithms into programming code.
- It is expected that the students would choose and integrate sophisticated data structures into program design using linked list, stack and Binary Search Tree.
 - It is expected that the students demonstrate an understanding of different sorting techniques and searching techniques in solving a problem.

LIST OF PROGRAMS

LAB CYCLE – I

- 1. Write a program to implement the operations on stacks.
- 2. Write a program for converting a given infix expression to postfix form.
- 3. Write a program for evaluating a given postfix expression
- 4. Write a program to implement stack operations using singly linked list.
- 5. Write a program to implement the operations on doubly linked list.
- 6. Write a program to implement the operations on circular linked list.

LAB CYCLE -II

- 7. Write a program to implement the operations on queues.
- 8. Write a program to implement the operations on circular queues.
- 9. Write a program to create a binary tree and also implementing the tree traversal techniques using recursion.

LAB CYCLE – III

- 10. Write a program to create a binary search tree and also implementing the tree traversal techniques using non-recursion.
- 11. Write a program to perform the operations on AVL-tree.
- 12. Write a program to perform the operations on B-tree.

LAB CYCLE – IV

- 13. Write a program to implement graph traversal techniques.
- 14. Write a program to implement searching techniques.
- 15. Write a program to implement hashing techniques.
- 16. Write a program to implement the following sorting techniques:
 - Bubble sort
 - Heap Sort
 - Merge sort

Learning Resources

- Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
- R. Kruse etal, "Data Structures and Program Design in C", Pearson Education Asia, Delhi, 2002.
- "Data Structure using C" AM Tanenbaum, Y Langsam & MJ Augustein, Prentice Hall India, New Delhi
- Data structure & Algorithm Analysis in C Weiss, Mark Allen Addison Wesley
- Data Structure : By Trembley & Sorrenson.
- "Theory and Problems of Data Structures", Lipscutz S, Schaums Outline Series, McGraw-Hill.
- "C Programming and Data Structures", Behrouz A. Forouzan, Richard F. Gilberg, Cengage Publications.

15MCA2252: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/ week	Credits:	2

- **Objectives:** To make the students understand the fundamentals of Java programming and developing Java applications.
 - To expose the students to object-oriented concepts, including classes, objects, methods, properties, abstraction, polymorphism, inheritance, encapsulation, and more.
 - To train the learners to implement and use inheritance and polymorphism, including interfaces and abstract classes, Packages.
 - To make the students to design appropriate Exception Handling in Java methods.
 - To make the students to understand the concepts of Threads, Files and I/O Streams, Applets, Networking in java.

• It is expected that the students are competent enough to write, debug, and document well-structured Java applications.

- It is expected that the students would apply decision and iteration control structures to implement algorithms and the learners implement Java classes from specifications.
- It is expected that the learners effectively create and use objects from predefined class libraries.
- It is expected that the students have proficient knowledge in handling of inheritance, and polymorphism as programming techniques and working with Interfaces, Abstract Class, Packages, Exceptions and Threads.
- It is expected that the students would work with Files, I/O Streams, Networking Packages and Applets.

LIST OF POGRAMS

LAB CYCLE - I

1. a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

b) Write a Java program to find both the largest and smallest number in a list of integers.

- 2. Write a Java program to multiply two given matrices by checking the compatibility of multiplication.
- 3. a) Find Volume of a box using classes.
 b) Write a Java program to illustrate method overloading and constructor overloading.
 c) Write a Java program to demonstrate on static variables and methods.
- 4. Write a Java program to demonstrate objects as arguments.
- 5. Write a Java program using String class methods to perform the following operations a) Sort a list of names in ascending order by command line arguments.
 - b) Develop a program that will take a string from a command line argument in order to check whether it is a palindrome.

LAB CYCLE – II

- 6. Design three classes: Student, Exam and Result. The student class has data members such as roll no, name etc. Create a class Exam by inheriting the Student class. The Exam class adds data members representing the marks scored in six subjects. Derive the Result from class Exam and it has its own members such as total marks and average. Calculate the total marks and average.
- 7. a) Write a java program to implement Method Overriding.
 - b) Write a java program to demonstrate constructor chaining in Inheritance.
 - c) Write a java program to demonstrate the use of final.
- 8. a) Write a java program by implementing super class reference and subclass object (Implement Dynamic Binding).

b) Write a Java program to create an abstract class named Shape that contains an empty method named numberOfSides ().Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides () that shows the number of sides in the given geometrical figures.

- 9. Write a Java program that illustrates the following.a) Creation of simple package. b) Accessing a package.
- 10. Develop a program to demonstrate multiple inheritance through interface

LAB CYCLE – III

- 11. Write Java programs that illustrates the following
 - a) Handling predefined exceptions b) Handling user defined exceptions
- 12. Write a Java program to create thread using Thread class and Runnable Interface.
- 13. Write a Java program to demonstrate Synchronization.
- 14. Write a Java program that Copies the content of one file to another file.

LAB CYCLE – IV

- 15. a) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
 - b) Write a Java program that displays the number of characters, lines and words in a text file.
- 16. Write a Java program to demonstrate URL and URLConnection.
- 17. Write a Java program for establishing a socket connection.
- 18. Write a Java program to pass parameters to Applets.

Learning Resources

- "The Complete Reference Java", Seventh Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
- JAVA How to program, Eighth Edition, Paul Deitel, Harvey Deitel, PHI Learning Pvt.Ltd., New Delhi
- **Core Java 2,** Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
- **Core Java 2,** Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
- **Object Oriented Programming through JAVA,** P. Radha Krishna.
Web Resources

- http://download.oracle.com/javase/tutorial/index.html
- http://www.javaj2ee.net/core-java-video-tutorial
- http://www.coderanch.com/forums/f-33/java
- http://www.javacertificate.net/
- http://oopweb.com/Java/Documents/IntroToProgrammingUsingJava/VolumeFrame s.html
- http://www.deitel.com/Tutorials/Freetutorialsandarticles/tabid/1575/default.aspx
- http://www.herongyang.com/Java/

Video references

- http://www.javavideotutes.com/lessons/
- http://www.archive.org/details/arsdigita_04_java

15MCA2253: OPERATING SYSTEMS LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/ week	Credits:	2

Objectives: • To make the students understand Mechanisms vs. Policies.

- To make the learners understand the Scheduling criteria and how they effect system performance.
- To make the students recognize the advantages and disadvantages of different scheduling algorithms.
- To expose the students to working of different scheduling algorithms for given situation.

Learning • It is expected that the learners familiarize with the complexity of CPU scheduling algorithms.

- It is expected that the students are familiar with the working of System calls.
- It is expected that the students are able to solve both the Dining philosophers problem and producer consumer problem.

LIST OF PROGRAMS

Basic programs: UNIX commands

LAB CYCLE - I

- 1. Write a shell script to accept two numbers and perform all arithmetic operations on it.
- 2. Write a shell script to check whether a particular user has logged in or not.
- 3. Write a shell script to find whether a number is Prime or not
- 4. Write a program to find number of vowels, consonants, numbers and special characters in a given string.
- 5. Program to implement searching and sorting operations on a list.

LAB CYCLE - II

- 6. Write a shell script to accept the name of the file from standard input and perform the following tests on it
 - o File executable
 - o File readable
 - o File writable
 - o Both readable & writable
- 7. Write a shell script to accept student number, name, and marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called studat

Rules: avg>=80 then grade A

avg<80 && avg>=70 then grade B avg<70 && avg>=60 then grade C avg<60 && avg>=50 then grade D avg<50 && avg>=40 then grade E Else grade F

- 8. Program to count no of ordinary and Directory files in a given Directory
- 9. Write a menu driven shell script to copy, edit, rename and delete a file

LAB CYCLE - III

- 10. Program to implement FCFS scheduling algorithm
- 11. Program to implement SJF scheduling algorithm
- 12. Program to implement Round Robin scheduling algorithm
- 13. Program to implement PRIORITY scheduling algorithm

LAB CYCLE - IV

- 14. Program to implement FORK system call and EXECL system call in C
- 15. Program to implement Producer Consumer Problem using Semaphores

Learning Resources

- **"UNIX and Shell Programming",** Behrouz A. Forouzan, Richard F. Gilberg, Cole-Thomson Learning
- "UNIX in a nut shell", Arnold Robbins, O'Reilly Media
- "Modern Operating Systems", Andrew S. Tanenbaum

15MCA1254: PROFESSIONAL COMMUNICATION PRACTICE LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	2 hrs/week	Credits:	1

Objectives:

• To offer training in administrative and professional writing skills.

- To expose the learners to the processes of putting across their lines of thinking and concepts.
- To train the learners in salient procedures related to technology enabled processes of communication.
- To raise the capabilities of learners in technical communication.
- To enhance the awareness of life skills required for professional leadership.

Learning
Be aware of the processes of administrative skills.
Develop insights into the professional argumentation.

- Be proficient in technology enabled communication skills.
- Develop technical and professional drafting skills.
- Be aware of the elements of Professional leadership.

UNIT – I

Administrative drafting and correspondence – Format, style and techniques. Memos. Minutes. E-mail Etiquette and Web notes.

UNIT – II

Self Affirmation. Advanced Group Discussion. Pyramid Discussion. PNI & Point-Counter Point.

UNIT – III

Technology enabled conferencing skills. Developing Abstract. Introduction to Executive summary- written and spoken. Technical Vocabulary- relevant sentential patterns.

UNIT – IV

Select Life Skills (50). Select Logies, Isms, Phobias and Manias (25 each). Sentence Completion (50 items.) Fundamentals of Syllogisms.

Learning Resources

Text Books:

- 1. Deborah. J. Bennett, Logic made easy: How to know when Language Deceives you, WV Norton & company, I edition(Reprint), 2005.
- 2. Ashraf Rizvi, Effective Technical Communication, TMI, I edition 2005.
- 3. 'Krishna', English Language Communication Skills, I Edition, Duvvuri Publications, 2008.
- 4. Eclectic Learning Materials offered by the Department.

Reference Books:

- 1. Khera Shiv, Living with Honour, Macmillan, I edition (Reprinted) 2003.
- 2. Daniel Goleman, Working with Emotional Intelligence, Bantam Books, I edition (Expo-Edition) 1999.
- 3. Christopher. M.Avary et al, Teamwork is an individual Skill, Magna, I edition 2003.
- 4. William W Hewitt, Art of Developing Personal Power, Jaico, Third Impression, 2003.

E-Resources and other digital materials:

- 1. Visionet Spears Digital Language Lab software Advance Pro, 28-01-2015.
- 2. www.bbc.co.uk/learning/subjects/english.shtml.

MCA15 Regulations 15MCA2301: DATABASE MANAGEMENT SYSTEMS

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

- To explain the students the strategies used in the appropriate selection of a DBMS.
 - To make the students aware of the latest trends in database systems.
 - To make the learners appreciate on how the database maps onto physical storage and how the security can be implemented.
 - To expose the students in Relational Algebra, Calculus in detail.
 - To make the students understand the need of SQL Statements.
 - To make the learners demonstrate the importance of Normalization.
 - To make the learners justify the importance of RAID for improving reliability and system performance.
 - To make the students understand the need for transaction processing, concurrency control and recovery mechanisms to maintain data integrity.

• It is expected that learners identify the features of the DBMS that will meet the organizational needs.

Outcomes:

- It is expected that the students familiarize on different ER Models.
- It is expected that the students are able to design a database efficiently.
- It is expected that the students are able to write queries using Relational Algebra, Relational Calculus.
- It is expected that the students write queries using SQL Statements.
- It is expected that the students recognize the importance of normal forms.
- It is expected that the students are able to judge the value of transaction transparency, concurrency control in the maintenance of data integrity.
- It is expected that the students familiarize how concurrency-control techniques can be used to maintain data integrity.

UNIT – I

Databases And Database Users: Introduction, An Example, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach.

Database System Concepts and Architecture: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architectures for DBMSs, Classification of Database Management Systems.

Data Modeling Using the Entity-Relationship (ER) Model: Using High-Level Conceptual Data models for Database Design, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types.

UNIT – II

The Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions, and Dealing with Constraint Violations.

The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, The Tuple Relational Calculus, The Domain Relational Calculus.

SQL-99: Schema Definition, Constraints, Queries, and Views: SQL Data Definition and Data Types, Specifying Constraints in SQL, Schema Change Statements in SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT, DELETE and UPDATE Statements in SQL, Specifying Constraints as Assertions and Triggers, Views (Virtual Tables) in SQL, Additional Features of SQL.

UNIT – III

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.

Relational Database Design Algorithms and Further Dependencies: Properties of Relational Decompositions, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

UNIT - IV

Disk Storage, Basic File Structures, and Hashing: Introduction, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access Using RAID Technology.

Introduction To Transaction Processing Concepts and Theory: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability.

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency Control Techniques.

Learning Resources:

Text Book:

[1] Ramez Elmasri, Shamkant B. Navathe, "FUNDAMENTALS OF DATABASE SYSTEMS", Fifth Edition, Pearson Education (2007).

Chapters: UNIT I: 1.1 to 1.6, 2, 3.1, 3.3 to 3.5

UNIT II: 5, 6.1 to 6.3, 6.6, 6.7, 8

UNIT III: 10, 11.1 to 11.4

UNIT IV: 13.1, 13.3 to 13.10, 17.1 to 17.5, 18.1 to 18.3.

Reference Books:

- [1] "DATABASE MANAGEMENT SYSTEMS", Peter Rob, A. Anand Rao, Carlos Coronel, Cengage Learning.
- [2] "DATABASE SYSTEM CONCEPTS", Abraham Silberschatz, Henry F. Korth, S. Sudarshan

- [3] "DATABASE MANAGEMENT SYSTEMS", Raghu ramakrishnan, Fourth Edition
- [4] "Database Management System Oracle SQL and PL/SQL", P.K.Das Gupta, PHI.
- [5] "Database System Concepts", Peter Rob & Carlos Coronel, Cengage Learning, 2008.

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	50
Practical	:	-	Credits:	4

15MCA2302: ADVANCED JAVA PROGRAMMING

Objectives: • To make the learners develop swing-based GUI.

- To make the students understand the importance of JDBC to access database.
- To prepare the students write server side programs in the form of servlets.
- To make the students develop applications with RMI.
- Understand the advantages and applications of EJBs.

Learning

Outcomes:

- It is expected that the learners able to design swing based GUI.
 - It is expected that the students able to retrieve and update the data stored in a database.
 - It is expected that the learners able to develop applications using servlets and JSP.
 - It is expected that the students able to develop applications with RMI.
 - It is expected that the learners develop applications with EJBs.

UNIT – I

Introducing Swing: The Origins of Swing ,Swing Is Built on the AWT ,Two Key Swing Features, Swing Components Are Lightweight ,Swing Supports a Pluggable Look and Feel, The MVC Connection, Components and Containers, Components, Containers, The Top-Level Container Panes, The Swing Packages, A Simple Swing Application, Event Handling, Create a Swing Applet.

Exploring Swing: JLabel and ImageIcon, JTextField, The Swing Buttons, JButton, JToggleButton Check Boxes, Radio Buttons, JTabbedPane, JScrollPane, JList, JComboBox, Trees, JTable.

UNIT – II

Database Programming with JDBC: Database Drivers, The java.sql Package-Connection management, Database access, Data Types, Database Metadata, Loading a Database Driver and Opening Connections, Establishing a Connection, Creating and Executing SQL Statements, Querying the Database, Prepared Statements.

