DIT UNIVERSITY
Dehradun

Detailed Course Structure& Syllabus
of
BCA

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020
Course Structure

Year: 1ST   **Semester: 1ST**

Course Category	Course Code	Course Title	L	T	P	Credit
DC	CA101	Fundamentals of Computer	3	0	2	4
DC	CA102	Programming in C	3	0	2	4
DC	CA103	Discrete Mathematics	3	1	0	3.5
DC	CA104	Operating Systems	3	1	0	3.5
HE	HS101	Professional Communication	2	1	1	3
DC	CA105	Digital Electronics	3	1	0	3.5
AC	CA106	*Colloquium*	0	0	2	0
		Total				**21.5**

Year: 1ST   **Semester: 2ND**

Course Category	Course Code	Course Title	L	T	P	Credit
DC	CA111	Software Engineering	3	1	0	3.5
DC	CA112	Data Structures in C	3	0	2	4
DC	CA113	Theory of computation	3	1	0	3.5
DC	CA114	Computer Organization	3	1	0	3.5
DC	CA115	Computer Based Numerical Techniques	3	0	2	4
DC	CA116	Accounting and Financial Management	3	1	0	3.5
AC	CA117	*Soft Skills:*	0	0	2	0
		Total				**22**

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020
Course Structure

Year: 2ND   **Semester: 3RD**

Course Category	Course Code	Course Title	L	T	P	Credit
DC	CA201	Data Base Management Systems	3	0	2	4
DC	CA202	Design and Analysis of Algorithm	3	1	0	3.5
DC	CA203	Object Oriented Programming with C++	3	0	2	4
DC	CA204	Web Technologies	3	0	2	4
DC	CA205	Computer Networks	3	1	0	3.5
DC	CA206	Organization Behavior	3	0	0	3
AC	CA207	*Pre Project Seminar:*	0	0	2	0
		Total	18	2	8	22

Year: 2ND   **Semester: 4TH**

Course Category	Course Code	Course Title	L	T	P	Credit
DC	CA211	Management Information System	3	1	0	3.5
DC	CA212	Visual Programming with VB .Net	3	0	2	4
DC	CA213	Microprocessor	3	0	2	4
DC	CA214	Advanced Web Technologies	3	0	2	4
DC	CA215	Computer Graphics	3	0	2	4
DC	CA216	Unified Modeling Language	3	1	0	3.5
PRJCT	CA217	Project-I	0	0	4	2
AC	CA218	*Industrial Tour:*	0	0	0	0
		Total	18	2	10	25

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020
Course Structure

Year: 3RD   **Semester: 5TH**

Course Category	Course Code	Course Title	L	T	P	Credit
DC	CA301	Multimedia and Animation	3	1	0	3.5
DC	CA302	Probability and Statistics	3	1	0	3.5
DC	CA303	Data Warehouse and Data Mining	3	1	0	3.5
DE	CA35*	Department Elective I	3	1	0	3.5
DC	CA304	Linux and System Administration	3	0	2	4
DC	CA305	Java Programming	3	0	2	4
AC	CA306	*Aptitude Building*	0	0	2	0
ST	CA307	*Industrial Training Presentation*:	0	0	2	0
		Total	18	4	8	22

Department Elective I

CA351	Cryptography & Network Security
CA352	Mobile Computing
CA353	Software Testing

Year: 3RD   **Semester: 6TH**

Course Category	Course Code	Course Title	L	T	P	Credit
DC	CA311	Software Project Management	3	1	0	3.5
DC	CA312	Artificial Intelligence	3	1	0	3.5
DC	CA313	Python Programming	3	0	2	4
DE	CA36*	Department Elective II	3	1	0	3.5
DC	CA314	E-commerce	3	1	0	3.5
DC	CA315	Mobile Application Development using Android	3	0	2	4
PRJCT	CA316	Project –II	0	0	4	2
		Total	18	4	8	24

OR

Course Category	Course Code	Course Title	L	T	P	Credit
PRJT	CA317	Industrial Project	0	0	32	16

Department Elective II

CA361	Ethical hacking & Cyber law
CA362	Cloud computing
CA363	Enterprise Resource Planning

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Summary of the Credit

Year	Semester	Credit
1	1	21.5
	2	22
2	3	22
	4	25
3	5	22
	6	24/16
Total		136.5/128.5

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020
Detailed Syllabus

Program/Branch:BCA

Subject Code	CA101	Subject Title	Fundamentals of Computer						
LTP	302	Credit	4	Subject Category	DC	Year	1	Semester	1

Course Objective:

Aware the student with the basics of computer- Hardware, Software, Operating System, Communication Systems. Student need to be familiar with Office Tools – Ms-Word, Ms-Excel and Ms- Power Point.

Detailed Syllabus

UNIT 1

Computer : Introduction, characteristics of computer; History of computers; classification of computers on size, architecture and chronology; Applications of computers; Commonly used terms–Hardware, Software, Firmware; Computer Architecture and organization; Input, Process and Output; Representation of information; BIT, BYTE,

UNIT 2

Memory, Memory size; Units of measurement of storage; Input/output devices; Secondary storage devices; Networking concepts - LAN, WAN and Topologies: Types of software; system and application software;.

UNIT 3

Operating system concepts, Different types of operating systems, structure of operating system,DOS/UNIX/LINUX commands, Data Processing, File systems and Database Management Systems, Different types of Database Management System.

UNIT 4

Basic elements of a Communication System, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network topologies, Network Types (LAN, WAN and MAN), Communication protocols, Internetworking tools, Distributed Computing Systems

UNIT 5

Introduction MS Windows 8,Desktop, creation of folders and shortcuts, features of Windows explorer, Familiarization and using MS packages – Word, Excel, PowerPoint, basic skills in using these tools.(Version MS-Office'XP).

Learning Outcome

After studying this course, you should be able to:
- understand the fundamental hardware components that make up a computer's hardware and the role of each of these components
- understand the difference between an operating system and an application program, and what each is used for in a computer

Approved by the Academic Council at its 6th Meeting held on 13.05.2017

Text book [TB]:

1. **Programming in ANSI C**, Balaguruswamy, Tata McGraw-Hill, 4th Edition, 2008.

2. **Problem Solving and Program Design in C,**Jeri R. Hanly& Elliot P, Pearson, 7thEdition, 2013.

Reference books [RB]:

1.**The C programming Language.**, Dennis Ritchie, Pearson,6th Edition,2015.

2.**Structured programming approach using C**,ForouzanCeilber, Thomson learning publication, 3rdEdition, 2007.

3. **Pointers in C** ,YashwantKanetkar, BPB Publication,3rd Edition,2003.

Subject Code	CA102	Subject Title	Programming in C						
LTP	302	Credit	4	Subject Category	DC	Year	1	Semester	1

Course Objective:

To understand computer programming and its roles in problem solving, Understand and develop well-structured programs using C language, basic file handling operation through implementing in C language.

Detailed Syllabus

UNIT 1

Problem analysis, need for programmed languages, introduction to algorithms, algorithmic representations, Pseudo codes flow charts and decision tables, structured programming and modular programming

UNIT2

Over view of C, Constant, variables, data, types and size, variable declaration, operators and expressions, type conversion, conditional expression, special operators, precedence rules. Decision making, looping and control structures. Data input/output. Input/output: Unformatted & formatted I/O function in C, Input functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(),putch(), putchar(), puts().

UNIT3

Arrays and String: defining and processing an array, one dimensional arrays, multidimensional arrays, passing arrays to functions, Handling of character strings. Pointers: Declaration, operations on pointers, array of pointers, pointers to arrays. Structure and Unions: Defining and processing a structure, user defined data types, structure and Pointers, nested structure, self-referential structures, and unions

UNIT4

Program structure: Storage classes, automatic, external, and static variables. Data files: Opening, closing, creating, and processing and unformatted data field.

