



PROGRAMME

BACHELOR OF COMPUTER APPLICATIONS

CURRICULUM AND SYLLABI

(For students admitted from the Calendar year 2015-16)

SCHOOL OF INFORMATION TECHNOLOGY

SRM UNIVERSITY, SIKKIM

Bachelor of Computer Application							
CURRICULUM							
Semester I							
Course Category	Course Code	Course Title	L	T	P	L+T+P	C
Language	LAE1511	English – I	3	1	0	4	3
Core	BCA1512	Programming in C	3	1	2	6	4
	BCA1513	Digital Logic Fundamentals	4	1	0	5	4
Supportive	BCA1514	Basic Statistics	4	1	0	5	4
General	GEN1515	Environmental Studies [internal Evaluation]	2	0	2	4	4
Skill	SPD1516	Computer Skills [Practical course]	1	0	2	3	3
Total Credits							22
Semester II							
Course Category	Course Code	Course Title	L	T	P	L+T+P	C
Language	LAE1521	English – II	3	1	0	4	3
Core	BCA1522	Programming in C++	3	1	2	6	4
	BCA1523	Data Structures and Algorithms	4	1	0	5	4
Supportive	BCA1524	Mathematics for Computer	4	1	0	5	4
Core	BCA1525	Scripting Languages Lab [Practical course]	2	2	2	6	4
General	GEN1526	Human Rights and Professional Ethics [internal Evaluation]	2	0	1	3	3
Extension	EX*1527	NSS / NCC /Yoga [internal Evaluation]	0	0	2	2	2
Total Credits							24
Semester III							
Course Category	Course Code	Course Title	L	T	P	L+T+P	C
Core	BCA1531	Core Java Programming	3	0	3	6	4
	BCA1532	Database Management Systems	3	0	3	6	4
	BCA1533	Operating System and Unix	4	1	0	5	4
Elective	BCA1534 / BCA1535	Management Information System / E-Commerce and M-Commerce	4	1	0	5	4
General	GEN1536	Value Education [internal Evaluation]	1	0	2	3	3
Supportive	BCA1537	Information Literacy [Internal Evaluation]	0	1	3	4	3
Skill	SPD1538	Soft Skill & Verbal Aptitude [internal Evaluation]	0	0	2	2	2
Total Credits							24
Semester IV							
Course Category	Course Code	Course Title	L	T	P	L+T+P	C
Core	BCA1541	Advanced Java Programming	3	0	3	6	4
	BCA1542	Computer Networks	4	1	0	5	4
	BCA1543	Software Engineering	4	1	0	5	4
Elective	BCA1544 BCA1545	Accounting and Financial Management / TCP & IP Networks	4	1	0	5	4
Core	BCA1546	Case Study :Object Oriented Analysis and Design [Practical course]	0	2	3	5	3

Skill	BCA1547	Technical Writing [Internal Evaluation]	0	1	3	4	3
Skill	SPD1548	Quantitative Aptitude and Reasoning-I [internal Evaluation]	0	0	2	2	2
Total Credits							24
Semester V							
Course Category	Course Code	Course Title	L	T	P	L+T+P	C
Core	BCA1551	Cloud Computing	3	0	3	6	4
	BCA1552	Enterprise Resource Planning	4	1	0	5	4
	BCA1553	Data Mining and Warehousing	4	1	0	5	4
Elective	BCA1554 / BCA1555	Health Care Information System / Banking Services	4	1	0	5	4
Core	BCA1556	Open Source Technologies Lab [Practical course]	0	2	3	5	3
Supportive	SPD1557	Entrepreneurial Development [internal Evaluation]	0	0	3	3	3
Skill	SPD1558	Quantitative Aptitude and Reasoning-II [internal Evaluation]	0	0	2	2	2
Total Credits							24
Semester VI							
Course Category	Course Code	Course Title	L	T	P	L+T+P	C
Core	BCA1561	Big Data and its Applications	4	1	0	5	4
	BCA1562	Software Testing	3	1	2	6	4
	BCA1563	Information and Storage Management	4	1	0	5	4
Elective	BCA1564/ BCA1565	Data Analytics / Business Intelligence	4	1	0	5	4
Skill	SPD1566	Leadership and Team Management [internal Evaluation]	0	0	2	2	2
Core	BCA1567	Project Work	0	2	6	8	4
Total Credits							22

Total Credits: 140

- Total Number of Hours per week includes L+T+P and Counseling / Library / Digital Reference / Guest Lecture / Co-Curricular Activities

SEMESTER I

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
LAE1511	English-I	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES

1. To enable students improve their lexical, grammatical and communicative competence.
2. To enhance their communicative skills in real life situations.
3. To assist students understand the role of thinking in all forms of communication.
4. To equip students with oral and appropriate written communication skills.
5. To assist students with employability and job search skills.
6. To improve the LSRW skills in the students
7. To enable the students to understand the Grammar and usage of the language.
8. To make the students culturally fit in the communicative environment.

UNIT-I LISTENING AND SPEAKING SKILLS

Common Errors in pronunciation-Describing the process (respective fields)-Conducting Meetings-Group Discussion-JAM (Just A Minute).

UNIT-II READING SKILL

Reading the newspaper and highlighting the news-Reading Comprehension-Summarizing and note making-Predicting the content.

UNIT-III WRITING SKILL

Interpretation of Data (flow charts, figures and pictures)-Writing notice, agenda, and minutes of meeting-Writing letters: business letter and informal letter-Writing a Resume and Covering letter-Essay Writing.

UNIT-IV GRAMMAR

Tense and Concord-Preposition-Direct and Indirect Speech-Spotting and correcting the errors-Arranging the sentence in sequential order.

UNIT-V THE ROLE OF MARKETING ENGLISH FOR RESEARCH

Project proposal-Report Writing-Types of data-Methods of collecting Data -Presentation Techniques.

REFERENCE BOOKS:

1. Department of English and Foreign Languages. "English for Engineers", SRM University Publications, 2013.
2. Dhanavel, S.P. "English and Communication Skills for Students of Science and Engineering", Orient Blackswan Ltd., 2009.
3. Green, David. "Contemporary English Grammar Structures and Composition." Macmillian Publishers India Ltd, Delhi,
4. Taylor, Shirley, V.Chandra. "Communication for Business. 4th Ed. Dorling Kindersly India pvt. Ltd., 2011.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1512	Programming in C	3	1	2	6	4

INSTRUCTIONAL OBJECTIVES

At the end of this course the learner is expected:

1. To acquire basic knowledge about Programming in C
2. To develop problem solving skills through C programming
3. To apply pointers concepts and functions in C Programming

UNIT-I BASIC STRUCTURE

Introduction- Importance of C- Basic Structure of C program- Tokens-Variables- Data types- Operators and Expression- Managing Input and Output Operators.

UNIT-II CONDITIONAL STATEMENTS

If statement- switch statement- goto statement- while statement- do statement-for statement- continue statement- break statement.

UNIT-III ARRAYS AND FUNCTIONS

One dimensional array- Two dimensional array- Multidimensional array-Built in functions (Library functions): String Handling functions- User defined functions.

UNIT-IV POINTERS

Structure definition- Arrays of structures- Structures and functions- Unions-Understanding pointers- Declaring and initializing pointers- Pointers and arrays- Pointers and functions- Pointers and structures.

UNIT-V FILE MANAGERMENTS

Defining and Opening a file- Closing a file- Input output operations on files-Error Handling during I/O operations- Command line arguments.

REFERENCE BOOKS:

1. Gottfried B.S., (1997) *Theory and problems of Programming with C*, Schaum's Outline Series, Tata McGraw Hill,
2. Kanetkar Y.(1995) *Let us C*, BPB Publications.
3. Deitel H.M. &Deitel P.J. (2001), *How to Program C*, Prentice Hall India.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1513	Digital Logic Fundamentals	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES

At the end of this course, the learner is expected :

1. To Understand the concept of digital systems
2. To operate on various number systems and Simplify Boolean functions.
3. To Distinguish logical and combinational circuits
4. To Design counters and understand the working of arithmetic logic and control unit

UNIT-I BINARY SYSTEMS

Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes.

UNIT-II BOOLEAN ALGEBRA AND LOGIC GATES

Basic Definitions, Boolean algebra: Theorems and Properties, Boolean Functions, Canonical and Standard Forms and Other Logic Operations. Digital Logic Gates and its Different Types.

UNIT-III SIMPLIFICATION OF BOOLEAN FUNCTIONS

Map Method: Two, Three and Four variable maps. Product of Sums Simplification, NAND and NOR implementation, Don't Care Conditions, Tabulation Method.

UNIT-IV COMBINATIONAL LOGIC AND SEQUENTIAL LOGIC ADDERS

Half Adder, Full Adder and Binary Parallel Adder. Decoder, Encoder, Multiplexer, Demultiplexer.

UNIT-V SEQUENTIAL CIRCUITS

Flip-Flops: RS, D, JK, MS; Counters: Asynchronous, Synchronous; Register and its types: Shift register, parallel/serial in, parallel/serial out. Memory organization: Primary Memory- RAM and its types, ROM and its types.

REFERENCE BOOKS:

1. Bartee T.C., (1985) *Digital Computer Fundamentals*, McGraw Hill, 6th edition,
2. Morris Mano M. (2000), *Digital Logic and Computer Design*, Prentice Hall India-4th Edition,
3. Malvino, Leach. (1986), *Digital Principles and Applications*, McGraw Hill-4th edition.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1514	Basic statics	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES

At the end of this course the learner is expected:

1. To provide a strong foundations in the principles of statistics.
2. To apply Statistical techniques for solving real life problems

UNIT-I Nature and scope of statistical methods and their limitations - Classification, tabulation - Diagrammatic representation of various types of statistical data - Frequency curves and O gives - Lorenz curve.

UNIT-II Measures of Central tendency – Arithmetic mean, Median, Mode, and their properties – Merits and demerits

UNIT-III Measures of Dispersion – Range, Mean Deviation, Quartile Deviation, Standard Deviation, Coefficient of Variation and their properties – merits and demerits

UNIT-IV Concept of Bivariate distribution -Correlation - Definition-Uses –Types – Karl Pearson's Correlation Co-efficient –Scatter diagram -Spearman's Rank Correlation Co-efficient - Regression equations –Regression Coefficient –Properties-Simple Problems

UNIT-V Random experiment – Definition of various events – Mathematical and Axiomatic definition of probability – Addition and Multiplication theorem – Simple problems.

