



**KAKATIYA UNIVERSITY, WARANGAL**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**BCA COURSE STRUCTURE WITH EFFECT FROM 2015-16**

**BCA I YEAR**

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	M A R K S		
			Internal	External	Total
BCA11	FUNDAMENTALS OF INFORMATION TECHNOLOGY	T ( 4 )	30	70	100
BCA12	PROGRAMMING IN 'C'	T ( 4 )	30	70	100
BCA13	COMMUNICATIVE ENGLISH	T ( 4 )	30	70	100
BCA14	DESCRETE MATHEMATICS	T ( 4 )	30	70	100
BCA15	SYSTEM APPROACH TO MANAGEMENT	T ( 4 )	30	70	100
BCA16	FUNDAMENTALS OF INFORMATION TECHNOLOGY LAB	L ( 4 )	--	50	50
BCA317	PROGRAMMING IN 'C' LAB	L ( 4 )	--	50	50
					<b>600</b>

**BCA II YEAR/ I SEMISTER:**

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	M A R K S		
			Internal	External	Total
BCA211	OBJECT ORIENTED PROGRAMMING WITH C++	T ( 4 )	30	70	100
BCA212	PROBABILITY AND STATISTICAL METHODS	T ( 4 )	30	70	100
BCA213	COMPUTER ORGANIZATION	T ( 4 )	30	70	100
BCA214	OPERATING SYSTEM	T ( 4 )	30	70	100
BCA215	BASIC WEB PROGRAMMING	T ( 4 )	30	70	100
BCA216	C++ LAB	L ( 4 )	--	50	50
BCA217	IT LAB	L ( 4 )	--	50	50
					<b>600</b>

**BCA II YEAR/ II SEMISTER:**

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	M A R K S		
			Internal	External	Total
BCA221	DATA STRUCTURES With C++	T ( 4 )	30	70	100
BCA222	OPERATION RESEARCH	T ( 4 )	30	70	100
BCA223	UNIX PROGRAMMING	T ( 4 )	30	70	100
BCA224	SOFTWARE ENGINEERING	T ( 4 )	30	70	100
BCA225	MANAGEMENT INFORMATION SYSTEM	T ( 4 )	30	70	100
BCA226	DS- LAB	L ( 4 )	--	50	50
BCA227	UNIX- LAB	L ( 4 )	--	50	50
					<b>600</b>

<b>BCA111</b>	<b>FUNDAMENTALS OF INFORMATION TECHNOLOGY</b>	<b>FIT</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

## UNIT I

**Introduction to Computer:** Definition, Characteristics, Generation of Computers, Capabilities and Limitations, Introduction to Operating System, Concept of Bios, Booting Files. Basic Components of a Computer System - Control Unit, ALU, Input/output functions and characteristics. Memory Introduction, Classifications- Volatile Memory and Non- Volatile , Flash Memory, RAM, ROM, EPROM, PROM, EEPROM other types of memory.

**M-DOS:** Internal and External Commands, Difference between External and Internal Commands. Internal Commands MD, CD, RD, COPY CON, TYPE, DATE & TIME, VOLUME VERSION, REN, PROMPT, CLS, DIR/P/W, COPY, DEL Etc. External commands - FORMAT, DISKCOPY, DISKCOMP, XCOPY, CHKDISK, SCANDISK, HELP, DEBUG, PRINT etc.

## UNIT II

Windows concepts, Features, Desktop, Taskbar, Start menu, My Computer, Recycle Bin, Windows Accessories, Windows Explorer.

**MS-Office:** Introduction to MS-Office, MS-Word: Word Basics, working with formatted text, Shortcut keys, Formatting documents: Selecting text, Copying & moving data, Formatting characters, changing cases, Paragraph formatting, Indents, Drop Caps, Using format painter, Page formatting, Header & footer, Bullets & numbering, Tabs, Forming tables. Finding & replacing text, go to (F5) command, proofing text (Spell check, Auto correct), Reversing actions, Macros, Inserting pictures, Hyperlinks, Mail merging, Printing documents.

## UNIT III

Spreadsheets, workbooks, creating, saving & editing a workbook, Renaming sheet, cell entries (numbers, labels, and formulas), spell check, find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Formatting worksheet, Functions and its parts, Some useful Functions in excel (SUM, AVERAGE, COUNT, MAX, MIN, IF), Cell referencing (Relative, Absolute, Mixed), What-if analysis Introduction to charts: types of charts, creation of charts, printing a chart, printing worksheet.

## UNIT IV

Presentation Software, Uses, Presentation tips, components of slide, templates and wizards, using template, choosing an auto layout, using outlines, adding subheadings, editing text, formatting text, using master slide, adding slides, changing color scheme, changing background and shading, adding header and footer, adding clip arts and auto shapes. Various presentation, Working in slide sorter view (deleting, duplicating, rearranging slides), adding transition and animations to slide show, inserting music or sound on a slide, viewing slide show, Printing slides.

## UNIT V

Database Management System, An Overview of Access, Data Types, Creating Tables, Queries, Creating Relationships, Forms, Reports.

### TEXT-BOOKS:

1. Computer Fundamentals – P.K. Sinha.
2. Introduction to Computers – N. Subramanian.
3. Introduction to Computers – Peter Norton Mcgraw Hill.
4. Fundamentals of Computers, by Rema Tharaja, Oxford University Press India, 2014.
5. MS–Office \_ BPB Publications.

<b>BCA112</b>	<b>PROGRAMMING IN 'C'</b>		<b>PCS</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>	

### UNIT I

About C, Evolution of C, Programming languages, Structure of a C program, Compiling a C program, Character set in C, Keywords in C, Hierarchy of operators, Basic data types, Variables in C, Type declaration, Output function, Input function and format specifiers, arithmetic operators, Unary operators, Relational and logical operators.

Control statements, if statement, if else statement, for statement, while loop, do while statements, break statement, continue statement, switch statement, goto statement, ternary operators.

### UNIT II

Arrays, advantages of arrays, types of arrays, array declaration, array initialization, accessing data from array, array inside the memory, multidimensional arrays.

Character arrays, String Variables, Reading & writing strings, string handling functions.

### UNIT III

Introduction of Static and Dynamic memory allocation, The process of Dynamic memory allocation, DMA functions malloc() function, sizeof() operator, Function free(), Function realloc().

Functions, advantages of functions, declaring a function, calling a function, variables, passing arguments to a function, passing array to functions, recursion in functions, Call by Value, Call by Address.

### UNIT IV

Structure, declaration of structure, Union, difference between structure and union, Pointers, pointer arithmetic, Pointers and function, Array of pointers, Pointer and Strings, Pointer to structure.

**Storage classes:** auto, static, extern register.

### UNIT V

**Introduction File handling:** File structure, File handling function, File types, Streams, Text, Binary, File system basics, The file pointer, Opening a file, Closing a file, Writing a character, Reading a character, Using fopen(), getc(), putc(), and fclose(), Using feof().

Working with string, fputs() and fgets(), Standard streams in C, Flushing a stream, Using fread() and fwrite(), Direct access file, fseek() and random access I/O, fprintf() and fscanf(), getting file name as Command line arguments.

Preprocessor, # define- defining functions like macros, #include, creating header files, include user defined header files.