Servlet Programming: Overview of the Java Servlet API, Servlet Implementation, Servlet Configuration, Servlet Lifecycle, Requests and Responses.

UNIT – III

Servlet Sessions: Approach to session tracking, Session tracking with java servlet API. **Java Server Pages (JSP):** Introducing JSP, JSP Directives, Scripting Elements, Standard Actions, Implicit Objects, Scope.

UNIT – IV

RMI: The RMI Architecture, Locating Remote Objects, RMI Exceptions, Developing Applications with RMI, the RMI Security Manager, Parameter passing in RMI. **EJB:** What are EJBs?, The EJB Container and its Services, Working with EJBs, EJB Components on the Web.

Learning Resources:

Text Books:

- [1] "Java: The Complete Reference", Seventh Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi (Unit-I)
- [2] "Professional Java Server Programming", J2EE 1.3 Edition, Subrahmanyam Allamaraju, Cedric Buest, APress Publications (Unit II, Unit-III, and Unit-IV)

Reference Books:

- [1] Robert W. Sebesta, "Programming the World Wide Web", Third Edition, Pearson Education.
- [2] Chris Bates, **"Web Programming–Building Internet Applications"**, Second Edition, Wiley.
- [3] Jeffrey C. Jackson, "Web Technologies A Computer Science Perspective", Pearson Education.

Web Resources:

- [1] http://download.oracle.com/javaee/1.4/tutorial/doc/
- [2] http://courses.coreservlets.com/Course-Materials/csajsp2.html
- [3] http://www.roseindia.net/jdbc/
- [4] http://www.roseindia.net/servlets/
- [5] http://www.roseindia.net/jsp/
- [6] http://pdf.coreservlets.com/

MCA15 Regulations 15MCA2303: DESIGN AND ANALYSIS OF ALGORITHMS

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

• To make the students analyze the running time of an algorithm.

- To make the students to know the basic paradigms and data structures to solve algorithmic problems.
- To make the learners understand the Multistage Graph, Shortest Paths and Traveling Salesperson Problems, Traversal and Searching Techniques.
- To make the students distinguish between NP-hard and NP-complete problems.

Learning

- **Outcomes:**
- It is expected that the learners use different computational models(e.g., divide-and-conquer),order notation and various complexity measures(e.g., running time, disk space) to analyze the complexity/performance of different algorithms.
- It is expected that the students understand various techniques for efficient algorithm design (divide-and-conquer, greedy, and dynamic algorithms) and be able to apply them while designing algorithms.
- It is expected that the learners differentiate between various algorithms for sorting (e.g., merge, quick-sort), searching (e.g., linear and binary search), and selection (e.g., min, max) and know how/when to use them.
- It is expected that the students know various advanced design and analysis techniques such as greedy and dynamic methods.
- It is expected that the students are able to understand the techniques used for designing graph theory algorithms (e.g., breath-first and depth-first algorithms) and apply them to solve other related problems (e.g., single source shortest path as in Dijkstra's and Bellman-Ford algorithm, Prim's and Kruskal's algorithms).
- It is expected that the students know the concepts of tractable and intractable problems and the classes NP-hard and NP-complete problems.

UNIT – I

Introduction: What is Algorithm, Algorithm Specification: Pseudo code Conventions, Recursive Algorithms; Performance Analysis: Space Complexity, Time Complexity, Asymptotic notation, Performance Measurement; Randomized Algorithms: Basics of probability theory, Randomized algorithms, Identifying the repeated element.

Divide and conquer: General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick sort, Strassen's Matrix Multiplication.

UNIT – II

The Greedy Method: The general method, Knapsack Problem, Job sequencing with deadlines; Minimum cost spanning trees: Prim's Algorithm, Kruskal's Algorithm, Optimal Storage on tapes, Optimal Merge patterns, Single Source shortest paths.

Dynamic Programming: The general method, Multi-stage graphs, All pairs shortest paths, Single source shortest paths, Optimal Binary Search Trees, 0/1 Knapsack, The Traveling SalesPerson Problem.

UNIT – III

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for graphs: Breadth First Search, Depth First Search traversals; Connected Components and Spanning Trees, Bi-connected components and DFS.

Backtracking: The general method, The 8-queens problem, sum of subsets, Graph coloring, Knapsack Problem.

UNIT - IV

Branch and Bound : The Method: Least Cost search, The 15 puzzle – control abstractions for LC search, Bounding, FIFO Branch and Bound, LC Branch and Bound; Traveling Sales person: FIFO Branch and Bound solution, LC Branch and Bound solution.

NP-Hard and NP – Complete problems: Basic concepts: Non deterministic algorithms, The classes NP hard and NP Complete, Satisfiability.

Learning Resources:

Text Book:

[1] Sartaj Sahni, "Fundamentals of Computer Algorithms", Second Edition, Universities Press (2008). Chapters : 1 to 8 and 11

Reference Books:

- [1] Thomas H Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, McGraw Hill.
- [2] Anany Levitin, "Introduction to the Design & Analysis of Algorithms", Second Edition, Pearson Education (2007).

15MCA2304: WEB DEVELOPMENT

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

- To make the students familiarize in configuring the web server.
 - To make the learners familiarize in using open source database.
 - To make the students familiarize to design interactive web pages using operators and control structures.
 - To make the students disseminate to design and implement web pages using forms.
 - To make the learners familiarize the design of web pages that can handle session tracking.

Learning
 It is expected that the students know the knowledge in configuring web server.

- It is expected that the students know the how to use the open source data bases along with existing knowledge on database.
- It is expected that the students know how to design and implement web pages using different concepts covered.

UNIT – I

XHTML: Introduction, Headers, Linking, Images, Special characters, Tables, Tables and formatting, Forms, Interlinking, Image maps, Meta Elements, Frames, Nested Frames.

CASCADING STYLE SHEETS (CSS): Introduction, Inline styles, Embedded style sheets, External Style Sheets, Positioning Elements, Backgrounds, Element Dimensions, Text flow and Box Model, User Style Sheets.

Java Script: Introduction to Scripting, Control Statements, Functions, Arrays, Objects. Extensible Markup Language (XML): Introduction, Structuring Data, XML namespaces, Document Type Definitions and Schemas, Document Object Model, DOM Methods.

UNIT – II

Introduction to Apache: Apache Explained; Starting, Stopping and Restarting Apache. **Configuration:** Modifying the Default Configuration.

Securing Apache: Set User and Group, Consider Allowing Access to Local Documentation, Don't Allow Public_html Web Site (Unless You want to), .htaccess, Remove server-status and server-info.

Apache Log files: Access control with .htaccess.

Introduction to MySQL: The SHOW DATABASE and CREATE DATABASE Commands, The USE Command, The CREATE TABLE and SHOW TABLES Commands, The DESCRIBE Command, The INSERT Command, The SELECT Command, The UPDATE Command, The DELETE Command, Some Administrative Details, Database Independent Interface, Table Joins, Loading and Dumping a Database.

UNIT – III

Introduction: Embedding PHP into HTML, Configuration, A Couple of Quick Examples. **Language syntax:** Variables, Data types, Arrays, Web Variables, Operators, Flow control Constructs, Writing PHP functions.

Built in PHP functions: Important Functions, Array functions, String functions, Other functions.

PHP and MYSQL: MySQL Functions Part 1 & Part 2, More PHP MySQL Functions.

UNIT – IV

Sessions and Authentication: Introduction to Sessions, Definition of session, Perpetuation of a Session, Session Security, How PHP implements Sessions, Basic PHP Sessions, Limitations of Basic PHP Sessions.

Learning Resources:

Text Books:

- [1] "Internet and World Wide Web How To Program", Third Edition, H.M.Deitel, P.J.Deitel, A.B.Goldberg, PHI Pvt. Ltd., New Delhi (Unit-I)
- [2] "Open Source Web Development with LAMP", James Lee and Brent Ware.
- [3] "Professional PHP6", Ed Lecky-Thompson, Steven D.Nowicki, Thomas Myer.

Reference Books:

- [1] C. Bates, **"Web Programming Building Internet Applications"**, Willey Dream Tech, 3rd edition, 2006.
- [2] Kevin Tatroe, Peter MacIntyre, "Programming PHP", O'REILLY, 3rd Edition, 2013
- [3] Adam Trachtenberg, David Sklar, "PHP Cookbook: Solutions and Examples for PHP Programmers", O'REILLY, 2nd Edition, 2006.
- [4] Lucas Carlson, Leonard Richardson, "Ruby Cookbook", O'REILLY, 2nd Edition, 2015.
- [5] Jay McGavren, "Head First Ruby", O'REILLY, 2nd Edition, 2015.
- [6] Robert W. Sebesta, "Programming the World Wide Web", Third Edition, Pearson Education (2007).
- [7] Chris Bates, "Web Programming–Building Internet Applications", Second Edition, Wiley (2007).
- [8] Jeffrey C. Jackson, "Web Technologies A Computer Science Perspective", Pearson Education (2008).

Web Resources:

[1] Prof. Indranil Sengupta, Internet Technology --http://nptel.ac.in/syllabus/syllabus.php?subjectId=106105084

15MCA2305: INDUSTRIAL MANAGEMENT

Lecture	:	4 hrs/week	Internal Assessment: 40	0
Tutorial	:	-	Final Examination: 60	0
Practical	:	-	Credits: 4	ŀ

Objectives:

• To provide basic knowledge on managerial functions and principles of management which are helping in an organization.

- To give brief information about organizational behavioral aspects of an employee in an organization.
- To provide knowledge in the area of financial management and investment decisions.
- To give information about human resource management concepts and leadership activities.

Learning

- Outcomes:
- Student will get knowledge how to apply the managerial functions and principles in an organization. He/She also get knowledge about corporate ethics and Social Responsibilities of Business.
- He/She will get knowledge how to associate with peers, superiors and other employees in an organization.
- He/She will understand how to make investment decisions based on the requirement of business through knowledge on financial management.
- He/She will get thorough knowledge in motivation, leadership principles and HR policies in an organization.

UNIT – I

General Management: Meaning and Importance of Management, Henri Fayol's Principles of Management, Managerial Functions: Planning, Organizing, Staffing, Directing, and Controlling. Levels of Management-Skills and qualities required by Managers, Corporate Ethics and Social Responsibilities of Business.

UNIT – II

Organizational Behavior: Nature, Definition, Fundamental Concepts and Challenges for OB in new era.

Personality: Determinants of Personality, Theories of Personality, Stages in Personality Development, Personality Traits important to OB.

Perception: Process, Factors influencing perception, Enhancing perceptual skills.

Attitudes: Attitude formation, Change of Attitude.

Developing Interpersonal skills: Transactional analysis and Johari Window.

UNIT – III

Financial Management: Objectives of Financial Management, Time value of money, Present value, Concept of interest, Compound interest, Future value of money, Cost of Capital, Introduction to Final Accounts.

Investment decisions: Nature of Capital Budgeting decisions, techniques of capital budgeting: Pay back method, Average rate of return and Time-Adjusted methods: IRR, NPV and Profitability index.

UNIT – IV

Human Resource Management: Significance, Definition and Functions, HR policies, Job Analysis, Human Resources Planning, Recruitment, Selection, Placement, Training and Development, Performance Appraisal, Job Evaluation, Stress Management.

Directing: Motivation and Leadership, Maslow's Needs Hierarchy Theory, Herzberg's Two Factor Theory and styles of Leadership.

Learning Resources:

Reference Books:

- [1] Koonz, Weihrich and Aryasri: "Principles of Management", Tata McGraw Hill, 2004.
- [2] Gupta R S, Sharma B D Bhalla N S: "Principles and Practice of Management", Kalyani Publications, Hyderabad, 2008.
- [3] P. Subba Rao: "Management", Himalaya Publishing House, Mumbai, 2010.
- [4] K.Aswathappa: "Organizational Behavior-Text, Cases and Games", Himalaya Publishing House, New Delhi, 2008,
- [5] Steven L Mc Shane, Mary Ann Von Glinow, Radha R Sharma: "Organizational Behavior", Tata McGraw Hill Education, New Delhi, 2008.
- [6] Brigham and Ehrdhart: "Financial Management Text and Cases", Cengage Learning, New Delhi.
- [7] I.M Pandey: "Financial Management", 9/e, Vikas Publishing, 2004
- [8] M.Y Khan, P K Jain: "Financial Management-Text and Problems", Tata McGraw Hill, New Delhi. 2003
- [9] Gary Dessler: "Human Resources Management", PHI Private Limited, New Delhi, 2007.
- [10] K Aswathappa: "Human Resource and Personnel Management", Tata McGraw Hill, New Delhi, 2007.

MCA15 Regulations 15MCA2351: DATABASE MANAGEMENT SYSTEMS LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/week	Credits:	2

Objectives:

- To make the students understand DDL, DML, TCL, DCL commands.
 - To make the students understand the basic SQL queries and complex queries using joins.
 - To make the students understand benefits of granting and revoking privileges, index, synonym and sequence.
 - To make the students get an insight into the working of Locking Tables.
- To make the students aware of writing PL/SQL blocks, Procedures, Functions, Triggers and Packages.

Learning It is expected that the learners able to create a Database and perform all DDL, DML, TCL, DCL operations. **Outcomes:**

- It is expected that the students can grant and revoke privileges.
- It is expected that the students can lock the tables.
- It is expected that the learners create Stored Procedures and Functions, Triggers and Packages.

LIST OF PROGRAMS

Create the following Tables and maintain the appropriate database:

1. The marketing company wishes to computerize their operations by using following tables:

CLIENT_MASTER (Client_No, Name, Address1, Address2, City, State, Pincode, Bal_Due)

PRODUCT_MASTER (Product_No, Description, Profit_Percent, Unit_Measure, Qty_On_Hand, Reorder_Lvl, Sell_Price, Cost_Price)

SALESMAN_MASTER (Salesman_No, Name, Address1, Address2, City, State, Pincode, Sal_Amt, Target_Amt, Remarks)

SALES_ORDER (S_Order_No, S_Order_Date, Client_No, Delve_Address, Salesman_No, Delve_Type, Billed_Yn, Delve_Date, Order_Status)

SALES_ORDER_DETAILS (S_Order_No, Product_No, Qty_Ordered, Qty_Disp, Product_Rate)

CHALLAN_MASTER (Challan_No, S_Order_No, Challan_Date, Billed_Yn) CHALLAN_DETAILS (Challan_No, Product_No, Qty_Disp)

2. An enterprise wishes to maintain a database to automate its operations. Enterprise divided into two certain departments and each department consists of employees. The following two tables describes the automation schemas **DEPT** (Deptno, Dname, Loc)

EMP (Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno)

LAB CYCLE – I

- 1. List the products which have highest sales.
- 2. Find out the details of top 5 earners of company.

- 3. Determine the names of employee, who earn more than their managers.
- 4. Find the names of clients who have placed orders worth of Rs. 10,000/- or more.
- 5. Determine the names of employees, who take highest salary in their departments.
- 6. Find the names of clients who have placed orders before the month of may 2006.
- 7. Find the customer names and address for the clients, who placed the order '019001'.
- 8. Display names of the managers who is having maximum number of employees working under him.
- 9. Create a view, which contain employee names and their manager names working in sales department.
- 10. Find out if the product is '1.44 drive' is ordered by any client and print the client number, name to whom it is sold.