REFERENCES BOOKS:

1. Pillai, R.S.N, Bagavathi, V. "*Statistics, Theory and Practice, 7th Edition*", S.ChandLtd, New Delhi 2009.
2. Ken Black, "*Business Statistics for Contemporary Decision Making, 7th Edition*", John Wiley Publications 2013.
3. Gupta, S.P. (2011), "*Applied Statistical Methods, 4th Edition*", Sultan Chand & Sons, New Delhi.
4. Nabendu Pal, "*Statistics: Concepts and Applications*", Prentice, India, Hall of India Pvt. Ltd.
5. Padmalochan Hazarika, "*Business Statistics*", New Delhi, S Chand.
6. Pillai R S N, Bagavathi V, "*Practical Statistics*", New Delhi, S Chand.
7. Manoj K Bhowal, Pronob Barua, "*Statistics*" (Vol. I & II), Delhi, Asian Books Pvt. Ltd.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
GEN1515	Environmental studies	2	0	2	4	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To gain knowledge on the importance of environmental education and ecosystem
2. To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution
3. To understand the various energy sources, exploitation and need of alternate energy resources. Disaster management
4. To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence
5. To be aware of the national and international concern for environment for protecting the environment

UNIT-I-ENVIRONMENTAL EDUCATION

Definition and objective. Structure and function of an ecosystem – ecological succession –primary and secondary succession - ecological pyramids – pyramid of number, pyramid of energy and pyramid of biomass.

UNIT-II POLLUTION

Air, water, soil –causes and effects and control measures. Specifically: acid rain, ozone layer depletion, green house gas effect and global warming. Waste management: prevention and control measures of solid waste.

UNIT-III NATIONAL CONCERN FOR ENVIRONMENT

Important environmental protection Acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act. Functions of central and state pollution control boards. Issues involved in enforcement of environmental legislation.

UNIT-IVBIODIVERSITY

Genetic, species and ecosystem diversity – bio diversity hot spots - values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - threats to biodiversity: habitat loss, poaching of wildlife – endangered and endemic species of India, Conservation of biodiversity: in-situ and ex-situ conservations.

UNIT-VENERGY RESOURCES AND THEIR EXPLOITATION

Conventional energy sources: -coal, oil, biomass and nature gas - over- utilization.. Non-conventional energy sources: hydroelectric power, tidal, wind, geothermal energy, solar collectors, photovoltaic, nuclear-fission and fusion. Energy use pattern and future need projection in different parts of the world, energy conservation policies.

Natural and Man made disasters -types, causes, onset, impacts. (viz. earthquake ,flood, drought, cyclone, tsunamic, volcanics, landslide, industrial accidents.). Forecasting and managements

REFERENCE BOOKS:

1. Jeyalakshmi.R, “Principles of Environmental Science”, 1st Edition, Devi Publications, Chennai, 2006.
2. De.A.K., “Environmental Chemistry”, New Age International, New Delhi, 1996.
3. Sharma.B.K. and Kaur, “Environmental Chemistry”, Goel Publishing House, Meerut, 1994.
4. Dara S.S., “A Text Book of Environmental Chemistry and pollution control”, S.Chand& Company Ltd., New Delhi, 2004.
5. Dr.RahavanNambiar, “Textbook of Environmental studies. SciTech Publication (India) Pvt.Ltd.Second edition

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
SPD1516	Computer Skills	1	0	2	3	3

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To gain knowledge on the basic computer system
2. To understand the MS-WORD.
3. To acquire knowledge with respect to MS-EXCEL
4. To learn the basics of MS-POWERPOINT and ACCESS.

UNIT I: INTRODUCTION TO COMPUTER SYSTEMS

Applications of Computers in Business – Types of Computers and Electronic devices – An overview of operation system – Single user systems – Multi user Systems – Assembler – Translator – Compiler – Different Computer Language.

UNIT II:THE WORD PROCESSOR

Creating a Document -Opening a Document -Laying Out the Page-Setting paper size, margins, and orientation -Creating headers and footers -Numbering pages -Entering and Editing Text-Modifying text-Moving and copying text -Finding and replacing text -Correcting mistakes automatically-Printing -Adding character to your characters -Planning Your Paragraphs-Aligning paragraphs -Spacing your lines -Making Lists -Bulleting lists-Numbering lists-Using a style -Creating a style - tables and columns

UNIT III: THE SPREADSHEET

Creating a Spreadsheet -Inputting Your Data -Entering your data -Editing your data -Filling cells automatically -Managing Columns and Rows-Copying, pasting, cutting, dragging, and dropping your cells -Adding the Art -Formula Basics-Adding, Subtracting, and More -Adding and other arithmetic -Adding with the Sum function -Rocketing into Orbit with Functions Using the AutoPilot: Functions dialog box -Editing functions -Entering functions manually -Copying and pasting formulas -Creating formula arrays -Recalculating formulas -Creating Magic Formula-Nesting functions -Creating conditional formulas

UNIT IV:THE POWER POINT PRESENTATION

Creating a Presentation -Opening an existing presentation -Adding Slides -Adding text to a slide -Saving Your Presentation for Posterity - Making Presentations Picture Perfect -Adding Images -Clipping art -Drawing objects -Coloring Backgrounds -Creating a plain-colored background -Creating a gradient background -Hatching a background -Using a bitmap image as a background -Creating 3-D text-Inserting 3-D objects -Animating Impressively -Using Text Effects Effectively -Creating Animation Effects -Creating Animated GIF files -Adding Slide Transition Effects - Showing a Presentation -Setting slide timing -Hiding slides -Specifying slide show settings - Delivering a Slide Show .

UNIT V: MS-ACCESS

Database development-Creating Access tables-Setting the primary key-Manipulating tables-Entering data with access forms-Selecting data with queries-Creating a multiple queries-Presenting data with access reports.

Operating system and fundamentals

Computer Networks and Internet

REFERENCE BOOKS:

1. Sinha P.K. & Sinha Priti, Computer Fundamentals, BPB Publications, 2007
2. Vishnu P. Singh, "*Ms Office 2007*", BPB Publications, 2007.
3. AnanthiSheshasaayee, Sheshasaayee G., "*Computer Applications in Business & Management*", Margham publishers, 2004.
4. Lisa A.Bucki, John Walkenbach, FaithWempen Michael Alexander and Dick Kusleika, "*Mirosoft office 2013 Bible*", Wiley India Pvt. Ltd., 2013

SEMESTER II

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
LAE1521	English – II	3	1	0	4	3

INSTRUCTIONAL OBJECTIVES:

1. To cater to the essential aspects of communication skills thereby creating a congenial class room atmosphere, leaving enough scope for confident interactions and free flow of individual thoughts.
2. To enable the students understand the various modes of communication.
3. To make students aware about the etiquettes of communication.
4. To enhance communicative competence among the students.
5. To help the students to survive in culturally different environment by using apt communicative skills.
6. To assist students understand the role of thinking in all forms of communication.

UNIT-I UNDERSTANDING COMMUNICATION

Communication: Its importance- Cross-Cultural Communication- Effective Listening- Corporate Communication- Business Communication Aids- Building Communicative Competence.

UNIT-II VERBAL AND NON VERBAL COMMUNICATION

Face to face Communication- Communicating with the group- Communicating during business meetings- Job interview- Team Presentation- Body Language and eye contact- Dress Code- Personal Grooming.

UNIT-III USE OF LANGUAGE

Formal usage of language- Usage of jargons- Correct choice of words- Tones, intonations, stress.

UNIT-IV ELECTRONIC COMMUNICATION

Use of internet- Writing e-mails and e-mail etiquette-Communicating over the telephone and Telephone Etiquette-Fax - The Impact of e-mails on business.

UNIT-V SURVIVING IN THE WORK PLACE THROUGH COMMUNICATION

Balancing work life through communication-The impact of different people on work life balance-Life demands-Strategies of balance.

REFERENCE BOOKS:

1. Quintanilla, Kelly M., Shawn T. Wahl. "Business and Professional Communication." SAGE Publication India Pvt Ltd, Delhi, 2011.
2. Raman, Meenakshi, Prakash Singh. "Business Communication." 2nd Ed. Oxford University Press, Delhi, 2012.
3. Taylor, Shirley, V.Chandra. "Communication for Business. 4th Ed. Dorling Kindersly India pvt. Ltd., 2011.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1522	Programming in C++	3	1	2	6	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To implement Inheritance.
2. To perform Overloading and Polymorphism.
3. To use Templates and Exceptions.
4. To do effective file management.

UNIT-I PRINCIPLES OF OBJECT ORIENTED PROGRAMMING (OOP)

Evolution of C++ -Programming Paradigms - Key Concepts of OOP - Advantages of OOP - Usage of OOP and C++ .Input and Output in C++-Streams-Stream classes Unformatted console I/O operations-Member functions of ostream class-manipulators-manipulators with parameters

UNIT-II INTRODUCTION TO C++

Tokens, Keywords, Identifiers, Variables, Operators, Expressions and Control Structures: Simple If, If...else, Switch - Repetitive Statements- for, while, do...while - Pointers and arrays

UNIT-III FUNCTIONS, CLASSES AND OBJECTS

Functions in C++ - Main Function - Function Prototyping - Parameters Passing in Functions - Values Return by Functions - inline Functions - Function Overloading Classes and Objects; Constructors and Destructors; and Operator Overloading - Type of Constructors

UNIT-IV INHERITANCE AND POLYMORPHISM

Inheritance: Single Inheritance - Multilevel inheritance - Multiple inheritances - Hierarchical Inheritance - Hybrid Inheritance. Pointers - Virtual Functions and Polymorphism

UNIT-V FILES

Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Detection - File Pointers - Updating a File - Error Handling during File Operations - Command-line Arguments

REFERENCE BOOKS:

1. Ashok N.Kamthane,(2006), "Object Oriented Programming with ANSI & Turbo C ++", First edition ,Pearson Education.
2. E. Balagurusamy, (2008), "Object Oriented Programming with C++", Tata McGraw-Hill Publication.
3. Herbert Schildt, (2003), "C++: The Complete Reference", Tata McGraw publication.
4. Bruce Eckel, "Thinking in C++", Second Edition, Pearson Education, 2001.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1523	Data Structures and Algorithms	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To gather extensive knowledge in Data Structures.
2. To strengthen the knowledge on structures, arrays etc., of Data Structures.
3. To study the Basics of algorithms through time and space complexity, Searching and Sorting Techniques and "Divide and Conquer" Methods.

UNIT-I INTRODUCTION TO THEORY OF DATA STRUCTURES

Complexity – Asymptotic Notation – Algorithm Analysis - Recursion – Introduction to Linear data structures – Array Operations – pointers and Arrays – Introduction to Lists and Linked Lists.

UNIT-II STACK AND QUEUES

Introduction to stacks – Representation of Stacks through Array and Lists – Applications of Stacks – Introduction to Queues – Representation of Queues – Circular Queues – Double Ended Queues – priority Queues – Applications of Queues.