UNIT 5

File Management in C: introduction to data files, opening & closing a file, file types, fopen, fgets, fputs, fscanf, fprintf, fclose.

Text book [TB]:

1. **Programming in ANSI C**, Balaguruswamy, Tata McGraw-Hill, 4th Edition, 2008.

2. **Problem Solving and Program Design in C,**Jeri R. Hanly& Elliot P, Pearson, 7thEdition, 2013.

Reference Books

1.**The C programming Language.**, Dennis Ritchie, Pearson,6th Edition,2015.

2.**Structured programming approach using C**,Forouzan Ceilber, Thomson learning publication, 3rdEdition, 2007.

3. **Pointers in C** ,YashwantKanetkar, BPB Publication,3rd Edition,2003.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA103	Subject Title	Discrete Mathematics						
LTP	310	Credit	3.5	Subject Category	DC	Year	1	Semester	1

Course Objective:

To understand the needs the precision of mathematical notation and techniques. Specify computational problems using mathematical objects such as sets, functions, relations, orders, and sequences.

Detailed Syllabus

UNIT 1

SETS: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets,Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, SimpleApplications.

RELATIONS AND FUNCTIONS: Properties of Relations, Equivalence Relation, PartialOrder Relation Function: Domain and Range, Onto, Into and One to One Functions, Compositeand Inverse Functions, Hashing functions, Recursive function.

UNIT2

PARTIAL ORDER RELATIONS AND LATTICES: Partial Order Sets, Representation ofPOSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices &Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed &Complemented Lattices.

UNIT3

Graphs: types and operations(bipartite graph. Subgraph, distance of a graph, cut-edges &cutvertices, isomorphic and homomorphic graphs), degree of graphs, adjacent and incidencematrices, path circuit(Floyd's and Warshall algorithms), hamiltonian graph, graph coloring.

UNIT4

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 5

Groups and Rings: Groups -Subgroups, Generation and evaluation of process- Rings, Integral domains and fields (definitions and simple properties only)

Learning Outcome

After studying this course, you should be able to:

- Problem solving through computer programming
- Ability to use different memory allocation methods
- Ability to deal with different input/output methods
- Ability to use different file structures

Text book [TB]:
1.**Discrete Mathematics and its Applications,** Rosen K.H, McGraw Hill, 6thEdition 2006**.**
2. **Discrete Mathematical Structure,** Kolman, Busby and Ross, PHI, 6th Edition 2009.

Reference Books:
1. **Discrete Math,** S.K. Sarkar, S. Chand & Co, 9thEdition , 2016.
2. **Discrete Mathematical Structures with Applications toComputer Science**, Tremblay, J.P. and Manohar, Tata McGraw Hill, 5th Edition2007.

Approved by the Academic Council at its 6th Meeting held on 13.05.2017

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA104	Subject Title	Operating Systems						
LTP	310	Credit	3.5	Subject Category	DC	Year	1	Semester	1

Course Objective:

Understanding of operating system concepts and the role it plays, Anunderstanding of the structure of operating systems, applications, and the relationship between them. Some knowledge of the services provided by operating systems. Exposure to some details of major OS

Detailed Syllabus

UNIT 1
Importance of OS, Basic concepts and terminology, types of OS, What is an OS , Functions, Structure, Types : Batch , Multiprogramming , Timesharing , Real time ,Multiprocessor system , Distributed system , OS as Resource manager , Booting process, POST.

UNIT2
Processor Management: Functions, Process, Process states, State transition, PCB, Events related to process, Process scheduling, Scheduling objectives , Scheduling levels , Preemptive and non preemptive scheduling algorithms , Concurrent processes , Process synchronization , Mutual exclusion and critical section , Solution to mutual exclusion problem : Software , Hardware & Semaphore Solutions , Classical problems of mutual exclusion , Deadlock :Handling deadlock , Prevention , Avoidance , Detection and Recovery.

UNIT3
Memory Management: Functions , Contiguous : State and Dynamic , Non-contiguous Segmentation and Paging , Virtual memory , Demand paging , Page replacement policies , Working Set principle .

UNIT4
File Management: Information management: File system, Functions, File directory, File system structure, File system design: Symbolic, Basic, Logical and Physical file system layers, File organization, Fileallocation, free space management, File protection and security.

UNIT 5
Device Management: Disk scheduling, Disk scheduling policies, Device management: Functions,T echniques for device management: Dedicated, Shared, Virtual, Spooling, Channels and Control unit.
Case Study: Introduction to Linux/UNIX.

Learning Outcome

- Write an argument using logical notation and determine if the argument is or is not valid.
- Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
- Understand the basic principles of sets and operations in sets.
- Prove basic set equalities.

Text book [TB]:
1.**Operating System Concepts**, Silbersachatz and Galvin, John Wiley & Sons, 7th Ed., 2005

2. **Operating System**, Haldar, Aravind,Pearson Education, 2nd Edition, 2014.

Reference Books
1.**Modern Operating System**, Tannenbaum,PHI, 4th Edition, 2016.

2.**Operating Systems**, Nutt, Pearson Education, 3rd Edition, 2009

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	HS101	Subject Title	Professional Communication					
LTP	202	Credit	3	Subject Category	HE	Year	1	Semester	1

Course Objective:

Improve the writing practices: prewriting, composing, revising, responding, editing, attending to language and style, and writing with audience and purpose in mind. recognize, evaluate, and use in their writing a variety of information sources: expert people, publications of information agencies, popular and specialized periodicals, professional journals, books, and electronic resources.

Detailed Syllabus

UNIT 1

Communication: Definition & Process, Types of Communication: Oral, Written, General, Technical, Verbal Communication, Non Verbal Communication: Kinesics, Proxemics, Chronemics, Oculesics, Haptics, Paralinguistics, Communication Flow and Communication Network, Barriers to Communication, Overcoming strategies.

UNIT2

Listening skills : Importance, Objectives, Process, Types, Barriers, Methods for improving Listening skills, Listening Comprehension: identifying General & Specific information, Note taking and drawing inferences.

UNIT3

Reading skills: Importance, Types, Techniques of improving reading skills, Vocabulary Building: Etymology & Roots, Antonyms, Synonyms, Homophones, Homonyms, One word substitution, Reading Comprehension

UNIT4

Paragraph construction: Features & Types, Paragraph writing, Comprehension passages, Precis writing, Letter Writing, Job Application Letter and Resume

UNIT 5

Types,Features, Elements Format Etc., Preparing a Technical Report, Preparing a Technical Proposal

Learning Outcome

- Students will demonstrate competency in communication skills related to production and presentation of messages in multiple formats.
- Students will demonstrate competency in critical thinking skills related to the analysis, interpretation, and criticism of messages.

Text book [TB]:

1   1. **Technical Communication: Principles and Practice**,Raman,Meenakshi and Sangeeta Sharma,2nd Edition, New Delhi: Oxford University Press, 2011.

2   **Effective Technical Communication**, Rizvi, Ashraf, McGraw Hill, New Delhi. 2005.

Reference Books
1   **Introduction of English Phonetics and Phonology,**Aslam, Mohammad,**Cambridge,2003.
2   **Basic Communication Skills,**Ford A, Ruther, Pearson Education, New Delhi,2013.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA105	Subject Title	Digital Electronics						
LTP	310	Credit	3.5	Subject Category	DC	Year	1	Semester	1

Course Objective:

To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits. Prepare students to perform the analysis and design of various digital electronic circuits.
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Detailed Syllabus

UNIT 1
Introduction: Logic gates NOT, AND, OR, Universal gates- NAND, NOR. EX-OR and EX-NOR gates. Diode and Transistor as a switch Logic Families-RTL,DTL,TTL,ECL,CMOS – (Main features only - without details of circuit connections and working). Definition of- current and voltage parameters, noise margin, Concepts of Fan -in, Fan-out, Boolean algebra: Basics Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using K-maps.