#### Textbooks:

1. Computer Science: A Structured Programming Approach using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M. Ghosh, Oxford University Press.

#### References:

1. Scaum Outline Series: "Programming in C".
2. Dennis & Ritchie: "Programming in C".
3. Stephen G. Kocher: "C Programming".
4. Programming in ANSI C, E. Balgurusamy Tata McGraw Hill, New Delhi, 5th Edition.

<b>BCA113</b>	<b>COMMUNICATIVE ENGLISH</b>	<b>CCE</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### **UNIT I**

Words and Sentences, Parts of speech, Articles, Verbs/ Tenses, Reported Speech, The passive.

### **UNIT II**

**Introduction to Communication:** Meaning and Definition, Objectives, Principles of Communication, Scope, Limitations. Barriers to Communication.

### **UNIT III**

**Communication process:** Meaning & Concept, Elements of Communication, and Media of Communication: Written, Oral, face-face, visual, audiovisual, computer based communication

### **UNIT IV**

Composition, Paragraph writing. Business Letters: Need and functions of business letters - Planning & layout of business letter - Types of business letters and letter writing, Application for employment and resume - Notices, Agenda and Minutes of the Meetings.

### **UNIT V**

Phonetics, presentation skills

### **Reference Books:**

1. Rajendra Pal & Korla Halli ,Essentials of Business Communication .
2. Dr. Urmila Rai and S M Rai,Business Communication.
3. Kaul, Asha. Business Communication., Prentice-Hall, New Delhi, 2006.
4. Ober, Scot. Contemporary Business Communication, 5th Edition. Biztantra, New Delhi, 2004.
5. Daniel Jones, Pronouncing Dictionary.

<b>BCA114</b>	<b>DISCRETE MATHEMATICS</b>	<b>DM</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### UNIT I

Sets, relations and functions, problem solving strategies, fundamentals of logic, logical inferences, first order logic, mathematical induction.

**Elementary Combinations:** Combinations and permutations, enumerations with repetitions, with constrained repetitions, Principle of Inclusion-Exclusion.

### UNIT II

**Graphs:** Basic Concepts, Isomorphism, Trees, Spanning Trees, Binary Trees, Planar Graphs, Euler Graphs.

**Boolean Algebra:** Introduction to Boolean Algebra Functions, Switching Mechanisms, Minimization of Boolean Functions, Applications to Boolean Design, Finite State Diagrams

### UNIT III

**Introduction to Statistics:** Data Collection and Tabulation, Graphical Representation of Data Measures of Central Tendency and Dispersion, Moments, Skewness and Kurtosis.

Random Variable and Mathematical Expectation of a R.V.

**Probability:** Introduction to Probability, Mutually Exclusive and Independent Events, Dependent Events and Conditional Probability. Addition and multiplication theorem of probability

### UNIT IV

**Discrete Probability Distributions:** Binomial Distribution, The Hyper Geometric Distribution, The Poisson Distribution, The Trinomial Distribution.

**The Normal Distribution:** Introduction to The Normal Distribution, Applications of The Normal Distribution, The Normal Approximation to the Binomial Distribution.

### UNIT V

**Sampling Distribution:** Sampling and The Distribution Of Sample means, Applications of Central Limit Theorem, The T-Distribution For Small Samples.

**Estimation:** Confidence Intervals for Means, Confidence Intervals For Means Based On Small Sample, Confidence Intervals For Proportions

### TEXT BOOKS:

1. Discrete Mathematics For Computer Scientist And Mathematicians By Joe L.Mott, Abraham Kandel, Theodore P.Baker.Z
2. Contemporary Statistics A Computer Approach, S.P.Gordan And F.S.Gordan(Mcgraw Hill1994)
3. Discrete Mathematics By Trembely And Manohar. (Tmh).Z
4. Discrete Mathematics By Bernord Kolnan, Robert C.Busby And Sharon Ross (Phi Third Edition)
5. Theory And Problems Pf Probability By Seymour Lipschutz(Schaum Series Tmh)
6. Stastical Methods By S.P.Gupta(Shand & Co).Op.

<b>BCA115</b>	<b>SYSTEM APPROACH TO MANAGEMENT</b>	<b>SAM</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

**UNIT I:**

**Principles Of Business Organization:** Commerce, Trade, Business, Industry, Forms Of Business Organization – Sole Trade, Partnership, Joint Stock Companies, Types, Promotion, Incorporation. Type Of Shares And Debentures, Stock Exchange, Meaning, Definition, Functions, working Of Stock Exchange.

**UNIT II:**

**Principles of Management:** Management, Nature, Definition, Scope and Importance of Management. Evolution of Management Thought, Traditional Approach, Scientific Management, Behavioral Aspects, Systems Theory Of Organization, Functions Of Management – Planning, Organizing, Staffing, Directing, Coordinating, Controlling.

**UNIT III:**

**Principles of Financial Accounting:** Book-Keeping And Accountancy, Definition Of Accounting, Principles And Practices, Classification Of Accounts, Double Entry System, Books Of Prime Entry, Subsidiary Books, Recording Of Cash And Bank Transactions, Preparation Of Ledger Accounts, Preparation Of Trial Balance.

**UNIT IV:**

**BRS and Final Accounts:** Bank Reconciliation Statement, Problems Relating To Bank Reconciliation Statement. Bills Of Exchange, Drawing, Accepting, Renewal and Retainment of Bills Capital, Revenue And Differed Revenue Expenditure, Preparation of Trading And Profit And Loss Account And Balance Sheet of Sole Trading Concern.

**UNIT V:**

**Financial Management:** Financial Management, Nature, Scope And Objectives, Profit Maximization Vs. Wealth Maximization, Financial Analysis, Meaning and Objectives, Types And Techniques Of Financial Analysis.

**TEXT BOOKS:**

1. Bushan Y.K : Business Organization & Management
2. Prasad L.M : Principles Of Management
3. Koontz & O' Donell : Management A System Approach
4. Grawal T.S. : Introduction To Accountancy.
5. Jain&Narang : Financial Accounting.

<b>BCA211</b>	<b>OBJECT ORIENTED PROGRAMMING WITH C++</b>	<b>CPP</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### **UNIT I**

Identifiers and Keywords, Constants, C++ Operators, Type Conversion, Declaration of Variables, Statements, Simple C++ Programs, Input/Output Streams, if statement, if - else statement, switch Statement, for loop, while loop, do-while loop, break statement, continue statement, goto statement.

### **UNIT II**

Defining a Function, return Statement, Types of Functions, Actual and Formal Arguments, Local and Global Variables, Default Arguments, Multifunction Program, Storage Class Specifiers, Recursive Function, Preprocessors Header Files, Standard Functions. Array, Arrays and Functions, Multidimensional Arrays, Character Array. Pointer operator, Address operator, Pointer expressions, Pointer Arithmetic, Pointers and Functions, Pointers and Arrays, Pointer and one dimensional array, Pointer and multidimensional array, Pointers and Strings, Array of Pointers, Pointers to Pointers.

### **UNIT III**

Classes, Declaration of Class, Member Functions, Defining the Object of a Class, Accessing a Member of Class, Array of Class Objects, Pointers and Classes, Nested Class, Constructors, Destructors, Inline Member Functions, Static Class Members, Friend Functions, Dynamic Memory Allocations, this Pointer. Inheritance, Types of Inheritances, function overriding, Constructors under Inheritance.

