SYLLABUS

For

3 YEARS BCA PROGRAMME

(Revised Syllabus Approved by Academic Council)

Dept. of
Computer Science and Electronics

JUNE, 2018

UNIVERSITY OF SCIENCE &TECHNOLOGY, MEGHALAYA

Techno City, 9th Mile, Baridua, Ri-Bhoi, Meghalaya, 793101

ABOUT THE DEPARTMENT:

In increasing importance of the Computer Application, a separate Department of Computer Science was established in USTM in the year 2012 to offer the degree Bachelor of Computer Application (BCA) and Master of Computer Application (MCA) .The first batch of BCA passed out in the year 2015. The courses offered are updated regularly to keep pace with the growing demands of the industry and the research community. The computers facilitate with all the latest software to meet the dynamic changes in the curriculum. The passed out students are working in various reputed industries in India. The main aim of the Deptt. of Computer Science is to meet the growing demand for qualified professionals in the field of Information Technology. This programme is inclined more toward Application Development and thus has more emphasis on latest programming language and tools to develop better and faster applications. It focuses on providing a sound theoretical background as well as good practical exposure to students in levant areas. In addition it covers various aspects of computational theory, programming, algorithm design and optimization, network and database management, mobile technologies, electronics, mathematics, probability, statistics, accounting, finance, etc. As the IT and the software industry are dynamic and fast growing, all the programmes are designed keeping in view the requirements of industry.

ACADEMIC FOCUS:

Bachelor of Computer Application is an undergraduate degree course which gives insight into world of Computers and its application. The duration of this undergraduate program of 3 years divided into 6 semesters which focus on practical skills addressing problems arising in Computer systems and Application. The demand for computer professional is increasing at rapid rate due to rapid growth which has taken place in IT and **Software Industries in India**.

While pursuing BCA, a student gets a basic as well as advanced knowledge of computers, along with supplement knowledge of mathematics. **Bachelor of Computer Application** assist student in gaining adequate programming knowledge and practices along with required theoretical knowledge.

PROGRAMME DETAILS:

Bachelor of Computer Application

Duration: 3 years (six semesters)

PROGRAM OBJECTIVES (PO):

The primary objective of this program is to provide a foundation of computing principles and business practices for effectively using/managing information systems. It helps students analyze the requirements for system

development and exposes students to business software and information systems. This course provides students with application software, e-commerce, artificial intelligence application.

PROGRAM SPECIFIC OUTCOMES (PSO):

A bachelor of Computer Science should be able to develop:

PSO1: Focuses on preparing student for roles pertaining to computer applications and IT industry.

PSO2: Develop programming skills, networking skills, learn applications, packages, programming languages and modern techniques of IT.

PSO3: Get skill and info not only about computer and information technology but also in common, organization and management.

PSO4: Bachelor in computer applications (BCA) gives a number of opportunities to individuals to go ahead and shine in their lives. A few of them being like software programmer, system and network
Administrator, web designer faculty for computer science and computer applications .

PROGRAM STRUCTURE:

The BCA programme is three year degree course divided into six semesters. The programme is of 120 credits and for the award of degree a student will be required to complete the credits as per the university norm.

Part I	First Year	Semester I	Semester II
Part II	Second Year	Semester III	Semester IV
Part III	Third Year	Semester V	Semester VI

CREDIT DETAILS for BCA SYLLABUS(2018-19)

Paper Code	SUBJECT NAME	Credit	Nature of course (T/P)	Marks Allotted		
				Internal	End Semester	Total
1st Semester						
BEN711	Communicative English(AECC-1)	4	T	30	70	100
BCA101	Fundamentals of Computer Science (CC-1)	4	T	30	70	100
BCA102	Programming Methodology and C Programming (CC-2)	4	T	30	70	100
BCA103.1	Digital Logic & Design (GE-1)	4	T	30	70	100
BCA103.2	Applied Physics (GE-1)	4	T	30	70	100
BCA104	Practical – I (PMCP & PC Packages) (CC-3)	4	P	30	70	100
	Total	**20**		**150**	**350**	**500**
2nd Semester						
BCA201	Data Structure through C (CC-4)	4	T	30	70	100
BCA202.1	Computer Organization & Architecture (GE-2)	4	T	30	70	100
BCA202.2	Basic Electronics (GE-2)	4	T	30	70	100
BCA203	Discrete Mathematics (CC-5)	4	T	30	70	100
BEV720	Environmental Studies (AECC-2)	4	T	30	70	100
BCA204	Practical – II (Data Structure) (CC-6)	4	P	30	70	100
	Total	**20**		**150**	**350**	**500**
3rd Semester						
BCA301	Object Oriented Programming with C++ (CC-7)	4	T	30	70	100
BCA302.1	Software Engineering (GE-3)	4	T	30	70	100
BCA302.2	Management Information System (GE-3)	4	T	30	70	100
BCA303	Operating System (CC-8)	4	T	30	70	100
BCA304	Relational Database Management System (CC-9)	4	T	30	70	100
BCA305	Practical III (C++ & RDBMS with MySQL) (SEC-1)	4	P	30	70	100
	Total	**20**		**150**	**350**	**500**

4th Semester						
BCA401	Programming with Java (CC-10)	4	T	30	70	100
BCA402.1	Computer Networks (GE-4)	4	T	30	70	100
BCA402.2	Positive Psychology (GE-4)	4	T	30	70	100
BCA403	.Net Technology (CC-11)	4	T	30	70	100
BCA404	Minor Project Work (Database Project) (CC-12)	4	P	30	70	100
BCA405	Practical IV (Java & VB.Net) (SEC-2)	4	P	30	70	100
	Total	20		150	350	500
	Non-Credit Compulsory Course					
HVP740	Human Values and Professional Ethics	-	T	15	35	50
5th Semester						
BCA501	Linux & Shell Programming (CC-13)	4	T	30	70	100
BCA502	Web Programming (CC-14)	4	T	30	70	100
BCA503.1	E-commerce& Digital Marketing (DSE-1)	4	T	30	70	100
BCA503.2	Artificial Intelligence (DSE-1)	4	T	30	70	100
BCA503.3	Python (DSE-1)	4	T	30	70	100
BCA504.1	Financial Accounting (DSE-2)	4	T	30	70	100
BCA504.2	Automata Theory (DSE-2)	4	T	30	70	100
BCA505	Practical V (Linux & PHP) (CC-15)	4	P	30	70	100
	Total	20		150	350	500
6th Semester						
BCA601	Major Project (CC-16)	20	P	150	350	500
	Total	20		150	350	500

Sem	Core course (16) 15*4=60+20=80credits	Ability Enhancement Compulsory Course(2) 2*4=8 credits	Skill Enhancement Course(SEC)(2) 2*4=8 credits	Discupline Specific Elective DSE(2) 2*4=8 credits	Generic Elective GE(4) 4*4=16 credits
I	Fundamentals of Computer Science Programming Methodology and C Programming Practical – I (PMCP & PC Packages)	General English			Digital Logic & Design / Applied Physics
II	Data Structure through C Discrete Mathematics Practical – II (Data Structure)	Environmental Studies			Computer Organization & Architecture / Basic Electronics
III	Object Oriented Programming with C++ Operating System Relational Database Management System		Practical III (C++ & RDBMS with MySQL)		Software Engineering / Management Information System
IV	Programming with Java .Net Technology Minor Project Work (Database Project		Practical IV (Java & VB.Net)		Computer Networks / Positive Psychology
V	Linux & Shell Programming Web Programming Practical V (Linux & PHP)			E-commerce& Digital Marketing / Artificial Intelligence / Python Automata Theory / Financial Accounting	
VI	Major Project				

1ST SEMESTER

Subject Name: Communicative English

Paper Code: BEN711

COURSE OBJECTIVES:

1. The aim of the syllabus is to make students adept in official correspondence, communication skills, grammar and writing skills.
2. The syllabus also gives scope to the students to enjoy, understand and interpret literary texts.

COURSE OUTCOMES:

The successful completion of this course shall enable the students:

CO1.   To impart basic communication skills among students.
CO2.   It will help the students to foster a taste for literary prose pieces.
CO3.   To provide throughout knowledge on English grammar.
CO4.   To able to understand the techniques on Literary Texts (Poetry).
CO5.   To provide throughout knowledge on Writing Skills.

UNIT- I:Literary Texts (Poetry)

This particular unit will help the students to enjoy, understand and interpret poems and develop a taste for fine poetry. The texts that have been chosen to be included are as follows:

- The Poison Tree by William Blake
- The Daffodils by William Wordsworth
- If by Rudyard Kipling.

UNIT- II: Literary Texts (Prose)

This particular unit will help the students to foster a taste for literary prose pieces. The texts that have been chosen to be included are as follows:

- The Stolen Bacillus by H.G. Wells.
- The Verger by Somerset Maugham.
- Shooting an Elephant by George Orwell.

UNIT- III: Grammar and Usage:

- Determiners, Tenses, Voice, Direct and Indirect Speech, Punctuation, Word Formation, Antonyms and Synonyms, Homophones, One word substitution.
- Idioms and Phrases

UNIT- IV: Writing Skills:

This part would include areas like official correspondence, Letter (Formal and Informal), Circular, Notice, Writing CVs/ Resume, Essay writing, e-mail writing, Blog writing, Story Writing, Paragraph writing.

The second section of this part will include Comprehension and Precis Writing that will enable the students to understand a particular passage and then express their opinions in their own language. This will enhance the student's reading and writing abilities.