UNIT2
Data and number representation- binary-complement representation BCD-ASCII, conversion of numbers form one system to the other, 2's complement representation, binary arithmetic Review of various number systems (Binary, Octal, Hexadecimal), Definition of BCD , Gray codes and Excess – 3 codes and their application (without design of code convertors), Parity generation and Checking.

UNIT3
Arithmetic Circuits: Adder, Subtractor, Parallel binary adder/Subtractor, binary multiplier and divider. Combinational Circuits: Multiplexers, De-Multiplexers, decoders, encoders.

UNIT4
Flip-flops: S-R, D, J-K, T, Clocked Flip-flop, Race around condition, Master slave Flip-Flop, Realization of one flip-flop using other flip-flop. Shift Registers: Serial-in-serial-out, serial-in-parallel-out, parallel-in-serial-out and parallel-in-parallel-out, Bi-directional shift register.

UNIT 5
Counters: Ripple counter, Synchronous Counter, Modulo Counters, Ring Counter, Twisted Ring, Memory Devices - RAM, ROM, PAL & PLA

Learning Outcome
- Have a thorough understanding of the fundamental concepts and techniques used in digital
  electronics.
- To understand and examine the structure of various number systems and its application in
  digital design.

Text book [TB]:

1. **Digital Logic and Computer Design**, M.M. Mano, PHI, 5th Edition, 2008

2.**Digital fundamentals**, Floyd, L, Thomas, Universal Book Stall, 10th Edition, 1998

Reference Books

1. **Computer Architecture,** M.M. Mano, PHI, 3rd Edition, 1998

2. **Computer Organization,**Hamcher, Vranesic and Zaky, McGraw-Hill, Signapore, 5th Edition,2000

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA111	Subject Title	Software Engineering						
LTP	310	Credit	3.5	Subject Category	DC	Year	1	Semester	2

Course Objective:

The program's goal is to provide a professionally guided education in software engineering that prepares graduates to transition into a broad range of career options: industry, government, computing graduate program, and professional education

Detailed Syllabus

UNIT 1

Introduction to Software Engineering: Definitions - Size Factors - Quality and Productivity Factors - Managerial Issues - Planning a software project: Defining the problem - Developing a Solution Strategy - Planning the Development Process - Planning an Organization structure - Other Planning Activities.

UNIT 2

Software Cost Estimation: Software cost factors - Software Cost Estimation Techniques - Staffing-level Estimation - Estimating Software Maintenance Costs - The Software Requirements Specification - Formal Specification Techniques - Languages and Processors for Requirements Specification.

UNIT 3

Software design: Fundamental Design Concepts - Modules and Modularization Criteria - Design Notations - Design Techniques - Detailed Design Considerations - Real-Time and Distributed System Design - Test Plans - Milestones, walkthroughs, and Inspections.

UNIT 4

Implementation issues: Structured Coding Techniques - Coding Style - Standards and Guidelines - documentation guidelines - Type Checking - Scoping Rules - Concurrency Mechanisms.

UNIT 5

Quality Assurance - Walkthroughs and Inspections - Static Analysis - Symbolic Execution - Unit Testing and Debugging - System Testing - Formal Verification: Enhancing Maintainability during Development - Managerial Aspects of Software Maintenance - Source Code Metrics - Other Maintenance Tools and Techniques.

Learning Outcome

an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, manufacturability, sustainability, ethical, health and safety;

Text book [TB]:
Text Books:

1. **Software engineering**, K.K.Aggarwal& Yogesh Singh, New Age International,2nd Edition,2005.

2. **Software Engineering**,I.Sommerville, Addison Wesley,10th Edition, 2006.

Reference Books

1. **Software Engineering – A Practitioner's Approach**, Roger S Pressman, McGraw Hills Publication, 8th Edition, 2012.

2.**SoftwareArchitectureIn Practice**, Len Bass, SEI Series, 3rd Edition, 2010.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA112	Subject Title	Data Structures in C						
LTP	302	Credit	4	Subject Category	DC	Year	1	Semester	2

Course Objective: The objectives of this course are

- To develop students' knowledge and understanding of the fundamental principles of data structures.

- Develop students' skills in analyzing data structures.

- Build up students' capacity to evaluate different algorithmic techniques.

Detailed Syllabus

UNIT 1

Introduction and Overview: Definition, Elementary data organization, Data Structures, data structures operations, Abstract data types, algorithms complexity, time-space tradeoff.Preliminaries: Mathematical notations and functions, Algorithmic notations, control structures, Complexity of algorithms, asymptotic notations for complexity of algorithms. String Processing: Definition, Storing Stings, String as ADT, String operations, word/text processing, Pattern Matching algorithms.

UNIT 2

Arrays: Definition, Linear arrays, arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear arrays, Inserting and deleting, Sorting: Bubble sort, Insertion sort, Selection sort, searching: Linear Search.

UNIT 3

Linked list: Definition, Representation of Singly linked list in memory, Traversing a Singly linked list, Searching a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list, Deletion from a singly liked list; Doubly liked list, Header liked list, Circular linked list.

UNIT 4

Stacks–Definition, Array representation of stacks, Linked representation of stacks, Stack as ADT, Arithmetic Expressions: Polish Notation, Application of Stacks, Recursion, Towers of Hanoi, Implementation of recursive procedures by stack. Queues–Definition, Array representation of queue, Linked list representation of queues Types of queue: Simple queue, Circular queue, Double ended queue, Priority queue, Operations on Queues, Applications of queues.

UNIT 5

Graphs: Graph theory terminology, Sequential representation of Graphs: Adjacency matrix, traversing a Graph. Tree–Definitions, Binary trees, Representing binary trees in memory, Traversing, Binary Trees, Binary Search Trees, Searching, Inserting and Deleting in a Binary Search Tree

Learning Outcome

Upon successful completion of this course, the student will be able to:

- Describe the basic operations on arrays, lists, stacks and queue data structures.

- Explain the notions of hashing, trees and binary search trees.

Approved by the Academic Council at its 6th Meeting held on 13.05.2017

- Describe the efficiency of algorithms with respect to the choice of data structures.

- Explain the basic concepts of object-oriented programming.

Text book [TB]:

1.**Data Structure** ,SeymourLipschutz, Tata-McGraw-Hill, 10th Edition, 2014

2. **Fundamentals of Data Structures in C**, Horowitz, Sahni& Anderson-Freed, University Press, 2nd Edition 2009.

Reference Books

1. **An Introduction to Data Structures with Applications**. , Jean-Paul Tremblay & Paul G, Mc Graw Hill Publishing, 7th Edition, 2014.

2.**Data Structures: A Pseudo-code approach with C**, Gilberg&Forouzan, Thomson Learning, 3rd Edition 2010.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA113	Subject Title	Theory of computation						
LTP	310	Credit	3.5	Subject Category	DC	Year	1	Semester	2

Course Objective:

To introduce students the basic concepts in theoretical computer science, and the formal relationships among machines, languages and grammars. Be able to construct finite state machines and the equivalent regular expressions.

Detailed Syllabus

UNIT 1

Automata: Introduction to formal proof, Additional forms of proof, Inductive proofs, Finite Automata (FA), Deterministic Finite Automata (DFA), Non-deterministic Finite Automata (NFA), Finite Automata with Epsilon transitions.

UNIT 2

Regular Expression and Languages: Regular Expression, A and Regular Expressions, Proving languages not to be regular, Closure properties of regular languages, Equivalence and minimization of Automata.

UNIT 3

Context-free Grammars and Languages :Context -Free Grammar (CFG),Parse Trees, Ambiguity in grammars and languages, Definition of the Pushdown automata, Languages of a Pushdown Automata, Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata

UNIT 4

Properties of Context-free Languages: Normal forms for CFG, Pumping Lemma for CFL, Closure Properties of CFL, Turing Machines, Programming Techniques for TM.