UNIT-III TREES

Introduction - Non Linear data Structures – Binary Trees – Types of Trees – Properties of Binary Trees – Representation of Binary Trees – Binary Tree Traversal – Applications of Binary Tree – AVL Trees – Representation – Operations – Expression Trees.

UNIT-IV SEARCHING AND SORTING

Introduction – Efficiency of Sorting Algorithm – Bubble Sort – Selection Sort – Quick Sort – Insertion Sort – Merge Sort – Binary Tree Sort – Radix sort – Shell sort – Heap sort – Searching: Binary Search – Indexed Sequential Search.

UNIT-V GRAPHS

Introduction – Terms Associated with graphs – sequential representation of Graphs – Linked Representation – Traversal of Graphs – Spanning Trees – Shortest path – Applications of Graphs.

REFERENCE BOOKS:

1. Instructional Software Research and Development (ISR) Group , (2006), "Data Structures Using C" , First edition, TMH Education Private Limited
2. Weiss Mark Allen, (2006), "Data Structure and algorithm analysis", Pearson Education.
3. Ellis Horowitz, Sahni, Dinesh Mehta, (1999), "Fundamentals of Data Structures in C++", Golgotha publication, New Delhi.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1524	Mathematics for computer	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To develop a strong foundations in Set Theory, Logic and Propositional Calculus
2. To solve problems in Vectors, Matrices, Integers, and Counting principles

UNIT-I Mathematical Logic I

Logic: Statements, connectives, conjunction, disjunction, negation, tautology, contradiction, logical equivalence, tautological implications.

UNIT-II Mathematical Logic II

Arguments, validity of arguments - Principle disjunctive normal form, Principle conjunctive normal form.

UNIT-III Matrix theory I

Matrices, types of matrices, addition, subtraction, multiplication of matrices, inverse of matrix, solution of linear equation: matrix method, Cramer's rule

UNIT-IV Matrix theory II

Matrices: Symmetric, skew symmetric, Hermitian, skew Hermitian, Orthogonal, Unitary matrices – Cayley Hamilton Theorem – Eigen values– Eigen vectors.

UNIT-V Basic set theory

Sets, Relations and Functions-Sets: sets, representation of sets, types of sets, operation on sets, Venn diagram.

Relation: types of relation, equivalence relation. Function: types of functions, composite of two functions, composite of three functions.

REFERENCE BOOKS:

1. Vittal.P.R.,(2011) MATHEMATICAL FOUNDATION ,Reprint ,Margham Publications, Chennai.
2. R.Veerarajan.,*Discrete mathematics*, Tata, Mcgraw Hill.
3. A.SingaraveluMeenakshi, *Discrete mathematics*, Publications.
4. P.R.Vittal., *Allied mathematics*, Margham Publications

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1525	Scripting Languages Lab	2	2	2	6	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To classify the various Scripting Languages
2. To understand DOM and XML
3. To create a webpage

UNIT-I INTRODUCTION TO INTERNET AND WORLD WIDE WEB

Introduction to networks, LAN,MAN and WAN, History of the Internet, Email concepts, Sending and Receiving files by E-mail, Intranet, Web system Architecture, Exploring HTTP, URL, Domain Name System, Web Browsers, Web Pages

UNIT-II HYPER TEXT MARKUP LANGUAGE AND WEB DESIGN

Basics of HTML, HTML Document display, Formatting Text, Link, Lists, Images, Tables, Forms, Frames, Website Design consideration, Case study: Designing Layout of a web page for any Domain

UNIT-III USAGE OF CASCADING STYLE SHEET

Syntax of CSS, Style sheets types, Properties and Text attributes Padding, List properties, List Properties, Positioning, Margins, Colors, Properties and Table attributes

UNIT-IV FUNDAMENTALS OF JAVA SCRIPT

DHTML, HTML and JavaScript, JavaScript Elements, Variables, Operators, Flow Control Statements, Arrays, Functions, Event Handling, Browsers and JavaScript, Web Pages and JavaScript, Frames and JavaScript, Validation of User Form

UNIT-V SERVER-SIDE PROGRAMMING

Client-Side Scripting and Server-Side Scripting, Servlets – Definition, Advantages, Life Cycle of a Servlets, Creating a Servlet and Configuring, Java Sever Page – Life Cycle and Structure of JSP, Active Server Pages – Creating an ASP, IIS installation for ASP, Built-in Objects, Exploring Forms, Comparison of ASP over JSP.

REFERENCE BOOKS:

1. Ivan Bayross, "Web enabled commercial application development using HTML, DHTML java script, perl CGI", 3rd Edition, BPB Publications, New Delhi 2005.
2. H M Deitel, T.R. Nieto, "Internet and world wide web How to program", Fifth Edition, Prentice Hall of Indian Pvt. Ltd, New Delhi 2011.
3. Deitel, Nieto,lin, sadhu, "XML How to program", Pearson Education 2005.
4. Deven N. Shah (2012), A Complete Guide to Internet and Web Programming, DreamTech Press, New Delhi
5. Raj Kamal (2002), Internet and Web Technologies, TataMcGraw Hill, New Delhi.
6. Margaret Levine Young (2002), Internet The Complete Reference, TataMcGraw Hill, Second Edition, New Delhi.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
GEN1526	Human Rights and Professional Ethics	2	0	1	3	3

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To gain knowledge on ethical practices around the world.
2. To understand and imbibe ethical values which are important in furthering one's professional life in workplaces

UNIT-I HUMAN VALUES

Types- morals- ethics- integrity- work ethics- service learning- virtues- respect for others- honesty- courage- commitment- empathy- challenges in the workplaces- character- spirituality- corporate excellence.

UNIT-II VARIETY OF MORAL ISSUES

Types of inquiry- Moral dilemmas- Moral autonomy- Kohlberg's theory- Gilligan's theory- consensus and controversy- Models of professional roles- Theories about right action.

UNIT-III SELF INTEREST

Customs and religion- Use of ethical theories- Valuing time- Cooperation codes of ethics- Outlook on law- The challenger case study.

UNIT-IV SAFETY AND RISK

Assessment- Responsibility and rights- Risk benefit analysis- Reducing risk- The three mile island and Chernobyl case studies.

UNIT-V GLOBAL ISSUES- Multinational corporations- Environmental ethics- Computer ethics- Weapons development and ethics- Moral leadership.

REFERENCE BOOKS:

1. Naagarajan R S A "Textbook on Professional Ethics and Human Values, New Age International", New Delhi 2006.
2. Mike Martin. Ethics in Engineering, McGraw Hill, New York 1996.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
EX*1527	NSS / NCC /Yoga	0	0	2	2	2

To imbibe in the minds of students the concepts and benefits of NSS / NCC/Yoga and make them practice the same

SEMESTER III

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1531	Core Java Programming	3	0	3	6	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To implement object oriented programming concepts using Java
2. To apply string concepts, Inheritance concepts in Programming

UNIT-I INTRODUCTION TO JAVA

The Genesis of Java- Buzzwords- Object oriented Concept- Lexica Issues- Data types and variables- Arrays- Operators

UNIT-II CONTROL STATEMENTS & OBJECT ORIENTED CONCEPTS

Control Statements Selection- Control Statement Iteration and jump Statement- Introducing classes- Class fundamentals- The General form of a class- Declaring Objects- Assigning object reference variables.

UNIT-III METHODS AND CLASSES

Introducing method – Constructors- The this Keyword- Garbage Collection- Finalize() method- Overloading methods- Overloading constructors- Using objects as parameters- Returning Objects- Recursion- Introducing access control- introducing final- Nested and Inner Classes- String class- command-Line arguments.

UNIT-IV INHERITANCE & EXCEPTION HANDLING

Inheritance Basics- using Super- method Overriding - abstract classes- Using final with Inheritance- Object class- Packages- Interfaces-Exception handling fundamentals- types- Using try, catch, throw, throws and finally exceptions.

UNIT-V MULTITHREADING, APPLLET AND STRING HANDLING

Java thread model -creating thread-Thread priorities-synchronization-Inter-thread communication-Deadlock- Applet fundamentals-string constructors- string operations- character Extraction- string comparison- searching strings- modifying a string.

REFERENCE BOOKS:

1. Naughton and H.Schildt, "Java 2-The complete reference", Fifth Edition, McGraw Hill 2007.
2. Arnold and J.Gosling, "The java programming language", Second edition ,Addision Wesley, 2000.
3. Art Gittleman, "Ultimate Java Programming", First edition, Wiley Publications. 2002.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1532	Database Management Systems	3	0	3	6	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To gain knowledge in the areas of database design and SQL programming.
2. To understand relational database technology for building applications for the current trend.
3. To analyze a business situation and build suitable database applications

UNIT-I INTRODUCTION TO DATABASE MANAGEMENT SYSTEM

PURPOSE of Database system - Advantages of DBMS over File Processing System –View of Data - Data Abstraction - Data Independence – Data models – Database languages – Database Administrator – Database users – DBMS system structure

UNIT-II QUERY HANDLING

Query Basics - DDL & DML - Computation Using Queries – Subtotals and GROUP BY Command - Queries with Multiple Tables - Sub Queries – - Set operations - Joins – DCL and TCL

UNIT-III SQL AND PL/SQL

SQL * PLUS –PL/SQL-Block-Triggers-procedures-packages.ER model basic concepts - Relational Algebra - Tuple relational Calculus & Domain Relational Calculus.

UNIT-IV NORMALIZATION

Pitfalls in relational database design- Decomposition –Functional dependency – Normalization using Functional Dependency-2NF- 3NF – BCNF- Multi Value Dependency & 4 NF – join Dependency & 5 NF.

UNIT-V TRANSACTION AND CONCURRENCY CONTROL

Transaction Management and states, ACID properties, and Concurrency Control and Protocols

REFERENCE BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “*Database System Concepts*”, fifth edition, McGraw Hill 2005.
2. Kevin Loney, George Koch, *Oracle9i “The Complete Reference*”, McGraw Hill 2002.
3. Ragu Ramakrishnan, “*Database Management Systems*”, Third edition, WCB/McGraw Hill, 1998.
4. Date C.J. *An Introduction to Database*, Version 2, Addison Wesley, 2003.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1533	Operating System With Unix	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To learn different types of Operating Systems
2. To Perform Scheduling and memory management.
3. To Handle Components of Operating System and Deadlocks
4. To learn different unix basics

UNIT-I INTRODUCTION

OS Functions, Computer System Organization, Computer System Architecture, Operating System Structure, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

UNIT-II PROCESS MANAGEMENT

Basic Concepts, Process Scheduling, operations on ‘Processes, Inter process communication, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

Process Coordination: Synchronization, the Critical Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors.