LAB CYCLE – II

- 11. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN)
- 12. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS Ex: Select the roll number, name of the student who secured fourth rank in the class.
- 13. Queries (along with sub Queries) using UNION, INTERSECT
- 14. (i) Create a user (ii) Create an varray, which holds the employee phone numbers
- 15. (i) Grant Privileges on Tables (ii) Revoke Privileges from Tables

LAB CYCLE - III

- 16. (i) Create predefined exceptions (ii) Create user-defined exceptions
 - (ii) Create a sequence
- 17. (i) Create an index for fast access 18. (i) Lock table in share mode (ii) Lock table in Exclusive mode
- 19. Write a PL/SQL program to display top 10 rows in emp table based on their job and salary.
- 20. Write a PL/SQL program to update the salary of a given employee using cursors.

Salary	Increment
<=1000	5%
> 1000 & < = 2500	10%
> 2500 & < = 4000	20%
> 4000	30%

LAB CYCLE – IV

- 21. Write a PL/SQL procedure to read the data into table as per following description: EMP (Empno, Ename, Address(Object), Qualification, PhoneNum (varray)
- 22. Write a PL/SQL procedure to evaluate grade of a student with following conditions:

	1	0
For pass	:	all marks > 40
For i class	:	total $\% > 59$
For ii class	:	total% between >40 and <60
For iii class	:	total% = 40

And also maintain the details in abstract table 1. Table std 2. Table abstract

- 23. Write a recursive function to calculate the n_{C_R} value.
- 24. Create a trigger to insert information about the transaction of a customer table. The customer table consists of custno, custname, and money. The information table consists of message field.
- 25. Create a package called math_lib having this following functions
 - 1. Add(): accept two numbers and return their sum
 - 2. Sub(): accept two numbers and return their difference
 - 3. Mul(): accept two numbers and return their product
 - 4. Div(): accept two numbers and return their division

Learning Resources:

[1] "Introduction to SQL", Rick F.Vander Lans, Pearson education.

- [2] "Oracle PL/SQL", B.Rosenzweig and E.Silvestrova, Pearson education.
- [3] "Oracle PL/SQL Programming", Steven Feuerstein, SPD.
- [4] "SQL & PL/SQL for Oracle 10g", Black Book, Dr.P.S.Deshpande, Dream Tech.
- [5] "Oracle Database 11g PL/SQL Programming", M. Mc Laughlin, TMH.

Web Resources:

- [1] https://docs.oracle.com/cd/B14117_01/server.101/b10759/statements_1001.htm
- [2] <u>http://www.w3schools.com/sql/sql_functions.asp</u>
- [3] https://docs.oracle.com/cd/A97630_01/appdev.920/a96624/a_samps.htm
- [4] <u>http://www.tutorialspoint.com/plsql/plsql_triggers.htm</u>

MCA15 Regulations 15MCA2352: ADVANCED JAVA PROGRAMMING LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/week	Credits:	2

Objectives: • To make the students write programs with swing based GUI.

- To make the students develop web applications using servlets and JSP.
- To make the students write business applications using EJBs.

• It is expected that learners are able to design applications using java swings.

- It is expected that learners are able to retrieve and update data in a database with servlets.
 - It is expected that learner is able to develop web applications using EJB.

LIST OF PROGRAMS

LAB CYCLE – I

- 1. Write a swing program to create a login form that validates the user using the following components: JLabel, JTextField and JButton.
- 2. Write a sample swing application using ActionListener with the following components. JScrollPane, JList, JComboBox.

LAB CYCLE – II

- 3. Write a HttpServlet that will reads user name and prints "Hello <Your name > Welcome to Servlets concept " in two ways .1)Get 2)Post
- 4. Write a servlet program to display the data in a table using JDBC.
- 5. Write a servlet program to check username and password entered by the user in database and redirect the user based on authentication.

LAB CYCLE – III

- 6. Demonstrate session tracking in servlets using sessions.
- 7. Write a JSP page to greet the user by writing a simple function by using scripting elements.
- 8. Write a JSP page that performs arithmetic operations accepting data from user.
- 9. Write a factorial program in JSP using include directive.
- 10. Write a JSP page using the useBean, setProperty, getProperty in Standard Actions.

LAB CYCLE – IV

- 11. Develop an application to demonstrate RMI.
- 12. Develop an EJB application for customer order management.

Learning Resources:

- [1] "Internet and World Wide Web How To Program", Third Edition, H.M.Deitel, P.J.Deitel, A.B.Goldberg
- [2] " Professional Java Server Programming ", J2EE 1.3 Edition, Subrahmanyam Allamaraju, Cedric Buest
- [3] Java Server Pages –Hans Bergsten, SPD O'Reilly
- [4] J2EE: The complete Reference by James Keogh.

Web Resources:

- [1] <u>http://download.oracle.com/javaee/1.4/tutorial/doc/</u>
- [2] http://courses.coreservlets.com/Course-Materials/csajsp2.html
- [3] <u>http://www.roseindia.net/jdbc/</u>
- [4] <u>http://www.roseindia.net/servlets/</u>
- [5] <u>http://www.roseindia.net/jsp/</u>
- [6] <u>http://pdf.coreservlets.com/</u>

15MCA2353: WEB DEVELOPMENT LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/week	Credits:	2

Objectives:

- To make the students familiarize in configuring the web server.
 - To make the students familiarize in using open source database.
 - To make the learners familiarize to design interactive web pages using operators and control structures.
- To make the students disseminate to design and implement web pages using forms.
- To make the learners familiarize the design of web pages that can handle session tracking.

Learning

- It is expected that the students acquire the practical knowledge in configuring web server. **Outcomes:**
 - It is expected that the students gain to know practical knowledge on databases. i.e., how to use the open source data bases along with existing knowledge on database.
 - It is expected that the students acquire the practical knowledge on how to design and implement web pages using different concepts.

LIST OF PROGRAMS

LAB CYCLE – I

- 1. Create an XHTML Document using frames dividing the page into three frames: Top frame, Left frame and Right frame. Top frame should contain a banner. Left frame containing menu with hyperlinks and pages to the links in the left frame must be loaded in Right frame initially this page contains description of frames.
- 2. Create an XHTML Document that marks up your Resume using the XHTML tags.
- 3. Write a XHTML Document using Inline, Internal and External Cascading Style Sheets.
- 4. Design a Registration form using Form elements and validate it using JavaScript.
- 5. Write a java script program using String, Date and Math Objects.

LAB CYCLE – II

- 6. Installation and configuration of scripting language.
- 7. Develop web pages on making use of Data types.
- 8. Develop web pages that make use of operators.
- 9. Develop web pages that make use of control structures.

LAB CYCLE – III

- 10. Develop web pages using arrays and functions.
- 11. Develop web pages using String functions.
- 12. Develop web pages to demonstrate Form handling.

LAB CYCLE – IV

- 13. Develop web pages to demonstrate validation of forms/active record validation. **Case study:** Application Development that uses form validation.
- Develop web pages Cookies and Sessions handling.
 Case study: Application Development using the language.

Learning Resources:

- [1] "Internet and World Wide Web How To Program", Third Edition, H. M. Deitel, P.J.Deitel, A.B.Goldberg, PHI Pvt. Ltd., New Delhi (Unit-I)
- [2] "Open Source Web Development with LAMP", James Lee and Brent Ware.
- [3] "Professional PHP6", Ed Lecky-Thompson, Steven D.Nowicki, Thomas Myer.
- [4] C. Bates, "Web Programming building Internet Applications", Willey Dream Tech, 3rd edition, 2006.
- [5] Kevin Tatroe, Peter MacIntyre, "Programming PHP", O'REILLY, 3rd Edition, 2013.
- [6] Adam Trachtenberg, David Sklar, "PHP Cookbook: Solutions and Examples for PHP Programmers", O'REILLY, 2nd Edition, 2006.
- [7] Lucas Carlson, Leonard Richardson, "Ruby Cookbook", O'REILLY, 2nd Edition, 2015.
- [8] Jay McGavren, Head First Ruby, O'REILLY, 2nd Edition, 2015.

Web Resources:

[1] Prof. Indranil Sengupta, Internet Technology --http://nptel.ac.in/syllabus/syllabus.php?subjectId=106105084

15MCA5354: SOFT SKILLS – I (Personality Development Course)

Lecture	:	-	Internal Assessment:	-
Tutorial	:	-	Final Examination:	-
Practical	:	2 hrs/week	Credits:	1

Objectives:

- **s:** The study provides a program for developing, self understanding, promoting, personal growth and prepare for successful employment. It helps the trained to become successful and develop as a team leader.
 - The study also provides training in Quantitative aptitude and logical reasoning which are essential to qualify in written examination-both competitive and academic.

• It is expected that the learners assess their strengths and weaknesses, both in their personality development and productivity.

- It is expected that the students solve problems in quantitative aptitude and reasoning.
- It is expected that the students face interviews and group discussions with confidence and attain their realistic goals and objectives.

UNIT – I

Introduction – Introducing one self.

"Shaping Young Minds" – A talk by Azim Premji – Listening activity and Discussion.

R.C. Tips Self-Analysis, Developing Positive Attitude.

Perception- Importance of analytical thinking. PPT – activity.

General Mental Ability: Series completion; Coding and decoding ; Blood relations ; Puzzle test; Sequential output tracing ; Direction sense test; Logical Venn diagrams; Alphabet test.

UNIT – II

Communication skills – Need and Methods. PPT – activity.

Body Language – I, How to interpret and understand – PPT.

Body Language – II, How to improve one's body language. PPT – activity.

Anger Management – PPT.

Stress Management – steps to reduce – Practical tips.

Time Management – Methods of using time effectively.

General Mental Ability: Number, Ranking& time sequence test; Mathematical operations; Logical sequence of words; Arithmetical reasoning; Inserting the missing character. Data sufficiency; Assertion and reason; Verification of the truth of the statement.

UNIT – III

Social and Business etiquettes – Video clips. Telephone and etiquette.

Logic reasoning: Statement- conclusions.

UNIT – IV

Standard operation methods (SOP) – Note Making – Note taking. Minutes preparation.

Team Building.

Non verbal reasoning: Series; Analogy; Classification; Analytical reasoning; Mirror image; Water images; Embedded figures; Completion of incomplete pattern; Paper folding; Paper cutting; Cubes and dice.

Learning Resources:

- [1] Personality development Wallace and Masters.
- [2] Winning at interview Edgar Thorpe, Showick Thorpe.
- [3] Quantitative Aptitude R. S. Aggarwal.
- [4] A Modern approach to Verbal and Non verbal reasoning R.S.Aggarwal.
- [5] Six thinking hats Edward do bone.
- [6] Communication skills in English Shipa Sapre –Bharmal,Dinesh Kumar, Susmita Dey, Nilakshi Roy.
- [7] Technical communication Principles and Practice Meenakshi Raman, Sangeetha Sharma.
- [8] Personality Development and soft skills Barun K. Mitra.

15MCA2401: SOFTWARE ENGINEERING

Lecture	:	4 hrs/ week	Internal Assessment:	40
Tutorial	:	1 hrs/ week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

- To provide the students with an overall view over Software Engineering as an engineering discipline and with insight into the processes of software development.
 - To gain students in-depth knowledge in number of important Software Engineering topics, mainly
 - 0 Software Life-cycle Models
 - o Software Requirements
 - o Software Integration and Testing
 - o Support Processes and Software Quality
 - The Students are expected to take up different systems and model them using UML (Unified Modeling Language) Diagrams i.e. Use case, Class, Sequence, Collaboration, State, Activity, Component and Deployment diagrams are drawn in Rational Rose (IBM Corp.)Software Tool in Windows XP platform.

Learning Outcomes:

- It is expected that the students have in-depth knowledge in various software processes and know how to choose between them and the process into practice.
- It is expected that the learners know how to elicit requirements from a client and specify them.
- It is expected the learners are proficient in creating and analyzing design models.
- It is expected that the students understand good coding practices, including documentation, contracts, regression tests and daily builds.
- It is expected that the learners realize various quality assurance techniques, including unit testing, functional testing, and automated analysis tools.
- It is expected that the students are exposed to the tools, techniques, and metrics used to ensure that sufficient product and process quality is achieved.
- It is expected that the students learn working in a team.
- It is expected that the learners have adequate knowledge in putting software process into practice.
- Students are made familiar with designing unified modeling language diagrams (UML) such as Use case, Class, Sequence, Collaboration, State, Activity, Component and Deployment diagrams for real time products using the Software Design Tool Rational Rose for IBM Corp.

UNIT – I

Introduction to Software Engineering: The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software: The Quality of legacy software, Software Evolution, Software Myths.

A Generic View of Process: Software Engineering-A Layered Technology, A Process Frame Work, The capability Maturity Model Integration (CMMI), Process Patterns, Process Assessment, Product and Process.

Process Models: Prescriptive Models, The Waterfall Model, Incremental Process Models: The Incremental Model, The RAD Model, Evolutionary Process Model: Prototyping, The Spiral Model, The Concurrent Development Model, Specialized Process Models: Component Based Development, The formal Methods Model, The Unified Process.

An Agile View of Process: What is Agility? What is Agile Process? Agile Process Models: Extreme Programming, Dynamic Systems Development Method, Scrum, Crystal.

UNIT – II

Software Engineering Practice: Software Engineering Practice, communication practices, Planning Practices, Modeling Practices, Construction Practices, Deployment.

System Engineering: Computer Based Systems, The System Engineering Hierarchy, Business Process Engineering: An Overview, System Modeling.

Testing Tactics: Software Testing Fundamentals, Black Box and White Box Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Black Box Testing.

UNIT – III

Project Management: The Management Spectrum, The People, The Product, The Process, The Project, The W5HH Principles.

Metrics for Process and Projects: Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within Software Process, Metrics for Small Organizations.

Estimation: Observations on Estimations, The project planning process, Software Scope and Feasibility, Resources, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models.

Quality Management: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Software Reliability, The ISO 9000 Quality Standards, the SQA Plan.

UNIT – IV

Object Orientation Introduction: What is Object Orientation, What is OO Development, OO Themes, Evidence for Usefulness of OO Development.

Class Modeling: Object and Class Concepts, Link and Association concepts, Generalization and Inheritance, A Sample Class Model.

State Modeling: Events, States, Transitions and Conditions, state diagrams.

Interaction Modeling: Use Case Models, Sequence Models, Activity Models.

Learning Resources

Text Books:

- [1] Roger S Pressman, "Software Engineering–A Practitioner's Approach", Sixth Edition, TMH International. (Unit-I,II,III)
- [2] Michael Blaha, James Rumbaugh, "Object Oriented Modeling and Design with UML", Second Edition, PHI. (Unit-IV)

Reference Books:

- [1] Sommerville, "Software Engineering", Seventh Edition Pearson Education (2007)
- [2] "Software Engineering", Kassem A. Saleh, Cengage Learning.
- [3] S.A.Kelkar, "Software Engineering A Concise Study", PHI.
- [4] Waman S.Jawadekar, "Software Engineering", TMH.
- [5] Ali Behforooz and Frederick J.Hudson, "Software Engineering Fundamentals", Oxford (2008).
- [6] "Object Oriented Analysis & Design with Applications", Grady Booch, 2nd Edition Pearson Education 1999.
- [7] "Unified Modeling Language Reference Manual", James Rumbaugh, Jacobson, Booch, PHI.
- [8] "The Unified Software Development Process", Jacobson et al., AW, 1999.
- [9] "UML Bible" by Tom Pender John Wiley & Sons.