UNIT 5

Undecidability: A language that is not Recursively Enumerable (RE),An undecidable problem that is RE, Undecidable problems about Turing Machine, Post's Correspondence Problem, The classes P and NP.

Learning Outcome

Explain the basic concepts of deterministic and non-deterministic finite automata, regular language, context-free language, Turing machines, Church's thesis, halting problem, computability and complexity

Text book [TB]:
1. **Introduction to Automata Theory, Languages and Computations**, J.E. Hopcroft, R. Motwani and J.D. Ullman, Pearson Educational, 2nd Edition 2001

2. **Elements of the theory of Computation**, H.R. Lewis and C.H. Papadimitriou, Pearson Education, 2nd Edition, 2005

Reference Books:
1. **An Introduction to the Theory of Computer Science, Languages and Machines**, Thomas A. Sudkamp,Pearson Education, 3rd Edition 2008

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA114	Subject Title	Computer Organization						
LTP	310	Credit	3.5	Subject Category	DC	Year	1	Semester	2

Course Objective:

This course will introduce students to the fundamental concepts underlying modern computer organization and architecture. Main objective of the course is to familiarize students about hardware design including logic design

Detailed Syllabus

UNIT 1

Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations

UNIT 2

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instruction, Timing and Control, Instruction Cycle, Memory Reference Instruction, Input-Output Interrupt, Design of Basic Computer, Design of Accumulator Logic

UNIT 3

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Format, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT 4

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithm, Floating-Point Arithmetic Operation, Decimal Arithmetic Unit.

UNIT 5

Input-Output and Memory Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Direct Memory Access, Input-Output Processor, Memory Hierarchy, Associative Memory, Cache Memory, Virtual Memory

Learning Outcome

By the end of this course, students should be able to:

- understand the basics of computer hardware and how software interacts with computer hardware
- analyze and evaluate computer performance
- understand how computers represent and manipulate data
- use Boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits

Text book [TB]:

1. **M.Morris Mano**-Computer System Architecture, 3rd Edition, Pearson Education, New Delhi, 2006.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Reference Books:

1. W.Stallings- Computer Organization & Architecture, 7th Edition, Pearson Education, New Delhi, 2006

2. N. Carter- Computer Architecture, Schaums Outline Series, TMH, New Delhi, 2006, Pearson Higher

1. W.Stallings- Computer Organization & Architecture, 7th Edition, Pearson Education, New Delhi, 2006

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA115	Subject Title	Computer Based Numerical Techniques						
LTP	302	Credit	4	Subject Category	DC	Year	1	Semester	2

Course Objective:

The objective of this course is to provide conceptual understanding of various numerical methods, in particular, with reference to numerical solution of non linear equations and system of linear equations, interpolation, numerical differentiation and integration and numerical solution of ordinary differential equations.

Detailed Syllabus

UNIT 1

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation. Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration Method, Regula-Falsi method, Newton Raphson method, Secant method

UNIT 2

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination and Gauss Jordan. Gauss Seidal iterative methods, Interpolation and approximation: Finite Differences, Difference tables. Polynomial Interpolation: Newton's forward and backward formula.Langrange's interpolation

UNIT 3

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's rules, Gaussian Quadrature Formula. Solution of differential equations: Picard's Method, Euler's Method, Taylor's Method,Runge-Kutta methods, Predictor-corrector method.

UNIT 4

Curve fitting, Method of least squares, fitting of straight lines, polynomials, exponential curves etc Frequency Chart: Different frequency chart like Histogram, Frequency curve, Pi-chart. Regression analysis, Multiple regression

UNIT 5

Time series and forcasting: Moving averages, smoothening of curves, forecasting models and methods. Statistical Quality Controls methods. Testing of Hypothesis: Test of significance, Chi-square test, t-test, ANOVA, F-Test. Application to medicine, agriculture etc

Learning Outcome

The student will be able:
- To learn fundamentals and concepts of statistical and optimization methods, in particular, with reference to frequency distribution and measures of central tendency, measures of dispersion, skew ness and kurtosis,
- To solve problems on theory of probability, linear programming problems, transportation, assignment and game problems.

Text book [TB]:

1. **Applied Numerical Analyses**, C.F Gerald& Wheatley, Addison Wesley, 7th Edison, 2011.

2**. Computer Oriented Numerical Methods**,Rajaraman V., PHI, 3rd Edition, 2013.

Reference Books

1. **Numerical Methods for Scientific and Engineering Computations**, Jain, Iyengar and Jain, New Age Int, 6th Edition, 2012.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA116	Subject Title	Accounting and Financial Management						
LTP	310	Credit	3.5	Subject Category	DC	Year	1	Semester	2

Course Objectives

- Ability to organize, analyze and interpret numerical and financial data
- Knowledge of economics and accounting in addition to finance
- Demonstrate the ability to organize, analyze and draw appropriate conclusions from financial information

Unit I

Introduction: History and Development of Accounting–Meaning Objectives and functions of Accounting, Book–keeping V/s Accounting –Users of accounting data–systems of book-keeping and accounting –branches of accounting–advantages and limitations of accounting. Accounting Concepts and conventions: Meaning need and classification, Accounting standards–meaning, need and classification of Indian accounting standards. Accounting principles V/s Accounting standards.

Unit II

Financial Accounting Process: Classification of accounting transaction and accounts, rules of debit and credit as per Double Entry System. Journalisation and Ledger position Preparation of different subsidiary books: Purchase Day Book Sales Day Book, Purchase Returns Day Books, Sales Returns Day Book, Cash Book. Bank Reconciliation Statement: Meaning, Need, Definition, preparation of BRS

Unit III

Accounting for bill of exchange: Meaning, Need, Definition, Partice to Bill of Exchange, Types of Bills. Accounts Procedure: Honour of the Bill, Dishonour of the Bill, Endorsement, Discounting, Renewal, Bills for collection, Retirement of the Bill, Accommodation Bills, Bill Receivable Book and Payable Book. Preparation of Trial Balance: Rectification of errors and journal Proper.

Unit IV

Preparation of Final accounts: Meaning, need and classification, Preparation of Manufacturing, Trading, Profit and loss account and Balance-Sheet of sale–traders and partnership firms.

Unit V

Accounting Software Packages, Accounting Software packages. An overview of computerized accounting system - Salient features and significance.

Outcomes:

- Acquire knowledge about general aspects of business operations.
- Describe the role of accounting information system and its limitations.
- Explain the concepts and procedures of financial reporting, including income statement, statement of retained earnings, balance sheet, and statement of cash flows.

Text Books

1. **Cost Accounting-An Introduction**, Nigam & Jain, PHI, 3rd Edition, 2010.
2**. Management Accounting**, Pande, VIKAS Publication, 6th Edition, 2009.

Reference Books

1. **Cost & Management Accounting** ,Inamdar.EPH Publication 5th Edition 2010.
2. **Engineering Management,**Mazda, Addisen Wesley, 3rd Edition, 2009.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA117	Subject Title	Soft Skills						
LTP	002	Credit	0	Subject Category	AC	Year	2	Semester	2

Course Objective:

- To introduce to students to the business & corporate environment and its expectations.
- To ensure employability of students through a perfect blend of hard & soft skills.

Detailed Syllabus

UNIT 1

1. swot analysis
2. goal setting
3. interpersonal, intrapersonal communication & attitude

UNIT 2

1. decision making ability and creative thinking

2. team building and leadership

3. business etiquettes

UNIT 3

1. career planning

2. self & time management

3. motivation

4. interview skills

.