UNIT-III DEAD LOCKS

System Model, Dead Lock Characterization, Methods of handling Dead Locks, Dead Lock Prevention, Dead Lock Avoidance, Dead Lock Detection, recovery from Dead Lock.

UNIT-IV MEMORY MANAGEMENT

Memory management Strategies-Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management, demand paging, Copy-on- Write, Page Replacement.

UNIT-V CASE STUDIES ON UNIX BASICS

Study of Open, Close, Read, Write. - Lseek, Dup - stat, fstat, and lstat functions. - File Types - Set user ID and Set Group ID - File Access Permissions- Study of Access, umask, Chmod, Link and Unlink Functions. - Mkdir and Rmdir - Reading Directories - chdir, fchdir and getcwd Functions.

REFERENCE BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin & Greg Gagne, “*Operating System Concepts*”, Sixth Edition , John Wiley & Sons, Inc 2006.
2. MilankovicM, “*Operating System concepts and Design*”, 2nd edition, Tata Mcgraw hill 1992.
3. Brian W. Kernighan, Rob Pike, “*The Unix Programming Environment*”, PHI Learning Pvt. Ltd 1988.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1534	Management Information System	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

1. To understand the MIS implementation in decision making process
2. To review the models of MIS in various organization

UNIT-I SYSTEM CONCEPTS & STRUCTURE OF MIS

Introduction - Subsystems of MIS - Role of MIS Professional - Operating Elements of an Information System –MIS support for decision making- MIS structure based on organizational functions- Synthesis and Some Issues of MIS Structure

UNIT-II SURVEY OF INFORMATION SYSTEMS TECHNOLOGY

Computer Hardware & data Representation – microelectronics and instructing a computer- Communication Facilities and Networks - Wide Area Network and Distributed Systems -Physical & Logical Models of Data - File & Database Organizations - Transaction Processing Cycle - Document preparation- Message & Document Communication, Information Processing Control-Information system availability controls.

UNIT-III CONCEPTUAL FOUNDATIONS &SYSTEM SUPPORT

Phases in decision Making Process - Methods Of decision making process - Documenting and communicating decision rules - The Basic model of Organizational structure - Organization Structure Implications for Information System Design - Decision Support systems and Expert Systems - Approaches to develop decision support systems Knowledge work and different types- -Software support facilities for knowledge work.

UNIT-IV INFORMATION SYSTEM REQUIREMENTS

Planning for information systems – The NOLAN stage model-Three stage model of planning process - Analysis of organizational information requirements - Three levels of information requirements and constraints - A strategy approach to determine information requirements – Determining application information requirements-Database Requirements- Data model concepts and terminology- Normalization in database design-Approaches in determining Data Requirements- User Interface Requirements and Interactive User Dialogue -Alternate interaction mechanisms.

UNIT-V DEVELOPMENT, IMPLEMENTATION AND MANAGEMENT OF INFORMATION SYSTEM RESOURCES

Prototyping approach to application development - Life cycle approach to application development – Life cycle development stage- Project Management and Implementation of Information Systems - Organizational functions for control and quality assurance- Quality assurance with user developed systems and post audit evaluation –Auditing of information system- Organization of information resources functions - Organization and management of end user computing.

REFERENCE BOOKS:

1. Gordon B. Davis and Margrethe H. Olson. (2008), Management Information Systems Conceptual Foundations, Structure and Development, Tata McGraw Hill International Book Company, New Delhi
2. Kenneth C.Laudon and Jane P.Laudon (2013), Management Information Systems-Managing the Digital Firm, Pearson Education Asia, New Delhi.
3. WamanS.Jawadekar (2009), Management Information Systems, Tata McGraw Hill Education Pvt. Ltd., New Delhi.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1535	E-Commerce and M-Commerce	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

1. To impart knowledge on E-Commerce, Various applications connected with E-Commerce and M-Commerce and legal issues of e-commerce.
2. To enable the learner for aiming careers in special software development involving E-Commerce and M-Commerce technologies.

UNIT-I-INTRODUCTION TO E-COMMERCE, BUSINESS OF INTERNET, N/W SECURITY & FIREWALLS

E-Commerce Framework, E-Commerce and Media Convergence - Anatomy of E-Commerce Applications - E-Commerce Consumer and Organization Applications - Telco/Cable/Online Companies- National Independent ISPs- Regional-level ISPs - Local level ISPs - Service Providers Abroad- Network Interconnection Points - Internet Connectivity Options - Client-Server Network Security - Emerging Threats - Firewalls and Network Security - Data and Message Security - Challenge Response Systems- Encrypted Documents and E-Mail.

UNIT-II E-COMMERCE & WWW, CONSUMER ORIENTED E-COM, E-PAYMENT SYSTEM

Architectural Framework for E-Com - WWW as the Architecture - Web background: Hypertext Publishing - Technology behind the Web - Security and the Web - Consumer Oriented Applications - Mercantile Process Models - Types of Electronic Payment System - Digital Token based e-payment systems - Smart Card e-payment system -Credit Card e - payment system- Risk and e-payment system - Designing e-payment system

UNIT-III INTER ORGANIZATIONAL COMMERCE & EDI, EDI IMPLEMENTATION, ADVERTISING AND MARKETING ON THE INTERNET

EDI - EDI Application in Business - EDI: Legal, Security and Privacy Issues - EDI and E-commerce - Standardization and EDI - EDI Software Implementation - EDI Envelope for Message Transport-Value Added Networks - Internet based EDI - The New Age of Information Based Marketing - Advertising on the Internet - Charting the Online Marketing Process - Market Research

UNIT-IV CHALLENGES OF THE INTERNET BUSINESS AND M-COMMERCE

Challenges of the internet business - Business and technology - Positive and negative effects of the internet - Value chain - Planning and execution - M-commerce-what is m-commerce? - Mobility and m-commerce - Location information: Asset

UNIT-V CUSTOMER CARE, BILLING AND REVENUE ASSURANCE, THE INTERNET BUSINESS MODEL

The Future and its Economics: Mobility & customer care - Billing and revenue assurance – OSS - The internet business model: Future and its economics - Public right and regulation - Internet Based model – OP - The next generation internet: Mobile Internet - The Next Generation Internet: Economics

REFERENCE BOOKS:

1. Kalakota & Whinston (1996), Frontiers of Electronic Commerce – Addison Wesley, New York
2. Louis (P J) (2001), M-Commerce Crash Subject: The Technology And Business Of Next generation – McGraw Hill, New York
3. Henry chan, Raymond Lee, Tharam Dillon, Elizabeth Change (2001), E-Commerce Fundamental and Applications – John Wiley & Sons Ltd., New York.
4. David Whiteley (2000), E- Commerce, Strategy, Technologies and Applications – Tata McGraw hill, New Delhi.
5. U.S.Pandey, Rahul Srivastava, Saurabh Shukla (2007), E-Commerce and its Applications - -S.Chand & Co., New Delhi.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
GEN1536	Value Education	1	0	2	3	3

INSTRUCTIONAL OBJECTIVES:

1. To define values understand its broad implications in life.
2. To demonstrate an acknowledgement and acceptance of the realities of diversity (ethnicity, culture, spirituality/religion)
3. To develop an understanding of how values influence decision making and behavior
4. To recognize the need to live together in atmosphere of peace and contributing to sustainable development
5. To familiarize the students with the concepts of "right" and "good" in individual and social context
6. To develop in them the sense of respect for the teachings and values of every Religion.
7. To understand the core value and sub value in cross-cultural context.

ETHICS (AXIOLOGY)

1. To familiarize the students with the concepts of "right" and "good" in individual and social context.
2. Help him/her determine what action or life is best to do or live.
3. Right conduct and good life.
4. Explications for how a highly, or at least relatively highly, valuable action may be regarded as ethically "good", and an action of low, or at least relatively low, value may be regarded as "bad".
5. Value systems- Positive and negative value.

BEHAVIOURAL PSYCHOLOGY

1. Perceptual, Cognitive and Emotional Development (friendships, peers, mora development).
2. Emotions revealed and Emotions assessed.
3. EQ Tests.

HUMANISM

1. Cross Cultural Learning.
2. Inclusive humanism.
3. The inclusive sensibility of all species, planet and lives.
4. Animalism- theory of evolution.
5. Religious Values (Reference to World Religion).

ETHNICAL AND SOCIAL ISSUES

1. Perspective Discussions.
2. Movies related to ethnical and social issues will be aired.
3. Videos related to value inculcation will be aired.

REFERENCE BOOKS:

1. Moral Element by Dr. Shanthichitra, Published by Department of English, FSH,SRM University, Chennai
2. Collective Learning for Transformational Change by Valerie A. Brown, JudithA.Lambert.
3. Defining the Humanities by Robert Proctor.
4. The Moral Animal by Robert Wright.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1537	Information Literacy	0	1	3	4	3

INSTRUCTIONAL OBJECTIVES:

1. To provide knowledge about the information literacy basics.
2. To educate the students on the purpose of Information.

Information literacy is a set of abilities requiring individuals to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” Information is available through libraries, community resources, special interest organizations, media, and the Internet—and increasingly, information comes to individuals in unfiltered formats, raising questions about its authenticity, validity, and reliability. In addition, information is available through multiple media, including graphical, aural, and textual, and these pose new challenges for individuals in evaluating and understanding it. Information literacy forms the basis for lifelong learning. It enables learners to master content and extend their investigations, become more self-directed, and assume greater control over their own learning.

An information literate individual is able to:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Incorporate selected information into one’s knowledge base
- Use information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

REFERENCE BOOKS:

1. Information Literacy Competency Standards for Higher Education, American Library Association, 2000.
2. <http://www.ala.org/acrl/ilcomstan.html>

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
SPD1538	Soft Skill & Verbal Aptitude	0	0	2	2	2

INSTRUCTIONAL OBJECTIVES

To equip the students with the required soft skills that would instill confidence and courage in them, to take up new opportunities for their career

Self-analysis - Attitude perceptions– Positive approach to challenges.
Change management – ideas & approach -Goal setting – vision - Time management planning -
Entrepreneurial skills Leadership skills -
People management – team work, leadership. Decision making – problem identification

Verbal communications- Synonyms - Antonyms - Idioms and phrases - Sentence completion - - Sentence correction - Reading comprehension -
Case studies (Topics: Current affairs across all related fields - and other such topics of the general criteria)

Text Book

Career Development Department. "INSIGHT." SRM University.

REFERENCE BOOKS:|

1. Mitra, Barun K. "Personality Development and Soft Skills." Oxford University Press, Delhi , 2013.
2. Managing Soft Skills for Personality Development. Ed. B. N. Gosh. Tata McGraw Hill Education Pvt Ltd,
3. Kumar, Sujit. "The Pearson Guide to Verbal Ability for the CAT and Other MBA Examinations. Pearson Publication, 2013.
4. Sharma, Arun.,MeenakshiUpadhya "How to Prepare for Verbal Ability and Reading Comprehension for CAT. McGraw Hill Education (India) Private Limited; 4 edition, 2011.