Web References:

- [1] http://www-01.ibm.com/software/rational/announce/rose/
- [2] http://www-01.ibm.com/software/rational/
- [3] http://www947.ibm.com/support/entry/portal/Overview/Software/Rational/Rational_bra nd_support_(general)

MCA15 Regulations 15MCA2402: MOBILE APPLICATION DEVELOPMENT

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

• To make the students understand the importance of mobiles, mobile operating systems,

and Android market.

- To make the learners understand the use of activities, intents and fragments.
- To provide the students comprehensive knowledge on user interface design.
- To make the students work with inserting pictures, menus and views within an app.
- To make the students understand how to store data in SQLite database.

Learning Outcomes:

- It is expected that the students will be able to build their own android apps.
- It is expected that the students understand how the AndroidTM applications work,

their

life cycle, and ADTs.

- It is expected that the learners have a clear understanding of intents and fragments.
- It is expected that the learners design and develop AndroidTM applications with menus, views, pictures, and action bars.

• It is expected that the students will be able store and manipulate data in SQLite database

<u>UNIT – I</u>

Getting Started With Android Programming: What Is Android? - Android Versions, Features of Android, Architecture of Android, Android Devices in the Market, The Android Market, The Android Developer Community.

Setting up An Android Studio Development Environment, Creating Your First Android Application, Anatomy of an Android Application.

Activities, Fragments, and Intents: Understanding Activities - Applying Styles and Themes to an Activity, Hiding the Activity Title, Displaying a Dialog Window, Displaying a Progress Dialog, Displaying a More Sophisticated Progress Dialog.

<u>UNIT – II</u>

Activities, Fragments, and Intents: Fragments-Adding Fragments Dynamically, Life Cycle of a Fragment, Interactions between Fragments. Calling Built-In Applications Using Intents - Understanding the Intent Object, Using Intent Filters, Displaying Notifications.

Getting to know the Android User Interface: Understanding the Components of a Screen - Views and ViewGroups, LinearLayout, AbsoluteLayout, TableLayout, RelativeLayout, FrameLayout, ScrollView.

<u>UNIT – III</u>

Getting to know the Android User Interface: Adapting to Display Orientation- Anchoring Views, Resizing and Repositioning. Utilizing the Action Bar - Adding Action Items to the Action Bar, Customizing the Action Items and Application Icon, Creating the User Interface Programmatically.

Designing your User Interface with Views: Using Basic Views - textView View, Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroup Views, ProgressBar View, AutoCompleteTextView View.

<u>UNIT – IV</u>

Designing your User Interface with Views: Using List Views to Display Long Lists-ListView View, Using the Spinner View.

Displaying Pictures and Menus with Views: Using Image Views to Display Pictures-Gallery and ImageView Views, Using Menus with Views- Creating the Helper Methods, Options Menu, Context Menu.

Data Persistence: Creating and Using Databases- Creating the DBAdapter Helper Class, Using the Database Programmatically, Pre-Creating the Database.

Learning Resources:

Text Book:

1. "Beginning Android 4 Application Development", Wei-Meng Lee, Wiley India (Wrox).

Online Reference:

1. www.ebookfrenzy.com/pdf_previews/AndroidStudioEssentialsPreview.pdf [Chapter 2 in the pdf - Setting up An Android Studio Development Environment (for Unit-I)]

Reference Books:

- 1. "Professional Android 4 Application Development", Reto Meier, Wiley India, (Wrox).
- 2. "Android Application Development for Java Programmers", James C Sheusi, Cengage Learning.
- 3. Sam's "Teach Yourself Android Application Development in 24 Hrs", Lauren Darcy and Shane Conder, 2ed.
- 4. "Android apps for absolute beginners", Wallace Jackson, Apress.

MCA15 Regulations 15MCA2403: DATA WAREHOUSING AND DATA MINING

Lecture	:	4 hrs/ week	Internal Assessment: 40	
Tutorial	:	1 hr/ week	Final Examination: 60	
Practical	:	-	Credits: 4	

• To make the students understand different concepts and techniques of data mining and data warehousing including architecture, design, implementation and applications

- To make the students understand the Association Rules for Transactional databases.
- To make the learners aware of various classification and prediction methods.
- To make the students understand various clustering algorithms.
- It is expected that the learners utilize a range of techniques for designing data mining and data warehousing systems.
 - It is expected that the students know the functionality of the various data mining and data warehousing components.
 - It is expected that the learners realize the strengths and limitations of various data mining and data warehousing models.

UNIT – I

Warehouse: What is a Data Warehouse-Differences between Operational Database Systems and Data Warehouses; A Multidimensional Data Model- From Tables and Spreadsheets to Data Cubes, Stars, Snowflake and Fact Constellation; Data Warehouse Architecture-Steps for the Design and Construction of Data Warehouses, Three-Tier Data Warehouse Architecture, Data Warehouse Back-End Tools and Utilities, Metadata Repository, Types of OLAP Servers; Data Warehouse Implementation..

UNIT – II

Data mining: Introduction-Data mining: On what kind of data; Data mining functionalities, Classification of Data mining systems; Major issues in Data Mining,; Mining Frequent Patterns, Associations and Correlations-Basic concepts and a Road Map, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules.

UNIT – III

Classification and Prediction: What is Classification and Prediction?, Issues regarding classification and prediction; Classification by Decision tree induction; Bayesian Classification; Classification by Backpropagation; Other Classification methods; Prediction; Classifier accuracy.

UNIT – IV

Cluster Analysis: What is Cluster Analysis? Types of data in Cluster Analysis; A Categorization of major clustering methods-Partitioning methods, Hierarchical methods; Density based methods-DBSCAN; Grid-based method-STRING ;Outlier analysis.

Learning Resources

Text Book:

1. Jiawei Han Micheline Kamber, "Data mining &Techniques", Morgan Kaufmann Publishers.Second Edition and Third Edition.

Reference Books:

- 1. S.N.Sivanandam, S.Sumathi, "Data Mining Concepts, Tasks and Techniques", Thomson (2006).
- 2. Ralph Kimball, "The Data Warehousing Toolkit", Wiley.
- **3.** Margaret H. Dunham, "Data mining Introductory and advanced topics", Pearson Education.
- 4. D.Hand, H. Mannila and P.Smyth, "Principles of Data mining", PHI (2001).

15MCA1404: OPTIMIZATION TECHNIQUES

Lecture	:	3 hrs/week	Internal Assessment: 40	
Tutorial	:	1 hrs/week	Final Examination: 60	
Practical	:	-	Credits: 4	

Objectives:

- To expose the students on Optimization to do things best under the given circumstances.
 - To expose students on the applications such as manpower and recourse allocation, production process control, inventory control, health care management, military operations, telecommunications, traffic control, manufacturing of goods and engineering system design.
 - To make students proficient in analyzing physical system and formulating a problem.
 - To train the students in the areas of setting up of objectives, determination of constrains against which decision should be adopted and construction of mathematical model.

Learning

Outcomes:

- It is expected that the students are able to formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics.
- It is expected that the students are able to solve the problem of transporting the products, assigning jobs with minimum cost and understand the dynamic programming.
- It is expected that the students are able to identify the optimal strategies for the players to win a game and optimal sequence for sequencing and scheduling problems.
- It is expected that the learners are able to assess the resources required for a project and produce a plan and work schedule in an optimal way.

UNIT I:

Linear Programming: Introduction, formulation of Linear Programming problems, Graphical method, standard form, Simplex method, Big-M method, Two-phase method, problem of degeneracy, Duality theory, Dual simplex method.

UNIT II:

Transportation Problem: Introduction, mathematical formulation, Basic feasible solution by Matrix minima method, Vogel's approximation method, Optimal solution by (uv-method) Modi method; Unbalanced Transportation problem.

Assignment problem: Formulation, Hungarian method, Maximal Assignment problem, Unbalanced Assignment problem.

Dynamic Programming: Characteristics of D.P.model, Bellman's principle of optimality, Application to Linear programming problem.

UNIT III

Theory of Games: Introduction, characteristics of game theory, Minimax -Maximin principle, Saddle point, optimal strategies and value of the game, solution of 2x2 game, Dominance property, Graphical method for 2xn and mx2 games, solution of mxn game by linear programming.

Sequencing and Scheduling: Introduction, Johnson's algorithm, Problems with n jobs and two machines, n jobs and m machines.

UNIT IV

Project Management: Introduction, PERT and CPM, Rules for drawing network diagram, Time Estimates and critical path in network analysis, Forward pass computations, Backward pass computations, Determination of floats and slack times, Determination of critical path, Examples on optimum duration and minimum duration cost, Crashing Cost consideration in CPM/PERT.

Beyond Syllabus:

Tools: Solving Linear Programming Problem, Transportation and Assignment problems using Mat lab and Excel Solver.

Text Book:

1. "Operations Research", S.D.Sharma, Kedarnath Co, Meerut

Reference Books:

- 1. Operations Research, An introduction 8/e, Taha, Pearson.
- 2. Operations Research 2/e, Panneerselvam.
- 3. Operations Research theory and applications, 3/e ,JK Sharma, McMillan.

Web Resources:

1. G. Srinivasan *Fundamentals of Operations Research NPTEL*. <u>http://nptel.iitm.ac.in/video.php?courseId=1110</u>

MCA15 Regulations 15MCA2405A: ARTIFICIAL INTELLIGENCE 4 hrs/ week Lecture **Internal Assessment:** 40 • Tutorial : **Final Examination:** 60 **Practical** : Credits: 4 **Objectives:** To make the students aware of the basic ideas and areas in Artificial Intelligence. To make the students understand problem solving,

• To make the students understand problem solving, knowledge representation, reasoning, decision making, planning, perception & action, and learning.

Learning Outcomes:

- It is expected that the students use logic as a representation and reasoning strategy for AI effectively.
 - It is expected that the learners understand the representation schemas such as Procedural Representations, Network Representations and Structured Representations and apply these to case studies.
 - It is expected that the learners select and apply a variety of graph search algorithms underpinning AI applications.
 - It is expected that the students undertake efficient searches and interpret the results of such searches.
 - It is expected that the learners apply reasoning techniques.

UNIT – I

What is AI? : The AI Problems, The Underlying Assumption, What is AI Technique? The level of the Model, Criteria for Success.

Problems, Problem spaces & Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the design of Search Programs, Additional Problems.

Heuristic search techniques: Generate and Test, Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction, Means Ends Analysis.

UNIT – II

Knowledge Representation Issues: Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem

Using Predicate Logic: Representing Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.

Representing knowledge using Rules: Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, Control Knowledge

UNIT – III

Symbolic Reasoning under Uncertainity: Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation: Depth-First Search, Implementation: Breadth-First Search. **Weak slot & filler Structures:** Semantic Nets, Frames.

Planning : Overview, An Example Domain : The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques.

UNIT - IV

Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing

Commonsense: Qualitative Physics, Commonsense Ontologies, Memory Organisation, Case-Based Reasoning.

Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition.

Learning Resources

Text Book:

1. Elaine Rich, Knight K, "Artificial Intelligence", TMH (1991) (Chapters : 1 through 7, 9, 13, 15, 10 and 20)

Reference Books:

- 1. Michael Negnevitsky, "Artificial Intelligence A Guide to Intelligent Systems", Second Edition, Pearson Education (2008)
- 2. Winston P.H, "Artificial Intelligence", Addision Wesley (1993)
MCA15 Regulations 15MCA2405B: HIGH PERFORMANCE COMPUTING

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	-	Credits:	4
Objective	es:	 To make a types of p To make a parallel pr To make programm To offer algorithms 	the students understand the significance of arallel computing platforms. the students familiar with the overheads as ograms, various effects on performance. the learners understand the principles of r ning and MPI. understanding of MPI library and applica s, sorting, and graph algorithm.	Eparallelism and nd challenges in message passing ations in Matrix
Learning		• It is expe	cted that the students analyze the paralle	el programming
Outcome	s:	 platforms It is expected of parallel It is expected Passing In It is expected Sorting and Sorting and Sorting and Sorting and Sorting and Sorting Sorting	for parallel computer systems. etted that the students assess and optimize to programs. ected that the students gain a broad via interface (MPI). etted that the students implement algorith and Graphs using MPI Library.	he performance ew of Message nms for Matrix,

UNIT – I

Parallel Programming Platforms: Implicit parallelism: Trends in Microprocessor Architectures, Limitations of memory system performance, Dichotomy of parallel computing platforms, physical organization of parallel platforms, communication costs in parallel machines, Routing mechanisms for interconnection networks.

Principles of Parallel Algorithm Design: Preliminaries, Decomposition Techniques, Characteristics of tasks and interactions.

UNIT – II

Basic communication operations: One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and Reduction, All-Reduce and Prefix-Sum Operations, Scatter and Gather.

Analytical modeling of parallel programs: Sources of overhead in parallel programs, performance metrics for parallel systems, The Effect of granularity on performance. **UNIT – III**

Programming using the message passing paradigm: Principles of Message passing programming, The building blocks: Send and Receive Operations, MPI: the message passing interface, Overlapping communication with computation, collective communication and computation operations.

Programming shared address space platforms: Thread Basics, why Threads, The POSIX thread API, Thread Basics: Creation and Termination, **S**ynchronization primitives in Pthreads.

UNIT - IV

Dense Matrix Algorithms: Matrix-Vector Multiplication, Matrix – Matrix Multiplication.

Sorting: Issues in Sorting on Parallel Computers, Sorting Networks, Bubble sort and its variants, Quick sort.

Graph Algorithms: Minimum Spanning Tree: Prim's Algorithm, Single-Source shortest paths: Dijkstra's Algorithm.

Learning Resources:

Text Book:

[1] Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar: "Introduction to Parallel Computing", Second Edition Pearson Education, 2007.

Reference Books:

1. Michael J. Quinn, "**Parallel Programming in C with MPI and OpenMP**" McGraw-Hill International Editions, Computer Science Series, 2004.

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

- To make the students familiarize with distributed computing environment.
- To make the students understand the issues involved in designing distributed Algorithms.
- To make the students understand the importance of synchronization, mutual exclusion in distributed transactions.
- To introduce students the distributed file systems examples like Sun Network and Coda file Systems.
- It is expected that the students are expected to understand the concepts of distributed systems.
 - It is expected that the learners understand the complexity of distributed systems environment.
 - Students are able to implement name spaces for entities involved in distributed systems.
 - It is expected that the students realize the importance of synchronization, consistency and fault tolerance.

UNIT – I

Learning

Outcomes:

Introduction: Definition of a Distributed System, Goals, Hardware Concepts, Software Concepts, The Client-Server Model.

Communication: Layered Protocols, Remote Procedure Call- Basic RPC Operation, Parameter Passing, Extended RPC Models, Remote Object Invocation - Distributed Objects, Binding a Client to an Object, Static versus Dynamic Remote Method Invocations, Parameter Passing.

Message-Oriented Communication: Persistence and Synchronicity in Communication, Message Oriented Transient and Persistent Communication. **Stream-Oriented Communication.**

UNIT – II

Processes: Threads, Clients, Servers, Code Migration, Software Agents.

Naming: Naming Entities -Names, Identifiers and Addresses, Name Resolution, The Implementation of a Name Space. Locating Mobile Entities, Removing Unreferenced Entities.

UNIT – III

Synchronization: Clock Synchronization. Logical Clocks, Global State, Election Algorithms, Mutual Exclusion, Distributed Transactions.