### **UNIT IV**

Member Access Control, Function Overloading, Special features of function Overloading, Operator Overloading, Overloading assignment operator, Overloading of Binary Operators, Overloading arithmetic operators, Overloading of comparison Operators, Overloading of Unary Operators. Polymorphism, Early Binding, Virtual Functions, Late Binding, Pure Virtual Functions, Abstract Base Classes, Virtual Base class, Template functions and template classes.

### **UNIT V**

Exception Handling: Exception Handling classes, Exception Specification, Exception in classes. Data file operations: Opening & closing of files, reading/Writing a character from a file, Binary file operations, Classes & file operations, Random Access File processing.

### **TEXT BOOK:**

- Object Oriented Programming with C++ Sixth edition, E.Balaguruswamy.
- A Structured Approach Using C++ By B.A.Forouzan & Rf Gilberg (Thomson Business Information India)
- Herbert Schilbt, C++ - The Complete Reference, TMH 2002
- J.P. Cohoon and J.W. Davidson, C++ program design – An Introduction To Programming and Object Oriented Design.- MGH 1999.



<b>BCA212</b>	<b>PROBABILITY AND STATISTICAL METHODS</b>	<b>PSM</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### UNIT I

**Correlation and Regression:** Correlation Coefficient, Bivariate Correlation, Karl Pearsons Formula, Rank Correlation, Regression. Linear Regression Equations, Regression Coefficient - Multiple-Correlation.

### UNIT II

Analysis Of Categorical Data, Consistency of Attributes, Various Measures of Consistency Independence and Association of Attributes, Various Measures of Association, Yule's Association, Bowley's Association.

### UNIT III

**Hypothesis Testing:** Concept of Statistical Hypothesis, Null and Alternative Hypothesis, Critical Region, Two Types of Errors, Level of Significance. Hypothesis Tests for Means, Hypothesis Testing Using P-Values, Hypothesis Tests For Means, Difference of Means, Proportions, Difference of Proportions Using Large Samples and Confidence Intervals, Summary of Hypothesis Testing.

### UNIT IV

Hypothesis Tests for Means, Hypothesis Testing Using P-Values, Hypothesis Tests for Difference of Means Using Small Samples. The Paired-Data Test and Confidence Intervals.  $\chi^2$  Tests for Variance, Goodness of Fit, Independency. Some Tests Based on F Distribution.

### UNIT V

**Analysis Of Variance:** One Way Classification, Two Way Classification, Statistical Analysis of Data.

### TEXT BOOK

1. Fundamentals Of Applied Statistics – By - Gupta And Kapoor

### REFERENCE BOOKS

1. FUNDAMENTAL OF MATHEMATICAL STATISTICS BY - V K KAPOOR AND GUPTA S
2. STATISTICS (PHI) BY - FREUD
3. PROBABILITY STATISTICS AND RANDOM PROCESS BY - R VEERA RAJAN (TMH)
4. INTRODUCTION TO PROBABILITY & STATISTICS BY - J.S. MILTON & JC ARNOLD (TMH)
5. MILLER & FERUNDS PROBABILITY & STATISTICS FRO ENGINNER BY - JOHNSON (PEARSON)
6. PROBABILITY & STATISTICS FRO ENGINEERS & STATISTICSTS BY - WALPOSE (PEARSON)
7. CONTEMPORARY STATISTICS A COMPUTER APPROACH, S.P.GORDAN AND F.S.GORDAN(MCGRAW HILL1994)

<b>BCA213</b>	<b>COMPUTER ORGANIZATION</b>	<b>CO</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

#### UNIT I

**Introduction Logic gates and circuits:** Gates (OR, AND, NOR, NAND, XOR & XNOR); Demorgan's laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Map).

#### UNIT II

**Data representation:** Representation of Number, Binary, Octal, Hexadecimal number and its Arithmetic, Representation of Integers, Representation of Fractions, Representation of Character, Characters codes (ASCII), Binary Multiplication Division, Conversation of number in Decimal, Binary, Octal, and Hexadecimal.

#### UNIT III

**Instructions and Flow of Control:** Instruction formats, Types of Instruction, Types of operands, Addressing modes & Their Importance, Flow of Control.

#### UNIT IV

**Processing Unit and Processors:**

Instruction Execution and Parallel Instruction Execution, CPU organization. Processors: RISC vs CISC, The Motorola 680X0 Family, The Intel 80X86 Family, The Power PC Family

#### UNIT V

**Computer Memory and Buses:** Introduction to Computer Memory, RAM, ROM, Types of RAM and ROM, Memory Hierarchical structure, Cache Memory and Virtual Memory, Introduction to buses, Types of buses.

**REFERENCE BOOKS:**

1. Computer Organization, Tmh (Iv Edition) By V.C. Hamacher
2. Computer Organization, (Phi) By Moris Mano
3. Computer Architecture & Organisation By Hayes, (Tmh)
4. Computer Systems Organisation & Architecture By.Arpinelli,(Addison Wesley)
5. The Architecture Of Computer Hardware And Sytems Hardware By I Englander (Wiley)
6. Computer Sytems Design And Architecture By Vp Heuring, Hf Jordan (Pearson)

<b>BCA214</b>	<b>OPERATING SYSTEM</b>	<b>OS</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### UNIT I

**Introduction:** What is an operating system? Mainframe Systems, Desktop Systems, Distributed Systems, Real Time Systems.

**Computer-System Structures:** Computer System Operation, I/O Structure, Storage Structure, Storage Hierarchy.

**Operating System Structures:** System Components, Operating-System Services, System Calls, System Programs, System Structure.

### UNIT II

**Processes:** Process Concept, Process Scheduling, Operations on Processes, Co-operating Processes, Inter-Process Communication.

**Threads:** Overview, Multithreading Models, Java Threads.

**CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.

### UNIT III

**Process Synchronization:** Background, the Critical-Section Problem, Synchronization Hardware, Semaphores, Monitors.

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

### UNIT IV

**Memory Management:** Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation.

**Virtual Memory:** Background, Demand Paging, Process Creation, Page Replacement Techniques, Thrashing.

### UNIT V

**File-System Interface and Implementation:** File Concept, Access Methods, Directory Structure. File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

**Mass-Storage Structure:** Disk Structure, Disk Scheduling, Disk Management, Swap Space Management, RAID Structure

### Text-Books :

1. Applied Operating System By – Siler Schatz, Galvin
2. Operating Systems - By - William Stallings (V Edition)
3. Peterson J and Silberchez A: Operating System Concepts Wesley.
4. Batch J: The design of Unix OS, PHI
5. Book-Unofficial Guide to ethical hacking-By Ankit Fadia-MacMillan, ISBN

<b>BCA215</b>	<b>BASIC WEB PROGRAMMING</b>	<b>BWP</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### **UNIT I**

HTML, Browsers and their types, URL's, web sites, Domain Names, static and dynamic sites and active web pages, Files Creation, Web Server, Web Client/Browser Hyper Text Markup Language, HTML Tags, Paired Tags, Commonly used HTML Commands Titles and Footers, Paragraph Breaks, Line Breaks, Heading Styles, Drawing Lines, Text Styles, Other Text Effects, Indenting Text, Lists, Types of Lists.