Reading List

TEXT BOOKS:

- Musings- II: A Collection of English Prose By Pulak Bhattacharyya (ed), Book Land Publishers.
- The Complete Poetry and Prose of William Blake By David V. Erdman(ed), Anchor Publishers.
- 65 Short Stories By Heinemann: London Maugham,Somerset,1988[rpt]
- The Complete Poetical Works of William Wordsworth By Henry Reed(ed),Troutman and Hayes Publishers.
- High School English Grammar And Composition By Martin & Wren, New Delhi: S Chand2000 print

REFERENCE BOOKS:

- Communicate With Confidence By Nilanjana Gupta, Anthem Press.
- Effective English Communication for You By V. Shyamala, Emerald Publisher.
- Developing Communication Skills By Krishnamohan and MeeraBannerji,
- Business Communication By R.K. Madhukar, Vikash Publishing house Pvt. Ltd.
- Concepts of Professional Communication By Shalin Sharma, Acme Learning
- English Phonetics By Daniel Jones,
- Spoken English for India By R.K. Bansal and Harrison,Sec. Ed. Madras Orient Longman.
- Business Communication Concepts By P.D. Chaturvedi and MukeshChaturvedi,Cases and Applications, Sec. Ed. Manipal Press Limited.
- Interpersonal Communication By Sarah Trenholm and Arthur Jensen, Sixth Ed. Oxford University Press.

Subject Name: **Fundamentals of Computer Science**

Paper Code: **BCA101**

COURSE OBJECTIVES:

A study of the subject matter presented in this course will enable the student to become familiar with:
1. Fundamental of computer system
2. Working of operating system
3. Various types of virus
4. Nature of networking

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   To make students well familiar with computer architecture, its application and uses.
CO2.   To make students well familiar with peripheral devices
CO3.   To make students well familiar with Internet.
CO4.   To practically train students in MS-Office.
CO5.   To make students well familiar with different computer programming languages and system programming

UNIT- I:

Brief History of Development of Computers, Computer System Concepts, Computer System Characteristics, Capabilities and Limitations, Types of Computers, Basic Components of a Computer System - Control Unit, ALU, Input/output Functions and Characteristics, Memory RAM, ROM, EPROM, PROM and other types of Memory. Input/ Output & Storage Units - Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Barcode Reader, Voice Recognition, Light pen, Touch Screen, Monitors - Characteristics and types of monitor , Size, Resolution, Refresh, Dot Pitch, Video Standard - VGA, SVGA, XGA Printers and its Types - Dot Matrix, Inkjet, Laser, Plotter, Sound Card and Speakers, Storage Fundamentals - Primary Vs Secondary data Storage, Various Storage Devices - Hard Disk Drives, Floppy Disks ,Optical Disks, Flash Drives.

UNIT- II:

Use of Communication and IT, Communication Process, Communication Types- Simplex, Half Duplex, Full Duplex, Serial and Parallel Communication, Types of Network - LAN, WAN, MAN , Internet, Topologies of LAN - Ring, Bus, Star, Mesh and Tree Topologies, World Wide Web and its Applications and Internet Services. Software and its Need, Types of Software - System Software, Application Software, System Software - Operating System, Utility Program, Programming Languages, Assemblers, Compilers and Interpreter, Programming Languages- Machine, Assembly, High Level, 4GL.

UNIT- III:

Working with Word Processor, Menus & Commands, Toolbars & Buttons, Shortcut Menus, Wizards & Templates, Creating a New Document, Different Page Views and layouts, Applying various Text Enhancements, Working with Styles, Text Attributes, Paragraph and Page Formatting, Text Editing using various features , Bullets, Numbering, Auto formatting, Printing & various print options, Advanced Features of Word, Spell Check, Thesaurus, Find & Replace; Headers & Footers, Inserting Page Numbers, Pictures, Files,

Auto texts, Symbols, Working with Columns, Tabs & Indents, Creation & Working with Tables including conversion to and from text, Margins & Space management in Document, Adding References and Graphics, Mail Merge, Envelops & Mailing Labels. Importing and exporting to and from various formats.

UNIT- IV:

Spreadsheet - Introduction and area of use, Working with Spreadsheet, concepts of Workbook & Worksheets, Using Wizards, Various Data Types, Using different features with Data, Cell and Texts, Inserting, Removing & Resizing of Columns & Rows, Working with Data & Ranges, Different Views of Worksheets, Column Freezing, Labels, Hiding, Splitting etc., Using different features with Data and Text; Use of Formulas, Calculations & Functions, Cell Formatting including Borders & Shading, Working with Different Chart Types; Printing of Workbook & Worksheets with various options.

UNIT- V:

Presentation - Introduction & area of use, Working with presentation, Creating a New Presentation, Working with Presentation, Using Wizards, Slides & it's different views, Inserting, Deleting and Copying of Slides, Working with Notes, Handouts, Columns & Lists, Adding Graphics, Sounds and Movies to a Slide, Working with PowerPoint Objects, Designing & Presentation of a Slide Show, Printing Presentations, Notes, Handouts with print options. Outlook Express, Features and uses, Configuration and using Outlook Express for accessing e-mails in office.

Reading List

TEXT BOOKS:

- Introduction to Information Technology , ITL Education Solutions Limited

REFERENCE BOOKS:

- Computers Today , By S.K Basandra, Galgotia Publications.
- Fundamentals Of Information Technology By Alexis Leon & Mathews Leon,Vikas Publishing

Subject Name: **Programming Methodology and C Programming**

Paper Code: **BCA102**

COURSE OBJECTIVES:

This course aims to familiarize the trainee with basic concepts of computer programming and developer tools and teach students how to design, write and Execute a Program in 'C'.
1. To teach the behavior of basic Data types, Control Structures and Various Programming techniques.
2. To understand and analyze a Problem and then try to write the C-Codes to solve the problem.
3. To make students familiar with basic Computer Programming Array, Pointers, Functions & File Handling in C
4. To present the syntax and semantics of the "C" language as well as data types offered by the language help the students to write their own programs using standard language infrastructure regardless of the hardware or software platform

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1. Prepare students to acquire knowledge of programming using C.
CO2. It is the precursor and inspiration for almost all of the most popular high-level languages available today.
CO3. Able to implement the programming in different platform.
CO4. To prepare student for basic Programming Methodology.
CO5. To practically trains students in C programming language.

UNIT- I:

Program Concept, Characteristics of Programming, Various Stages in Program Development, Algorithms, Flow Charts, Programming Techniques – Top Down, Bottom Up, Modular, Structured, Features, Merits, Demerits and Their Comparative Study. Programming Logic - Simple, Branching, Looping, Recursion, Programming Testing & Debugging.

UNIT- II:

Introduction to C Language, C Language Standards, Features of C, Structure of C Program, Introduction to C Compilers, Creating and Compiling C Programs, IDE, Features of Turbo C Compiler. Keywords, Identifiers, Variables, Constants, Scope and Life of Variables, Local and Global Variable, Data Types, Expressions. Operators - Arithmetic, Logical, Relational, Conditional and Bit Wise Operators, Precedence and Associativity of Operators, Type Conversion. Basic Input/Output Library Functions ,CharacterInput/Outputgetch(), getchar(). getche(), putchar(). Formatted Input/Output - printf() and scanf(), Mathematical & Character Functions.

UNIT- III:

Declaration Statement, Conditional Statement - if Statement, if else Statement, Nesting of if... .else Statement, else if Ladder, The ?: Operator, switch Statement. Iteration Statements - for Loop, while Loop, do-while Loop. Jump Statements: break, continue, goto, exit(). Arrays - Concept of Single and Multi Dimensional Arrays Strings : Declaration, Initialization, Functions

UNIT- IV:

The Need of C Functions, User Defined and Library Function, Prototype of Functions, Prototype of main() Function, Calling of Functions, Function Arguments, Argument Passing: Call By Value and Call By Reference, Return Values. Nesting of Function, Recursion, Array as Function Argument, Command Line Arguments, Storage Class Specifier - Auto, Extern, Static, Register.

UNIT- V:

Defining Structure, Declaration of Structure Variable, Type def, Accessing Structure Members, Nested Structures, Array of Structure, Structure Assignment, Structure as Function Argument, Function that Return Structure, Union, Pointer: introduction, array with pointer, structure with pointer

Reading List

TEXT BOOKS:

- Programmingin in ANSI C   By Balagurusamy, TMH Publications

REFERENCE BOOKS:

- Programming With C   By Gottfried Schaums Outline Series, TMH Publications
- Thinking In C   By Mahapatra, PHI Publications
- Introduction To Computers And Information Technology By Anurag Seetha, Rain Prasad & Sons,
- Computers Today By S.K. Basandra, Galgotia Publications.
- Program Design By Peter Juliff, PHI Publications

Subject Name: **Digital Logic & Design**
Paper Code: **BCA103.1**

COURSE OBJECTIVES:

1. The concept of various components.
2. The concepts that underpin the disciplines of analog and digital electronic logic circuits.
3. Various Number system and Boolean algebra.
4. Design and implementation of combinational circuits.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   To make students well familiar with Analog and Digital System.
CO2.   To make students well familiar with Number System.
CO3.   Able to understand the concept of Combination Circuits.
CO4.   To understand and analyze Sequential logic- Flip-Flops and its different types.
CO5.   To make students well familiar with Registers, Counters and the memory unit.

UNIT-I:

Data representation Data Types and Number Systems, Binary Number System,Octal & Hexa-Decimal Number System, Fixed Point Representation, 1's & 2'sComplement, Binary, Arithmetic Operation on Binary Numbers, Overflow &Underflow, Floating Point Representation, Codes, ASCII, EBCDIC Codes, Gray Code, Excess-3 & BCD, Error Detection & Correcting Codes Binary Storage and Registers.

UNIT-II:

Boolean algebra and digital logic circuits -Logic Gates, AND, OR, NOT,, NOR,NAND & XOR Gates and their Truth Tables, Boolean Algebra, Basic Definition and Properties, Basic Boolean Law's, Demorgan's Theorem, Minimization Techniques, K Map – Two, Three and More Variables maps, Sum of Product & Product of Sums, Don't care conditions.

UNIT-III:

Combination Circuits - Half adder & Full adder, Full Subtractor, Full Subtractorand decimal adder, Code Conversion, Multilevel NAND and NOR Circuits, Decimal adder, decoders, Multiplexers and Demultiplexers.

UNIT-IV:

Sequential logic- Flip-Flops - RS, D, JK & T Flip-Flop, Triggering in flip flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, flip-flop excitation tables, Design procedure and design of counters. Design with equations.

UNIT-V:

Registers, Counters and the memory unit, Shift registers, Ripple counters and Synchronous counters, Inter-register Transfer, Arithmetic Logic and Shift Micro Operation, Conditional Control Statement, Instruction Codes, Processor organization, design of a simple computer.