Consistency and Replication: Introduction, Data- Centric Consistency Models, Client –Centric Consistency Models, Distribution Protocols, Consistency Protocols.

UNIT – IV

Fault tolerance:-Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery. **Distributed File Systems**:-Sun Network File System, The Coda File System.

Learning Resources:

Text Book:

1. Andrew S.Tanenbaum, Maarten Van Steen "Distributed Systems: principles and paradigms", 2002, Pearson Education/PHI..

Reference Books:

- [1] Coulouris, Dollimore, Kindberg, "Distributed Systems-Concepts and Design" 3rd edition, Pearson Education.
- [2] Mukesh, Singhal & Niranjan G.Shivarathri, "Advanced Concepts in Operating Systems", TMH.
- [3] Sinha, "Distributed Operating System Concepts and Design", PHI.

15MCA2405D: COMPUTER GRAPHICS

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	-	Credits:	4

Objectives: • To expose students on the introduction to computer graphics techniques, focusing on 2D and 3D concepts like Geometric Transformations, Geometric Algorithms, Clipping operations, Output primitives, Projections, and Animations.

- To enable students to develop their creativity using computer graphics and Animations.
- To make the students understand the interdisciplinary nature of computer graphics is emphasized in the wide variety of examples and applications.
- LearningIt is expected that the students understand the graphics techniques and algorithms.
 - It is expected that the students appreciate recent advances in Computer Graphics (Covering both 2D & 3D Concepts) and put them in to context.
 - It is expected that the students understand the concepts of input devices and display devices.
 - It is expected that the students understand the multimedia concepts.

UNIT – I

Overview of Computer Graphics: Introduction to Computer graphics & its applications, Video Display Devices, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays, Raster Scan Systems, Random Scan Systems, Input Devices & output Devices.

Graphical User Interfaces and Interactive Input Methods: The User Dialogue, Windows and Icons, Input of Graphical Data, Input Functions.

UNIT – II

Output Primitives: Points and Lines, Line-Drawing Algorithms: DDA Algorithm, Bresenham's Line Algorithm, Circle Generation Algorithms, Ellipse Generation Algorithms.

Attributes of output Primitives: Line Attributes, Area Fill Attributes, Character Attributes, Bundled Attributes, Ant aliasing.

UNIT – III

Two Dimensional Geometric Transformations: Basic Transformations, Matrix Representation and Homogenous Coordinates, Composite Transformations, Other Transformations.

Two Dimensional Viewing: The Viewing pipeline, Viewing Coordinates Reference Frame, Window to Viewport Coordinate Transformations, Two Dimensional Viewing Functions, Clipping Operations, Point Clipping, Line Clipping: Cohen-Sutherland Line Clipping, Polygon Clipping: Sutherland-Hodgeman Polygon Clipping, Curve Clipping, Text Clipping, Exterior Clipping.

UNIT – IV

Three Dimensional Object Representations: Polygon Surfaces, Quadric Surfaces, Super quadrics.

Three Dimensional Geometric and Modeling Transformations: Translation, Rotation, Scaling, Composite Transformations. Three Dimensional Transformation Functions, Projections

Animations: Creating Animations: Creating Keyframes, Layers in Animation, Steps for Creating Animation, Frame-by-Frame Animation, Tweened Animations.

Multimedia: Introduction to Multimedia, Multimedia Applications, Building Blocks of Multimedia, Visual elements, Sound Elements, Multimedia storage.

Learning Resources:

Text Book:

- 1. "Computer Graphics", 2nd Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education. (UNIT I, II, III)
- **2. "Computer Graphics, Multimedia and Animation",** Malay K.Pakhira ,PHI publications. (UNIT IV)

Reference Books:

- **1. "Computer Graphics C version"**, Donald Hearn and M.Pauline Baker, Pearson Education.
- 2. "Computer Graphics 2nd Edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc- Graw hill edition.
- **3. "Procedural elements for Computer Graphics"**, David F Rogers, Tata Mc Graw hill, 2nd Edition.

Web Resources:

[1] <u>http://www.mhhe.com/ansinha/cg</u>

15MCA2451: .NET LAB

Lecture	:	-	Internal Assessment: 40
Tutorial	:	2 hrs/week	Final Examination: 60
Practical	:	3 hrs/week	Credits: 2

Objectives:

- To make students to understand the effective use of visual studio .NET.
- To make students proficient in creation of ASP.NET Web pages that dynamically display content
- To make the learners apply common skills across a variety of devices, application types, and programming tasks.
- To make the students integrate with other tools and technologies to build the right solution with less work.
- To make the learners build compelling applications faster.
- LearningIt is expected that the students would be able describe the purpose of the .NET Framework, and explain how to use Microsoft Visual C# and Visual Studio 2010 to build .NET Framework applications.
 - It is expected that the students are familiar with syntax of basic C# programming constructs, how to create and call methods, how to catch, handle, and throw exceptions, how to perform basic file I/O operations in a Visual C# application.
 - It is expected that the students design and configure numerous aspects of an ASP.NET application effectively.
 - It is expected that the students know how to display and modify data from a database by using ADO.NET with ASP.NET Web controls, manipulate and update data using ADO.NET DataSets effectively.

LIST OF PROGRAMS

LAB CYCLE - I (VB.NET)

- 1. Develop an application which is similar to "Notepad" using menus.
- 2. Develop an application for facilitating purchasing order.
- 3. Develop an application which is similar to login form including the progress bar controls.
- 4. Develop an application using font dialog control
- 5. Develop an application using color dialog control
- 6. Develop an application to display the file selected by the user in a web browser control.
- 7. Develop an application using the data reader to read from a database.

LAB CYCLE - II (ASP.NET)

- 8. Design an application for dynamically populating a checkbox list.
- 9. Design an application with simple bulleted list control
- 10. Design an application for uploading files using new file upload control.
- 11. Design an application for building a form in the wizard control.
- 12. Design an application by using the compare validator to test values against control values.

- 13. Design an application using the grid view control in an ASP.Net web page.
- 14. Design an application for adding an insert command to the SQL data source control.
- 15. Design a web site using the concept of master pages.

LAB CYCLE - III (C#.NET)

- 16. Develop a project for performing arithmetic, relational, logical operations.
- 17. Develop a project for demonstrating polymorphism, abstraction.
- 18. Develop a project for demonstrating switch statements.
- 19. Develop a project for implementing inheritance using abstract classes.
- 20. Develop a project for implementing interfaces using multiple inheritance.

LAB CYCLE - IV (C#.NET)

- 21. Create a form that is the main window of a program using window class.
- 22. Create a form which displays the given inputs in the form of a tree view structure.
- 23. Develop a project for implementing exception handling in C#.
- 24. Develop a project which displays the student information in the relevant fields from the database which already exists.

Learning Resources:

- 1. Xue Bai, Michael Ekedah, "The Web Warrior Guide to Web Programming", Thomson.
- 2. Kogent Solutions Inc., ".Net Programming", Black Book, Dream Tech (2008).
- 3. Joe Duffy, "Professional.Net Programming 2.0", Wiley.
- 4. George Stepherd, "ASP.NET 3.5 Microsoft", PHI (2008).

Web Resources:

- 1. http://www.asp.net/
- 2. http://www.andymcm.com/dotnetfaq.htm
- 3. http://www.codeproject.com/kb/dotnet/
- 4. http://www.worldofdotnet.net/
- 5. http://www.csharp-station.com/Links.aspx
- 6. http://msdn.microsoft.com/en-gb/netframework/

MCA15 Regulations 15MCA2452: MOBILE APPLICATION DEVELOPMENT LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/week	Credits:	2

- **Objectives:** To make the learners install and set up the android application development environment.
 - To make the students design apps by displaying windows and also working with intents.
 - To make the students develop applications by using menus with views.
 - To make the students work with data files and SQLite database.

Learning

Outcomes:

- It is expected that the students build custom android applications.
- It is expected that the students design and develop apps with good user interface by using menus and views.
 - It is expected that the students design and develop apps with pictures and action bars.
- It is expected that the students develop apps that store data in files and databases.

LIST OF PROGRAMS

LAB CYCLE - I

- 1. Understand the architecture of Android, features of android, and Android versions.
- 2. Installation of the required software : JDK, Android SDK, and Eclipse IDE
- 3. Create an Android application that shows "Welcome to Android" and run it on the emulator.

LAB CYCLE - II

- 4. Create an application that displays a dialog window using an activity.
- 5. Create an application that displays the progress of an operation.
- 6. Create an application that obtains result from an activity.
- 7. Create an application that dynamically adds a fragment.

LAB CYCLE - III

- 8. Create a screen that has input boxes for Name, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button.
- 9. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout
- 10. Create an application that uses the basic views of Android.

LAB CYCLE - IV

- 11. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.
- 12. Create a user registration application that stores the user details in a database table.

13. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.

Learning Resources:

- 1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox)
- 2. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox)
- 3. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning,
- **4.** Sams Teach Yourself Android Application Development in 24 Hrs, Lauren Darcy and Shane Conder, 2ed.
- 5. Android apps for absolute beginners, Wallace Jackson, Apress.
- 6. Introduction to Android application development, Joseph Annuzzi, Lauren Darcey, Shane Conder, 4ed.
- 7. Android apps with Eclipse, Onur Cinar.

15MCA2453: DATA MINING LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/week	Credits:	2

Objectives:

- To make the students perform various data preprocessing operations.
- To make the students perform various data cube operations.
- To make the students analyze and visualize large databases.
- To make the students perform classification task with supervised and unsupervised learning.
- It is expected that the students get acquaintance with data mining tools and implement different methods of preprocessing data.
 - It is expected that the students understand the association rule mining concepts of data mining.
 - It is expected that the students implement multiple classification algorithms.
 - It is expected that the students implement and analyze clustering algorithms for different datasets.

LIST OF PROGRAMS

LAB CYCLE - I

- 1. Introduction to weka and rapidminer tool.
- 2. Create an dataset and apply preprocessing techniques like Data cleaning.
- 3. Application of Association rule mining using apriori algorithm.

LAB CYCLE - II

- 4. Application of Association rule mining using FP Growth algorithm
- 5. Implementation of classification technique using Decision trees
- 6. Demonstration of classification technique using Naive Bayesian classifier

LAB CYCLE - III

- 7. Exhibiting clustering process using simple k-means and k-medians algorithm
- 8. Evaluation of clustering process using DBSCAN algorithm

LAB CYCLE - IV

- 9. Demonstration of clustering process using BIRCH algorithm
- 10. Analysing the clustering algorithms.

Learning Resources:

- RapidMiner: Data Mining Use Cases and Business Analytics Applications (Chapman & Hall/CRC Data Mining and Knowledge Discovery Series) —Markus Hofmann and Ralf Klinkenberg.
- [2] Data Mining: Practical Machine Learning Tools and Techniques, Second Edition (Morgan Kaufmann Series in Data Management Systems) 2nd Edition –Ian H.Witten and Eibe Frank
- [3] J. Han and M. Kamber, "Data Mining Concepts and Techniques", 2 ed Elseiver publishers
- [4] A. K. PUJARI, "Data Mining Techniques" University Press.

Web Resources:

[1] Weka is a set of software for machine learning and data mining developed. Weka is open source software issued under the GNU General Public License. http://www.cs.waikato.ac.nz/ml/weka/

15MCA5454: SOFT SKILLS-II (Campus Recruitment Training)

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	2 hrs/week	Credits:	1

- Objectives:
- To provide students an understanding of, developing self understanding, promoting personal growth and prepare for successful employment. It helps the trained to become a successful and develop as a good team leader.
- To provide students training in Quantitative aptitude and logical reasoning which are essential to qualify in written examination-both competitive and academic.

Learning

- Outcomes:
- It is expected that students assess their strengths and weaknesses, both in their personality development and productivity.
- It is expected that students solve problems in quantitative aptitude and reasoning
- It is expected that students would face interviews and group discussions with confidence and attain their realistic goals and objectives.

UNIT – I

Introduction to topics.

Team Building – Leadership Qualities – Importance of a Team.

Vocabulary: Analogies.

Sentence Completion – Sentence-Course of Action.

Sentences – Assumptions, Correction of sentences.

Analogy, Sentence and Arguments, Sentence and Conclusion.

Paragraph Writing.

Arithmetical ability: Numbers; H.C.F &L.C.M of numbers; Averages; Problem on numbers; Problem on ages; Percentages.

UNIT – II

Group Discussion – How to present yourself. Group Discussion – Activity practical sessions with PPTs. **Arithmetical ability:** Profit& loss; Ratio& Proportion; Partnership; Chain rule; Time& work; Pipes & cisterns.

UNIT – III

Letter Writing - Formal and Informal.

CV/Resume with Practice Session.

Arithmetical ability: Time & Distance; Problems on trains; boats & Streams; Allegation OR mixtures; Simple interest; compound interest; Area.

UNIT – IV

Interview Questions – Problem questions and Answers. Interview- Practice session with student activity and video clips. **Arithmetical ability:** Calendar; Clocks; Permutations & Combinations; Probability. **Data interpretation:** Bar graph, pie chart, Line graph, table method.

Learning Resources

- 1. Personality development—Wallace and Masters.
- 2. Winning at interview—Edgar Thorpe, Showick Thorpe.
- **3.** Quantitative Aptitude RS Aggarwal.
- 4. A Modern approach to Verbal and Non verbal reasoning—R.S.Aggarwal.
- 5. Six thinking hats—Edward do bone.

MCA15 Regulations 15MCA2501: CRYPTOGRAPHY AND NETWORK SECURITY

Lecture	:	4 hrs/week	Internal Assessment: 4	0
Tutorial	:	1 hr/week	Final Examination: 6	0
Practical	:	-	Credits: 4	1

- **Objectives:** To make the students aware of the basics of security, types of attacks on Networks, the concepts of encryption and decryption, symmetric and asymmetric cryptography.
 - To make the students understand block ciphers and stream ciphers.
 - To make the learners understand the mathematical concepts-random numbers, modular arithmetic.
 - To expose the learners on digital signatures, e-mail security, web security, system security, the concepts of computer security viruses, worms etc.

Learning Outcomes:

- It is expected that the students understand well the use of encryption in secure data transfer.
- It is expected that the learners recognize the use of Digital Signatures.
- It is expected that the students should understand secure electronic transactions.

UNIT – I

Introduction: Security Trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

Block Cipher and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles.

Confidentiality Using Symmetric Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.

UNIT – II

Introduction to Number Theory: Fermat's and Euler's Theorems, Discrete Logarithms Public Key Cryptography and RSA: Principles of Public Key Cryptosystems, The RSA Algorithm

Key Management: Other Public-Key Cryptosystems: Key Management, Diffie-Hellman Key Exchange.

Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs.

Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard.

UNIT – III

Authentication Applications: Kerberos, X.509 Authentication Service, PKI. Email Security: Pretty Good Privacy, S/MIME.

IP Security: IP Security Overview, IP security architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management.Web Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction.

UNIT – IV

Intruders: Intruders, Intrusion Detection, Password Management.

Malicious Software: Viruses and Related Threads, Virus Countermeasures, Distributed Denial of Service Attacks.

Firewalls: Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation.

Learning Resources:

Text Book:

[1] William Stallings, "Cryptography and Network Security", Fourth Edition, PHI. Chapters: 1,2,3,7,8.2,8.5,9,10.1,10.2,11,13,14,15,16,17,18,19,20.