Learning Outcome

- Students identify their goals and through enhanced soft skills work towards achieving them.
- Greater self-confidence and knowledge of life skills helps them to develop healthier interpersonal relationships.
- Prepares the students to face future challenges and excel in their personal and professional lives.

Text book [TB]:

- The Seven Habits of Highly Effective People by Steven R. Covey. 2007.
- How to win Friends and influence People by Dale Carnegie. 2009.
- Soft Skills: Know Yourself & Know the World by Dr. Alex . S. Chand Publications 2001.
- The ACE of Soft Skills: Attitude, Communication and Etiquette for Success by Gopalswamy Ramesh. 2008.
- Managing Soft skills for Personality development by B. N Ghosh. 2006.
- Personality Development by Elizabeth B. Hurlock. TMH Publication. 2010.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA201	Subject Title	Database Management Systems						
LTP	302	Credit	4	Subject Category	DC	Year	2	Semester	3

Course Objective:

Objective of this course is to introduce the data base management system. To introduce the server query language and designing the database for the system. It enable the students to generate the query and to the transaction of data to perform various task of the different management system.

Detailed Syllabus

UNIT 1
History of Data base Systems, Database System Vs File System, Database System concepts and architecture, data models schema and instances, data independence, interfaces, Database Languages,DDL, DML, Overall Database Structure, data base Users and Administrator.ER model concepts, notation for ER diagram, Mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation.

UNIT 2
Relational data model concepts, integrity constraints: entity integrity, Referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus.

UNIT 3
Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL Commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate Functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL.PL/SQL, Triggers and cursors.
.
UNIT 4
Data Base Design & Normalization: Role of Normalization, Schema refinement, Problems Caused by redundancy, Functional dependencies, normal forms, first, second, third normal Forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs

UNIT 5
Transaction Processing Concepts: Transaction system, Transaction concepts : Transaction execution and Problems, Transaction execution and control with SQL, Transaction properties, Transaction log, Concurrency control, locking Techniques for concurrency control

Learning Outcome

At the end of this class, the successful student will:
- have a broad understanding of database concepts and database management system software
- have a high-level understanding of major DBMS components and their function
- be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.

be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS

Text book [TB]:

1. **Data base System Concepts,** Silberschatz, Korth, McGraw hill,USA, 6th edition, 2011.

2. **Fundamentals of Database Systems,** ElmasriNavate, Pearson Education, India, 6th edition, 2010

Reference Book:
1.**Introduction to Database Systems,** C.J.Date, Pearson Education, India, 8th edition, 2003.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA202	Subject Title	Design and Analysis Of Algorithm					
LTP	310	Credit	3.5	Subject Category	DC	Year	2	Semester	3

Course Objective:

Objective of this course is to study and analyse the algorithms. It provides us with the mathematical and technical approaches of solving problems in various ways. This course enables the students to design the algorithm to solve the problems and to find out the complexity of the program. It enables the students to check how the worst case complexity of an algorithm is defined.

Detailed Syllabus

UNIT 1

Introduction: Algorithms, Pseudo code for expressing algorithms, Space complexity, Time complexity, Asymptotic Notation-Big oh notation, Omega notation, Theta notation and Little oh notation. Sorting: buble

UNIT 2

Recurrences - substitution, iteration and master methods Sorting :buble sort, selection sort.   Divide-and-conquer: general approach, binary search, merge sort, quick sort, Strassen's matrix multiplication
.

UNIT 3

Greedy algorithms -general approach, activity selection, knapsack problem, minimum-spanning tree, Diskstra's algorithm, Huffman code
.

UNIT 4

Dynamic Programming -General approach, matrix-chain multiplication, all-pairs shortest paths, binary search tree, traveling salesperson, 0/1 knapsack problem

UNIT 5

Branch and Bound: Traveling sales man problem, Linear programming.
Backtracking: General method, applications-n-queen problem, sum of subset problem.

Learning Outcome

- Know the big O, omega, and theta notations and their usage to give asymptotic upper, lower, and tight bounds on time and space complexity of algorithms.

- Know how to determine the worst time complexity of algorithms

- Know how to design algorithms using the divide-and-conquer strategy, and recite algorithms that employ this strategy

Text book [TB]:

1. **Introduction to Algorithms**, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd./ Pearson Education, India, 2nd edition, 2001.

2. **Fundamentals of Computer Algorithms**, Ellis Horowitz, SatrajSahniandRajasekharam, Galgotia publications pvt.Ltd,New Delhi India, 2nd edition, 2007

Reference Books
1. **Introduction to Design and Analysis of Algorithms A strategic approach**, .C.T.Lee, S.S.Tseng, Chang and T.Tsai, Mc GrawHill,USA, 2/e, 2007.

2. **Design and Analysis of algorithms**, Aho, Ullman and Hopcroft, Pearson education,India, 4/e, 2009

3. **Algorithms,** Richard Johnson baugh and Marcus Schaefer, Pearson Education, India, 3/e, 2006

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA203	Subject Title		Object Oriented Programming with C++					
LTP	302	Credit	4	Subject Category	DC	Year	2	Semester	3

Course Objective:

Understand object oriented programming and advanced C++ concepts. Be able to explain the difference between object oriented programming and→ procedural programming. Be able to program using more advanced C++ features such as→ composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc. Be able to build C++ classes using appropriate encapsulation and design→ principles.

Detailed Syllabus

UNIT 1

Object Oriented Programming- Object-Oriented programming features and benefits. Object Oriented features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Static Data Members and Member Functions, Nested and Local Class, Accessing Members of Class and Structure, Preprocessor Directives, Namespace.

UNIT 2

Initialization & Cleanup- Constructors – Default, Parameterized & Copy Constructors and Default Values to Parameters, Destructors.Console I/O: Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations, Manipulators, Arrays, array of Objects, Passing and Returning Objects to Functions, String Handling in C++. Dynamic Memory Management: Pointers, new and delete Operator, Array of Pointers to Objects, this Pointer, Passing Parameters to Functions by Reference &pointers,Friend Function, Friend Class.

UNIT 3

Inheritance- Rules of Derivations – Private, Protected and Public Derivations, Different Forms of Inheritance – Single, Multiple, Multilevel, Hierarchical and Multipath Inheritance, Roles of Constructors and Destructors in Inheritance,
.

UNIT 4

Polymorphism-Function Overloading, Operator Overloading, Function Overriding, Virtual Function and its Need, Pure Virtual Function, Abstract Class, Virtual Derivation, Virtual Destructor. Type Conversion: Basic Type Conversion, Conversion between Objects and Basic Types, Conversion between Objects of Different Classes.

UNIT 5

Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files, Opening and Closing Files, File Pointers, Manipulators and Error Handling.

Learning Outcome

After the completion of this course, a successful student will be able to do the following:

- Use the characteristics of an object-oriented programming language in a program.
- Use the basic object-oriented design principles in computer problem solving.
- Use the basic principles of software engineering in managing complex software project.
- Program with advanced features of the C++ programming language.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Text book [TB]:

1.**Object Oriented Programming with C++,**Balaguruswami, E, Tata McGraw-Hill, 6Edition 2017.

2**. C++,The Complete Reference,**HerbertSchildt, Tata McGraw-Hill Education Pvt. Ltd., 4e, 2003.

Reference Books:

1..**Object Oriented Programming using C++ ,** Robert Lafore, BPB Publication , 2004

2. **Object Oriented Programming using C++,** YashwantKaneth, BPB, 2004

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA204	Subject Title	Web Technologies						
LTP	302	Credit	4	Subject Category	DC	Year	2	Semester	3

Course Objective:

This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web

Detailed Syllabus

UNIT 1
Internet Basic - Introduction to HTML - List - Creating Table - Linking document Frames - Graphics to HTML Doc - Style sheet - Style sheet basic - Add style to document - Creating Style sheet rules - Style sheet properties - Font - Text - List - Color and background color - Box - Display properties.