### **UNIT II**

Using the Border attribute, Using the Width and Height Attribute, Using the Align Attribute, Tables - Header, Data rows, The Caption Tag, Attributes - Width and Border, BGCOLOR, COLSPAN, ROWSPAN, External Document References, Internal Document References, Images as Hyperlinks, Introduction to Frames, tag, <FRAME> tag.

### **UNIT III**

DHTML Introduction, use and its elements, Cascading Style Sheets – Introduction, Using Inline Styles, Sample Examples, Defining Your Own Styles, Properties in Values in Styles, A worked example, Formatting Blocks of Information, Layers, Embedded Style Sheets, Linking external sheets.

### **UNIT IV**

JavaScript, Advantages, JavaScript Syntax, Data Types and Literal, Type Casting, Variables, Incorporating variables in a Script, Array, Operators and Expressions, Arithmetic Operators, Logical Operators, Comparison Operators, String Operators, Assignment Operators, Conditional Expression, Ternary and Special Operators, JavaScript Programming Constructs, If - then - else, Immediate If, For Loop, Built-in Functions, User Defined functions, Declaring functions, Place of Declaration, Passing Parameters, Variable Scope, Return Values, Recursive Functions, Placing text in a Browser, Dialog Boxes - Alert dialog box, Prompt dialog box, Confirm dialog box.

### **UNIT V**

The Form Object, The Form Object's Methods, Text Element, Password Element, Button Element, Submit Button Element, Reset Button Element, Checkbox Element, Radio Element, Text Area Element, Select and Option Element, Multi Choice Select Lists Element, Other Built-In Objects in JavaScript - String, Math, Date Object, Creating a User Defined Object.

### **TEXT BOOKS:**

1. Web Programming –Chris Bates – Third Edition.(Wiley)
2. Internet & World Wide Web- H. M. Deitel, P.J. Deitel, A. B. Goldberg-Third Edition

<b>BCA221</b>	<b>DATA STRUCTURES WITH C++</b>	<b>DS</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### UNIT I

**Introduction & Concepts of Data Structure:** Definition, Data Types (Primitive, Non-Primitive), Type of Data Structures, Applications, Aims & Goals of Data Structure, Storage Representation of data in 1, 2 and Multidimensional Array and Sparse Matrix.

### UNIT II

**Searching and Sorting Techniques:** Sequential search, Binary Search, Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort.

**Linked Lists:** Single Linked List, Double Linked List, Circular Linked Lists, Merits and Demerits of Linked Lists.

### UNIT III

#### **Linear Data Structures:**

Stack: Basic Operations using array and linked list (Push, Pop, Display), Applications of Stack.

Queue, Circular Queue: Basic Operations using array and linked list (Insert, Delete, Display),

Concept of Priority Queue and Double Ended Queue, Applications of Queues.

### UNIT IV

**Trees:** Introduction of Tree: Definitions, Basic Tree Terminology, Binary Tree, Full, Complete, in-complete, balance, imbalance, Memory Representations of Binary Tree (Array & Linked) and its merits & demerits of representations. Binary Search Tree, Properties of BST, Basic Operations on BST using linked list (Create, Insert, Search), Traversal algorithms: In order, pre-order, post order, Applications, Merits & Demerits of the trees.

### UNIT V

**Graphs:** Introduction of Graph, Properties of graph & Terminology, Representation of Graphs, Graph Traversal Techniques (DFS & BFS), Applications of Graph.

#### **References:**

1. Data Structures A Pseudocode Approach With C ++ By – Richard F. Gilberg.  
Behrouz A. Forouzan (Thomson Press)
2. Data Structures & Algorithm Analysis In C ++ By – Mark Allen Weiss.

<b>BCA222</b>	<b>OPERATION RESEARCH</b>	<b>OR</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### UNIT I

**Linear Programming Problems:** Formulation of Linear programming problem, Graphical solution and sensitivity analysis of a L.P.P. with two variables. Simplex method, Big-M method, Two Phase Method.

### UNIT II

**Transportation Problem:** Principle of duality in linear programming problem, Dual simplex method. Transportation Problem, Initial Basic Feasible Solution by N-W corner rule, matrix minima method, Vogel's approximation method, optimal transportation solution, Balanced and unbalanced degenerate cases.

### UNIT III

**Assignment Problem:** Definition and application of assignment problem, Hungarian Assignment Algorithm, unbalanced assignment problem, maximization case in assignment problem.

**Travelling Salesmen Problem:** Routing problem.

### UNIT IV

**Queuing Models:** Concepts, applicability, classification, exponential distribution, Birth and Death process, poisson queues, single server, multiple server queuing models.

### UNIT V

**Sequencing of jobs:** Problem of sequencing of 'n' jobs on 2 machines and problem of sequencing of 'n' jobs on 3 or more machines.

**Scheduling by PERT/CPM:** Basic concepts, constraints in network, construction of the network time, calculation, critical path method, PERT, PERT calculations.

### TEXT BOOKS:

1. Operations Research : An Introduction - Hamdy.A Taha Phi.
2. An Introduction To Optimisation : Operations Research By J.C. Pant. (4th Edition) Jain Brothers New Delhi (1998)

### REFERENCE BOOKS:

1. Operations Reserach By Kanthi Swaroop. P.K. Gupta, Manmohan.
2. Operations Research By P.K. Guptha, Manmohan,S.Chand & Company, Delhi-6
3. Introduction To Operations Research : A Computer Oriented Algorithmic Approach By Billy E.Gilett.
4. Engineering Optimisation By S.S.Rao New Age Internation (P) Limited.
5. Operation Research By G.V. Shenoy Etc., New Age International.

<b>BCA223</b>	<b>UNIX PROGRAMMING</b>	<b>UNIX</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### UNIT I

**Introduction:** Introduction to UNIX, Different Flavours of UNIX, Features of UNIX, Architecture of UNIX. Understanding the UNIX Command: Locating Commands, Internal and External Commands, Command Structure, Flexibility of Command Usage, man: Browsing the Manual Pages On-Line.

**General Purpose Utilities:** cal, date, echo, printf, bc, script, passwd, who, uname, tty, sty.

**The File System:** The File, What's in a (File)name?, The Parent-Child Relationship, pwd, cd, mkdir, rmdir, Absolute Pathnames, Relative Pathnames, ls.

### UNIT II

**Handling Ordinary Files:** cat, cp, rm, mv, more, file, wc, od, cmp, comm., diff, gzip, gunzip, tar, zip, unzip.

**Basic File Attributes:** ls-l, The -d option, File Ownership, File Permissions, chmod, Directory Permissions.

**The VI Editor:** vi Basics, Input Mode, Saving Text and Quitting, Navigation, Editing Text, Undoing Last Editing Instructions, Repeating the Last Command, Searching for a pattern, Substitution.

### UNIT III

**The Shell:** The shells Interpretive Cycle, Shell offerings, Pattern Matching- The Wild Cards, Escaping and Quoting, Redirecton: The Three standard Files, /dev/nul and /dev/tty: Two Special Files, Pipes, tee, Command Substitution, Shell Variables.

**Simple Filters, Regular Expressions and Grep Family:** The sample Database, pr, head, tail, cut, paste, sort, uniq, tr. grep, egrep, sed.