Reading List

TEXT BOOKS:

- Digital Logic And Computer Design By Morris Mano

REFERENCE BOOKS:

- Computer System Architecture By Morris Mano

Subject Name: Applied Physics

Paper Code: BCA103.2

COURSE OBJECTIVES:

1. To impart knowledge in basic concepts of physics relevant to engineering applications
2. To introduce advances in technology for engineering applications.

COURSE OUTCOMES:

This subject has divided into four units to fulfill the following objectives

     CO1.   To make students well familiar with general properties of matter.

     CO2.   To make students well familiar with waves and sound.

     CO3.   To make students well familiar with modern Physics I which include de Broglie's hypothesis of matter, waves.

     CO4.   To make students well familiar with modern Physics II which include band theory, conductors and insulators.

     CO5.   To give brief description of fiber optics.

UNIT-I

General Properties of Matter: Conservative forces, Rotational motion, torque, angular momentum, conservation of angular momentum, work and power in rotational motion, KE of rotation, moment of Inertia, theorems of Moment of Inertia, Moment of Inertia of rectangular plate, circular disc, circular ring, sphere (solid and hollow).

Compound pendulum, equivalent simple pendulum, centers of suspension and oscillation, four points of equal time period, conditions for minimum time period.

Elasticity: Hooke's law, different kinds of elastic constants, relation among the elastic constants, Bending of beam fixed at one end and loaded at the other end, torsion of a rod.

UNIT-II

Waves and Sound: Simple Harmonic motion, Differential equation of Simple harmonic motion, total energy of a particle executing SHM, Free, forced and damped vibration, resonance, sharpness of resonance, equation of wave motion, principle of superposition of waves, beats, stationary wave and Doppler's effect.

Acoustics: Basic requirement of good acoustic Halls, Reverberation and time of Reverberation, Sabine's formula, absorption formula and its measurement.

Ultrasonic waves- Production of ultrasonic waves, application of ultrasonic waves, principle of SONAR systems.

UNIT-III

Modern Physics I: Wave and Particle Duality: de-Broglie's hypothesis of matter waves, de-Broglie wavelength, Heisenberg's Uncertainty Principle, Its illustrations and applications.

Schroendinger's time independent and time dependent wave equations, wave function, its physical interpretation, particle enclosed in one dimensional and 3D rigid potential box, quantum well, quantum wire and quantum dot.

UNIT-IV

Modern Physics II: Band theory of solids: Origin of Band Theory, types of Band, conductors, insulators and semiconductors, introduction to Superconductivity, its properties and types, BCS Theory, Applications of Superconductivity.

Preliminary ideas on Nanotechnology, properties and systhesis of nanoparticles. Various characterization techniques, applications of Nanotechnology.

Fibre Optics: Introduction, Principle, Structures, Types and application of fibre optics.

Reading List

TEXT BOOKS:

- Elements of properties of matter(By D.S. Mathur) : S. Chand.

REFERENCE BOOKS:

- A text book of sound- N. Subramanyam and Brijlal.
- Modern Physics (R. Murugeshan and K. Sivaprasath): S. Chand
- Perspective of Modern Physics, A. Beiser.
- Fundamentals of nanoelectronics- George W. Hanson, Pearson.

2ND SEMESTER

Subject Name: **Data Structure through C**

Paper Code: **BCA201**

COURSE OBJECTIVES:

1. Notion of Abstract Data Types (ADT) & Recursive access on them
2. Relation between Data Structure operations and Amortized Complexity analysis
3. How to implement Iterated Lists and variations thereof
4. Tree data structures and how to balance them, for specific access needs
5. Understanding Graph representations, Event modelling, spatial and temporal relational data
6. Choose a Data structure, a set of access methods and determine their asymptotic efficiency

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Have a comprehensive knowledge of the data structures and algorithms on which file structures and data bases are based.

CO2.   Understand the importance of data and be able to identify the data requirements for an application.

CO3.   Have an understanding and practical experience of algorithmic design and implementation.

CO4.   Understand the issues involved in algorithm complexity and performance.

CO5.   Understand the concept of graph & application of graphs.

UNIT- I:

The Concept of Data Structure, Abstract Data Type, Concept of List & Array, Introduction to Stack, Stack as an Abstract Data Type, Primitive Operation on Stack, Stack's Application - Infix, Postfix, Prefix and Recursion. Introduction to Queues, Primitive Operations on Queues, Queue as an Abstract Data type, Circular Queue, Dequeue, Priority Queue, Applications of Queue.

UNIT- II:

Linked List - Introduction to Linked List, Memory Representation of Linked List,Operations on Linked List, Linked List Representation of Stack and Queue, Header Nodes. Types of Linked List - Doubly Linked List, Circular Linked List, Application of Linked List.

UNIT – III:

Trees - Basic Terminology of Trees, Binary Trees, Tree Representations as Array &Linked List. Binary Tree Representation. Traversal of Binary Trees - Inorder, Preorder & Postorder, Application of Binary Tree, Threaded Binary tree, Height Balanced tree, B-tree.

UNIT-IV:

Analysis of Algorithm, Complexity with Big 'O' Notation. Searching – Sequential Search, Binary Search and their Comparison. Sorting - External & Internal Sorting, Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Comparison of Sorting Methods.

UNIT-V:

Graphs - Introduction to Graphs, Basic Terminology, Directed, Undirected &Weighted graph, Representation of Graphs, Graph Traversals - Depth First &Breadth First Search. Spanning Trees, Minimum Spanning Tree, Applications of Graphs : Shortest Path Problem using Dijkstra Method.

Reading List

TEXT BOOKS:

- Fundamentals Of Data Structure , By S. Sawhney &E.Horowitz

REFERENCE BOOKS:

- Data Structure By T Rembley&Sorrenson
- Data Structure By Lipschuists (Schaum 'S Outline SeriesMcgraw Hill Publication)
- Fundamentals Of Computer Algorithm By Ellis Horowitz And SartajSawhney

Subject Name : **Computer Organization& Architecture**

Paper Code: **BCA 202.1**

COURSE OBJECTIVES:

1. Conceptualize the basics of organizational and architectural issues of a digital computer.
2. Analyze processor performance improvement using instruction level parallelism.
3. Study various data transfer techniques in digital computer.
4. Articulate design issues in the development of processor or other components that satisfy design requirements and objectives.
5. Learn microprocessor architecture and study assembly language programming.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1. Understanding the introduction to digital computer and their fundamental architectures.

CO2. Input and Output peripheral devices and their communication with the rest of the computer components.

CO3. Functionalities and organization of processor units and their types.

CO4. Include the interrupts and direct memory access and clasp the standard I/O devices.

CO5. Memory organization, hierarchy and organization. Able to aware of RAM, ROM, COST, SIZE, CACHE and virtual memory.

UNIT-I:

Introduction - Organization and Architecture, Structure and Function Computer Evolution and Performance - A Brief History of Computers, Designing for Performance, Pentium and Power PC Evolution. System Buses - Computer Components, Computer Function, Interconnection Structures, Bus Interconnection, PCI, Future bus.

UNIT-II:

Internal Memory - Computer Memory System Overview, Semiconductor Main Memory, Cache Memory, Advanced DRAM organization. External Memory - Magnetic Disk, RAID, Optical Memory, Magnetic Tape. Input / Output - External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O,DMA,I/O channels and Processors, The External Interface. Operating System Support - Operating System Overview, Scheduling, Memory Management.

UNIT-III:

Computer Arithmetic - ALU, Integer Representation, Integer Arithmetic, Floating - Point Representation, Floating - Point Arithmetic Instruction Sets: Characteristics and Functions -Machine Instruction Characteristics, Types of operands, Types of Operations, Assembly Language. Instruction Sets - Addressing, Instruction Formats.

UNIT-IV:

CPU Structure and Function - Processor Organization, Register Organization, The Instruction Cycle, Instruction Pipelining, The Pentium Processor, The PowerPC Processor. RISC - Instruction Execution Characteristics, The

use of a Large Register File, Compiler Based Register Optimization, Reduced In-struction Set Architecture, RISC Pipelining, Motorola 88510, MIPS R4650, The RISC versus CISC Controversy.

UNIT-V:

Superscalar Processors - Overview, Design Issues, PowerPC, Pentium Control Unit Operation - Micro-Operation, Control of the CPU, H/W Implementation. Micro-programmed Control - Basic Concepts, Microinstruction Sequencing, Microinstruction Execution, TI 8800, Applications of Microprogramming.

Reading List

TEXT BOOKS:

- Computer Systems Architecture By M.Morris Mano,PHI, Third Edition , 1997.

REFERENCE BOOKS:

- Computer Organization and Architecture   By William Stallings,, PHI , Fourth Edition, 1997.
- COMPUTER ORGANIZATION   By V.CarlHamacher, ZvoKogG.Vranesic and SafwatG.Zaky,, McGraw-Hill, ISE, 1984.

Subject Name :   **Basic Electronics**

Paper Code: **BCA 202.2**

COURSE OBJECTIVES:

1. The objective of this course is to introduce the students about the semiconductor devices.
2. This course is to familiarize the students about the transistor, FET and operational amplifier.
3. This course also familiarizes the students about the basics of Digital Electronics.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Identify the unique vocabulary associated with electronics and explain the basic concepts of Semiconductor diodes such as pn junction diode, characteristics and ammeters, DC load-line, Zener diode.
To apply the basics of diode to describe the working of rectifier circuits such as Full and half wave rectifiers. To solve examples on rectifiers for parameters such as Capacitance, load and source effect, line and load regulations, and circuit current.

CO2.   Draw and explain the structure of bipolar junction transistor. Explain the operation of each device in terms of junction bias voltage and charge carrier movement. Identify and explain the various current components in a transistor.

CO3.   Describe the application of transistors for Current and voltage amplification. Also to describe the characteristics of different configurations of the transistor. Describe DC load line and bias point. List, explain, and design and analyze the different biasing circuits.