Reference Books:

- [1] William Stallings, "Network Security Essentials Applications and Standards", Third Edition, Pearson Education (2007).
- [2] Neal Krawety, "Introduction to Network Security", Thomson (2007).
- [3] Behrouz A.Forouzan, "Cryptography & Network Security", The McGraw-Hill Companies (2007).

MCA15 Regulations 15MCA3502A: DATABASE ADMINISTRATION

Lecture	:	-	Internal Assessment: 4	0
Tutorial	:	2 hrs/week	Final Examination: 60	0
Practical	:	-	Credits: 2)

Objectives: • To explain the students that how Oracle stores and manages the data and also explains the schema object types.

- To make the students aware how memory and processes are managed by Oracle.
- To make the learners learn the Oracle architecture and its components.
- To make the students understand the Oracle database instance.

LearningIt is expected that the students would familiarize with various jobs of a Database Administrator.

- It is expected that the students should recognize the Locking mechanisms.
- It is expected that learners would identify the features of memory and process architecture.

UNIT – I

Introduction, Schema objects (Tables and Indexes): About Relational Databases, Brief History of Oracle Database, Introduction to Schema Objects.

Data Concurrency and consistency: Introduction to Data Concurrency and Consistency, Oracle Database Transaction Isolation Levels, Oracle Database Locking Mechanism, Automatic Locks, Manual Data Locks, User-Defined Locks.

UNIT – II

Transactions: Introduction to Transactions, Transaction Control, Transaction Guard, Application Continuity, Autonomous Transactions, Distributed Transactions.

Physical Storages and Logical Storages: Physical Storage Structures, Data Files, Control Files, Online Redo Log.

Logical Storage Structures: Logical Storage Structures, Data Blocks, Extents, Segments, Tablespaces.

UNIT – III

Oracle Database Instance: Oracle Database Instance, Database Instance Startup and Shutdown: Instance and Database Startup, Database and Instance Shutdown, Checkpoints, Instance Recovery, Parameter Files, Diagnostic Files.

UNIT – IV

Memory Architecture: Oracle Database Memory Structures, User Global Area and Program Global Area (PGA), System Global Areas.

Process Architecture: Introduction to Processes, Client Processes, Server Processes, Background Processes.

Learning Resources:

Text Book:

[1] "Beginning Oracle Database 12c Administration: From Novice to Professional", Second Edition, Ignatius Fernandez, Apress, 2015.

Reference Books:

- [1] "Database Administration Fundamentals", <u>Microsoft Official Academic Course</u>, 1st Edition.
- [2] "Oracle 10g Database Administrator II: Backup/Recovery and Network Administration", Claire Rajan, 2nd Edition.
- [3] "Oracle Essentials Oracle Database 12C", Rick Greenwald, 2013.

Web Resources:

UNIT – I

- [1] <u>https://docs.oracle.com/database/121/CNCPT/intro.htm#CNCPT001</u>
- [2] <u>https://docs.oracle.com/database/121/CNCPT/tablecls.htm#CNCPT111</u>
- [3] <u>https://docs.oracle.com/database/121/CNCPT/consist.htm#CNCPT020</u>

UNIT - II

- [4] <u>https://docs.oracle.com/database/121/CNCPT/transact.htm#CNCPT016</u>
- [5] <u>https://docs.oracle.com/database/121/CNCPT/physical.htm#CNCPT003</u>
- [6] https://docs.oracle.com/database/121/CNCPT/logical.htm#CNCPT004

UNIT - III

[7] <u>https://docs.oracle.com/database/121/CNCPT/startup.htm#CNCPT005</u>

UNIT - IV

[8] https://docs.oracle.com/database/121/CNCPT/memory.htm#CNCPT007

[9] <u>https://docs.oracle.com/database/121/CNCPT/process.htm#CNCPT008</u>

15MCA3502B: PROGRAMMING IN SCALA

Lecture	:	-	Internal Assessment:	40
Tutorial	:	2 hrs/week	Final Examination:	60
Practical	:	-	Credits:	2
Objective	s:	 To make the stud Scala and how to o To expose the st objects, functions, To train the learn pattern matching, 	ents understand the fundamentals of develop applications using Scala. udents to object-oriented concepts abstraction, polymorphism, inherita- ners to implement traits, packages a abstract members, extractors and we	f Programming in including classes, ince. and working with iting annotations.
Learning		 It is expected that 	the students are competent enough	h to write, debug,
Outcome	s:	 and document we It is expected the specifications. It is expected the structures to imple It is expected that of traits, inheritan It is expected that pattern match aga with annotations. 	Il-structured Scala applications. hat the learners implement Scala at the students apply decision and ement algorithms. It the students have proficient know ce, and polymorphism as programmi students can write programs using e inst arbitrary classes, not just case cla	classes from the iteration control ledge in handling ing techniques. extractors, how to asses and working

UNIT – I

A Scalable Language: A language that grows on you, what makes Scala scalable?, Why Scala?, Scala's roots Conclusion.

First Steps in Scala: Learn to use the Scala interpreter, Define some variables, Define some functions, Write some Scala scripts, Loop with while; decide with if, Iterate with foreach and for.

Next Steps in Scala: Parameterize arrays with types, Use lists, Use tuples, Use sets and maps, Learn to recognize the functional style, Read lines from a file.

Classes and Objects: Classes, fields, and methods, Semicolon inference, Singleton objects, A Scala application, The Application trait.

Basic Types and Operations: Some basic types, Literals, Operators are methods, Arithmetic operations, Relational and logical operations, Bitwise operations, Object equality, Operator precedence and associativity, Rich wrappers.

UNIT – II

Functional Objects: A specification for class Rational, Constructing a Rational, Reimplementing the toString method, Checking preconditions, Adding fields, Self references, Auxiliary constructors, Private Fields and methods, Defining operators, Identifiers in Scala, Method overloading, Implicit conversions.

Built-in Control Structures: If expressions, While loops, For expressions, Exception handling with try expressions, Match expressions, Living without break and continue, Variable scope, Refactoring imperative-style code.

Functions: Methods, Local functions, First-class functions, Short forms of function literals, Placeholder syntax, Partially applied functions.

UNIT – III

Composition and Inheritance: A two-dimensional layout library, Abstract classes, Defining parameterless methods, Extending classes, Overriding methods and fields, Defining parametric fields, Invoking super class constructors, Using override modifiers, Polymorphism and dynamic binding, Declaring final members, Using composition and inheritance, Implementing above, beside, and toString, Defining a factory object, Heighten and widen, Putting it all together.

Traits: How traits work.

Packages and Imports: Packages, Imports, Implicit imports, Access modifiers. Case Classes and Pattern Matching: A simple Example, Kinds of patterns.

UNIT - IV

Case Classes and Pattern Matching: A simple example, Kinds of patterns.

Abstract Members: A quick tour of abstract members, Type members, Abstract vals, Abstract vars, Initializing abstract vals, Abstract types.

Extractors: An example: Extracting email addresses, Extractors, Patterns with zero or one variables, Variable argument extractors, Extractors and sequence patterns, Extractors versus case classes, Regular expressions.

Annotations: Why have annotations?, Syntax of annotations, Standard annotations.

Learning Resources:

Text Book:

[1] Programming in Scala, First Edition, by Martin Odersky, Lex Spoon, and Bill Venners.

Web Resources:

- [1] <u>https://www.artima.com/pins1ed/index.html#TOC</u>
- [2] <u>http://www.scala-lang.org/docu/files/ScalaByExample.pdf</u>
- [3] <u>http://www.scala-lang.org/docu/files/ScalaReference.pdf</u>
- [4] http://www.scala-lang.org/files/archive/spec/2.11/
- [5] <u>http://docs.scala-lang.org/tutorials/tour/tour-of-scala.html</u>

15MCA3502C: E-COMMERCE

Lecture	:	-	Internal Assessment:	40
Tutorial	:	2 hrs/week	Final Examination:	60
Practical	:	-	Credits:	2

Objectives:

- To make the students familiar with different types of electronic payment systems.
- To understand the role of supply chain management in e-commerce.
- To make the students familiar with inter and intra organizational commerce.
- To develop an understanding of information search and retrieval.

• It is expected that the students understand the various components of electronic commerce.

- It is expected that the students analyze Inter-organizational business scenarios involving Electronic Data Interchange.
- It is expected that the students recognize the dimensions of internal electronic commerce systems.
- It is expected that the students examine the Information search and retrieval through Multimedia.

UNIT – I

Electronic Commerce: Frame work, Anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

Consumer Oriented Electronic commerce: Mercantile Process models.

Electronic payment systems: Types of Electronic payment systems, Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT – II

Inter Organizational Commerce: EDI, EDI Implementation, Value added networks. Intra Organizational Commerce: Work Flow, Automation Customization and internal Commerce, Supply Chain Management.

UNIT – III

Corporate Digital Library: Document Library, digital Document types, corporate Data Warehouses.

Advertising and Marketing: Information based marketing, Advertising on Internet, on-line marketing Process, market research.

UNIT – IV

Consumer Search and Resource Discovery: Information search and Retrieval, Commerce Catalogues, Information Filtering.

Multimedia: key multimedia concepts, Digital Video and electronic Commerce, Desktop video Processing, Desktop video conferencing.

Learning Resources:

Text Book:

[1] Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

Reference Books:

- [1] "E-Commerce fundamentals and applications", Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
- [2] "E-Commerce", S.Jaiswal, Galgotia.
- [3] "E-Commerce", Efrain Turbon, Jae Lee, David King, H.Michael Chang.
- [4] "Electronic Commerce", Gary P.Schneider Thomson.
- [5] "E-Commerce:Business,Technology, Society", Kenneth C.Taudon, Carol Guyerico Traver.

Web Resources:

[1] <u>http://onlinevideolecture.com/?course_id=190&lecture_no=35</u>

15MCA3502D: STRUTS 2

Lecture	:	-	Internal Assessment:	40
Tutorial	:	2 hrs/week	Final Examination:	60
Practical	:	-	Credits:	2

Objectives:

- To make the students understand working of Struts 2 framework.
 - To make the students understand and write Struts 2 Action classes.
- To make the learners to write action mapping.
- To make the student understand and write view related tags in JSP documents.
- To make the learners understand and apply server side and client side validation in Struts 2 applications.
- To make the learners understand Interceptors stack significance and write custom Interceptors.

Learning

- Outcomes:
- It is expected that the students understand the fundamentals and components of Struts Framework.
- It is expected that the students understand overview of the Model, View, Controller (MVC) design pattern and how it is applied by Struts Framework.
- It is expected that the students to perform client & server side validation using Struts Validator Framework.
- It is expected that the students can develop web applications using Form tags, Data tags, actions, database access, localization, Exception Handling and working with annotations.

UNIT – I

Basic MVC Architecture: The Model, The View, The Controller.

Overview: Struts 2 Framework Features, Struts 2 Disadvantages.

Environment Setup

Architecture: Request Life Cycle.

Examples: Create a Dynamic Web Project Create Action Class, Create a View, Create Main Page Configuration Files, To Enable Detailed Log, Procedure for Executing the Application **Configuration**: The web.xml File, The Struts.xml File, The Struts-config.xml File, The Struts.properties File

UNIT – II

Actions: Create Action, Create a View, Execute the Application, Create Multiple Actions. Interceptors: Struts 2 Framework Interceptors, How to Use Interceptors?Create Custom Interceptors, Create Interceptor Class, Create Action Class, Create a View,Create Main Page, Configuration Files ,Stacking Multiple Interceptors.

Result Types: The Dispatcher Result Type, The Freemaker Result Type, The Redirect Result Type.

UNIT – III

Value Stack / OGNL: The Value Stack, The OGNL, ValueStack/OGNL Example, Create Views Configuration Files.

Database Access: Create Action, Create Main Page, Create Views, Configuration Files. Validations: Create Main Page, Create Views, Create Action, Configuration Files, How this Validation Works?, Xml Based Validation.

Localization: Resource Bundles, Access the messages, Localization Example.

UNIT - IV

Exception Handling: Global Exception Mappings.

Annotations: Create Main Page, Create Views, Create Action, Configuration Files. Data Tags: The Action Tag, The Action Tag - Detailed Example, The Include Tag - Detailed Example, The Bean Tag - Detailed Example, The Date Tag - Detailed Example, The Param Tag - Detailed Example, The Property Tag - Detailed Example, The Push Tag - Detailed Example, The Set Tag – Detailed Example, The Text Tag - Detailed Example. The Form Tags: Simple UI Tags, Group UI Tags.

Learning Resources:

Text Books:

- [1] Dave Newton, "Apache Struts 2 Web Application Development", 2009, Packt Publishing.
- [2] Budi Kurniawan, "Struts 2 Design and Programming: A Tutorial", Second Editon, Brainy Software.

E-Book:

[1] http://www.cs.indiana.edu/~dgerman/08092011.pdf

E-Resources:

- [1] <u>https://struts.apache.org/docs/getting-started.html</u>
- [2] <u>http://www.tutorialspoint.com/struts 2/</u>
- [3] <u>http://www.javatpoint.com/struts-2-tutorial</u>
- [4] <u>http://www.java4s.com/struts-tutorials/</u>
- [5] <u>http://www.java2blog.com/2012/07/welcome-to-strut2.html</u>

15MCA3502E: R PROGRAMMING FOR DATA SCIENCE

Lecture	:	-	Internal Assessment:	40
Tutorial	:	2 hrs/week	Final Examination:	60
Practical	:	-	Credits:	2

UNIT – I

History and Overview of R: Introduction to R & S language, The S Philosophy, Back to R, Basic Features of R, FreeSoftware, Design of the R System, Limitations of R.

Getting Started with R: Installation, Getting started with the R interface.

R Nuts and Bolts: Entering Input, Evaluation, R Objects, Numbers, Attributes, Creating Vectors, Mixing Objects, Matrices, Lists, Factors, Missing Values, Data Frames, Names

UNIT – II

Getting Data In and Out of R: Reading and Writing Data, Reading Data Files with read.table(), Reading in Larger Datasets with read.table, Calculating Memory Requirements for R Objects.

Control Structures in R: if-else, for Loops, Nested for loops, while Loops, repeat Loops, next, break.

UNIT – III

Functions in R: Your First Function, Argument Matching, Lazy Evaluation, The Argument, Arguments Coming After the Argument.

Loop Functions: Looping on the Command Line, lapply(), sapply(), split(), Splitting a Data Frame, Tapply, apply(),Col/Row Sums and Means, Other Ways to Apply, mapply(), Vectorizing a Function.

UNIT – IV

Debugging: Something's Wrong!, Figuring Out What's Wrong, Debugging Tools in R, Usingtraceback(),Using debug(),Using recover().

Simulation: Generating Random Numbers, Setting the random number seed, Simulating a Linear Model,Random Sampling.

Learning Resources:

Text Books:

- [1] Roger D Peng, "R Programming for Data Science" Lean Publishing, 2014-15
- [2] Michael J Crawley "The R Book" John Wiley & Sons, 2007

Reference Books:

- [1] Paul Teetor, "R Cookbook", Oreily publications, 2011
- [2] Mark Gardener, "Beginning R: The statistical programming language", 2012

Web Resources:

- [1] <u>https://www.coursera.org/learn/r-programming</u>
- [2] https://www.edx.org/course/introduction-r-data-science-microsoftdat204x-2
- [3] <u>https://www.udemy.com/r-basics/</u>
- [4] <u>https://www.udemy.com/r-programming/</u>

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MCA15 Regulations 15MCA3502F: INTRODUCTION TO ANGULARJS

Lecture	:	-	Internal Assessment:	40
Tutorial	:	2 hrs/week	Final Examination:	60
Practical	:	-	Credits:	2

UNIT – I

AngularJS prerequisites (HTML, CSS, JavaScript), What is AngularJS and Features, Advantages and Disadvantages, AngularJS introduction, AngularJS setup. **JQUERY:** Basics of JQuery, Effects using JQuery, JQuery HTML, JQuery traversing. **AJAX:** Ajax Introduction, Methods in Ajax (load (), get (), post ()).