### UNIT IV

**Shell Programming:** Shell Scripts, Read: Making Scripts Interactive, Command Line Arguments, Exit status of a command, The Logical Operators, Conditional Execution, Exit,, The if Conditional, The Case Conditional, expr: Computation, While, until, for, trap, Sample Validation.

### UNIT V

**awk – An Advanced Filter:** Simple awk filtering, Splitting a line into fields, printf, The comparison operators, Number Processing, Variables, The -f Option, The BEGIN and END Sections, Built in Variables, Arrays, Functions, Control Flow Statements.

**File Management:** File Structures, System Calls for File Management – create, open, close, read, write.

### TEXT BOOK:

1. Unix System Concepts And Applications By  
Sumithaba Das (Tata Mcgraw Hill)
2. Unix Net Work Programming By  
W.Richard Stevens(Phi/Addision Wesley Two Columes)

### REFERENCE BOOK

1. Unix The Complete Reference By  
Rosen ,Host Farber And Rosinski-Tatamcgraw Hill
2. The Unix Programming Environment By  
Brian W. Kernigham& Rob Pike -Phi

<b>BCA224</b>	<b>MANAGEMENT INFORMATION SYSTEM</b>	<b>MIS</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### **UNIT I**

Introduction to Management Information System (MIS) - Evolution - Definition - Role of MIS - Approches to Management - Models of Organisation Structure - Strategic Uses of Information Technology - Components of Information System.

### **UNIT II**

Structure of Information System - Information System for Strategic Planing - Management Control and Operational Control - Applications of Tactical And Strategic Information System to Accounting and Finance, Marketing Production And Human Resources.

### **UNIT III**

Decision Making Process - Intellegence Design and Choie - Structued and Un-Structured Decisions Theory - Decision Support System (DSS)

### **UNIT IV**

Inventory Model- Capital Budgetting - Break Even Analysis - Decision Support System (DSS) Components – DSS And Major Business Functions.

(NOTE: Methods for Determing Alternatives Is Restricted to Concepts and Student is not Expected to Solve the Problems)

### **UNIT V**

Planning and Developing Information Systems -MIS Planing Approaches - Interanl Problems Related to MIS - Pit Falls in MIS Development - Organisation for Mis - Centralization vs Decentralization.

### **REFERENCE BOOKS :**

1. Robert Schultheis. Mary Sumner Management Information System : The Manager's View Tata Nc Graw Hill Publishing Company Limited, New Delhi.
2. W.S. Jawadeker ,Management Information Systems, Tata Mcgraw Hill Publishing Company Limited, New Delhi.
3. David Kroenke, Management Information Systems Tata Mcgrawhill Book Company.
4. Robert G.Mudrick. Joel Ross James, Clagget, Information System For Modern Management Prentice Hall Of India Private Limited, New Delhi.
5. Gordan A Davis Margrethe H. Olson,Management Information System Conceptual Foundations-Structure And Development Mc Graw Hill International Edition.



<b>BCA225</b>	<b>SOFTWARE ENGINEERING</b>	<b>SE</b>
<b>WORK LOAD: 4 PPW</b>	<b>INTERNAL MARKS: 30</b>	<b>EXTERNAL MARKS: 70</b>

### Unit I

**Introduction to Software Engineering:** The Evolving Role of Software, Changing Nature of Software, Software Myths. A Generic View of Process: Software Engineering- A Layered Technology, a Process Framework, the Capability Maturity Model Integration (CMMI), Process Patterns, Process Assessment, Personal and Team Process Models.

**Process Models:** The Waterfall Model, Incremental Process Models, Evolutionary Process Models, the Unified Process.

**Software Requirements:** Functional and Non-Functional Requirements, User Requirements, System Requirements, Interface Specification, The Software Requirements Document.

### UNIT II

**Requirements Engineering Process:** Feasibility Study, Requirements Elicitation and Analysis, Requirements Validation, Requirements Management.

**System Models:** Context Models, Behavioral Models, Data Models, Object Models, Structured Methods.

**Design Engineering:** Design Process and Design Quality, Design Concepts, the Design Model. Creating an Architectural Design: Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design.

### UNIT III

**Object-Oriented Design:** Objects and Object Classes, An Object-Oriented Design Process, Design Evolution. Performing User Interface Design: Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

**Testing Strategies:** A Strategic Approach to Software Testing, Test Strategies for Conventional Software, Black-Box and White-Box Testing, Validation Testing, System Testing, The Art of Debugging.

### UNIT IV

**Product Metrics:** Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

**Metrics for Process and Products:** Software Measurement, Metrics for Software Quality.

**Risk Management:** Reactive Vs. Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, RMMM, RMMM Plan.

### UNIT V

**Quality Management:** Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Statistical Software Quality Assurance, Software Reliability, The ISO 9000 Quality Standards.

### Text Books:

1. Software Engineering, A Practitioner's Approach- Roger S. Pressman,
2. Software Engineering- Somerville, Pearson Education

**MODEL PAPER**  
Faculty of Computer Science  
Bachelor of Computer Application (BCA)

**Time: 3 hrs**

**Total Marks: 70**

**Section - A**

**1. Answer the following**

**(5X4=20)**

- a)
  - (b)
  - (c)
  - (d)
  - (e)
- (Each question from each unit)

**Section – B (5X10 = 50)**

**Answer all questions**

- |       |          |
|-------|----------|
| 1.a)  | UNIT-I   |
|       | (OR)     |
| b)    | UNIT-I   |
| 2. a) | UNIT-II  |
|       | (OR)     |
| b)    | UNIT-II  |
| 3. a) | UNIT-III |
|       | (OR)     |
| b)    | UNIT-III |
| 4. a) | UNIT-IV  |
|       | (OR)     |
| b)    | UNIT-IV  |
| 5. a) | UNIT-V   |
|       | (OR)     |
| b)    | UNIT-V   |

**KAKATIYA UNIVERSITY  
WARANGAL-506009**



**Bachelor of Computer Application (BCA)  
III year Syllabus**

**(With effect from 2015-16)**

**DEPARTMENT OF COMPUTER SCIENCE  
University College, KU, Warangal-506009**

BCA III YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks		
			External	Internal	Total
BCA51	Multimedia Systems And Applications	T ( 4 )	70	30	100
BCA52	Object Oriented Design in UML	T ( 4 )	70	30	100
BCA53	Visual Programming	T ( 4 )	70	30	100
BCA54	E-Commerce Technologies	T ( 4 )	70	30	100
BCA55	Cryptography and Network Security	T ( 4 )	70	30	100
BCA56	Multimedia Systems And Applications- lab	L ( 4 )	50	0	50
BCA57	Visual Programming- Lab	L ( 4 )	50	0	50

BCA III YEAR II SEMESTER

Code	Subject	Workload Per Week	Marks			
			External	Internal	Total	
BCA61	Elective A1/B1/C1	T(4)	70	30	100	
	A1					Artificial Intelligence
	B1					Theory of Computation
	C1					Digital Image Processing
BCA62	Elective A2/B2/C2	T(4)	70	30	100	
	A2					Data mining
	B2					Android Programming
	C2					Unix programming
BCA63	Major project (including Seminars)		300	100	400	

BCA III YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks		
			External	Internal	Total
BCA51	Multimedia Systems And Applications	T ( 4 )	70	30	100
BCA52	Object Oriented Design in UML	T ( 4 )	70	30	100
BCA53	Visual Programming	T ( 4 )	70	30	100
BCA54	E-Commerce Technologies	T ( 4 )	70	30	100
BCA55	Cryptography and Network Security	T ( 4 )	70	30	100
BCA56	Multimedia Systems And Applications- lab	L ( 4 )	50	0	50
BCA57	Visual Programming- Lab	L ( 4 )	50	0	50

# MULTIMEDIA SYSTEMS AND APPLICATIONS

## UNIT I

Multimedia: Introduction, Definitions, Where to Use Multimedia- Multimedia in Business, Schools, Home, Public Places, Virtual Reality; Delivering Multimedia.