SEMESTER IV

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1541	Advanced Java Programming	3	0	3	6	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To develop applet, awt and swing control applications
2. To implement RMI and Networking concepts in programming
3. To develop Database connectivity applications

UNIT-I APPLET, AWT AND EVENT HANDLING

Applet Basics-Applet architecture-HTML APPLLET tag-Passing parameter to Applet-getDocumentBase() and getCodeBase()-AWT classes and Graphics-AWT Controls-Event Handling-Event Classes-Event Listener Interfaces-Layout Managers-Menus

UNIT-II INTRODUCING SWING & JAVA BEANS

Exploring Swing -JLabel and ImageIcon, JTextField -The Swing Buttons – JTabbedPane -JScrollPane, JList&JcomboBox -Trees &JTables -What Is a Java Bean? - Advantages of Java Beans -Introspection, Bound and Constrained Properties -Persistence & Customizers

UNIT-III RMI & NETWORKING

Remote Method Invocation -Settingup Remote Method Invocation -RMI with Applets -Networking Basics - The Networking Classes and Interfaces -InetAddress -Inet4Address and Inet6Address -TCP/IP Client sockets -URL - URL Connection -URLConnection .

UNIT-IV JDBC

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

UNIT-V SERVLETS

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

REFERENCE BOOKS:

1. Naughton and H.Schildt, "Java 2-The complete reference", Fifth Edition McGraw Hill 2007.
2. Jim Keogh, "The Complete Reference J2EE", Tata McGraw Hill Edition, New Delhi 2002.
3. Marty Hall, Larry Brown, "Core Servlets and Java Server Pages", 2nd Edition, Pearson Education 2004.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1542	Computer Networks	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To Identify Network Architecture and select appropriate network topology
2. To identify congestion controls and deadlock algorithms.

UNIT-I INTRODUCTION TO COMPUTER NETWORKS

Introduction to computer networks – Uses of network-Network structure – The OSI reference model concepts – Layers of the OSI model.

UNIT-II PHYSICAL LAYER

The physical layer-Different types of transmission medium-CODEC-Switching techniques-Channel allocation methods-ALOHA protocol-LAN protocol (any one protocol)-IEEE standards 802.3, 802.4 and 802.5.

UNIT-III DATA LINK LAYER

The data link layer – design issues – Concept of framing – Different methods – Error detection and correction: Single error correction and cyclic redundancy check.

UNIT-IV NETWORK LAYER

The network layer – design issues – Internal organization of network layer – Congestion control algorithm, Leaky bucket algorithm and token bucket algorithm – Dijkstra routing algorithm.

UNIT-V TRANSPORT, SESSION, PRESENTATION, AND APPLICATION LAYER

Repeaters, Bridges, Routers and Gateways-Brief introduction to the transport layer, session layer, presentation layer and application layer-Basic concepts of Internet – WWW.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "Computer Networks", Third Edition, Prentice Hall of India 2011.
2. W. Stallings, "Data and computer communication", Eighth edition, Prentice Hall of India. 2007.
3. Behrouz and Forouzan, "Introduction to data communications and networking", Forth Edition, McGraw Hill 2007.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1543	Software Engineering	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To classify the various Software Process Models
2. To build an Analysis Model and subsequently architect a suitable design
3. To understand Testing Strategies and Testing Tactics

UNIT-I-INTRODUCTION TO SOFTWARE ENGINEERING

Characteristics of software -The Changing Nature of software – Legacy Software and Software myths – A Generic view of process – Software Engineering: A layered Technology and A process framework - Capability Maturity Model Integration, Personal and Team Process Models -Process Models – Prescriptive models and The Waterfall Model - The Incremental Process Models and Evolutionary Process Models -Specialized Process Models and The Unified Process -An agile view of Process.

UNIT-II REQUIREMENTS ANALYSIS AND DESIGN

System Engineering - Requirements Engineering – Requirements Engineering Tasks - Initiating the Requirements Engineering Process-Eliciting Requirements and Developing Use cases – Building the Analysis Model - Analysis Modeling Approaches – Data Modeling Concepts and Scenario based Modeling-Flow Oriented Modeling and Class Based Modeling – Design Engineering - Software Design Concepts- Various Design Models and Pattern Based Software Design.

UNIT-III TESTING STRATEGIES AND TACTICS

Introduction to Testing - Definition of Testing Terminologies-Testing Strategies for Conventional Software-Validation Testing - System Testing - Debugging Process-Testing Tactics – White Box Testing - Black Box Testing - Object Oriented Testing Methods-Testing for Specialized Environments.

UNIT-IVPROJECT MANAGEMENT, ESTIMATION AND SCHEDULING

Project Management Spectrum - The People and the Product- The Process and the Project -Metrics for Process and Projects- Estimation - The Project Planning Process – Resources - Decomposition Techniques - Empirical Estimation Models - Project Scheduling Concepts – Timeline charts and Tracking the Scheduling - Earned Value Analysis.

UNIT-VQUALITY, CHANGE AND RISK MANAGEMENT

Reactive and Proactive Risk Strategies – Software Risks –Risk Identification and Risk Projection – Risk refinement and Risk Mitigation, Monitoring and Management -Quality Concepts -Software Quality Assurance -Software Reviews and Formal Technical Reviews -Statistical Quality Assurance and Software Reliability -The Software Configuration Management and the SCM Repository - The Software Configuration Management Process -Business Process Reengineering and Reverse Engineering -Restructuring and Forward Engineering -The Road Ahead -New Modes of Representing Information.

REFERENCE BOOKS:

1. Roger, S. Pressman (2004), Software Engineering: A Practitioner Approach, McGraw Hill International Edition, Sixth Edition, New Delhi
2. Waman, S Jawadekar (2004), Software Engineering: Principles and Practice, McGraw Hill Education Pvt. Limited, New Delhi.
3. RohitKhurana (2011), Software Engineering-Principles and Practices, Vikas Publishing House Pvt. Ltd., Second Edition, New Delhi.
4. Chairperson, Counting Practices Committee, Valerie Marthaler, EDS, Troy, Michigan, Function Point Counting Practices Manual Release 4.1.1, The International Function Point User Group, April 2000.

5. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli (1991), Fundamentals of Software Engineering, Prentice Hall of India, New Delhi.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1544	Accounting and Financial Management	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

- To provide knowledge about the Final and management accounting.
- To learn the ratio analysis and budgets with real time applications.

UNIT-I-INTRODUCTION

Meaning and Scope of Accounting, Basic Accounting Concepts and Conventions – Objectives of Accounting – Double Entry book keeping, Journal – Ledger – Trial Balance – Cash Book.

UNIT-II FINAL ACCOUNTS

Preparation of Final Accounts of a Sole trading concern – Adjustments – Closing Stock, Discount on Debtors, Provision for Bad debts, outstanding expenses, prepaid expenses, Accrued Income.

UNIT-III-MANAGEMENT ACCOUNTING

Management Accounting – Meaning , Scope, Importance and limitations – Analysis and Interpretation of financial statements. Comparative statements, Common size statement and Trend Analysis.

UNIT-IV-RATIO ANALYSIS AND BUDGETS

Ratio Analysis – Classification of Ratios – Liquidity, Profitability, turnover, capital structure and leverage – Budgets and Budgetary control Types of budgets- Production, Cash and Flexible Budgets.

UNIT-V-MARGINAL COSTING AND BREAK EVEN ANALYSIS

Marginal Costing – CVP Analysis – Break even Analysis – Break even Chart.

REFERENCE BOOKS:

- Dr. Maheswari S.N, *Management Accounting*, Sultan Chand and Co.
- Jain and Narang, *Financial Accounting*, Kalyani Publications.
- Shukla M.C. and Grewal T.S., *Advanced Accounts*, S. Chand and Co., New Delhi 1991.
- Kuchhal S.C., *Financial Management*, Chaitanya, Allahabad, 1980.
- Hingorani N.L. and Ramanathan A.R., *Management accounting*, Sultan chand, New Delhi, 1982.
- Ramachandran T, *Accounting and Financial Management*, Scitech and Co. Chennai 2001.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1545	TCP & IP Networks	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

- To impart knowledge about TCP/IP and current trends OSI layer protocols
- To learn about UDP versus TCP in data communication
- To become a network engineer
- To become a network administrator

UNIT-I INTRODUCTION

A brief history – Protocols and standards – Standard organization – Internet standards Internet administration. The OSI model and the TCP/IP Protocol Suite – The OSI model – Layers in OSI model – TCP/IP protocol suite – addressing – IP versions - IP addresses : Class addressing - Sub netting and super netting - Class less addressing - Various length blocks – sub netting - Address allocation.

UNIT-II ARP

ARP package – RARP - Internet Protocol (IP) – Datagram – Fragmentation – checksum - IP package - Internet Control Message Protocol(ICMP) – Types of messages – Message format – Error reporting – query – checksum – ICMP Package - Internet Group Management Protocol(IGMP) - Group management - IGMP messages – IGMP operation – Encapsulation - IGMP Package. Process to Process communication – Checksum - UDP operation - Uses of UDP – UDP package

UNIT-III TCP & SCTP

Transmission Control Protocol (TCP) –TCP services – TCP features – Segment – A TCP connection – State Transition Diagram – Flow Control - Error control – Congestion Control TCP timers – SCTP – SCTP services - Process – to process communication – Multiple streams – Multihoming – Full duplex communication – connection oriented service – reliable service

UNIT-IV ROUTING ALGORITHMS

Distance vector Routing – Initialization – Sharing – Updating – When to share – Two-Node Loop Instability – Three Node Instability - RIP – RIP message Format – Request and responses Timer in RIP – RIP versions – Encapsulations – Link State Routing – Building routing tables – OSPF – areas – metric – types of links graphical Representation OSPF packets – Encapsulation – Path Vector Routing – BGP.