CO4.   Sketch, explain and design the amplifier circuit for given specification and analyze them discuss oscillator principles, oscillator types, and frequency stability as it relates to its operation. Analyze and Design the different types of Oscillators. Discuss ideal and practical operational amplifier (op amp) their electrical parameters, need for op amp. Explain and design different application circuits using op amp.

CO5.   Sketch and explain the basic block of communication system. State the principles of modulation and explain the different modulation techniques. Describe the theory and operation of radio systems and super heterodyne receivers. Solve simple examples.
List and explain the different number system. Solve examples on converting one form of number system to another form. State Boolean laws and theorems. State and explain the different logic gates using truth table. Analyze and design different adder circuits.

UNIT- I:

Circuit Concepts: Voltage and Current Sources Resistors: Fixed and Variable resistors, Color coding of resistors, resistors in series and parallel Inductors: Fixed and Variable inductors, Self and mutual inductance, Faraday's law and Lenz's law of electromagnetic induction Capacitors: Principles of capacitance, Parallel plate capacitor, Permittivity, Definition of Dielectric Constant, Dielectric strength, Energy stored in a capacitor, Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic capacitor, capacitors in series and parallel.

UNIT-II:

Circuit Analysis : Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), Node Analysis, Mesh Analysis RC Circuit, RL Circuit, RLC Circuits Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. Voltage-Current relationship in Resistor, Inductor and Capacitor Passive Filters: Low Pass, High Pass, Band Pass and Band Stop.

UNIT-III:

Analog Electronics: PN Junction Diode, Construction and characteristics, Zener Diode, Half wave, full wave and bridge rectifier, Clipping and clamping circuit, regulated power supply, basic transistor action, Transistor current components and amplification. Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, I-V characteristics,

UNIT-IV:

Digital Electronics Decimal, Binary, Hexadecimal and Octal number systems, base conversions, Truth Tables of OR, AND, NOT, XOR, XNOR, Universal (NOR and NAND) Gates, Basic postulates and fundamental theorems of Boolean algebra, Combinational Logic Analysis and Design, Adder, Subtractor, Encoder and Decoder, Multiplexers and Demultiplexers, Sequential logic design, Latches and Flip flops, S-R Flip flop, J-K Flip flop, T and D type Flip flops, Introduction to registers and counters

UNIT-V:

Oscillations and feedback amplifiers: basic concept of feedback amplifiers-negative and positive feedback, advantages and disadvantages of negative feedback, Barkhausen criteria for oscillations, transfer gain with feedback , Analysis of voltage and current in feedback amplifier circuits.

Reading List

TEXT BOOKS:

- W. H. Hayt, J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Tata McGraw Hill,2005
- M. Morris Mano, Digital System Design, Pearson Education Asia,(Fourth Edition)

REFERENCE BOOKS:

- R. L. Boylestad, L. Nashelsky, K. L. Kishore, Electronic Devices and Circuit Theory, Pearson Education 2006.
- Millman and C. Halkias, Integrated Electronics, Tata McGraw Hill, 2001

Subject Name: **Discrete Mathematics**

Paper Code: **BCA203**

COURSE OBJECTIVES:

1. Mathematics concepts and notations are useful in studying and describing objects and problems in computer algorithms and programming languages and have applications in cryptography, automated theorem proving and software development.
2. The objective of combinatorial mathematics is to demonstrate an understanding of the theory underlying exact approaches to combinatorial optimization problems, prove & interpret standard results in graph theory & develop, implement & critically evaluate the correctness and performance of standard graph algorithms and recurrence relations of different orders.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

     CO1.   Apply knowledge of computing and mathematics appropriate to the discipline.
     CO2.   Analyze a problem and identify and define the computing requirements to solution.
     CO3.   Apply knowledge of computing, mathematics, science, and engineering appropriate to the modeling and design of software.
     CO4.   Implement the numerical methods using computer software and apply them in example.
     CO5.   Understand the concepts of algorithms.

UNIT-I:

Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets, Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation .Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions. Notion of Proof: Proof by counter-example, the contra-positive, proof by contradiction, inductive proofs.

UNIT-II:

Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Rings and Fields: definition and standard results.

UNIT-III:

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices. Graphs: Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected

graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.Tree: Definition and example.

UNIT-IV:

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

UNIT-V:

Combinatorics: Basic Counting Technique, Pigeon-hole Principle, Recurrence Relation, Generating function, Polya's Counting Theorem

Reading List

TEXT BOOKS:

- Dicrete Mathematics with Graph Theory and Combinatorics By T Veerarajan
- Elements of Discrete Mathematics By C L Liu & D.P. Mahaptra

REFERENCE BOOKS:

- Discrete Mathematics and Its Applications, By Kenneth H Rosen, McGraw Hill, Sept.2002.
- Discrete Mathematical Structures with Applications to Computer Science, By J. P. Tremblay, R. Manohar, McGraw Hill Pub, 1975.
- Graph Theory With Applications to Engineering and Computer Science, By Prentice Hall, Englewood Cliffs, N. J, 1974
- Combinatorics: Theory and Applications, By V. Krishnamurthy, East-West Press Pvt. Ltd., New Delhi, 1986.

Subject Name: **Environmental Studies**

Paper Code: **BEV 720**

COURSE OBJECTIVES:

1. Environmental Studies is a multidisciplinary subject.
2. It has been introduced with the objective of exposing the students to the basic concepts of environment - resources, pollution, management and law and also the current issues endangering life on earth.

COURSE OUTCOMES:

This subject has divided into seven units to fulfill the following objectives

CO1.   Acquire skills to understand environment and its various components, related issues and problems, identifying and solving them.

CO2.   Participate and be actively involved at all levels in working towards the benefits of environment.

CO3.   Gain a variety of experiences and acquire knowledge to save the environment for future generations.

CO4.   Acquire an awareness of the environment as a whole, its allied problems and sensitivity.

CO5.   Understand social issues with environment.

UNIT- I:

Definition, scope and importance, Multimedisciplinarynature of environmental studies, need for public awareness.
Natural resources and associated problems:
(a) Forest resources: Use and overexploitation, deforestation timber extraction, mining,dams and their effects on forests and tribal people,
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and usingmineral resources.
(d) Food resources: W orId food problems, changes caused by agriculture effects ofmodem agriculture, fertilizer-pesticide problems;
(e) Energy resources: Growing energy needs, renewable and non renewable energysources, use of alternate energy sources.
(f) Land resources: land as resources, and land degradation, man induced landslides,soil erosion and desertification.Role of an individual in conservation of natural resources Equitable use of resources for Sustainable lifestyles.

UNIT-II:

Concept of an ecosystem, Structure and function of an ecosystem, Producers,consumers and decomposers, Energy flow in the ecosystem, Ecological succession. Food chains,food webs and ecological pyramids, Introduction, types, Characteristic features, structure andfunction of 'the following ecosystem:
a) Forest ecosystem   b) Grassland ecosystem   c) Desert ecosystem
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III:

Biodiversity and its conservation: Introduction-Definition: genetic, species and ecosystem diversity, Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option value, Biodiversity at global, national and local levels, India as a mega-diversity nation, Western ghat as a bio-diversity, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poachingof wildlife, man-wildlife Conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ, Conservation of biodiversity.

UNIT- IV:

Environmental Pollution: Definition, causes, effects and control measures of:
a) Air pollution
b) Water -pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal pollution
g) Nuclear hazards. Solid waste management causes, effects and control measures urbanand industrial wastes, Role of an individual in prevention of pollution, Disastermanagement: folds, earthquake, cyclone and landslides,Tsunami.

UNIT- V:

Social Issues and Environment: From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns, Environmental ethics: Issuesand possible solutions, Climate change, global-warming, acid rain, ozone layer depletion, nuclearaccidents and holocaust, Wasteland reclamation, consumerism and waste products, Environmentprotection Act, Air (Prevention and control of pollution) Act., Water (Prevention and control ofpollution) Act., Wildlife protection act, Forest conservation Act, Issues involved in enforcement ofenvironmental legislation public awareness.

UNIT- VI:

Human Population and the Environment: Population growth, variation among nations,Population explosion, Family welfare programme, Environment and human health, Value Education,Women and Child Welfare, Role of information technology in Environmental and human health.

UNIT- VII:

Field work: Visit to a local area to document environmental assetsriver /forest /grassland / hill /mountain., Visit to a local polluted site Urban / Rural / Industria / Agricultural, Study of commonplants, insects, birds, Study of simple ecosystem-ponds, river, hill slopes, etc.

Reading List

TEXT BOOKS:

- Environmental Chemistry By De. A.K. ,Wiley Eastern Ltd.,
- Fundamental of Ecology By Odum E.P. ,W.B. Saunders Co. USA 574p

- A Txtbook of nvironmental Studis By Erach Bharucha, UGC, New Delhi
- Perspective in Environmental Studies By A.Kaushik and C.P. Kaushik,2016, New Age International Publishers, New Delhi.

REFERENCE BOOKS:

- Environmental Engineering By Anindita Basak , Pearson Publication.
- Environmental Studies By Benny Joshep , 2015, McGraw Hill Education.
- Environmental Studies: From Crisis to Cure By R. Rajagopalan, 2016,Oxford University Pess, New Delhi
- Environmental Science & Engineering By P. Venugopala Rao, 2016, PHI Learning Pvt.

3RD SEMESTER

Subject Name: Object Oriented Programming with C++
Paper Code: BCA 301

COURSE OBJECTIVES:

1. The fundamental point in learning programming is to develop the critical skills of formulating programmatic solutions for real problems.
2. It will be based on basic knowledge of algorithms and procedural programming language.
3. Once the basic skill of writing programs using loop, methods and arrays will be clear then the student can develop object oriented software using class encapsulation and inheritance.
4. To impart the basic concepts of Java Programming and to develop understanding about Basic Object oriented Design.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1. Know the principles of OOPs concept and structure.
CO2. Analyze the concept of classes and object, array, functions, constructor and destructor.
CO3. Come to know the concept of inheritance and classification, pointers, virtual function and polymorphism.
CO4. Able to work with file, file pointers and manipulators.
CO5. Understand the concept of templates and exception handling.