Text: Meaning, Fonts and Faces, Using Text in Multimedia, Computers and Text, Font Editing and Design Tools, Hypermedia and Hypertext.

Images: Before You Start to Create, Making Still Images, Color.

## UNIT II

Sound: The Power of Sound, Digital Audio, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Audio File Formats. Adding Sound to Your Multimedia Project.

Animation: The Power of Motion, Principles of Animation, Animation by Computer, Making Animations.

## UNIT III

Video: Using Video, How Video Works and Is Displayed, Digital Video Containers, Obtaining Video Clips, Shooting and Editing Video.

Making Multimedia: The Stages of a Multimedia Project, the Intangibles, Hardware, Software, Authoring Systems

Planning and Costing: The Process of Making Multimedia, Scheduling, Estimating; Designing and Producing.

## UNIT IV

The Internet and Multimedia: Internet History, Internetworking, Multimedia on the Web.

Designing for the World Wide Web: Developing for the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web, Video for the Web.

Delivering: Testing, Preparing for Delivery, Delivering on CD-ROM, DVD and World Wide Web, Wrapping.

Text book:

1. Tay Vaughan, "Multimedia: Making it work", TMH, Eighth edition.

Reference books:

1. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications", Pearson.
2. Keyes, "Multimedia Handbook", TMH.
3. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI.
4. Spoken Tutorial on "GIMP" as E-resource for Learning: -<http://spoken-tutorial.org>
5. Spoken Tutorial on "Blender" as E-resource for Learning: -<http://spoken-tutorial.org>

## **OBJECT ORIENTED DESIGN IN UML**

### **UNIT - I**

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

### **UNIT II**

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

### **UNIT - III**

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

### **UNIT-IV**

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

Case Study: The Unified Library application

### **TEXT BOOKS**

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

### **REFERENCES**

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TATA McGrawHill
5. Craig Larman Applying UML and Patterns: An introduction to Object - Oriented Analysis and Design and Unified Process, Pearson Education.

## **VISUAL PROGRAMMING**

### **UNIT – I**

Introduction: Visual Basic, Visual Studio Integrated Development Environment, Test-Driving the Visual Basic. Overview of the Visual Studio 2012 IDE, Menu Bar and Toolbar, Navigating the Visual Studio IDE, Using Help, Using Visual App Development to Create a Simple App that Displays Text and an Image.

Introduction to Visual Basic Programming: Introduction, Programmatically Displaying Text in a Label, Addition Program, Building the Addition Program, Memory Concepts, Arithmetic, Decision Making-Equality and Relational Operators.

Introduction to Problem Solving and Control Statements: Introduction, Algorithms, Pseudocode Algorithm, Control Structures, If ... Then Selection Statement, If ... Then ... Else Selection Statement, Nested If ... Then ... Else Selection Statements, Nested Control Statements, Using the Debugger: Locating a Logic Error.

### **UNIT – II**

Problem Solving and Control Statements: Introduction, For ... Next Repetition Statement, Examples Using the For ... Next Statement, Nested Repetition Statements, Select ... Case Multiple-Selection Statement, Do ... Loop While and Do ... Loop Until Repetition Statements, Using Exit to Terminate Repetition Statements, Using Continue in Repetition Statements, Logical Operators,

Methods: Introduction, Classes and Methods, Subroutines - Methods That Do Not Return a Value, Functions - Methods That Return a Value, Implicit Argument Conversions, Option Strict and Data-Type Conversions, Passing Arguments - Pass-by-Value vs. Pass-by-Reference, Scope of Declarations, Method Overloading, Optional Parameters, Using the Debugger – Debugging Commands

Arrays: Introduction, Arrays, Declaring and Allocating Arrays, Initializing the Values in an Array, Summing the Elements of an Array, Passing an Array to a Method, For Each ... Next Repetition Statement, Rectangular Arrays, Resizing an Array with the ReDim Statement.

### **UNIT – III**

Windows Forms GUI: A Deeper Look: Introduction, Controls and Components, Creating Event Handlers, Control Properties and Layout, GroupBoxes and Panels, ToolTips, Mouse-Event Handling, Keyboard-Event Handling, Menus, MonthCalendar Control, DateTimePicker Control, LinkLabel Control, ListBox and CheckedListBox Controls, Multiple Document Interface (MDI) Windows, Visual Inheritance, Animation with the Timer Component. Exception Handling: A Deeper Look (Appendix)

Object-Oriented Programming - Classes and Objects: Introduction, Classes, Objects, Methods and Instance Variables, Account Class, Value Types and Reference Types, Class Scope, Object Initializers, Auto-Implemented Properties, Using Me to Access the Current Object, Garbage Collection, Shared Class Members, Const and ReadOnly Fields, Shared Methods and Class Math, Object Browser.



## **UNIT IV**

Object-Oriented Programming - Inheritance and Polymorphism : Introduction, Base Classes and Derived Classes, Class Hierarchy, Constructors in Derived Classes, Protected Members, Introduction to Polymorphism - A Polymorphic Video Game, Abstract Classes and Methods,

Databases and LINQ : Introduction, Relational Databases, A Books Database, LINQ to Entities and the ADO.NET Entity Framework, Querying a Database with LINQ, Dynamically Binding Query Results, Retrieving Data from Multiple Tables with LINQ, Creating a Master/Detail View App.

### **TEXT BOOKS:**

1. Visual Basic 2012: How to Program by Paul Deitel, Harvey Deitel, Abbey Deitel, Sixth Edition, 2014.

## **E-COMMERCE TECHNOLOGIES**

### **UNIT I**

An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

### **UNIT II**

The Internet and WWW: Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Baner, Exchange, Shopping Bots

### **UNIT III**

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model,Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash

### **UNIT IV**

Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites

Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

#### **BOOKS RECOMMENDED:**

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang E-Commerce, Fundamentals And Applications, Wiely Student Edition, 2011

# **CRYPTOGRAPHY AND NETWORK SECURITY**

## **UNIT I**

Introduction: Security Trends, Security Attacks, Security Services, Security Mechanisms, Model for Network Security,

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

## **UNIT II**

Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles. Advanced Encryption Standard: Evaluation Criteria For AES, The AES Cipher.

## **UNIT III**

Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems, the RSA Algorithm,

Public-Key Cryptosystems: Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

## **UNIT IV**

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, Kerberos, X.509 Authentication Service, Public-Key Infrastructure.