UNIT-V MULTICASTING

Unicasting – Multicasting – Broadcasting – Multicasting versus Multiple Unicasting – multicast applications– multicast routing – optimal routing: shortest path trees – routing protocols – multicast link state routing: MOSPF: multicast distance vector distance vector: DVMRP –DVMRP - CBT.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "TCP/IP Protocol Suite", McGraw Hill, Third edition, New Delhi, 2002.
2. Douglas Comer, "Internet Working with TCP/IP –Vol.1", Prentice Hall of India Pvt. Ltd., New Delhi, 2010.
- Richard Stevens W, "TCP/IP Illustrated Vol.I Version 3", Addison Wesley Publications, New York, 2000.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1546	Object Oriented Analysis and Design	0	2	3	5	3

INSTRUCTIONAL OBJECTIVES:

At the end of this course, the learners is expected:

1. To analyze and design the problem domain using unified Object approach
2. To identify and categorize business, access and view layer objects of the application
3. To derive OOA & OOD phases using UML diagrams and CASE tools

UNIT-1OO BASICS & METHODOLOGIES

Object Oriented Approach and its Benefits – Object Oriented Concepts – Object Oriented Life Cycle and Quality Attributes – Object Oriented Methodologies such as Rumbaugh OMT, Booch OOD and Jacobson OOSE with a Case study - The Unified Approach: Layered Architecture – Component Based Development – Patterns and Frameworks

UNIT-II UML DIAGRAMS

UML Architecture – UML Diagrams: UseCase Diagram, Class Diagram, Sequence Diagram, Collaboration Diagram, Activity Diagram, State chart diagram, Object Diagram and relationships, Component Diagram and Deployment Diagram, Packages and UML extensibility mechanisms with suitable examples and Case studies

UNIT-III OO ANALYSIS

Business Process Analysis- OOA steps- Identify Actors, Business Process Model - Identify UseCase, Usecase Documentation- Identify classes using Classification theorems: Noun phrase approach, Class pattern approach, Usecase driven sequence diagram approach, and CRC approach – Case study on Identifying object Relationships Attributes, Methods: Case study approach

UNIT-IV OO DESIGN

OOD steps – Axioms and Corollaries - Design Business layer classes — Design Access layer classes – Compare Relational, Distributed and Object Oriented Database – Various Table Class Mapping – Design View layer classes – User Interface Design rules – Guidelines for designing User Interface Controls

UNIT-VOO TESTING

Testing strategies -Impact of OO testing – Myths of OO testing – OO testing techniques such as class testing, state based testing, polymorphism testing, inheritance testing and integration testing – Usability and User satisfaction testing – Debugging principles – OO Metrics (Develop test cases with real time examples)

REFERENCE BOOKS:

1. Ali Bahrami (2008), "Object Oriented Systems Development", Tata McGraw-Hill Edition, New Delhi
2. Srimathi.H, Srirarm. H & Krishanmoorthy .A (2006), "Object Oriented Analysis and Design using UML", Scitech Publications , 2nd edition, India
3. Stephen R. Schach (2010), "Object-Oriented Software Engineering", McGraw- Hill, Education, 8th Edition, New Delhi.
4. Grady Booch, Ivar Jacobson, James Rumbaugh (2005), "The Unified Modeling Language User Guide" Pearson Education, 2nd edition, New Delhi.

- Craig Larman (2004), "Applying UML & Patterns: An Introduction to Object oriented analysis and design", Addison Wesley Professional, 3rd Edition, New York.
- Timothy C. Lethbridge, Robert Laganriere (2004), "Object-Oriented Software Engineering – A practical software development using UML and Java", McGraw-Hill Education, New Delhi.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1547	Technical Writing	0	1	3	4	3

INSTRUCTIONAL OBJECTIVES:

- To learn the English usage in technical writing.
- To educate the students on the writing technical documents.
- To acquire the knowledge of SRS.

UNIT-I Overview of Technical writing, Categories of Documents, Nuances of English usage in Technical writing, Technical writing process guidelines, The role of tools in technical writing, Essential skills of technical writing, Careers in Technical writing

UNIT-II Structured Description : Role, mechanism and process, Structured layout: Hierarchical, vertical, horizontal, linear and non-linear, Information chunk and structural clash

UNIT-III Writing technical documents : Instruction Manual, User Manual, Installation Manual, Maintenance Manual

UNIT-IV Software Requirement Specification (SRS): Importance of writing an SRS, Involvement of Technical writing, SRS content layout, Case studies of SRS samples

UNIT-V Online help, Technical description, Specification Sheets, Frequently asked questions, Letters Electronic communication, Document design aspects, Ethical norms in technical writing, Remedial measures – use and misuse

REFERENCE BOOKS:

- Sharon J. Gerson & Steven M. Gerson "Technical Writing - Process & Product", Pearson Education.
- Eisenberg, "Effective Technical Communication", Mc. Graw Hill.
- Software Requirements and Specifications: A Lexicon of Practice, Principles and Prejudices (ACM Press) Paperback – September 2, 1995 by Michael Jackson

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
SPD1548	Quantitative Aptitude and Logical Reasoning-I	0	0	2	2	2

QUANTITATIVE APTITUDE

Partnership
Simple Interest, Compound Interest
Profit and Loss
Problems on Clock, Calendar and Cubes
Permutation and Combination
Allegation and mixtures

LOGICAL REASONING

Letter and Symbol series
Number series
Analyzing arguments
Making judgments

REFERENCE BOOKS:

R.S. Aggarwal, "Quantitative Aptitude for Competitive Examinations", 7th Revised Edition, S.Chand and Co. Ltd, New Delhi, 2005

SEMESTER V

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1551	Cloud Computing	3	0	3	6	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To understand the basic concepts on cloud computing.
2. To attain the knowledge on the reason for migration on cloud.
3. To acquire the clear idea about the working principles of cloud computing.

UNIT-ICLOUD BASICS

Cloud computing , history- Pros and cons- Cloud architecture- Cloud architecture- Choice of cloud computing- Choice of cloud computing

UNIT-II CLOUD SERVICES

Various cloud services- Platform as a service- Platform as a service- Software as a service- Software as a service- Infrastructure as a service- Design of web application- Machine, privacy and data management- Other cloud services

UNIT-IIICLOUD SECURITY

Cloud security- Infrastructure security- Data security and storage- Network security – I- Network security – II- Host security

UNIT-IVDISASTER RECOVERY AND MANAGEMENT

Disaster recovery and management- Disaster recovery- Disaster recovery planning- Disaster in the cloud- Disaster management.

UNIT-VVIRTUALIZATION

Virtualization objectives- Why Virtualize- How to Virtualize- Concerns- security- Microsoft HyperV- VMWare- VMWare infrastructure

REFERENCE BOOKS:

1. George Reese, "Cloud Application Architectures: Building Applications and Infrastructures in the cloud", O'Reilly Media Inc, 2009.
2. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, "Cloud Computing A practical Approach", McGraw Hill 2010.
3. Miller Michael, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing 2008.
4. Beard Haley, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data 2008.
"Centers in the Cloud with SLAs", Emereo Pvt. Limited.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1552	Enterprise Resource Planning	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To provide a basic understanding and knowledge of the Enterprise Computing techniques used in industries
2. To analyze and propose IT solutions for the integration of business process throughout the enterprise
3. To aim for careers in various ERP consultancies, ERP-support services and Software Developers

UNIT-IERP TECHNOLOGIES

An Overview- Enterprise – An Overview-Benefits of ERP, ERP and Related Technologies- Business Process Reengineering (BPR)- Data Warehousing- Data Mining- OLAP- SCM

UNIT-II ERP IMPLEMENTATION

Lifecycle - Implementation Methodology-Hidden Costs- Organizing the Implementation-Vendors- Consultants and Users- Contracts with Vendors- Consultants and Employees- Project Management and Monitoring

UNIT-IIIBUSINESS MODULES

Business modules in an ERP Package- Finance- Manufacturing- Human Resources- Plant Maintenance- Materials Management- Quality Management- Sales and Distribution

UNIT-IV THE ERP MARKET

ERP Market Place- SAP AG- Peoplesoft- Baan- JD Edwards- Oracle- QAD- SSA

UNIT-V ERP PRESENT AND FUTURE

Turbo Charge the ERP System- EIA- ERP and e-Commerce- ERP and Internet- Future Directions

REFERENCE BOOKS:

1. Alexis Leon, *“ERP Demystified”*, Tata McGraw Hill, New Delhi. ,(For Units I to III) 2000.
2. Joseph A Brady, Ellen F Monk, Bret Wagner, *“Concepts in Enterprise Resource Planning”*, Thompson Course Technology, USA.(For Units IV to V) 2001.
3. Vinod Kumar Garg and Venkitakrishnan N K , *“Enterprise Resource Planning – Concepts and Practice”*, PHI, New Delhi 2003.
4. Jagan Nathan Vaman, *“ERP Strategies for Steering Organizational Competence and Competitive Advantage”*, Tata McGraw-Hill Education 2007

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1533	Data Mining and Warehousing	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To impart knowledge about Data Mining
2. To know about various techniques used in Data Mining
3. To design data warehouses for the companies
4. To enable the learner for aiming careers in Data Warehouse Management

UNIT-I DATA MINING CONCEPTS & ARCHITECTURE

Introduction – Data Mining Definitions - k-nearest neighbor - Data Mining Tools-Applications of Data Mining - Anatomy of Data Mining - Learning: types of learning -Machine learning-Knowledge: types of Knowledge-Knowledge discovery process- Architecture of Data Mining

UNIT-II DATA MINING TECHNIQUES

Visualization Techniques – Likelihood & distance-Neural Networks-Decision Tree technique-Constructing decision trees-ID3 algorithm-Genetic algorithms: Crossover & mutation -Clustering: Distance function-K-means algorithm -Hierarchical Clustering - Applications -Association rules: Apriori algorithm.

UNIT-III DATA WAREHOUSING CONCEPTS & ARCHITECTURE

Introduction - Goals- data warehouse users - Types of Data Warehouse-Data warehouse objects: fact table & Dimension table-Load Manager-Warehouse Manager-Query Manager-Data Warehouse Schemas: Star schemas-Snowflake Schemas.

UNIT-IV DATA WAREHOUSE PARTITIONING & AGGREGATION

Horizontal Partitioning-vertical Partitioning-Hardware Partitioning-Software partitioning Methods-Aggregation-Designing Summary tables-Designing Summary tables

UNIT-V DATA MARTS, META DATA, BACKUP & RECOVERY

Data Marts: Introduction-Estimating Design – Cost-Meta Data-Backup : Types of backup-Backup the data warehouse – SureWest Online Backup-Recovery : Strategies-various Testing Strategies-Various Recovery models, Disaster Recovery procedure

REFERENCE BOOKS:

1. S. Prabhu , N. Venkatesan *“Data Mining & Warehousing – New Age International – First Edition”*, New Delhi 2006.
2. Sam Anahory , Dennis Murray, *“Data Warehousing in real world – Pearson Education”*, New Delhi 2004.
3. Pieter Adriaans ,DolfZantinge, *“Data Mining – Pearson education”*, New Delhi 2005.
4. Alex Berson, Stephen J.Smith *“Data Warehousing, Data mining & OLAP – Tata McGraw Hill Publications”*, New Delhi 2004.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1554	Health Care Information Systems	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

1. To provide knowledge about the various health care information system.
2. To learn the Information technology support for health care system.