UNIT – II

Basics of AngularJS, Angular Expressions, Modules, Directives, Controllers.

UNIT – III

Angular Models, Data-Binding, Scopes, Filters, Forms, Events.

UNIT – IV

Angular Tables, Services, Http (Ajax), Routing, AngularJS Dependency Injection, Build Sample AngularJS Applications.

Learning Resources:

Web Resources:

- [1] https://www.edureka.co/blog/angular-tutorial/
- [2] <u>https://www.w3schools.com/angular/</u>
- [3] <u>https://www.guru99.com/angularjs-introduction.html</u>
- [4] <u>https://thinkster.io/a-better-way-to-learn-angularjs</u>
- [5] <u>https://www.w3schools.com/jquery/default.asp</u>
- [6] <u>https://www.w3schools.com/js/js_ajax_intro.asp</u>
- [7] <u>http://www.tutorialsteacher.com/angularjs/angularjs-tutorials</u>
- [8] <u>https://www.javatpoint.com/angularjs-tutorial</u>
- [9] <u>https://www.tutorialspoint.com/angularjs/angularjs_tutorial.pdf</u>
- [10] <u>https://coursetro.com/courses/12/Learn-Angular-4-from-Scratch</u>
- [11] <u>https://www.youtube.com/watch?v=nO1ROKMjPqI&list=PLvZkOAgBYrsS_ugya</u> <u>msNpCgLSmtIXZGiz</u>

15MCA2503: PYTHON PROGRAMMING

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

- **Objectives:** To explain the students to be fluent in the use of procedural statements assignments, conditional statements, method calls.
 - To encourage students to understand the variables, expressions and statements and test small Python programs that meet requirements. This includes a basic understanding of top-down design.
 - To make the students understand the concepts of Operators and functions.
 - To prepare the students to have knowledge of iterating loops and string functions of basic python programming.
 - To make the students understand the concepts of Lists, Dictionaries, and Tuples in Python Programming.

• It is expected that students understand well the use of procedural statements — assignments, conditional statements, method calls.

- It is expected that the learners recognize the variables, expressions and statements and test small Python programs that meet requirements.
- It is expected that the students understand iterating loops and string functions, Files, Lists, Dictionaries and Tuples of basic Python Programming.

UNIT I:

Introduction: Creativity and motivation, Computer hardware architecture, Understanding programming, Words and sentences, Conversing with Python, Terminology: interpreter and compiler, Writing a program, What is a program?, The building blocks of programs, What could possibly go wrong?

Variables, expressions and statements: Values and types, Variables, Variable names and keywords, Statements, Operators and operands, Expressions, Order of operations, Modulus operator, String operations, Asking the user for input, Comments, Choosing mnemonic variable names.

Conditional execution: Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Catching exceptions using try and except, Short-circuit evaluation of logical expressions.

UNIT II:

Functions Calls: Built-in functions, Type conversion functions, Random numbers, Math functions, Adding new functions, Definitions and uses, Flow of execution, Parameters and arguments, Fruitful functions and void functions, Why functions? **Iteration:** Updating variables, The while statement, Infinite loops, "Infinite loops" and break, Finishing iterations with continue, Definite loops using for, Loop patterns.

UNIT III:

Strings: A string is a sequence, Getting the length of a string using len, Traversal through a string with a loop, String slices, Strings are immutable, Looping and counting, The in operator, String comparison, String methods, Parsing strings, Format operator.

Files: Persistence, Opening files, Text files and lines, Reading files Searching through a file, Letting the user choose the file name, Using try, Except, and Open, Writing files.

UNIT IV

Lists: A list is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Deleting elements, Lists and functions, Lists and Strings, Parsing lines, Objects and values, Aliasing, List arguments.

Dictionaries: Dictionary as a set of counters, Dictionaries and files, Looping and Dictionaries.

Tuples: Tuples are immutable, Comparing tuples, Tuple assignment, Dictionaries and tuples, Multiple assignment with dictionaries, The most common words example.

Learning Resources:

Text Book:

[1] Charles Severance, "Python for Informatics", Exploring Information.

Web Resources:

- [1] <u>https://www.coursera.org/course/pythonlearn</u>
- [2] <u>https://www.edx.org/course/introduction-computer-science-mitx-6-00-1x-0</u>
- [3] <u>https://www.thenewboston.com/videos.php?cat=36</u>
- [4] <u>http://diveintopython.org/</u>

Reference Books:

- [1] David M. Beazley. Python Essential Reference. 3rd Ed. Sams, Indianapolis. 2006.
- [2] Wesley J. Chun. Core Python Programming. 2nd Ed. Prentice Hall, Upper Saddle River, NJ. 2007.

MCA15 Regulations 15MCA2504A: HUMAN COMPUTER INTERACTION

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives: • To make the students understand the concepts of Screen design and Graphical User Interface.

- To make the students understand human interaction characteristics in the design process.
- To expose the learners discover and use the screen elements for presenting information simply and effectively.
- To make the students analyze device based, screen based controls and components of a window.

Learning

Outcomes:

- It is expected that students understand the human interaction characteristics in the design process.
- It is expected that the learners recognize the screen elements for presenting information simply and effectively.
- It is expected that the students create an user interface using various software tools.

UNIT – I

Introduction: Importance of user interface, definition, importance of good design, A brief history of Screen Design.

Graphical User Interface: Popularity of graphics, the concept of direct manipulation, graphical system, characteristics.

Web user Interface: popularity, characteristics- principles of user interface.

UNIT – II

Design Process: Human interaction with computers, importance of human characteristics, human considerations, human interaction speeds.

Screen designing: Interface design goals, screen meaning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, visually pleasing composition, amount of information, focus and emphasis, presenting information simply and meaningfully, technological considerations in interface design.

UNIT – III

Windows: Characteristics, components, operations. Selection of device based and screen based controls.

Components: Icons and images, Multimedia, choosing proper colors.

UNIT – IV

Software Tools: Specification methods, interface, Building tools. **Interaction devices:** Keyboard and function keys, pointing devices, speech recognition, digitization and generation, image and video displays, drivers.

Learning Resources:

Text Books:

- [1] Wilbert O Galitz, "The Essential Guide to User Interface Design", 2nd edition, Wiley DreamaTech.
- [2] Ben Shneidermann, "Designing the User Interface", 3rd edition, Pearson Education Asia

Reference Books:

- Alan Dix, Janet Fincay, Gre Goryd, Abowd and Russell Bealg, "Human Computer Interaction", 2nd edition Pearson Education.
- [2] Prece, Rogers, Sharps Interaction Design. Wiley Dreamatech Soren Lauesen, "User Interface Design", 2nd edition Pearson Education.

15MCA2504B: CLOUD COMPUTING

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives: • To make the students impart essential concepts in the area of cloud computing.

- To make the students understand various services, storage and applications of cloud computing.
- To make the students understand the benefits and limitations of cloud computing.
- To make the learners understand the necessary hardware, infrastructure for cloud computing.

• It is expected that students explain and characterize different cloud computing models, namely, infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS).

- It is expected that the learners recognize various reasons to use cloud storage.
- It is expected that students develop applications for cloud computing.
- It is expected that students make recommendations on cloud computing solutions for an enterprise.

UNIT – I

Cloud Computing Basics: Cloud Computing Overview, Applications, Intranets and the cloud.

Your Organization and Cloud Computing: When you can use cloud computing, Benefits, Limitations, Security concerns.

Cloud computing with the Titans: Google, Microsoft, and Amazon.

The Business case for going to the cloud: Cloud computing services, How those applications help your business, Deleting your datacenter.

UNIT – II

Hardware and Infrastructure: Clients, Security, Network, Services. Accessing the Cloud: Platforms, Web Applications, Web APIs, Web Browsers. Cloud Storage: Overview, Cloud Storage Providers. Standards: Application, Client, Infrastructure, Service.

UNIT – III

Software as a service: Overview, Driving Forces, Company offerings, Industries. Software plus Services: Overview, Mobile Device Integration, Providers, Microsoft Online. Developing Applications: Google, Microsoft, Intuit Quick Base, Cast Iron Cloud, Bungee Connect.

UNIT – IV

Local clouds and Thin Clients: Virtualization, Server Solutions, Thin Clients. Migrating to the Cloud: Cloud Services for Individuals, Cloud services aimed at the midmarket, Enterprise- Class Cloud Offerings, Migration.

Best practices and the future of cloud computing: Analyze your service, Best Practices.

Learning Resources:

Text Book:

[1] Anthony T.Velte, Toby.J Velte, Robert Elsenpeter, "Cloud Computing: A Practical Approach", Tata McGraw-Hill, 2010.

Reference Books:

- [1] "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Michael Miller, Que Publishing, 2008.
- [2] George Reese "Cloud Applications Architectures: Building Applications and Infrastructure in the cloud", O'Reilly.
- [3] "Cloud Computing implementation, management and security", John W. Rittinghouse, James F.Ransome, CRC Press, Taylor & Francis group,2010.
- [4] Beard Haley, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs", 2008, Emereo Pvt. Limited.

15MCA2504C: WEB MINING

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives: • To make the students understand the different knowledge discovery issues in data mining from the World Wide Web.

- To make the students analyze the different algorithms commonly used by Web application.
- To make the learners apply the role played by web mining in Information retrieval and extraction.
- To expose the students to learn document structures and grouping.
- To make the students understand and develop applications using web mining.

Learning

- **Outcomes:**
- It is expected that the students understand the basic concepts and techniques of information retrieval, web search for extracting knowledge from the web.
- It is expected that the students understand the different knowledge discovery issues in data mining from the World Wide Web.
- It is expected that the learners recognize the role played by Web mining in Information retrieval and extraction.
- It is expected that the learners understand architecture and main algorithms commonly used by web mining applications.
- It is expected that the students learn document structures and grouping.
- It is expected that the students use the probabilistic model for web mining.

UNIT – I

Introduction: Crawling and Indexing, Topic Directories, Clustering and Classification, Hyperlink Analysis, Resource Discovery and Vertical Portals, Structured vs. Unstructured Data Mining.

Crawling the Web: HTML and HTTP Basics, Crawling Basics, Engineering Large Scale Crawlers, Putting together a Crawler.

UNIT – II

Web Search and Information Retrieval: Boolean Queries and the Inverted Index, Relevance Ranking, Similarity Search.

UNIT – III

Learning: Similarity and Clustering, Formulations and approaches, Bottom up and Top down Partitioning Paradigms, Clustering and Visualization via Embeddings, Probabilistic Approaches to clustering, Collaborative Filtering, Supervised Learning, Semi Supervised Learning.

UNIT - IV

Applications: Social Network Analysis- Social Sciences and Bibliometry – Page Rank and HITS – Short comings of coarse Grained Graph model- Enhanced Models and Techniques-Evaluation of Topic Distillation- Measuring and Modeling the Web – Resource Discovery – Collecting Important Pages Preferentially – Similarity Search Using Link Topology – Topical Locality and Focused Crawling – Discovering Communities- The Future of Web Mining.

Learning Resources:

Text Book:

[1] Soumen Chakrabarti, "Mining the Web: Discovery Knowledge from Hypertext Data", Elsevier Science 2003.

Reference Books:

- [1] Sholom Weiss, **"Text Mining: Predictive Methods for Analyzing Unstructured Information"**, Springer, 2005.
- [2] Hercules Antonio do Prado, Edilson Fernada, "Emerging Technologies of Text Mining: Techniques and Applications", Information Science Reference (IGI), 2008.
- [3] Min Song, Yi-fang Brrok Wu, "Handbook of Research on Text and Web Mining Technologies", Vol I & II, Information Science Reference (IGI), 2009.

MCA15 Regulations 15MCA2504D: SOFTWARE PROJECT MANAGEMENT

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

- To make the students understand the tools necessary to organize project objectives, create realistic plans, and build and manage an accomplished team through every phase of the Software Development Life Cycle.
 - To make the students aware of managing projects that are complex, multifaceted, and evolving through a constant state of change.
- It is expected that the students understand overview of philosophies, Outcomes: • It is expected that the students understand overview of philosophies, methods, and techniques to project management and modeling supplemented by insights into the use and implementation of tools.
 - It is expected that the learners learn to deliver successful software projects that support organization's strategic goals.
 - It is expected that the learners would be able plan and manage projects at each stage of the software development life cycle.
 - It is expected that the students create an effective project plan that addresses real-world management challenges.

UNIT – I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT – II

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Model based software architectures: A Management perspective and technical perspective. Work Flows of the process: Software process workflows, Iteration workflows.

UNIT – III

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment.

UNIT – IV

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants.

Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions. Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

Learning Resources:

Text Book:

[1] "Software Project Management", Walker Royce: Pearson Education, 2005.

Reference Books:

- [1] "Software Project Management", Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
- [2] "Software Project Management", Joel Henry, Pearson Education.
- [3] "Software Project Management In Practice", Pankaj Jalote, Pearson Education 2005.
15MCA2505A: BIG DATA ANALYTICS

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives:

- To expose the students the classification of digital data, characteristics and evolution of Big Data.
- To make the students aware of the challenges with Big Data and the changing in realms of Big Data.
- To make the learners identify the importance of NoSQL, Hadoop.
- To make the students understand the MapReduce fundamentals and HBase.

Learning

Outcomes:

- It is expected that the students familiarize with traditional business intelligence and Big Data.
 - It is expected that the students recognize the challenges facing Big Data.
 - It is expected that learners identify the features of Hadoop and HDFS.
 - It is expected that the students able to differentiate RDBMS and Hadoop.

UNIT – I

Types of Digital Data: Classification of Digital Data.

Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data? Other Characteristics of Data which are not Definitional Traits of Big Data, Why Big Data? Are we just an Information Consumer or Do We also Produce Information?, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today? What is changing in Realms of Big Data?

Big Data Analytics: Where do we Begin?, What is Big Data Analytics?, What Big Data Analytics isn't?, Why this Sudden Hype Around Big Data Analytics?, Classification of Analytics, Greatest Challenges that Prevent Businesses from Capitalizing on Big Data, Top Challenges Facing Big Data, Why is Big Data Analytics Important?, What Kind of Technologies are we Looking Toward to Help Meet the Challenges Posed by Big Data?, Data Science, Data Scientist, Terminologies Used in Big Data Environments, Basically Available Soft State Eventual Consistency, Few Top Analytics Tools.

UNIT – II

The Big Data Technology Landscape: NoSQL, Hadoop.

Introduction to Hadoop: Introducing Hadoop, Why Hadoop?, Why not RDBMS?, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Use Case of Hadoop, Hadoop Distributors, HDFS, Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN, Interacting with Hadoop Ecosystem.

UNIT – III

Understanding MapReduce Fundamentals and HBase: The MapReduce Framework, Techniques to Optimize MapReduce Jobs, Uses of MapReduce, Role of HBase in Big Data Processing.

Understanding Big Data Technology Foundations: Exploring the Big Data Stack, Virtualization and Big Data, Virtualization Approaches.