### **TEXT BOOK:**

1. W. Stallings, *Cryptography and Network Security Principles and Practices*, 4th Ed., Prentice-Hall of India, 2006.

### **BOOK RECOMMENDED**

1. C. Pfleeger and S.L. Pfleeger, *Security in Computing*, 3rd Ed., Prentice-Hall of India, 2007.
2. M.Y. Rhee, *Network Security*, John Wiley and Sons, NY, 2002.

## PRACTICAL: MULTIMEDIA SYSTEMS AND APPLICATIONS

### NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

### Example programs:

Practical exercises based on concepts listed in theory using Presentation tools in office automation tool/ GIMP/Blender / Audacity/ Animation Tools/ Image Editors/ Video Editors.

### Implement the followings using Blender -

1. Create an animation using the tools panel and the properties panel to draw the following – Line, pe , oval, circle, rectangle , square, pencil , brush , lasso tool
2. Create an animation using text tool to set the font , size , color etc.
3. Create an animation using **Free transform tool** that should use followings-  
Move Objects  
Skew Objects  
Stretch Objects  
Rotate Objects  
Stretch Objects while maintaining proportion  
Rotate Objects after relocating the center dot
4. Create an animation using layers having following features-  
Insert layer, Delete layer, guide layer, Mask layer.
5. Modify the document (changing background color etc.)Using the following tools  
Eraser tool  
Hand tool  
Ink bottle tool  
Zoom tool  
Paint Bucket tool  
Eyedropper tool
6. Create an animation for bus car race in which both starts from the same point and car wins the race.

7. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
12. Create an animation for bouncing ball (you may use motion guide layer).

## PRACTICAL: VISUAL PROGRAMMING

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. Print a table of numbers from 5 to 15 and their squares and Cubes.
2. Print the largest of three numbers.
3. Find the fractional of a number n.
4. Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.
5. A person deposits Rs. 1000 in a fixed account yielding 5% interest. Complete the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.
7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list.use arrays.
8. Read a single dimension array. Find the sum and average of these numbers.
9. Read a two dimension array. Find the sum of two 2D Array.
10. Create a database Employee and Make a form to allow data entry to **Employee Form** with the following command buttons:

Employee Form

Employee Name:	<input type="text"/>
Employee Id:	<input type="text"/>
Date of Joining:	<input type="text"/>
Designation:	<input type="text"/>
Department:	<input type="text"/>
Address:	<input type="text"/>
Basic Pay:	<input type="text"/>

PREV	NEXT	FIRST	LAST	ADD	SAVE	DELETE	CANCEL
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BCA III YEAR II SEMESTER

Code	Subject		Workload Per Week	Marks		
				External	Internal	Total
BCA61	Elective A1/B1/C1		T(4)	70	30	100
	A1	Artificial Intelligence				
	B1	Theory of Computation				
	C1	Digital Image Processing				
BCA62	Elective A2/B2/C2		T(4)	70	30	100
	A2	Data mining				
	B2	Android Programming				
	C2	Unix programming				
BCA63	Major project (including Seminars)			300	100	400

## **ELECTIVE A1: ARTIFICIAL INTELLIGENCE**

### **UNIT I**

Introduction: Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

### **UNIT II**

Problem Solving and Searching Techniques: Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A\* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

### **UNIT III**

Knowledge Representation: Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs.  
Programming in Logic (PROLOG)

### **UNIT IV**

Dealing with Uncertainty and Inconsistencies: Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.

Understanding Natural Languages: Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

### **BOOKS RECOMMENDED:**

1. DAN.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2007.
2. Russell &Norvig, Artificial Intelligence-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.
3. Rich & Knight, Artificial Intelligence – Tata McGraw Hill, 2nd edition, 1991.
4. W.F. Clocksin and Mellish, Programming in PROLOG, Narosa Publishing House, 3rd edition, 2001.
5. Ivan Bratko, Prolog Programming for Artificial Intelligence, Addison-Wesley, Pearson Education, 3rd edition, 2000.



## **ELECTIVE B1: THEORY OF COMPUTATION**

### **UNIT I**

Computer Hardware And System Software: Introduction, Computer Hardware and Types of System Software, Man-machine Communication Spectrum.

INTRODUCTION TO COMPILERS: Introduction, Theory of Computer Languages, Design of a Language, Evolution of Compilers, Stages of Compilation.

### **UNIT II**

LEXICAL ANALYSIS: Introduction, Alphabets and Tokens in Computer Languages, Representation of Tokens and Regular Expression, Token Recognition and Finite State Automata, Lexical Analysis Tool

SYNTAX ANALYSIS: Introduction, Context-free Grammar and Structure of Language, Parser and its Types, Top-down Parser, Bottom-up Parser, Parser Generator Tool (Yacc),

### **UNIT III**

INTERMEDIATE CODE GENERATION: Introduction, Need for Intermediate Code, Types of Intermediate Code, Semantic Analysis.

OPTIMIZATION: Introduction, Hints on Writing Optimized Code at User Level, Construction of Basic Blocks and Processing.

### **UNIT IV**

CODE GENERATION: Introduction, Issues in Code Generation, Target Machine Architecture

COMPILER WRITING TOOLS: Introduction, Lexical Tools, Syntactic Tools,

TEST BOOK:

1. K. Muneeswaran, Compiler Design (with CD), Oxford university press, 2012

REFERENCE BOOKS

1. Santanu Chattopadhyaya, Systems Programming, PHI, 2011.
2. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques, and Tools, 2nd edition, Prentice Hall, 2006.
3. D. M. Dhamdhere, Systems Programming, Tata McGraw Hill, 2011.
4. Leland Beck, D. Manjula, System Software: An Introduction to System Programming, 3<sup>rd</sup> edition, Pearson Education, 2008.
5. Grune D, Van Reeuwijk . K, Bal H. E, Jacobs C J H, Langendoen K, Modern Compiler Design, 2nd edition, Springer, 2012

## **ELECTIVE C1: DIGITAL IMAGE PROCESSING**

### **UNIT - I**

DIGITAL IMAGE FUNDAMENTALS: What is Digital Image Processing, fundamental Steps in Digital Image Processing, Components of an Image processing system, elements of Visual Perception. Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, Linear and Nonlinear Operations.

### **UNIT - II**

IMAGE TRANSFORMS: Two-dimensional orthogonal & unitary transforms, properties of unitary transforms, two dimensional discrete Fourier transform. Discrete cosine transform, sine transform, Hadamard transform, Haar transform, Slant transform, KL transform.

### **Unit III**

ENHANCEMENT: Image Enhancement in Spatial domain, Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations.

Basics of Spatial Filtering Image enhancement in the Frequency Domain filters, Smoothing Frequency Domain filters, Sharpening Frequency Domain filters, homomorphic filtering.

### **UNIT - IV**

Model of image degradation/restoration process, noise models, Restoration in the Presence of Noise, Only-Spatial Filtering Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degradations, inverse filtering, minimum mean square error (Weiner) Filtering, Color Fundamentals. Color Models, Pseudo color Image Processing., processing basics of full color image processing

### **TEXT BOOK:**

1. "Digital Image Processing", Rafael C. Gonzalez, Richard E. Woods, et.al, TMH, 2nd Edition 2010.