UNIT-I-INTRODUCTION

Introduction to health care information- Health care data quality – Health care information regulations, laws and standards.

UNIT-II HEALTH CARE INFORMATION SYSTEMS

History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support.

UNIT-III INFORMATION TECHNOLOGY

Information architecture and technologies that support health care information systems – Health care information system standards – Security of health care information systems.

UNIT-IVMANAGEMENT OF IT CHALLENGES

Organizing information technology services – IT alignment and strategic planning – IT governance and management.

UNIT-V IT INITIATIVES

Management's role in major IT initiatives – Assessing and achieving value in health care information systems.

REFERENCE BOOKS:

1. Karen A Wager, Frances Wickham Lee, John P Glaser, " Managing Health Care Information Systems: A Practical Approach for Health Care Executives", Jossey-Bass/Wiley, 2005.
2. Rudi Van De Velde and Patrice Degoulet, "Clinical Information Sytems: A Componenet based approach", Springer 2005.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1555	Banking Services	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

1. To provide knowledge about the various banking terms.
2. To educate the students on the practical applications of banking services.

UNIT-IBANKING AND CUSTOMER

Meaning – definition – banking – customer – banker and customer relationship – opening of an account – types of accounts – closing of account – pass book – Know Your Customer – RBI Guidelines for KYC.

UNIT-II COMMERCIAL BANKS

Classifications and functions - Reserve Bank of India – Functions of RBI – Credit Control Measures.
Loans and advances – principles – types – modes of creating charges – types of securities.

UNIT-IIIIE-BANKING

Meaning and services – risks – managing risks – advantages and demerits of internet baking – debit card – credit card – ATM card – smart card – electronic transfer.

UNIT-IV TECHNOLOGY POLICY GUIDELINES IN INDIA

Technology Upgradation in Banking Sector, Dr.A.Vasudevan 1999-Report on Internet Banking , S.R. Mittal, 1999.- IT Act 2000-Cyber Law 2000- Report of the Advisory Group of Payment and Settlement – System – Part I & II, M.G. Bhide, Sep,27,2000 – Report on Working group on Electronic Money – Zarir J. Cama – July 2002-Committee on Payment Systems - Dr. R. H. Patil - Oct 2002 – Report of the Committee on Computer Audit – A. L.Narasimhan – Dec 2002 – Working Group on Cheque Truncation and E-Chanque – Dr. Barma – July 2003 RTGS Regulation 2004-

UNIT-VNEGOTIABLE INSTRUMENT ACT 1881

Meaning and characteristics of promissory note – bill of exchange – cheque – crossing – endorsement – Paying Banker– Duties and Statutory Protections of Paying banker – Collecting Banker – Statutory Protections of Collecting banker - material alteration

REFERENCE BOOKS:

1. Guruswamy S (2013): "*Banking Theory Law and Practice*", Vijay Nicole Imprints Ltd, Chennai,
2. Santhanam (2013): "*Banking Theory Law and Practice*", Margham Publications, Chennai, (all the 5 units)
3. Sundharam K P M and P N Varshney, "*Banking Theory Law and Practice*, Sultan Chand & Sons, New Delhi, Edn 2013
4. Gordon E and K Natarajan(2013), "*Banking Theory Law and Practice*", Himalayan Publishing, Mumbai, Edn
5. "*Information Technology, Data Communications & Electronic Banking*" (2/e) ISBN 9780230632998 - Macmillan Publishers India Edition 2.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1556	Open Source Technologies Lab	0	2	3	5	3

INSTRUCTIONAL OBJECTIVES:

1. To understand the basics and advantages of open source
2. To learn the open source software Linux, Apache, MySQL, PHP and Perl

UNIT-DEFINITION OF TERMS

Open Source – Free Software – Public Domain Software, Uses of open source: Internet – Linux – Open source appliances – New business use – adopted to many systems, Examples of open source systems, Issues of open source: Advantages of open source – Major elements of open source – Choosing open source.

Linux Operating System: Open source software and GNU – GNU public license – Difference between Windows and Linux, Installing Linux

UNIT-II HARDWARE AND ENVIRONMENTAL CONSIDERATIONS

Server design Dual booting issues – Methods of Installation, Managing Users: User management tools – User and access permissions, The command line: Introduction to BASH – Command line shortcuts – Documentation tools – Files Types – File permissions – File management and manipulation – Editors.

UNIT-III BASIC CONCEPTS

Installing Apache – Configuring Apache – Starting and Stopping Apache – Hosting Multiple sites – Proxy servers and caching – Logs and monitoring – Security – Dynamic Content – URL rewriting – Module construction.

UNIT-IV INTRODUCING MYSQL

Prerequisites for MySQL – MySQL versions – MySQL Linux Installation – MySQL Server administration and security – MySQL database functions – Command line interface basics – MySQL CLI environment variables – Using CLI in interactive and non-interactive mode – Creating CLI environment – Utility and administrative statements – commands – Data Definition Language – Data Markup Language.

UNIT-V PERL

Installing the Perl DBI and MySQL DBD – Introducing the DBI – Functions with DBI – Building basic applications – Building web applications with DBI. PHP: PHP Installation – PHP essentials – PHP MySQL Configuration – PHP MySQL functions – Building MySQL enabled applications with PHP.

REFERENCE BOOKS:

1. Paul Kavanagh, "Open Source Software", Elsevier Digital Press, New Delhi, 2004.
2. Steve Shah, Wale Soyinka, "Linux Administration – A beginners Guide", TataMcGraw-Hill, Fourth Edition, New Delhi, 2005.
3. Scott Hawkins, "Apache Webserver Administration and e-commerce Handbook", Pearson Education Asia, New Delhi, 2001
4. Linda McKinnon, Al McKinnon, "Installing and Administartion Linux", Wiley Dream Tech India Pvt. Ltd., 2nd Edition, New Delhi, 2002.
5. Timothy Boronczyk et al., "Beginning PHP6", Apache, Mysql Web Development, Wiley Dream Tech India Pvt. Ltd, New Delhi, 2009.
6. Jason Gerner et al., "Professional LAMP: Linux, Apache, MySQL and PHP5 Web Development", Wiley Dream Tech India Pvt. Ltd, New Delhi, 2005.
7. James Lee, Brent Ware, "Open Source Web Development with LAMP", Addison-Wesley Professional, New York, 2013

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
SPD1557	Entrepreneurial Development	0	0	3	3	3

INSTRUCTIONAL OBJECTIVE:

1. To encourage students to become entrepreneurs.

2. To improve the entrepreneurial skills
3. To identify entrepreneurial opportunities

UNIT-ICONCEPT OF ENTREPRENEURSHIP

Entrepreneurship – Meaning – Types – Qualities of an Entrepreneur – Classification of Entrepreneurs – Factors influencing Entrepreneurship – Functions of Entrepreneur

UNIT-II ENTREPRENEURIAL DEVELOPMENT

Agencies Commercial Banks – District Industries Centre – National small Industries Corporation – Small Industries Development organization – Small Industries Service Institute. All India Financial Institutions – IDBI – IFCI – ICICI – IRDBI.

UNIT-III PROJECT MANAGEMENT BUSINESS IDEA GENERATION TECHNIQUES

Identification of Business opportunities – Feasibility study – Marketing, Finance, and Technology & Legal Formalities – Preparation of Project Report – Tools of appraisal.

UNIT-IV ENTREPRENEURIAL DEVELOPMENT PROGRAMMES (EDP)

Role, relevance, and achievements – Role of Government in organizing EDPs – Critical Evaluation.

UNIT-V ECONOMIC DEVELOPMENT AND ENTREPRENEURIAL GROWTH

Role of entrepreneur in economic growth – Strategic approaches in the changing Economic scenario for small scale Entrepreneurs – Networking, Niche play, Geographic Concentration, Franchising/Dealership – Development of Women Entrepreneurship.

REFERENCE BOOKS:

1. Dr. Gupta C.B., Dr.Srinivasan N.P, “*Entrepreneurial Development*”, Sultan Chand & Sons, 2009.
2. Saravanavel P., “*Entrepreneurial Development*”, Ess Pee kay Publishing House, 1997.
3. Vasant Desai, “*Project Management*”, Himalaya Publishing House, 1999.
4. Jayshree Suresh, “*Entrepreneurial Development*”, Margham Publications, 2010.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
SKUD1558	Quantitative Aptitude and Logical Reasoning-II	0	0	2	2	2

QUANTITATIVE APTITUDE

Time and Distance
 Height and Distance
 Problems on Ages, Trains
 Pipes and Cistern Boats and Streams
 Probability

LOGICAL REASONING

Direction Sense test
 Venn diagrams
 Seating arrangements
 Cause and effect
 Blood relation test
 Dice
 Logical verbal puzzles

REFERENCE BOOKS:

R.S.Aggarwal, “Quantitative Aptitude for Competitive Examinations”, 7th Revised Edition, S.Chand and Co. Ltd, New Delhi, 2005

SEMESTER VI

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1561	Big Data and its Applications	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To understand the nature of data & carry out intelligent data analytics.
2. To know various modern data analysis tools & trends in data analysis.
3. To gain knowledge in Hadoop Distributed File Systems and Applications of Big Data using Pig and Hive services.

UNIT-I-INTRODUCTION TO BIG DATA PLATFORM

Challenges of Conventional Systems - Intelligent data analysis Nature of Data - Analytic Processes and Tools - Analysis vsreporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT-II MINING DATA STREAMS

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT-IIIHADOOP

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types, Formats & Features

UNIT-IVHADOOP ENVIRONMENT

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

UNIT-VFRAMEWORKS

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphereBigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

REFERENCE BOOKS:

1. Michael Berthold, David J. Hand, *"Intelligent Data Analysis"*, Springer. 2007.
2. Tom White, *"Hadoop: The Definitive Guide"* Third Edition, O'reilly Media 2012.
3. AnandRajaraman and Jeffrey David Ullman, *"Mining of Massive Datasets"*, Cambridge University Press 2012.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1562	Software Testing	3	1	2	6	4

INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To develop and implement an effective test strategy, you can successfully manage software test efforts.
2. To apply the effective test strategy, including feedback mechanisms, and recognizing the critical issues as they surface

UNIT-I INTRODUCTION TO SOFTWARE TESTING

Introduction to software testing-The Psychology of Testing-The Economics of Testing -Software Testing Principles-Inspections and Walkthroughs-Code Inspections -An Error checklist for Inspections-White-box testing-Error guessing

UNIT-II MODULE (UNIT) TESTING, HIGHER- ORDER TESTING & DEBUGGING

Test-Case Design -Incremental Testing-Top-down versus Bottom- up Testing-Function Testing- System Testing -Acceptance Testing- Installation Testing-Debugging.