UNIT-I:

Object Oriented Programming, Concepts, Advantages, Usage. C++ Environment: Program Development Environment, C++ language standards. Introduction to Various C++Compilers, C++ Standard Libraries, Prototype of main() Function, Data types. Classes & Objects- Classes, Structure & classes, Union & Classes, Friend Function, Friend Classes, Inline Function,, Scope Resolution Operator, Static Class Members, Static Data Member, Static Member Function, Passing Objects to Function, Returning Objects, Object Assignment.

UNIT-II:

Array, Pointers References & The Dynamic Allocation operators Array of objects, Pointers to Object, Type Checking C++ Pointers, The This pointer, Pointer to Derived Types, Pointer to Class Members, Reference parameter, Passing references to Objects, Returning Reference, Independent Reference, 'Dynamic Allocation Operators, Initializing Allocated Memory, Allocating Array, Allocating Objects.

UNIT-III:

Constructor & Destructor - Introduction, Constructor, Parameterized constructor, Multiple Constructor in a class, Constructor with Default Argument, Copy Constructor, Default Argument, Destructor, Function & Operator Overloading Function Overloading, Overloading Constructor Function Finding the address of an Overloaded function.

UNIT-IV:

Operator Overloading: Creating a member, Operator Function, Creating Prefix &Postfix forms of the increment & decrement operation, Overloading the shorthand operation (i.e. +=,-=~., etc), Operator overloading

restriction, Operator overloading using friend function, Overloading New & Delete, Overloading some special operators, Overloading [ ], ( ),-, comma operator, Overloading <<.

UNIT-V:

Inheritance -Base Class Access Control, Protected Members, Protected Base Class Inheritance, Inheriting Multiple Base Classes, Constructors, Destructors &Inheritance, When Constructor & Destructor Function, Passing parameters to base Virtual base classes. Virtual functions & Polymorphism: Virtual function, Pure Virtual functions, Early vs. Late binding.

Reading List

TEXT BOOKS:

- Programming with C++ By E. Balgurusamy, TMH Publication

REFERENCE BOOKS:

- C++ The Complete Reference By Herbertz Shield, TMH Publication
- Object Oriented Programming With C++ By R. Subburaj ,VikasPublishing House, New Delhi.
- Programming In C++ By M. Kumar ,TMH Publications
- Object Oriented Programming C++ By R. Lafore
- Object Oriented Programming WithAnsi& Turbo C++ By Ashok . N. Kamthane, Pearson Education Publication

Subject Name: **Software Engineering**

Paper Code: **BCA 302.1**

COURSE OBJECTIVES:

1. To develop an understanding of software engineering, software crisis, SDLC.
2. Understanding the concept of software project planning – feasibility analysis, requirement analysis, SRS documents.
3. Come to know the software designing strategies – structured analysis, structured design, DFD, structure chart.
4. Understand concept of Project Management along with software testing, maintenance, back-up.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Learn developing methodology of software project.
CO2.   Acquire skill to know how to develop software project.
CO3.   Understand tools and techniques of software engineering.
CO4.   Maintain the quality of software project.
CO5.   Verify and validate the problem of software programming.

UNIT – I:

Software : Software Characteristics and Applications, Software Engineering - A Layered Technology, Software Process Models - Linear Sequential Model, Prototype & RAD Model, Incremental Model and Spiral Model. Project Metrics : Software Measurement–Size Oriented, Function Oriented Metrics, Extended Function Point Metrics.

UNIT - II :

Software Project Planning: Objectives, Decomposition Techniques, and Empirical Estimation Models. Analysis Concept and Principles: Requirement Analysis, Analysis Principles.

UNIT – III :

Design Concepts and Principles: Design Process, Design Concepts, Design Principles, Effective Modular Design, Human Computer Interface Design, Interface Design Guidelines.

UNIT - IV :

S/W Quality Assurance : Quality Concepts, Reliability S/W Testing Models : S/W Testing Fundamentals, White and Black Box Testing, Basic Path Testing, Testing Strategies : Strategic Approach to S/W Testing, Unit Testing, Integration Testing, Validation Testing, System Testing.

UNIT - V :

S/W Reuse : Reuse Process, Classification and Retrieving Components, Economics of S/W Reuse CASE : Introducing to CASE, Taxonomy of Case Tools.

Reading List

TEXT BOOKS:

- Fundamental of Software Engineering By Rajib Mall

REFERENCE BOOKS:

- Software Engineering By R.S.Pressman
- An Integrated Approach To Software Engineering By Pankaj Jalote

Subject Name: **Management Information System**

Paper Code: **BCA 302.2**

COURSE OBJECTIVES:

1. Completing this course will enable the students to:
2. Recognize contemporary MIS theory and how information systems support business strategy, business processes, and practical applications in an organization.
3. Interrelate how various support systems can be used for business decisions and to sustain competitive advantage.
4. Describe how the Internet and World Wide Web provide a global platform for e-business, business mobility and communications, collaboration, and cloud computing.
5. Express the proven value of, and relationship between business data, data management, and business intelligence.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   To understand the managerial level management in organizations.

CO2.   To learn about different management tools, level of decision making.

CO3.   Coordination with DSS.

CO4.   To develop team management skills.

CO5.   To understand about the Security and Ethical Challenges.

UNIT-I:

Management Information System (MIS): Organization and Information Systems, Changing Environment and its impact on Business - The IT/IS and its influence. The Organization: Structure, Managers and activities - Data, information and its attributes - The level of people and their information needs - Types of Decisions and information - Information System, categorization of information on the basis of nature and characteristics.

UNIT-II:

kinds of Information Systems: Transaction Processing System (TPS) – Office Automation System (OAS) - Management Information System (MIS) - Decision Support System (DSS) and Group Decision Support System (GDSS) - Expert System (ES) - Executive Support System (EIS or ESS)

UNIT-III:

Enterprise System : Enterprise Resources Planning (ERP): Features, selection criteria, merits, issues and challenges in Implementation - Supply Chain Management (SCM): Features, Modules in SCM - Customer Relationship Management (CRM): Phases. Knowledge Management and e-governance.
Nature of IT decision - Strategic decision - Configuration design and evaluation Information technology implementation plan.

UNIT-IV:

Management Issues in MIS: Data base requirements user interface requirements developing and implementing application systems Quality assurance and evaluation of Information systems future developments and their organizational and social implications.

UNIT-V:

Manufacturing & Service System: Information systems for Accounting, Finance, Production and Manufacturing, Marketing and HRM functions - IS in hospital, hotel, bank.

Reading List

TEXT BOOKS:

- S Paul : Management Information System
- Robert D. Cuze : Management Information System

REFERENCE BOOKS:

- James A. O' Brien : Introduction to Information System, Tata McGraw Hill, 12th Edtion.
- S.Sadagopan: Management Information Systems, PHI, 1/e, 2005
- Lynda M AppleGate, Robert D Austin et al : Corporate Information Strategy and Management, Tata McGraw Hill, 7th Edition
- Effy Oz : Management Information Systems, Thomson Course Technology, 3/e, 2003

Subject Name: **Operating System**

Paper Code: **BCA 303**

COURSE OBJECTIVES:

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organisation of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.
6. Students should understand the data structures and algorithms used to implement an OS.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Analyze the structure and basic architecture components involved in OS.
CO2.   Demonstrate competence in recognizing and using system features.
CO3.   Understand and analyze the theory and implementation of different OS aspect.
CO4.   Understand the different types of scheduling algorithms.
CO5.   Understand about the physical and logical address and concept of pages.

UNIT-I:

Definitions, functions and types of operating system, components, Operating system Services, System Calls, programs, System structure.

UNIT - II:

Process Concepts, process state & process control block, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling Real-Time Scheduling, Threads.

UNIT – III:

Critical Section Problem , Semaphores, Classical Problem Of Synchronization, , Deadlock Characterizations, Method for Handling, Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock .

UNIT- IV:

Logical versus physical address space, Swapping, Contiguous Allocation, Paging, Segmentation, Virtual Memory, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT- V:

Disk Scheduling, Disk Management, Swap Space Management, Disk. reliability, Stable Storage Implementation. File Concepts Directory structure, Protection, File system in Linux.

__Reading List__

TEXT BOOKS:

- Operating System Concepts By Silberschatz & Galvin, Addison Edition.

REFERENCE BOOKS:

- Operating System Concepts & Design By Milan MilenKovic , Wesley Publication 6

Subject Name: **Relational Database Management System**

Paper Code: **BCA 304**

COURSE OBJECTIVES:

1. The objective of the course is to enable students to understand and use a relational database system.
2. Introduction to Databases, Conceptual design using ERD, Functional dependencies and Normalization, Relational Algebra is covered in detail.
3. Students learn how to design and create a good database and use various SQL operations.
4. The course concludes with an overview of transaction management and introduction to advanced and non-relational databases.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Give an introduction to about DBMS, data model, schema and benefit of database.
CO2.   Able to design a good database using normalization, decomposition.
CO3.   Understand the concepts of database architecture, parallelism concept and distributed database concept.
CO4.   Understand about the indexes, sequences, data integrity, creating and maintaining tables.
CO5.   Understand the concept of different query languages, cursors, triggers.

UNIT- I:

Introduction To Database Systems Purpose of Database System, View Of Data,Characteristics of Database Approach, Architecture for a Database System,Advantages and Disadvantages Of DBMS, Database Users and Administrator,Database Design and ER Model , Mapping the ER Model to Relational Database, Data Model Classification.

UNIT-II:

Structure of Relational Database, Database Schema, Key, Relational OperationsFormal Relational Query Languages.

UNIT-III:

Features of Good Database Design, Universal Relation, Anomalies in A Database Atomic Domain and 1NF ,Functional Dependency Theory, 2NF, 3NF, BCNF, Decomposition Using Multi-valued Dependency, Database Design Process.

UNIT-IV:

Basic Concepts Of Indexing and Hashing, Query Processing, Measures Of Query Cost, Query Processing for Select, Sort, Join Operations. Basics of Query Optimization, Transformation of Relational Expression, Estimating Statistics of Expression, Choice of Evaluation Plan.