UNIT 2
Introduction to Javascript - Advantage of Javascript ,Javascript Syntax - Datatype - Variable - Array - Operator and Expression - Looping Constructor - Function - Dialog box.

UNIT 3
Javascript document object model - Introduction - Object in HTML - Event Handling - Window Object - Document object - Browser Object - Form Object - Navigator object Screen object - Build in Object - User defined object - Cookies.
.

UNIT 4
XML: Introduction, The Need for XML, Structured Data and Formatting, Advantages of XML, SGML, XML, and HTML, World Wide Web Consortium (W3C) Specifications and Grammars,

UNIT 5
XML Applications and Tools: Creating and Viewing XML Documents, Transforming XML Documents, XML Document Syntax, Validating XML Documents with DTDs, XML Namespaces

Learning Outcome

The student will be able to:
- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Style Sheets.
- Build dynamic web pages using JavaScript (Client side programming).
- Create XML documents and Schemas.

Text book [TB]:

1. **Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI,** I. Bayross, BPB Publications, 2000

2. **Mastering Javascript,**J. Jaworski, BPB Publications, 1999

Reference Books:

1. **Complete Reference HTML**T. A. Powell, Third Edition, TMH, 2002

2. **ASP.NET Developers Guide,**G.Buczek, TMH, 2002

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA205	Subject Title	Computer Networks						
LTP	310	Credit	3.5	Subject Category	DC	Year	2	Semester	3

Course Objective:

objective of this course is to build an understanding of the fundamental concepts of computer networking and to amiliarize the student with the basic taxonomy and terminology of the computer networking area.

Detailed Syllabus

UNIT 1
Introduction: Motivation, OSI model, Signals and media, Bits over signals, Synchronous communication, Modulation and modems, Bandwidth, Throughput, and noise, Time division and Frequency division multiplexing, Standards, Switching methods, ISDN

UNIT 2
Packet Transmission: Multiplexing, Frames, Error correction techniques, LAN/WAN/MAN, Topology, CSMA/CD,LAN protocol, Elementary Data link protocol- Sliding window protocols, Token passing rings, FDDI, IEEE 802.3, 802.5.

UNIT 3
Routing Algorithms: Distance-Vector, Link-State, Shortest path computation, Dijkstra's algorithm, Congestion control, WAN technologies including frame relay, X.25, ATM.
.
UNIT 4
Internetworking: Motivation, Concept, Goals, TCP/IP model, IP addressing with sub netting, Address binding with ARP, IP Datagram, Encapsulation IP fragmentation and reassembly, ICMP,IGMP,TCP.

UNIT 5
Network Services: Electronic mail, File transfer, Access and management, Virtual terminals, Remote procedure call.

Learning Outcome

After completing this course the student must demonstrate the knowledge and ability to:
- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer

Text book [TB]:

1. **Data communication and Networking,** Forouzan, B.A, McGraw Hill, 4th Edition, 2006

2. **Computer Networks,**Tanenbaum, A.S., Prentice Hall,4th Edition, 2003

Reference Books:

1. **Internetworking with TCP/IP Vol. 1 Principles,** Comer, D.E., Prentice Hall of India,5th Edition, 2005

2. **Computer Networking with Internet Protocols and Tech,**Stallings, W.,Prentice Hall of India, 2007.

Subject Code	CA206	Subject Title	Organization Behavior						
LTP	300	Credit	3	Subject Category	DC	Year	2	Semester	3

Course Objective:

objective of this course is to build an understanding of the fundamental concepts of computer networking and to amiliarize the student with the basic taxonomy and terminology of the computer networking area.

Detailed Syllabus

UNIT 1

Fundamentals of Organizational Behaviour-Nature, Scope, Definition and Goals of Organizational Behaviour; Fundamental Concepts of Organizational Behaviour; Models of Organizational Behaviour; Emerging aspects of Organizational Behaviour: Meaning Cultural Diversity,

UNIT 2

Managing the Perception Process-Attitude, Values and Motivation Concept, Nature, Process, Importance, Management Behavioural aspect of Perception. Effects of employee attitudes; Personal and Organizational Values; Job Satisfaction; Nature and Importance of Motivation; Achievement Motive; Theories of Work Motivation: Maslow's Need Hierarchy Theory McGregcrs's Theory 'X' and Theory 'Y'.

UNIT 3

Personality-Definition of Personality, Determinants of Personality; Theories of Personality- Traitand Type Theories, The Big Five Traites, Mytes-Briggs Indicator; Locus of Control,S Type A and Type B Assessment of Personality.
.
UNIT 4

Work Stress Meaning and definition of Stress-Symptoms of Stress; Sources of Stress: Individual Level, Group Level, Organizational Level; Stressors, Extra Organizational Stressors; Effect of Stress – Burnouts; Stress Management – Individual Strategies, Organizational Strategies; Employee Counselling.

UNIT 5

Group Behaviour and Leadership-Nature of Group, Types of Groups; Nature and Characteristics of team; Team Building, Effective Teamwork; Nature of Leadership, Leadership Styles; Traits of Effective Leaders.

.

Learning Outcome

At the completion of this paper students should be able to:
- Analyse the behaviour of individuals and groups in organisations in terms of the key factors that influence organizational behaviour.
- Assess the potential effects of organisational-level factors (such as structure, culture and change) on organizational behaviour.
- Analyse organizational behavioural issues in the context of organizational behaviour theories, models and concepts.

Text book [TB]:

1. **Organizational Behavior Text, Cases and Games,** K.Aswathappa, Himalaya Publishing House, Mumbai, Sixth Edition ,2005

2. **Organizational Behavior,**Stephen P. Robbins, Timothy A. Judge, Prentice Hall,15th Edition,2012

Reference Books

1. **Organizational Behavior Human Behavior at Work,**J.W. Newstrom, Tata McGraw Hill Publishing Company Limited, New Delhi, 12th Edition, 2007

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA211	Subject Title	Management Information Systems						
LTP	310	Credit	3.5	Subject Category	DC	Year	2	Semester	4

Course Objective:

- Explain to students why information systems are so important today for business and management;
- Evaluate the role of the major types of information systems in a business environment and their relationship to each other;

Detailed Syllabus

UNIT 1

Introduction to MIS: The Technical and Business Perspective, Organization Structure, Evaluation of MIS through Information System, Levels of MIS (Top, Middle, Lower), MIS Organization within the Company, Methodology and Tools/Techniques for Systematic Identification, Evaluation and Modification of MIS.

UNIT 2

Managing the Perception Process-Attitude, Values and Motivation Concept, Nature, Process, Importance, Management Behavioural aspect of Perception. Effects of employee attitudes; Personal and Organizational Values; Job Satisfaction; Nature and Importance of Motivation; Achievement Motive; Theories of Work Motivation: Maslow's Need Hierarchy Theory McGregcrs's Theory 'X' and Theory 'Y'.

UNIT 3

Transaction Processing System: hardware and software requirements, tools used, case studies, merits and demerits of transaction processing system, Managerial control, Information and tools required, difference between transactional system and managerial system. Frequency of taking outputs, Need for interconnected system, common database, Redundancy control, case studies.

Decision Support System: Introduction, concept and tools, case studies, virtual organizations, strategic decisions-unstructured approach, cost and values of unstructured information.

UNIT 4

Optimization: Optimization techniques, difference between optimization tools and DSS tools expert system, difference between expert system and management information system. Role of chief information officer.

UNIT 5

Advanced MIS: Concepts, Needs and Problems in Achieving Advanced MIS, DSS.
Pitfalls in MIS Development: Fundamental Weakness, Soft Spots in Planning and Design Problems
Functional MIS: A Study of Marketing, Personnel, Financial and Production MIS.