UNIT-III THE REALITIES OF SOFTWARE TESTING & TESTING THE SOFTWARE

SDLC Models -STLC Model -Software Testing Terms and Definitions-Testing Fundamentals-Dynamic Black-Box Testing Equivalence Partitioning-Data Testing-State Testing.

UNIT-IV APPLYING TESTING SKILLS

Configuration Testing -Compatibility Testing-Usability Testing-Testing the Documentation--Web Site Testing -Testing for Software Security

UNIT-V AUTOMATED TESTING AND TEST TOOLS & BUG REPORTING

Automated Testing and Test Tools: -benefits-Test Tools-Software Test Automation-Bug Bashes and Beta Testing-Writing and Tracking

REFERENCE BOOKS:

1. Glenford J. Myers, "The Art of Software Testing", Second Edition, John Wiley & Sons, New Delhi 2008.
2. Ron Patton, "Software Testing", Second Edition, SAMS Techmedia Publication 2007.
3. William E. Perry, "Effective Methods for Software Testing", Second edition, John Wiley & Sons, New Delhi 2000.
4. Boris Beizer, "Black-Box Testing: -Techniques for Functional Testing of Software and Systems", Second edition John Wiley & Sons, New Delhi 1995.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1563	Information and Storage Management	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

1. To impart knowledge on Information Storage and Management Technologies for the recent trends.
2. To provide a variety of solutions for storing, managing, accessing, protecting, securing, sharing and optimizing information
3. To help the learners to learn the developments that have taken place in the area of information storage and management.

UNIT-I-INTRODUCTION

Introduction to Storage Technology - information storage, evolution of storage technology and architecture, data center infrastructure, information life cycle; Storage System Environment – storage system environment components, disk drive components, logical components of Host; Data Protection – implementation of RAID, RAID Array components, RAID levels, and performance comparisons.

UNIT-II DAS, SCSI, AND STORAGE NETWORKING

Direct Addressed Storage – Type of DAS, benefits and limitations, Disk Drive Interfaces, Parallel SCSI; Storage Area Networks – evolution, components of SAN, Fibre Channel(FC) connectivity, FC architecture, FC Topologies; Network Attached Storage – Benefits of NAS, components of NAS, protocols, i/o operations.

UNIT-III IP SAN, CAS AND STORAGE VIRTUALIZATION

IP SAN-introduction, components of iSCSI, FCIP; Content Addressed Storage(CAS) – fixed content and archives, types of archives, CAS Architecture; Storage Virtualization – forms of virtualization, taxonomy, Storage Virtualization Challenges, types of storage virtualization.

UNIT-IV BUSINESS CONTINUITY

Introduction - Information Availability, BC terminology, BC planning lifecycle, Business impact analysis- Backup and recovery – purpose and considerations, topology , technologies; local replication - Uses of Local Replicas, Data Consistency, Replication Technologies.

UNIT-V STORAGE SECURITY AND MANAGEMENT

Storage Security - Storage security framework, Risk Triad, Storage security domains, security implementations in storage Networking; Managing the Storage Infrastructure - Monitoring the Storage Infrastructure, Storage Management Activities, Storage Infrastructure Management Challenges.

REFERENCE BOOKS:

1. EMC Corporation, Information Storage and Management, Wiley India, New Delhi
2. Robert Spalding, Storage Networks: The Complete Reference, Tata McGraw Hill, New Delhi 2003.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, New Delhi 2002.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1564	Data Analytics	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

1. To give training for students in the analysis of volumes of data.
2. To prepare the learners to become Data Analysts / Data Scientists.
3. To familiarizes the analytical techniques for Data Analysis.

UNIT-IMULTIVARIATE ANALYSIS

Review of Fundamentals: Computation of Mean, Standard Deviation, Coefficient of Variation, Median, Mode and Coefficient of Skewness and Kurtosis, Computation of Correlation Matrix, simple regression and multiple regression equations.

Meaning of Multivariate Analysis - Measurements Scales - Metric measurement scales - Non-metric measurement scales - Measurement Error - Type I error and Type II error - Classification of Multivariate Techniques: Dependence Techniques and Inter-dependence Techniques - Guidelines for Multivariate Analysis and Interpretation - Application of Multivariate Techniques in different disciplines.

UNIT-II FACTOR ANALYSIS

Meanings, Objectives and Assumptions - Designing a factor analysis - Deriving factors - Assessing overall factors - Partitioning the variance of a variable (common variance, specific variance, error variance) - Criteria for the number of factors to extract - Interpreting the factors - Choosing the Factor Rotation Methods - Interpreting a factor matrix - Validation of Factor Analysis.

UNIT-III CLUSTER ANALYSIS

Meanings, Objectives and Assumptions - Forming clusters - Determination of number of clusters - Meaning heterogeneity - Measuring Similarity (Correlation Measures, Distance Measures, and Association Measures) - Hierarchical cluster procedure - Clustering algorithms - Non-Hierarchical clustering procedure - Interpretation of clusters - Validation and profiling of the clusters.

UNIT-IVMULTIPLE REGRESSION ANALYSIS

Meanings, Objectives and assumptions-Selection of Dependent and Independent variables-Interpreting the Simple Regression Model-Multiple Regression Equation-Prediction with multiple regression- Representing linear effects with polynomials-Estimating the regression model and assessing overall fit.

UNIT-VBASICS OF FORECASTING

Basics of Forecasting - Basic steps in forecasting task - Time series and cross sectional Data - The forecasting Scenario: Analyzing methods - Exponential Smoothing Methods - Single Exponential Smoothing - Holt's linear method - Holt-winter's trend - Seasonality method - A comparison of methods.

REFERENCE BOOKS:

1. Joseph F.Hair, William C.Black, Barry J.Babin, RolphE.Anderson and Ronald L.Tatham (2006). Multivariate Data Analysis, 6th Edition, Pearson Education, Inc., New Delhi
2. Spyros Makridakis, Steven C.Wheelwright and Rob J. Hyndman (2005). Forecasting methods and Applications, Third Edition, John Wiley & Sons Inc., New York
3. Rummel R.J (1970). Applied Factor Analysis, Evanston, First Edition, North Western, Western University Press, Illinois, USA.
4. Johnson, R.A., and Wichern, D.W (2002). Applied Multivariate Statistical Analysis, 5th Edition, Prentice Hall, Upper Saddle Rier, New Jersey, USA

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
BCA1565	Business Intelligence	4	1	0	5	4

INSTRUCTIONAL OBJECTIVES:

1. To focus on the dominant suite of business analytical and decision making tools
2. To achieve strategic goals by monitoring organizational performance and achievement of day-to-day operation goals.

UNIT-IINTRODUCTION TO OLTP AND OLAP

BI Definition and BI Concepts - Business Applications of BI - BI Framework- Role of Data Warehousing in BI -BI Infrastructure Components- BI Process - Developing Data Warehouse - Management Framework - Business driven approach -BI Technology - BI Roles & Responsibilities - BI Component and framework

UNIT-II CONCEPTS OF DATA INTEGRATION

Need and advantages of using Data Integration – Introduction to common data integration approaches – Introduction to ETL using SSIS – Introduction to Data Quality – Data Profiling Concepts and Applications.

UNIT-III INTRODUCTION TO DATA AND DIMENSIONAL MODELING

Multi-Dimensional Data Model – ER modeling Vs Multi-Dimensional Model – Concepts of Dimensions - facts - cubes- attributes- hierarchies- star and snowflake schema – Introduction to Business Metrics and KPIs – Understanding Measure and performance, Measurement system terminology, Fact based Decision Making and KPIS, KPI usage in companies Creating Cubes using SSAS.

UNIT-IV INTRODUCTION TO ENTERPRISE REPORTING

Report standardization and presentation practices, Enterprise reporting characteristics in OLAP world- Concepts of dashboards –How to create dashboards - scoreboards Vs dashboards - balanced scorecards – Introduction to SSRS Architecture– Enterprise Reporting using SSRS reporting service

UNIT-V Business Intelligence and Mobility – Business Intelligence and cloud computing – Business Intelligence for ERP systems - Benefits of Business Intelligence in ERP- NorthWind_Traders Data-Data Analyses through Excel-Kettle Tool – Conversion of data using Kettle Tool.

REFERENCE BOOKS:

1. RN Prasad, Seema Acharya (2011), "Fundamentals Of Business Analytics" Wiley India, New Delhi (For 1 to 5 units).
1. Soumendra Mohanty (2007), "Data Warehousing Design, Development and Best Practices", Tata McGraw-Hill, New Delhi.
2. Larissa Terpeluk Moss and ShakuAtre (2007), "Business Intelligence Roadmap", Pearson Education, New Delhi.

Course Code	Course Title	L	T	P	TOTAL OF LTP	C
SPD1566	Leadership and Team Management	0	0	2	2	2

INSTRUCTIONAL OBJECTIVES:

At the end of this course on Services Marketing the learner will be able to:

1. Define service
2. Classify services
3. Project service life cycle
4. Develop new service
5. Measure service quality gap
6. Position, price, deliver, services

UNIT-I LEADERSHIP

Attributes – Styles – Theories of Effective Leadership – charismatic leader, transformational leader.

UNIT-II FACTORS INFLUENCING LEADERSHIP BEHAVIOUR I

Personality, types, theories, Perception, factors – Learning Styles – theories.

UNIT-III FACTORS INFLUENCING LEADERSHIP BEHAVIOUR II

Emotional Intelligence – skills for Emotional intelligence – Cultural – formation – changing culture, Organizational and Situational Factors.

UNIT-IV DESCRIPTION OF TEAMS IN THE ORGANIZATIONS

Organizational context of teams -- structure, culture, support, human resource policies – team topography – purpose of teams, types of teams, size, diversity, extent of use.

UNIT-V INTRA-TEAM PROCESSES (TASK-RELATED)

Mission, goals, objectives, action planning – intra-team processes (relationship-related) : communication, conflict, trust, decision-making – inter-team processes: conflict, coordination – team effectiveness – measures of productivity, satisfaction, etc.

REFERENCE BOOKS:

1. Uday Kumar Haldar, Leadership And Team Building, Oxford Publications, 2011
2. Chandra Mohan, "Leadership and Management", Himalaya Publishing House, 2007
3. Richard Hughes, Robert C. Ginnett, Gordon J Curphy, Leadership: "enhancing the lessons of Experience", McGraw –Hill Publication, 6th Edition, 2011

Course Code	Course Title	L	T	P	TOTAL OF LTP	C

BCA1567	Project Work	0	2	6	8	4
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INSTRUCTIONAL OBJECTIVES:

At the end of this course the learner is expected:

1. To develop Software Products / Applications on emerging technologies
2. To adopt the software development life cycle.
3. To improve presentation skills