UNIT-V:

Transaction Concepts, Features of Database Transaction. Concurrency Control in Database - Lock Base, Time Stamp Base, Validation Base Protocols Database Recovery System .

Reading List

TEXT BOOKS:

- Database System Concepts By Silverschatz Korth And Sudarshan, 6 Th Ed. Tata Mc-Graw Hill.

REFERENCE BOOKS:

- Fundamentals Of Database Systems By R. Elmasri Et. Al , 3rd Edition – Addison Wesley, (Indian Reprint), New Delhi.
- Database Management Systems By Raghu Rama Krishnan,2 Nd Ed. Tata Mc-Graw Hill
- Database Management System By Rajesh Narang ,2nd Ed.PHI
- Data Base Systems By C.J.Date, Vol I & II

4TH SEMESTER

Subject Name: **Programming with Java**

Paper Code: **BCA 401**

COURSE OBJECTIVES:

1. The fundamental point in learning programming is to develop the critical skills of formulating programmatic solutions for real problems.
2. It will be based on basic knowledge of algorithms and procedural programming language.
3. Once the basic skill of writing programs using loop, methods and arrays will be clear then the student can develop object oriented software using class encapsulation and inheritance.
4. To impart the basic concepts of Java Programming and to develop understanding about Basic Object oriented Design using UML and Applet.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1. To have oops concept.
CO2. Ability to solve real world problems.
CO3. Understand the basic principles of creating java application with Graphical User Interface (GUI).
CO4. To be able to develop rich user interface using modern API's such as JAVAFX.
CO5. Understands the basic approaches to design software applications.

UNIT-I:

C++ Vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVAenvironment, JAVA program structure, Tokens, Statements, JAVA virtualmachine, Constants & Variables, Data Types, Type Casting, Operators ,Expressions & its Evaluation, Decision making and branching, Loops, Jumps inLoops, Labeled Loops.

UNIT-II:

Defining a class, Adding variables and methods, Creating objects, Accessing classmembers, Constructors, Method overloading , Static members, Nesting ofmethods, Inheritance: Extending a class, Overriding methods, Final variables andmethod~, Final classes, Finalizes methods, Abstract methods and classes,Visibility control.

UNIT-III:

Arrays, One dimensional & two dimensional, Strings, Vectors, Wrapper classes,Defining interfaces, Extending interfaces, Implementing interfaces, Accessinginterface Variables, System packages, Using system packages, Namingconventions, Creating packages, Accessing a package, Using package, Adding aclass to a package, Hiding classes.

UNIT-IV:

Threads, Creating threads, Extending the threads class, Stopping and blocking athread, Life cycle of a thread, Using thread methods, Thread exceptions, Threadpriority, Synchronization, Implementing the runnable Interface.

UNIT-V:

Applets, Local and remote applets, Applets Vs applications, Writing applets,Applets life cycle, Creating an executable applet, Designing a web page, Applettag, Adding applet to HTML file, Running the applet, Passing parameters toapplets, Aligning the display, HTML tags & applets, Getting input from the userinterface.

Reading List

TEXT BOOKS:

- Programming Java 2nd Edition By E. Balaguruswamy, TMH Publications.

REFERENCE BOOKS:

- Java: The Complete Reference, Seventh Edition By Herbert Schildt, McGraw Hill
- Peter Norton Quid E T O Java Programming By Peter Norton, TechmediaPublications.

Subject Name: **Computer Networks**

Paper Code: **BCA 402.1**

COURSE OBJECTIVES:

1. To provide an introduction to the fundamental concepts on data communication and the design of computer networks.
2. 2. To get familiarized with the basic protocols of computer networks.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

     CO1.   Have basic concepts and terminology in computer network.
     CO2.   Acquire knowledge of different types of topologies and protocols.
     CO3.   Understand different models of networking.
     CO4.   Have knowledge regarding different issues associated with layers.
     CO5.   Have knowledge about network security.

UNIT- I:

Networking - Needs and Advantages, Network Hardware & Software, Types- Client, Server and Peers,Introduction to various types of servers. Wired & Wireless transmission, Baseband and Broadband transmission. Connectivity Devices: Modem, Repeater, Hub, bridge Gateway.

UNIT-II:

Transmission Media Types- Properties & Specialty of Various Media Types,Comparative Study. Network Topology-Bus, Star, Ring, Star Bus, Star Ring,Mesh Features, Advantages and Disadvantages of Each Type, Network Adapters Cards, Switching Techniques.

UNIT- III:

The Theoretical Network Model – OSI, Introduction to IEEE 802 standards, Ethernet, Token Rings, FDDI, Network Scaling-No. of nodes, distance, software, speed, special requirements ,

UNIT- IV:

Overview of TCP/IP reference model. Protocols- IP, TCP, UDP, ARP, SNMP, FTP, SMTP, TELNET Protocols, IP Addressing Class A, B & C. Domain Name Addressing, URL, E-mail address.

UNIT-V:

Network Security : Network Security Issues, Security Barriers Needs Firewalls and Features of Firewalls, Types of Firewall Technology, Network Level and Application Level, IP Packets Filter Screening Routers, Limitations of Firewalls.

Reading List

TEXT BOOKS:

- Data communication and networking By Forouzan, 4th Edn, TMGH

REFERENCE BOOKS:

- Networking Essentials: Study Guide MCSE Ames ChewsCharles Perkins, Matthew Strebe BPB Publications.
- Local Area Networks By S. K.Basandra& S. Jaiswal, , GalgotiaPublications
- Computer Network By Andrew S Tanenbaum
- Data and Computer Communication By William Stalling
- Data Communication By Prakash C Gupta

Subject Name: **Positive Psychology**

Paper Code: **BCA 402.2**

COURSE OBJECTIVES:

1. Students will learn the emerging Positive Psychology Principles and theoretical models targeted at increasing success and happiness in college

2. Students will identify stressors that students face as they enter college and learn strategies to cope with such stressors.

3. Students will acquire insight into their own strengths and virtues and learn strategies to increase their happiness and overall quality of life.

4. Students will be expected to demonstrate applications of core concepts of Positive Psychology.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.	Critically evaluate the theories, techniques and evidence-base of positive psychology.
CO2.	Demonstrate an in-depth understanding of the range of positive psychology interventions to strengthen optimism, resilience and self-esteem.
CO3.	Actively apply positive psychology techniques to enhance the wellbeing of individuals, groups, workplaces, communities and institutions.
CO4.	Get the idea of Hope, Optimism, Self and related concepts, and Resilience.
CO5.	Able to know Flow, Mindfulness, Spirituality and Interpersonal Character Strengths.

UNIT -I:

Introduction Positive psychology: Definition; goals and assumptions; Brief history of Positive psychology, Relationship with other fields of psychology, Scope of positive psychology.

UNIT- II:

Positive emotions Positive emotions: concept and theory; Cultivating positive emotions; Relevance of positive emotions.

UNIT -III:

Happiness and Well-Being Happiness- hedonic and Eudemonic approaches; Well- being: negative vs positive functions; Subjective well –being: Emotional, social and psychological well-being, Martin Seligman's model of well-being and happiness: PERMA model

UNIT-IV:

Positive Cognitive States: Resilience and Optimism Resilience: perspectives; Sources of resilience in childhood, adulthood and later life; Optimism How optimism works; variation of optimism and pessimism; Explanatory or attributional style of explaining life events.

UNIT -V:

Applications of Positive Psychology Positive schooling: Components; Positive coping strategies, Mental health: Moving toward balanced conceptualization; Mindfulness, Essential steps to mindfulness.

Reading List

TEXT BOOKS:

- Snyder, C.R. & Lopez, S.J. (2002). Handbook of positive psychology. (eds.). New York: Oxford University Press.

REFERENCE BOOKS:

- Baumgardner, S.R & Crothers, M.K.(2009). Positive Psychology. U.P: Dorling Kindersley Pvt Ltd.
- Carr, A. (2004). Positive psychology, The science of happiness and human strengths.New York: Routledge.
- Singh, A.(2013).Behavioral science: Achieving behavioral excellence for success

Subject Name: .Net Technology

Paper Code: BCA 403

COURSE OBJECTIVES:

1. To learn .Net Framework
2. To develop web application with ASP.Net
3. To develop database application using ADO.Net

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

    CO1.   Able to develop application software using .NET framework.
    CO2.   Understanding the use of main features of the integrated development environment (IDE).
    CO3.   Able to develop windows applications.
    CO4.   Able to work with XML documents.
    CO5.   Able to develop crystal report.

UNIT- I:

Introduction to .NET, .NET Framework features & architecture, CLR, CommonType System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of .NET- Menu bar, Toolbar,Solution Explorer, Toolbox, Properties Window, Form Designer, OutputWindow, Object Browser. The environment: Editor tab, format tab, general tab,docking tab. visual development & event drive Programming -Methods andevents.

UNIT – II:

The VB.NET Language- Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, Collections, Subroutines, Functions, Passing variable, Number of Argument Optional Argument, Returning value from function. Controlflow statements: conditional statement, loop statement. Msgbox& Input box.Working with Forms: Loading, showing and hiding forms, controlling oneform within another.GUI Programming with Windows Form

UNIT-III:

Introduction to C# language, Program Structure, Basic Syntax, Data types, Variables, Constants and literals, Operators, Control Statements and Loops, Methods, Arrays, Strings, Structures, Object oriented Programming using C#, Classes & Objects, Introduction to Windows form application.

UNIT-IV:

Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NET Validation Controls, Using the Simple Validations, Creating a Consistent Web Site, ASP.NET Master Pages, Displaying Data with the Grid View Control Introducing the Grid View Control, Filter Data in the Grid View Control, Allow Users to Select from a Dropdown List in the Grid, Add a Hyperlink to the Grid, Deleting a Row and Handling Errors

UNIT- V:

Database programming with ADO.NET Overview of ADO, from ADO toADO.NET, Accessing Data using Server Explorer. Creating Connection,Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Dataon data bound controls, display data on data grid.