Learning Outcome

Upon completion of this course, students will be able to:
- Understand the basic concepts and technologies used in the field of management information systems;
- Have the knowledge of the different types of management information systems;
- Understand the processes of developing and implementing information systems.

Text book [TB]:
1. **Analysis and Design of Information Systems**, V. Rajaraman,3 Edition,PHI,2011
2. **Management Information Systems**, S. Sadagopan, Prentice-Hall of India

Approved by the Academic Council at its 6th Meeting held on 13.05.2017

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA212	Subject Title	Visual Programming with VB .Net						
LTP	302	Credit	4	Subject Category	DC	Year	2	Semester	4

Objectives: The course is designed to guide the beginning programmer in developing applications using Visual Basic.Net (VB.NET) programming languages. The ability to program using object-oriented tools is beginning to be treated as fundamental knowledge of the average MIS major.

Unit I

Introduction to .net framework -Features, Common Language Runtime (CLR) ,Framework Class Library(FCL).Visual Studio.Net – IDE, Languages Supported, Components. Visual Programming, VB.net- Features, IDE- Menu System, Toolbars, Code Designer, Solution Explorer, Object Browser, Toolbox, Class View Window, Properties Window, Server Explorer, Task List, Output Window, Command Window.

Unit II

Properties, Events and Methods of Form, Label, Text Box, List Box, Combo Box, Radio Button, Button, Check Box, Progress Bar, Date Time Picker, Calendar, Picture Box, HScrollbar, VScroll Bar, Group Box, ToolTip, Timer.

Unit III

Data Types, Keywords, Declaring Variables and Constants, Operators, Understanding Scope and accessibility of variables, Conditional Statements- If- Then, If-Then-Else, Nested If, Select Case, Looping Statement- Do loop, For Loop, For Each-Next Loop, While Loop, Arrays- Static and Dynamic.

Unit IV

Menus and toolbars- Menu Strip, Tool Strip, Status Strip, Built-In Dialog Boxes –Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogs, Input Box, Message Box, Interfacing With End user- Creating MDI Parent and Child, Functions and Procedures- Built-In Functions- Mathematical and String Functions, User Defined Functions and Procedures.

Unit V

Object Oriented Programming- Creating Classes , Objects, Fields, Properties, Methods, Events , Constructors and destructors, Exception Handling- Models, Statements, File Handling- Using File Stream Class, File Mode, File Share, File Access Enumerations, Opening or Creating Files with File Stream Class, Reading and Writing Text using Stream Reader and Stream Writer Classes, Data Access withADO.Net –Data Access with Server Explorer, Data Adapter and Data Sets, ADO.NET Objects and Basic SQL

List of practicals:
1. Write a VB.net code to use variables(dim keyword) and various data types and prompt user to input through console and prints the output to console
2. Write a VB.net program to use if, for, while and do while loop.
3. Write a VB.net program to use procedure and module.
4. Write a VB.net program using array to sort elements of an array by creating a function of bubble sort. Also create a function to search an element within an array.
5. Design a student registration form using various controls like Label, List Box, Text Box, radio button etc.
6. Design a page in ASP.net to demonstrate use of validators.
7. Create a user control of login and add it to the toolbox.
8. Create a MDI form and add Menu Strip control and Tool Tip and add MDI Child forms.
9. Create a VB.Net form and use Built-In Dialog Boxes –Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogsetc
10. Create a VB.Net form and use Color Dialogs, Print Dialogsetc
11. Create a VB.net program to use Data Adapter andDataSets
12. Create a VB.net program to create classes and objects.

Learning Outcomes:

- Understand the programming algorithm, process, and structure
- Understand and identify the fundamental concepts of object-oriented programming
- Understand and use the concepts of objects, primitive value, message, method, selection control structure, repetition control structures, object reference, container, and method parameter

Text Books

1. **Visual Basic 2015 Unleashed**, Alessandro Del Sole,1st edition,2015
2. **The Complete Reference Visual Basic .NET**, Jeffery R. Shapiro ,Tata McGraw Hills,1st Edition,2002

Reference Books

1. **Murach's Visual Basic 2015**, Anne Bohem,MikeMurach& Associates,6th Edition,2015

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA213	Subject Title	Microprocessor						
LTP	302	Credit	4	Subject Category	DC	Year	2	Semester	4

Course Objective:

The objective of this course is to provide the students with fundamentals of analog and digital communication design with their practical considerations. Develop a fundamental understanding of communication systems with emphasis on signal modulation techniques.

Detailed Syllabus

UNIT 1
Introduction of Microcomputer System: CPU, I/O devices, clock, memory, bussed architecture, tristate logic, address bus, data bus and control bus. Semiconductor Memories: Development of semiconductor memory, internal structure and decoding, memory read and write timing diagrams, MROM, ROM,EPROM,EEPROM, DRAM,

,
UNIT 2
Architecture of 8-bit Microprocessor: Intel 8085A microprocessor, Pin description and internal architecture. Operation and Control of Microprocessor: Timing and control Unit, op-code fetch machine cycle, memory read/write machine cycles, I/O read/write machine cycles, interrupt acknowledge machine cycle..

UNIT 3
Instruction Set: Addressing modes; Data transfer, arithmetic, logical, branch, stack and machine control groups of instruction set, macro RT Land micro RTL flow chart of few typical instructions; Unspecified flags and instructions. Assembly Language Programming: Assembler directives, simple examples; Subroutines, parameter passing to subroutines.
.
UNIT 4
Interfacing: Interfacing of memory chips, address allocation technique and decoding; Interfacing of I/O devices, LEDs and toggle-switches as examples, memory mapped and isolated I/O structure; Input/Output techniques: CPU initiated unconditional and conditional I/O transfer, device initiated interrupt I/O transfer.
Interrupts: Interrupt structure of 8085A microprocessor, processing of vectored and non-vectored interrupts, latency time and response time; Handling multiple interrupts
.
UNIT 5
Programmable Peripheral Interface: Intel 8255, pin configuration, internal structure of a port bit, modes of operation, bit SET/RESET feature, programming, Intel 8253, pin configuration, internal block diagram of counter and modes of operation, counter read methods, programming.
.
Learning Outcome
- The student will be able to analyse, specify, design, write and test assembly language programs of moderate complexity.
- The student will be able to select an appropriate 'architecture' or program design to apply to a particular situation; e.g. an interrupt-driven I/O handler for a responsive real-time machine. Following on from this, the student will be able to design and build the necessary programs.

Text book [TB]:

1. **Microprocessor and Interfacing-Programming and Hardware**, Hall D.V.,2nd Ed., Tata McGraw-Hill Publishing Company Limited, 2008.
2. **Microprocessor Architecture, Programming and Applications,** Gaonkar R.S., 5th Ed., Penram International, 2007.

Reference Books:
1. **Microprocessor Systems- Hardware,Software and Programming**, Stewart J, Prentice Hall International Edition,1990
2. **Microprocessors and Programmed Logic,**Short K. L, 2nd Ed.,Pearson Education, 2008.

Subject Code	CA214	Subject Title	Advanced Web Technologies					
LTP	302	Credit	4	Subject Category	DC	Year	2	Semester

Course Objective:

This course introduces World Wide Web Consortium (W3C) standard markup language and services of the Internet. Topics include creating web pages, search engines, FTP, and other related topics. Upon completion, students should be able to deploy a hand-coded web site created with mark-up language, and effectively use and understand the function of search engines.

Detailed Syllabus

UNIT 1

PHP: Introduction to PHP Evaluation of Php Basic Syntax Defining variable and constant PhP Data type Operator and Expression, GET & POST method PHP, Conditional Structure & Looping Structure, Array, String Creating and accessing, String Searching & Replacing, String Formatting String, String Related Library function.

UNIT 2

PHP: Introduction to PHP Evaluation of Php Basic Syntax Defining variable and constant PhP Data type Operator and Expression, GET & POST method PHP, Conditional Structure & Looping Structure, Array, String Creating and accessing, String Searching & Replacing, String Formatting String, String Related Library function.