### **REFERENCE BOOKS:**

1. "Fundamentals of Digital Image Processing", Anil K. Jain, Pearson Education, 2001.
2. "Digital Image Processing and Analysis", B. Chanda and D. Dutta Majumdar, PHI, 2003.

## **ELECTIVE A2: DATA MINING**

### **UNIT I**

Data Mining and Knowledge Discovery Process: data mining, Data Mining Differ from Other Approaches - The Knowledge Discovery Process-Introduction, Knowledge Discovery Process, Knowledge Discovery Process Models.

Data Understanding: data, Concepts of Learning, Classification, and Regression

### **UNIT II**

Data Mining: Methods for Constructing Data Models: Unsupervised Learning: Clustering-From Data to information Granules or Clusters, Categories of Clustering Algorithms, Hierarchical Clustering, Objective Function-Based Clustering, Cluster Validity, random Sampling and Clustering as a Mechanism of Dealing with large datasets.

### **UNIT III**

Association Rules – Introduction, Association Rules and transactional Data , Mining Single Dimensional , Single-Level Boolean Association Rules, Mining Other Types of Association Rules.

Supervised Learning: Bayesian Methods, Regression- Decision Trees, Rule and Hybrids Algorithms.

### **UNIT IV**

Text Mining: Introduction, Information Retrieval Systems, Improving Information Retrieval Systems.

Data Security, Privacy and Data Mining: Privacy in Data Mining, Privacy Versus Levels of Information Granularity, Distributed Data Mining, Collaborative Clustering.

Text Books:

1. Data mining A knowledge discovery approach , Pedrycz, Kurgan, Springer , 2007

References:

1. Data mining Concepts and Techniques , Micheline Kamber, third edition, MK Elsevier publications
2. Principles of data mining , David hand Heikki Mannila , PHI publications-2004

## **ELECTIVE B2: ANDROID PROGRAMMING**

### **UNIT I**

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

### **UNIT II**

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

### **UNIT III**

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes.

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog.

### **UNIT IV**

Database: Understanding of SQLite database, connecting with the database.

Book Recommended:

1. Android application development for java programmers. By James C. Sheusi.  
Publisher: Cengage Learning, 2013.

ONLINE READING / SUPPORTING MATERIAL:

1. <http://www.developer.android.com>
2. <http://developer.android.com/about/versions/index.html>
3. <http://developer.android.com/training/basics/firstapp/index.html>
4. <http://docs.oracle.com/javase/tutorial/index.htm> (Available in the form of free downloadable ebooks also).
5. <http://developer.android.com/guide/components/activities.html>
6. <http://developer.android.com/guide/components/fundamentals.html>
7. <http://developer.android.com/guide/components/intents-filters.html>.
8. <http://developer.android.com/training/multiscreen/screensizes.html>
9. <http://developer.android.com/guide/topics/ui/controls.html>
10. <http://developer.android.com/guide/topics/ui/declaring-layout.html>
11. <http://developer.android.com/training/basics/data-storage/databases.html>

## **ELECTIVE C2: UNIX PROGRAMMING**

### **UNIT I**

Introduction: Introduction to UNIX, Different Flavours of UNIX, Features of UNIX, Architecture of UNIX. Understanding the UNIX Command: Locating Commands, Internal and External Commands, Command Structure, Flexibility of Command Usage, man: Browsing the Manual Pages On-Line.

General Purpose Utilities: cal, date, echo, printf, bc, script, passwd, who, uname, tty, sty.

The File System: The File, What's in a (File)name?, The Parent-Child Relationship, pwd, cd, mkdir, rmdir, Absolute Pathnames, Relative Pathnames, ls.

### **UNIT II**

Handling Ordinary Files: cat, cp, rm, mv, more, file, wc, od, cmp, comm., diff, gzip, gunzip, tar, zip, unzip.

Basic File Attributes: ls-l, The -d option, File Ownership, File Permissions, chmod, Directory Permissions.

The VI Editor: vi Basics, Input Mode, Saving Text and Quitting, Navigation, Editing Text, Undoing Last Editing Instructions, Repeating the Last Command, Searching for a pattern, Substitution.

The Shell: The shells Interpretive Cycle, Shell offerings, Pattern Matching- The Wild Cards, Escaping and Quoting, Redirecton: The Three standard Files, /dev/nul and /dev/tty: Two Special Files, Pipes, tee, Command Substitution, Shell Variables.

### **UNIT III**

Simple Filters, Regular Expressions and Grep Family: The sample Database, pr, head, tail, cut, paste, sort, uniq, tr. grep, egrep, sed.

Shell Programming: Shell Scripts, Read: Making Scripts Interactive, Command Line Arguments, Exit status of a command, The Logical Operators, Conditional Execution, Exit,, The if Conditional, The Case Conditional, expr: Computation, While, until, for, trap, Sample Validation.

### **UNIT IV**

awk – An Advanced Filter: Simple awk filtering, Splitting a line into fields, printf, The comparison operators, Number Processing, Variables, The -f Option, The BEGIN and END Sections, Built in Variables, Arrays, Functions, Control Flow Statements.

File Management: File Structures, System Calls for File Management – create, open, close, read, write.

#### **TEXT BOOK:**

1. Unix System Concepts And Applications By Sumithaba Das (Tata Mcgraw Hill)
2. Unix Net Work Programming By W.Richard Stevens(Phi/Addision Wesley Two Columes)

#### **REFERENCE BOOK**

1. Unix The Complete Reference By Rosen ,Host Farber And Rosinski-Tatamcgraw Hill
2. The Unix Programming Environment By Brian W. Kernigham& Rob Pike -Phi

## **PROJECT GUIDE LINES**

1. Maximum 2 students shall be allowed to take up a project.
2. Guiding one project shall be considered as 4 hours of practical per week as the work load for the concerned internal guide.
3. Each student shall submit his/her project synopsis to the concerned guide within 15days in consultation with internal guide from the commencement of the respective semester.
4. Each student has to carry out 2 project seminars compulsorily in project duration.
5. Each seminar will be considered for their internal assessment (IA).

### **Scheme of valuation - 400 Marks**

- IA – 100 Marks

- Synopsis - 20 Marks
- Seminar 1 - 40 Marks
- Seminar 2 - 40 Marks

- Dissertation – 300 Marks

- Documentation - 150 Marks
- Presentation / Demonstration - 100 Marks
- Viva- 50 Marks

# **SCHEME OF QUESTION PAPER**

**FACULTY OF SCIENCES**  
**Bachelor of Computer Application (BCA)**  
**V/VI Semesters**  
**KAKATIYA UNIVERSITY, WARANGAL**  
**Code: Name of the Paper**

**Time: 3 hrs**

**Total Marks: 70**

**Section - A**

**1. Answer any six from the following**

**(6 X 5 = 30)**

- a. from unit I
- b. from unit I
- c. from unit II
- d. from unit II
- e. from unit III
- f. from unit III
- g. from unit IV
- h. from unit IV

**Section - B**

**Answer all questions**

**(4 X 10 = 40)**

- |    |     |      |     |                |
|----|-----|------|-----|----------------|
| 2. | (a) | (OR) | (b) | from UNIT -I   |
| 3. | (a) | (OR) | (b) | from UNIT -II  |
| 4. | (a) | (OR) | (b) | from UNIT -III |
| 5. | (a) | (OR) | (b) | from UNIT -IV  |