Reading List

TEXT BOOKS:

- VB.Net Programming Black Book By Steven HolznerDreamtech Publications

REFERENCE BOOKS:

- Mastering VB.Net By Evangelos Pet Routsos- Bpb Publications
- Introduction To .Zvet Framework ,WorxPublicationmsdn.
- .Net 4.5Programming(6-In-1) Black Book
- ASP.Net 4.6Web Programming With C# By Mary Dilamater By Anne Boehm
- Microsoft.com/ Net www.gotdotnet. com

Subject Name: Human Values and Professional Ethics

Paper Code: HVP 740

COURSE OBJECTIVES:
The purpose of this course is to examine various ethical issues that may arise in one's professional life, and how such a life intersects one's personal life and self-understanding with the core focus to enlighten the students regarding value based approaches within a variety of context. The concept of value is understood in two different contexts; one is People's judgments about what is important or meaningful in their lives and the other is principles or standards for behavior, supported by religion, constitution and norms.

COURSE OUTCOMES:

CO1.   To critically understand ethical issues as they pertain to professional and personal identity.
CO2.   To learn to consider oneself and the world around from these basic ethical positions.
CO3.   To develop sharpened analytic powers and capacities for oral and written expression.

Unit-1: Ethics and Human Values   **[8 Lectures]**
Definition, Importance and Relevance in present-day Society.
Indian Constitutional Values**:** Fundamental Rights and Duties; Freedom, Equality, Fraternity, Justice; Directive Principles of State Policy.
Religious and Cultural Values: Values embedded in different religions; Religious Tolerance.

Unit-2: Basic Human Virtues   **[8 Lectures]**
Concept of Honesty, Punctuality, Responsibility, Courtesy, Discipline, Courage, Compassion, Empathy and Restrain
Family responsibilities: Duties as a Member of the Society, Guidance to youngsters; Gender Equality.
Social Concerns: Evils of Dowry & Caste System, Racial Discrimination, Suicidal Tendencies, Substance Abuse and Addiction.

Unit-3: Introduction to Professional Ethics   **[8 Lectures]**
Need, Importance and Goals; Ethical Values in Different Professions: Dignity of Labour, Respect for Authority, Code of Conduct, Conflicts of Interest.
Occupational Crime; Sexual and Mental Harassment in work place.
Professional Rights: Employee Rights, Intellectual Property Rights (IPR).

Unit-4: Ethics in Professional and Global Space   **[5 Lectures]**
Cyber Ethics and Etiquette.
Correct and Judicious use of Mobile Phones/electronic gadgets, Social Networking in professional space.
Environmental Ethics; Ethics in Research.

Suggested Readings:

1) Jayashree Suresh and B S Raghavan- *Human Values and Professional Ethics: Values and Ethics of Profession.* S Chand, 2005.

2) Martin, Clancy, Wayne Vaught, and Robert Solomon (eds.)- *Ethics Across the Professions: A Reader for Professional Ethics*. Oxford: Oxford University Press, 2010.
3) R.R. Gaur, R. Sangal and G.P. Bagaria- *A Foundation Course in Human Values and Professional Ethics* (Paperback). Excel Books, 2010
4) Terrence M. Kelly- *Professional Ethics: A Trust-Based Approach.* Lexington Books, 2018.
5) R. S. Naagarazan- *Professional Ethics and Human Values.* New Age International (Second ed.), 2019.

5TH SEMESTER

Subject Name: **Linux & Shell Programming**

Paper Code: **BCA 501**

COURSE OBJECTIVES:

1. To understand Unix Operating System
2. To explore the Basic Shell Commands

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Perform installation, package management and process monitoring.
CO2.   Able to perform file system security and management.
CO3.   Learn Shell scripting.
CO4.   Learn advanced security and network concepts.
CO5.   Perform User administration.

UNIT- I:

Linux introduction and file system - Basic Features, Different flavors of Linux. Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp&comm, View files, disk related commands, checking disk free spaces. Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process.

UNIT- II:

Essential linux commands Understanding shells, Processes in linux - process fundamentals, connecting processes with pipes, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron commands, kill, ps, who, sleep, Printing commands, touch, file related commands - wc, cut, dd, etc. Mathematical commands- bc, expr. Creating and editing files with vi& vim editor.

UNIT- III:

System administration: Common administrative tasks, configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel. Backup and restore files, installing and removing packages with rpm command. KDE & Gnome graphical interfaces.

UNIT- IV:

Shell programming- Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks. Simple filter commands – pr, head, tail, cut, paste, sort, uniq, tr. Filter using regular expressions – grep, egrep, and sed.

UNIT-V:

Basic networking administration: Setting up a LAN using Linux, choosing peer to peer vs client/server model, setting up an Ethernet Lan, configuring host computers, checking Ethernet connecting, connecting to Internet, common networking administrative tasks, configuring Ethernet, initializing Ethernet Interface, ifconfig, netstat and netconfig commands, TCP/IP network, DNS services, routing using Linux Installation & Administration of mail server, ftp server and Apache web server.

Reading List

TEXT BOOKS:

- UNIX - Concepts & Applications (Third Ed.) By Sumitabha Das, Tata McGraw Hill Publications

REFERENCE BOOKS:

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- UNIXFor Programmers And Users (Third Ed.) By Graham Glass & King Ables, Pearson Education India.
- Fedora Core 6 Bible
- Red Hat Linux 9 Bible – Cristopher Negus, IDG Books India Ltd.
- Using Linux ByJack T Ackett By David Gunter, PHI, EEE Edition
- Linux Installation And Administration By Nicholas Wells, Course Technology Vikas Publishing.
- UNIX Shell Programming By YashwantKanetkar, BPB Publications,
- Red Hat Linux Unleashed Techmedia (BPB Publications)
- Linux Networking And Security By Wells, Course T EchnologyVikas Publishing, New Delhi

Subject Name: **Web Programming**

Paper Code: **BCA 502**

COURSE OBJECTIVES:

1. Demonstrate competency in the use of common HTML code.
2. Demonstrate competency using FTP to transfer web pages to a server.
3. Construct pages that meet guidelines for efficient download.
4. Construct pages that meet the needs of an identified audience.
5. Construct efficient file structure for web sites.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Create PHP scripts that use object-oriented PHP.
CO2.   Use stored procedures and triggers.
CO3.   Create CSS and HTML script.
CO4.   Create and deploy a portable web-based system.
CO5.   Test and debug object-oriented PHP scripts.

UNIT-I:

Introduction to PHP, History of PHP, Versions of PHP, Features of PHP, Advantages of PHP over Other Scripting Languages, Installation and Configuration of PHP, Data Types in PHP, PHP Syntax, Comments, PHP Variables and Constants, Scope of Variables, PHP String, String Manipulation, PHP Operators, Precedence of Operators, Expressions, Creating a PHP Script, Running a PHP Script.

UNIT-II:

Basic HTML, Embedding PHP in HTML, Passing Information between Pages, PHP $_GET, PHP $_POST, PHP Conditional Statements, PHP Looping Statements, Break, Continue, Exit, PHP Functions: Built-in and User Defined Function, Regular Expression Functions, Mathematical, Date and Time Functions, PHP Arrays: Creating Array and Accessing Array Elements.

UNIT-III:

PHP File Permissions, Working with Files: Opening, Closing, Reading, Writing a File; Working with Directory: Creating, Deleting, Changing a Directory; Working with Forms: Introduction to a Web Form, Processing a Web Form, Validating a Web Form, Input Validation, PHP with Client Side Scripting Language, Exception and Error Handling in PHP, Introduction to Cookies and Session Handling.

UNIT-IV:

Working with Database: PHP-Supported Databases; Using PHP & My SQL: Installation and Configuration of My SQL on Windows, Checking Configuration, Connecting to Database, Selecting a Database, Adding Table and Altering Table in a Database, Inserting, Deleting and Modifying Data in a Table, Retrieving Data, Performing Queries, Processing Result Sets.

UNIT-V:

Code Re-use, require(), include(), and the include_path, File System Functions and File Input and Output, File Uploads, Use of CSS, Introduction to Object Oriented Programming with PHP, Installing and Configuring Apache to use PHP on Windows, php.ini File.

Reading List

TEXT BOOKS:

- PHP 5 And My SQL Bible, By Tim Converse And Joyce Park, Wiley-Dreamtech India Publications

REFERENCE BOOKS:

- PHP & My SQL, By VikramVaswani, TMH Publications
- PHP Essentials, By Julie C. Meloni, BPB Publications
- Web Technologies, Black Book, Dreamtech Press
- Core PHP Programming By Atkinson, Leon, New York: Prentice Hall
- Learning PHP 5, By David Sklar Publisher O'reilly Media
- Mastering PHP, By Charles, Publisher: BPB
- Expert PHP And MySQL, Wrox Programmer To Programmer, Wrox Press, 2010
- PHPFor Absolute Beginners, Apress, 2009
- Sams Teach Yourself CSSIn 24 Hours (2nd Edition), Sams Publishing, 2006

Subject Name: **E-Commerce & Digital Marketing**

Paper Code: **BCA 503.1**

COURSE OBJECTIVES:

1. To develop an understanding of scope of E-Commerce.
2. To develop an understanding of electronic market and market place.
3. To develop an understanding of business models.
4. To develop an understanding of legal issues, threats of E-Commerce.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Define various types of E-commerce.
CO2.   Describe hardware and software technologies for E-commerce.
CO3.   Explain payment systems for E-commerce.
CO4.   Describe the process of buying and selling on the web.
CO5.   Describe various E-business strategies.

UNIT-I:

E-Commerce an Introductions, Concepts, Advantages and Disadvantages, Technology in E-Commerce, Benefits and impact of E-commerce on travel industry, Goals of E-Commerce, Difference between E-Commerce and E- Business, Models of E-Commerce,Limitations and Advantages of E-Commerce.

UNIT-II:

Electronic Payment Systems- Introduction, Types of Electronic Payment Systems, Electronic Payment Systems, Smart Cards and Electronic Payment Systems, Credit Card-Based Electronic Payment Systems, Risk and Electronic Payment Systems.

UNIT-III:

E-Security Network and Web Site Risk for E-Business, Information Technology Act 2000 and its Highlights Related to E-commerce, E-Security,Firewalls, Electronic Market / E- Shop, Introduction to Security, Types of Securities, Security Tools, Network Security.