UNIT – IV

Storing Data in Databases and Data Warehouses: RDBMS and Big Data, Non-Relational Database, Polyglot Persistence, Integrating Big Data with Traditional Data Warehouses, Big Data Analysis and Data Warehouse, Changing Deployment Models in Big Data Era.

Storing Data in Hadoop: Introducing HDFS, Introducing HBase, Combining HBase and HDFS, Selecting the Suitable Hadoop Data Organization for Applications.

Learning Resources:

Text Books:

- [1] Seema Acharya, Subhashini Chellappan, "BIG DATA AND ANALYTICS", Wiley Publications (2015)
 UNIT I: Chapters: 1, 2, 3
 UNIT II: Chapters: 4, 5
- [2] "BIG DATA Black Book", DT Editorial Services, DreamTech Press (2015)
 UNIT III: Chapters: 5, 6
 UNIT IV: Chapters: 7, 8

Reference Books:

- [1] "Business Intelligence Practice, Technologies and Management", Rajiv Sabherwal, Irma Becerra Fernandez, John Wiley 2011.
- [2] "Business Intelligence Roadmap", Lariss T.Moss, ShakuAtre, Addison-Wesley It Service.
- [3] "Oracle Business Intelligence: The Condensed Guide to Analysis and Reporting", Yuli Vasiliev, SPD Shroff, 2012.

MCA15 Regulations 15MCA2505B: SOFTWARE TESTING METHODOLOGIES

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

- **Objectives:** To make the students proficient in checking the software to find errors and remove them if found.
 - To make the learners understand the concept that the testing is the last step before releasing software is performed at the end of software development life cycle.
 - To make the learners aware of functional testing tools.
- It is expected that the students are aware of different types of testing.
 - It is expected that students understand the concept of object oriented testing with examples.
 - It is expected that the learners are aware of test cases preparation, management, execution and reporting using functional test tool.

UNIT – I

Outcomes:

Principles of Testing: Context of testing in producing software, About this chapter, The incomplete car, Dijkstra's doctrine, A test in time!, The cat and the saint, Test the tests first!, The pesticide paradox, The convoy and the rags, The policeman on the bridge, The ends of the pendulum, Men in black, Automation syndrome.

System and Acceptance Testing: System testing overview, Why do system testing, Functional Vs Nonfunctional testing, Functional system testing, Nonfunctional testing, Acceptance testing, summery of testing Phases.

Performance Testing: Introduction, Factors governing performance testing, Tools for performance testing, Process for performance testing, Challenges.

UNIT – II

Regression Testing: What is regression testing, Types of regression testing, When do regression testing, How to do regression testing, Best practices in regression testing.

Ad hoc Testing: Overview of Ad hoc testing, Buddy testing, Pair testing, Exploratory testing, Iterative testing, Agile and extreme testing, Defect seeding.

Testing of object oriented Systems: Introduction, Primer on object-oriented software, Differences in OO testing.

UNIT – III

Usability and Accessibility Testing: What is usability testing, Approach to usability, when to do usability testing, How to achieve usability, Quality factors for usability, Aesthetics testing, Accessibility testing, Tools for usability, Usability lab setup, Test roles for usability.

Organization Structures for testing teams: Dimension of organization structures, Structures in single-product companies, structures for multi-product companies, Testing services organizations, Success factors for testing organizations.

UNIT – IV

Functional Testing Tool: Overview, Testing an application using tool, Synchronization of test cases, Creating checkpoints, Testing calculator with parameterization, Testing database application, Testing web application.

Test Director: Test Director overview, Testing management process, Managing the testing process using Test Director.

Learning Resources:

Text Books:

(1) "Software Testing Principles and practices", Srinivasan Desikan, Gopalaswamy Ramesh, Pearson Education.
 UNIT I: Chapters: 1, 6, 7

UNIT II: Chapters: 8, 10, 11

UNIT III: Chapters: 12, 14

[2] "Software Testing Tools", Dr. K.V.K.K.Prasad, Dream Tech Press. UNIT IV: Chapters: 9, 11

Reference Books:

- [1] "The craft of software Testing", Brian Marick, Pearson Education.
- [2] "Software Testing in the Real World", Edward Kit, Pearson.
- [3] "Art of Software Testing", Meyers, John Wiley.

MCA15 Regulations 15MCA2505C: INFORMATION RETRIEVAL SYSTEMS

Lecture	:	4 hrs/week	Internal Assessment: 40
Tutorial	:	1 hr/week	Final Examination: 60
Practical	:	-	Credits: 4

Objectives:	•	To make the students study the text processing techniques which
		are required to produce basic document retrieval systems.

- To help the students in finding features on commercial information retrieval systems through physical inspection.
- LearningIt is expected that the students are aware of Content-based retrieval approaches Boolean, vector space, and probabilistic approaches.
 - It is expected that the students understand the search techniques for commercial, digital information access and retrieval systems.

UNIT – I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

Information Retrieval System Capabilities: Search, Browse, Miscellaneous.

UNIT – II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing,

Information Extraction. **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT – III

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT – IV

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext. Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

Learning Resources:

Text Book:

[1] M. T. M. Gerald J Kowalski, "Information Storage and Retrieval Systems", Springer International Edition, 2005.

Reference Books:

- [1] W. B. Frakes, Ricardo Baeza-Yates, Information Retrieval Data Structures and Algorithms: Prentice Hall PTR, 2000.
- [2] R. Baeza-Yates, Modern Information Retrival: Pearson Education, 2000.
- [3] R. Korfhage, Information Storage & Retrieval: John Wiley & Sons, 2006.

Web Resources:

[1] G. Marchionini , Intersection of information retrieval and human-computer interaction Available: <u>http://www.youtube.com/watch?v=noMQjrACHxQ</u>

MCA15 Regulations 15MCA2505D: WIRELESS AND MOBILE NETWORKS

Lecture	:	4 hrs/week	Internal Assessment:	40
Tutorial	:	1 hr/week	Final Examination:	60
Practical	:	-	Credits:	4

Objectives: • To make the students understand the concepts of Cellular communication Systems and Standards.

- To explain the students analyze Telecommunication and Satellite Communication Systems.
- To make the students compare the technologies of 3G, 4G and 5G communications.
- To make the students analyze principles and protocols for different types of Wireless network architectures.

Learning

- Outcomes:
- It is expected that the students familiarize with the concepts of Cellular communication Systems and Standards.
- It is expected that the students analyze Telecommunication and Satellite Communication Systems.
- It is expected that learners compare the technologies of 3G, 4G and 5G communications.
- It is expected that the students analyze principles and protocols for different types of wireless network architectures.

UNIT – I

Wireless Systems and Standards: First Generation Cellular Systems, Second Generation Cellular Systems, GSM/DCS1800/PCS1900, IS-54/136 and IS-95, PDC, Cordless Telephone Systems, Third Generation Cellular Systems, Wireless LANs and and PANs, Frequency Reuse and the Cellular Concept, Mobile Radio Propagation Environment, Co-channel Interference and Noise, Receiver Sensitivity and Link budget, Coverage, Spectral efficiency and Capacity, Software defined network.

Telecommunications systems: GSM, Mobile Services, System Architecture, Radio interface, Protocols, Localization and Calling, Handover, Security, New Data Services. **Satellite systems:** History, Applications, Basics: GEO, LEO, MEO.

UNIT – II

Third Generation (3G) Overview: UMTS, Services, Air Interface, 3GPP release 1999 Network architecture, Release 4 architecture, Release 5 All-IP architecture, Overview CDMA2000, TD-CDMA, TD-SCDMA, Commonality among WCDMA, CDMA2000,TD-CDMA and TD-SCDMA.

Universal Mobile Telecommunications: The WCDMA Air Interface, The UTRAN Architecture, Establishment of a UNTS Speech Call, UMPTS Packet Data, High speed packet Data, Handover, HSPA Connection Establishment.

UNIT – III

Long-Term Evolution: LTE Ecosystem, Standards, Radio Spectrum, LTE Architecture, UE, eNodeB, Core Network, Radio Channel Components, TD-LTE, MIMO, LTE Scheduler, Carrier aggregation, Cell Search, Cell Reselection, Attach and Default Bearer Activation, Handover, SONs, Relay Cells, HetNET, RRH, VoLTE, LTE Advanced.

5G and Beyond: Technology path, smart phones and wireless Broadband Edge Device(WBED), Software-Defined Radio(SDR), Millimeter Wave Backhaul, Applications, Services, Advanced Broadband Wireless Access, Multimedia(Mobile TV), MVNO.

UNIT – IV

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs)

Mobile Ad-Hoc Networks: Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks.

Wireless Sensor Networks: Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols.

Learning Resources:

Text Books:

- [1] Gordan L. Stuber, "Principles of Mobile Communication", Springer, 2011. (UNIT - I)
- [2] "Mobile communications", Jochen H.Schiller, 2nd edition, Pearson Education. (UNIT - I)
- [3] Clint Smith, Daniel Collins, "Wireless Networks-Design and Integration for LTE, EVDO, HSPA and WIMAX", Third Edition, McGraw Hill, 2014. (UNIT – II & III)
- [4] Nader F. Mir, "Computer and Communication Network", Pearson Education, 2007. (UNIT IV)

Reference Books:

- [1] Rappaport T.S., "Wireless Communications; Principles and Practice", Pearson Education, 2010.
- [2] William Stallings, "Wireless Communication & Networking", Pearson Education Asia, 2010.

MCA15 Regulations 15MCA2551: PYTHON PROGRAMMING LAB

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/week	Credits:	2

Objectives:

- To explain the students to be fluent in the use of procedural statements — assignments, conditional statements, method calls.
 - To encourage students to understand the variables, expressions and statements and test small Python programs that meet requirements. This includes a basic understanding of top-down design.
 - To make the students understand the concepts of Operators and functions.
 - To prepare the students to have knowledge of iterating loops and string functions of basic python programming.
 - To prepare the students to have knowledge of writing functions, working with files, lists, dictionaries, tuples and their methods.

Learning

Outcomes:

- It is expected that students understand well the use of procedural statements assignments, conditional statements, method calls.
 It is expected that the learners recognize the variables expressions and
 - It is expected that the learners recognize the variables, expressions and statements and test small Python programs that meet requirements.
 - It is expected that the students understand iterating loops and string functions of basic python programming.
 - It is expected that the students understand writing functions, working with files, lists, dictionaries, tuples and their methods of basic python programming.

LIST OF PROGRAMS

LAB CYCLE – I

- 1. Write a python code to read 'n' numbers and print their sum and mean.
- 2. Write a python program to swap two numbers without using third variable. Print the two variables before swap and after swap. (Without arithmetic Operators)
- 3. Write a python program which prompts the user for a Celsius temperature, convert the temperature to Fahrenheit, and print the converted temperature.
- 4. Write a program to prompt for a score between 0.0 and 1.0. If the score is out of range, print an error message. If the score is between 0.0 and 1.0, print the grade.

LAB CYCLE – II

- 5. Write a python program demonstrating the usage type conversion functions and random.
- 6. Write a python program demonstrating the usage of math functions.
- 7. Write a python program contains a function that takes username and password as input and returns a string either valid user or not. Allow the user to check for maximum three times only and quits the program.
- 8. Write a python program that prompts for a list of numbers and at the end prints out both the maximum and minimum of the numbers and the average numbers. (without sorting)

9. Write a python program demonstrating break, continue keywords and infnite loop.

LAB CYCLE – III

- 10. Write a python program having two functions as below:
 - (a) Count the number of characters of an input string
 - (b) Count the number of words in an input string.

Using above two functions, print the number of characters and number of words in the input string.

- 11. Write a python program demonstrating the usage of string functions.
- 12. Write a python program to read through a file and print the contents of the file in upper case.
- 13. Write a python function which saves results in a .txt file, the first 1000 Fibonacci numbers.
- 14. Write a python function which saves results in two files: random .txt file storing 100 random numbers and repetitions_random.txt storing those random numbers which got repeated.

LAB CYCLE – IV

- 15. Write a python program to demonstrate the usage of lists and its methods.
- 16. Write a python program to demonstrate the usage of lists in functions.
- 17. Write a python program involving the usage of dictionaries and its methods.
- 18. Write a python program mentioning the usage of Tuples and its methods.

Learning Resources:

Text Book:

[1] Charles Severance, Python for Informatics- Exploring Information.

Reference Books:

- [1] David M. Beazley. Python Essential Reference. 3rd Ed. Sams, Indianapolis. 2006. ISBN: 0-6723-2862-3.H.
- [2] Wesley J. Chun. Core Python Programming.2nd Ed. Prentice Hall, Upper Saddle River, NJ. 2007. ISBN: 0-132-26993-7.

Web Resources:

- [1] <u>https://docs.python.org/3/tutorial/</u>
- [2] <u>http://thepythonguru.com/</u>
- [3] <u>https://www.codeacdemy.com/learn/python</u>
- [4] <u>https://www.programiz.com/python-programming</u>
- [5] <u>https://www.thenewboston.com/videos.php?cat=36</u>

15MCA4552: MINI PROJECT

Lecture	:	-	Internal Assessment:	40
Tutorial	:	-	Final Examination:	60
Practical	:	3 hrs/week	Credits:	2

Objectives: • To estimate the ability of the student in transforming the theoretical knowledge studied so far into a working model or software or application of a computer/information system.

- Enable the students to gain experience in organization or institute and implement a small project and thus acquire the necessary confidence to carry out main project in the final year.
- Encourage students to be creative and develop their own ideas in the given project descriptions.
- Motivate students to work in emerging/latest technologies.
- Develop ability of the students to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.
- Provide enough experience to carry out the larger project in the sixth semester.

Learning Outcomes:

- It is expected that the students transform the theoretical knowledge studied so far into a working model of a computer/information system.
 - It is expected that the students gain experience in industry, academic institutions and research laboratories and implementation of a small project.
 - It is expected that the students acquire the necessary confidence to carry out main project in the final year.

15MCA4651: MAJOR PROJECT

Lecture	:	-	Internal Assessment: 40)
Tutorial	:	2 hrs/week	Final Examination: 60)
Practical	:	28 hrs/week	Credits: 15	5

Objectives: • To make the students develop quality software solution.

- To make the students to involve in all the stages of the software development life cycle like requirements engineering, systems analysis, systems design, software development, testing strategies and documentation with an overall emphasis on the development of reliable software systems.
- To make the students understand and gain the knowledge of the principles of software engineering practices, so as to participate and manage a large software engineering projects in future.
- To make the students exhibit the ability to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

Learning Outcomes:

- It is expected that the students develop quality software using the software engineering principles
 - Appreciate evaluating systems requirements, perform and evaluate feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and operational feasibility for the project.
 - It is expected that the students understand how to decide the S/W requirement specifications and H/W requirement specifications.
 - It is expected that the students perform project cost estimates using various techniques.
 - Document requirements and prepare SRS.
 - Plan and use various tools/diagrams during the systems design phase of the SDLC.
 - It is expected that the students perform coding for the project using latest programming languages.
 - It is expected that the students perform various systems testing techniques/strategies to include the phases of testing.
 - It is expected that the students able to decide the future scope and further enhancement of the system.
 - It is expected that the students plan for several appendices to be placed in support with the project report documentation.
 - Develop of the ability to communicate effectively.
 - It is expected that the students work effectively as an individual or as a team member to produce correct, efficient, well-organized and documented programs in a reasonable time.