UNIT-IV:

E-Governance, E-democracy, Government Efforts to Encourage Citizen Participation, Privacy and Security Issues, Information Security Management Digital Divide. Applications in Governance, E-government, Government –to- business, Business-to-Government and Citizen-to-Government,E-Governance Models.

UNIT-V:

Digital marketingdefinition, different medium of digital marketing(PPC, search engine optimization, websites, social media marketing , email flipping , customized apps); advantages and disadvantages of digital marketing, Digital Advertising, digital security, digital payment method, digital signing.

Cyber Crime, Categorizing Cyber Crime, Information Warfare- Concept, information as an Intelligence Weapon, Attacks and Retaliation, Attack and Defense. Cyber Law.

Reading List

TEXT BOOKS:

- Digital Marketing and Practice By Dutta & Srivastav
- E-Commerce An Indian Perspective By P. Tjoseph, S.J. Prentice-Hall Of India

REFERENCE BOOKS:

- Frontiers Of Electronic Commerce, By- Kalakota, Ravi; Stone, Tom; Whinston, Andrew B, Addison Wesley Publishing Co,

Subject Name: **Artificial Intelligence**

Paper Code: **BCA 503.2**

COURSE OBJECTIVES:

1. To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements.
2. To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
3. To review the different stages of development of the AI field from human like behavior to Rational Agents.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1. Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.

CO2. Analyze and form the problem as a state space, graph, design heuristics and select among different search or game based techniques to solve them.

CO3. Develop intelligent algorithms for constraint satisfaction problems.

CO4. Design intelligent systems for game playing.

CO5. Apply concepts of NLP to problems leading to understanding of cognitive computing.

UNIT- I:

Introduction to the object and goal of artificial intelligence: Aim and scope of the artificial intelligence, problem space and problem characteristics, state space representation.

UNIT- II:

Problem Solving Techniques: Generate and test, hill climbing, search problem reduction techniques, constraint propagation, means-end-analysis, heuristics search techniques and heuristic problem solving.

Game Playing: And or graph search, game trees and associated techniques, minimax and alpha beta pruning. Some case studies

UNIT- III:

Knowledge representation and inferencing :Procedural and deductive approaches production system formalism, predicate logic (first order and second order), Rule based system, schematics net conceptual dependencies, conceptual path, frames, scripts associated inferencing mechanism. Resolution in predicate logic, unification , natural deduction theorem proving, forward and backward deduction.

UNIT- IV:

Uncertainity: Different techniques for reasoning under uncertainty, monotics and non monotic reasoning. Constraint satisfaction problem.

UNIT- V:

Learning: Introduction, Empiricist Algorithm, Matching Algorithm, Failure driven learning, Learning Languages

Reading List

TEXT BOOKS:

- Artficial Intelligence By Patrick,Henry,Winston , Pearson Education

REFERENCE BOOKS:

- Artificial Intelligence By Rich and Night
- Introduction to Artificial Intelligence By Charniak, Mc Dermott, Pearson Education

Subject Name: **Python**

Paper Code: **BCA 503.3**

COURSE OBJECTIVES:

1. The course is designed to provide Basic knowledge of Python.
2. Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1. Create scripts in Python.
CO2. Demonstrate the ability to solve problems using system approaches, critical and innovative thinking, and technology to create solutions.
CO3. Understand the purpose and the process of code reviews.
CO4. Design and develop applications using Python.
CO5. To make students well familiar with Python Modules.

UNIT- I:

Basic python Programming : Features of python, history, python constant, python strings, variables and identifiers, data types, operators and expressions.

UNIT- II:

Decission Control Statement : Selection / conditional branching, if, if-else, if-elif statement, lops in python

UNIT- III:

Functons : function definition, function call, variable scope and lifetime, return statement, arguments of python

UNIT- IV:

Modules : name of modules, making own modules, python modules, ,modules and namespaces, standard library modules.

UNIT- V:

File Handling : Introduction, types of files, opening and closing of files, reading and writing of files.

Reading List

TEXT BOOKS:

- Python Programming: An Introduction to Computer Science By John M Zelle

REFERENCE BOOKS:

- Programming Python: Powerful Object Oriented Programming By Mark Lutz
- Python Programming By Bruce Rogers
- Python Programming for Beginners By Joseph Joyner

Subject Name: **Financial Accounting**

Paper Code: **BCA 504.1**

COURSE OBJECTIVES:

1. This course will enable the students to combine practice and theoretical knowledge of financial accounting.
2. The students of this course will be active learners and develop awareness of emerging trends in financial accounting,
3. The course will provide decision making skills to the students in the financial analysis context,
4. The students of this course will have the ability to identify and analyze financial accounting problems and opportunities in real life situations.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.	To give the practical knowledge of accounting to the students.
CO2.	To make the students competent in preparation of Accounts for the Business Entities.
CO3.	Learn about Management Accounting and Cost Accounting.
CO4.	To make students well familiar with Computerized Accounting Packages.
CO5.	Able to implement voucher Entry in Tally, Making Print out of the financial statements.

Unit- I:

Meaning and Scope of Accounting: Meaning and Importance of Financial Accounting, Development and Definition of Accounting; Golden Rule of Accounting; Book-keeping and Accounting Processes, Types of Accounts, Different Branches of Accounting; Objectives of Accounting.

Unit- II:

Accounting Transactions: Meaning of Accounting Transaction, Meaning of Accounting Cycle; Preparation of Journal; Preparation of Ledger Account; Relationship between journal and ledger; Compound journal entry; Opening entry; posting to Trail Balance, Subsidiary Books and its applications; meaning of Depreciation, Method of Depreciation; Posting of Depreciation.

Unit- III:

Reporting of Accounting :Accounting concepts and Income measurement; Capital and Revenue - Classification of Income; Classification of expenditure; Classification of Receipts expired cost and Income measurement;

Preparation of Final Accounts (Trading Account, Manufacturing Account, Profit & Loss Account, Income & Expenditure Account; Balance Sheet.); Concepts on Accounts of Non – Trading Institutions

Unit- IV:

Management Accounting and Cost Accounting :Meaning of Management Accounting and its Utility, Meaning of Cost Accounting and its Utility, Application of Marginal Costing Technique, Marginal Contribution, Profit Volume Ration, Break Even Point, Margin of safety; Application of Budgetary Control, different type of Budget, Advantages of the Budgetary Control; Application of Standard Costing, Variance calculation for material, Labour, and overhead.

Unit- V:

Computerized Accounting Packages :History of Computerized Accounting Software; Present Scenario of Computerized Accounting Software in India, the fundamental posting process of transactions; Computerized Invoicing methods and applications; Introduction Tally; Voucher Entry in Tally, Making Print out of the financial statements.

Reading List

TEXT BOOKS:
- Financial Accounting By Bassu & Das
- Management Accounting By Dr. S.P. Gupta

REFERENCE BOOKS:

- Engineering Management By Mazda, 1st Edition, 2000, AddisenWesley
- Financial Management By I.M. Pandey, 8th Edition, 1999, VikasPublication

Subject Name: **Automata Theory**

Paper Code: **BCA 504.2**

COURSE OBJECTIVES:

1. To learn fundamentals of Regular and Context Free Grammars and Languages
2. To understand the relation between Regular Language and Finite Automata and machines.
3. To learn how to design Automata's and machines as Acceptors, Verifiers and Translators.
4. To understand the relation between Contexts free Languages, PDA and TM.

COURSE OUTCOMES:

This subject has divided into five units to fulfill the following objectives

CO1.   Design automata, regular expressions and context-free grammars accepting or generating a certain language.

CO2.   Transform between equivalent deterministic and non-deterministic finite automata, and regular expressions.

CO3.   Prove properties of languages, grammars and automata with rigorously formal mathematical methods.

CO4.   Determine if a certain word belongs to a language.

CO5.   Define Turing machines performing simple tasks.

UNIT-I:
Finite Automata DFA, NFA, NFA with ε-moves, Equivalence of DFA and NFA, Reduction of the number of states in finite automata

UNIT- II:
Regular Languages and Regular Grammar Concept of languages and grammar, Regular expressions, Connection between regular expressions and regular languages, Regular grammars, Right and Left-Linear Grammars, Equivalence between Regular languages and Regular grammars.

UNIT-III:
Properties of Regular Languages Closure under simple set operations- union, intersection, concatenation, complementation and star closure, Decision algorithms for emptiness, finiteness and infiniteness, equality, Proof of non regularity using Pigeonhole principle and using pumping lemma for regular languages.

UNIT-IV:
Context Free languages Context-free grammars, leftmost and rightmost derivations, derivation trees, Parsing and Ambiguity in grammars and languages, Simplification of Context free Grammars- removing useless productions, empty-productions and unit-productions. Normal forms- Chomsky and Greibach normal forms, Pumping Lemma for CFL, Using Pumping Lemma to show that certain languages are not Context free

UNIT-V:
Pushdown Automata Definition and language accepted (acceptance by empty stack and final state and their equivalence), Pushdown Automata and Context free languages. Deterministic PDA and Deterministic Context free Languages.

Reading List

Text Books:

- Theory of Computation, CENCAGE Learning BY Michal Sipser

Reference Books:

- Introduction to Automata Theory, Languages and Computation By Hopcroft, Motwani & Ullman 3rd Edn. LPE
- Introduction To Languages & Theory of Computation By Martin, TMH

- Finite Automata, Their Algebras and Grammars: Towards a Theory of Formal Expressions By Buchi A,Springer

6TH SEMESTER

Subject Name: **Major Project**
Paper Code: **BCA601**

Students undergo their major project in sixth semester with following objectives.

1. Student will get exposure to implement practical knowledge in real life applications.
2. Students will get exposure to enhance skills in problem solving, fault analysis and debugging.
3. Students will be able to discover potential research areas in the field of IT.
4. Demonstrate an ability to work in a team.
5. Compare and contrast the existing solutions for the research challenge.
6. Formulate and propose a plan for creating a solution for the research plan identified.
7. Report and present the findings of the study conducted in the preferred domain.
8. Establish a good repo with external organization and get employability skills.