UNIT 3

PHP Components: PHP GD Library, PHP Regular expression function, Cookies, Session, Server variable, Database Connectivity with MySQL (Using PhpMyAdmin)
.
UNIT 4

Working with file and Directories: Understanding file& directory, Opening and closing a file Coping ,renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading

UNIT 5

PHP with OOPS: Class, constructor, inheritance, serialize objects PHP with XML
.
Learning Outcome

Upon successful completion of the course, the student

- is able to understand and use the basics of the XML based technologies
- is able to understand and define and utilize the Web Services / Windows Communication Foundations concept
- is able to describe how Web Services can be used to implement Service Oriented Architecture (SOA)
- is able to design and implement user interfaces based on the AJAX technology

Text book [TB]:

1. **XML How to Program**, Deitel, Nieto, Pearson, 1st edition, 2001

2. **PHP Bible**, Joyce Park and Tim Converse, Wiley, 2nd edition, 2002

Reference Book:
1. Beginning XML, Joe Fawcett, Danny Ayers, Liam R. E. Quin, Wrox, 5th Edition, 2012

2. Professional PHP5, Stephen Nowicki, Wiley, 2nd edition, 2007

Approved by the Academic Council at its 6th Meeting held on 13.05.2017

Subject Code	CA215	Subject Title	Computer Graphics						
LTP	302	Credit	4	Subject Category	DC	Year	2	Semester	4

Course Objective:

This subject helps students develop problem-solving, communication and research skills in the context of computer graphics, including computer representation, and manipulation and display of pictorial information. It also helps students enhance their skills to design and implement three-dimensional (3D) computer images, such as those used in animated films, virtual reality (VR), data visualisation and computer games.

Detailed Syllabus

UNIT 1

Introduction to Active and Passive Graphics, Applications of Computer Graphics, concept of pixels, resolution, aspect ratio, frame buffer. Positioning techniques, Rubber-Band techniques, Dragging Dimensioning techniques and Graphical Potentiometers, Pointing and Selection: the use of selection points defining a boundary rectangle, multiple selections, Menu selection, Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet, Scanner and Digitizing Cameraetc

Refresh Cathode Ray Tube, Raster Scan displays, Random Scan displays, Architecture of Raster and Random Scan Monitors, Color CRT-monitors and Color generating techniques (Shadow Mask, Beam Penetration) , Direct View Storage Tube, Flat-Panel Displays; 3-D Viewing Devices, Raster Scan Systems, Random Scan Systems, Graphics monitors and workstations, Color Models (RGB and CMY), Lookup Table.

UNIT 2

Process and need of Scan Conversion, effect of scan conversion, imagerepresentation. Line- Straight Line, DDA algorithm, Bresenham's Line Algorithm. Circle- Mid Point Circle Algorithm, Bresenham's Algorithm, Ellipse-Mid Point Algorithm. polygon filling algorithms- boundary fill, scan-line algorithm, Aliasing and Anti-aliasing, flood fill techniques, character generation.

UNIT 3

Translation, scaling, fixed point scaling, rotation, reflection, transformation with respect to arbitrary points. Application of homogeneous coordinates for uniform matrix operations, composite transformations. Window to viewport transformation, Clipping- Point clipping, Line Clipping, Cohen-Sutherland Line Clipping algorithms, Polygon Clipping-Sutherland-hodgeman algorithm.
.
UNIT 4

3D Graphics: 3DDisplay Methods, 3D transformations (Translation, Scaling, Rotation, Reflection, Shearing), Projection-parallel projections, perspective projection, Hidden Surface removal Algorithms-scan line method, Z-buffer method.

UNIT 5

Illumination and shading: illumination models, Ambient light, Diffuse reflection, Specular reflection, Gouraud and Phong shading models, parametric cubic curves, Hermite, Bezier and Bspline curves.

Learning Outcome

Upon successful completion of this subject students should be able to:
- Describe the major computer graphics applications.

- Explain the operations of graphics hardware systems

- Explain the viewing pipeline of generating a raster-scan image.

- Explain some classic 2D and 3D graphics algorithms.

Text book [TB]:

1. **Computer Graphics C Version**, Donald Hearn and M Pauline Baker, Pearson Education, 2nd edition, 2006

2. **Introduction to Computer Graphics,** J.D. Foley, A.V. Dam, Addison-Wesley Publishing Company, 2nd edition, 1994.

Reference Books:
1. **Computer Graphics(Schaums Outline Series)**, R.A. Plastock et.al., TMH, 2nd edition, 2006

2. **Computer Graphics,** J.D.Foley, Pearson Education, 2nd edition, 2004

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA216	Subject Title	Unified Modeling Language						
LTP	310	Credit	3.5	Subject Category	DC	Year	2	Semester	4

Course Objective:

- To teach the students a solid foundation on object-oriented principles
- To teach the student the essential and fundamental aspects of object-oriented analysis and design, in terms of "how to use" it for the purpose of specifying and developing software.

Detailed Syllabus

UNIT 1

Introduction: Object Orientation, Object Oriented Development, Object Oriented Themes, Evidence for usefulness of Object oriented Development Modeling as a Design Technique Modeling. The Object Modeling Technique: Object Modeling; Objects and Classes. Links and Associations, Advanced Link and Association Concepts, Generalization and inheritance, Grouping Constructs. Advanced Object Modeling; Aggregation, Abstract Classes, Generalization as Extension and restriction. Multiple inheritance, Metadata, Candidate Keys Constrains.

UNIT 2

Dynamic Modeling: Events and States, Operations, Nested State Diagrams, Concurrency, Advanced dynamic Modeling Concepts, Relation of Objects and Dynamic Models, Functional Modeling, Functional Models, Data Flow Diagrams, Specifying Operations, Constrains, Methodology Preview, and OT as a Software Engineering Methodology. The OMT Methodology, impact of an Object Oriented Approach.

UNIT 3

Analysis: Overview of Analysis, Problem Statement, Object Modeling, Dynamic Modeling, Adding Operation. Systemdesign: Overview of System Design, Breaking a System into Subsystems, identifying Concurrency, Allocating Subsystem to Processors and Task, Management of Data Stores, Trade-Off Priorities, Common Architectural Frameworks, Object Design: Overview of Object Design, Combining the Three Models, Design Algorithms
.
UNIT 4

Methodology Summary: Analysis, System Design, Object design Comparison of Methodologies Structured Analysis/Structure Design, Jackson Structured Development, Information Modeling Notations Object Oriented Work.

UNIT 5

Programming Style: Object Oriented Style, Reusability, Extensibility, Robustness, Programming in the large Object Oriented language. Translating a Design into an implementation, Class Definitions, Creating Objects, Calling Operations, Using inheritance, implementing Associations, Object Oriented Language Features.

Learning Outcome

By the end of the course, you should:

- Possess an ability to practically apply knowledge software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML.

- Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their models.

Approved by the Academic Council at its 6th Meeting held on 13.05.2017

<u>**Text book [TB]:**</u>

1. Object Oriented analysis &Design with Applications,G. Booch, 2nd Edition, Addison Wesley, 1994

2. Applying UML and patterns – An introduction to Object Oriented Analysis & Design, C. Larman, Prentice Hall PTR, 1998

Reference Book:
1. **Object Oriented Modelling and Design,** J. Rumbaugh, M. Blaha, W. Premeriari, F. Eddy, W Lorensen, Prentice Hall of India 1991

2. **The Unified Software Development Process,** I. Jacobson, G. Booch, J. Rumbaugh, Addison Wesley Longmans, 1999.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA301	Subject Title	Multimedia & Animation					
LTP	310	Credit	3.5	Subject Category	DC	Year	3	Semester	5

Course Objective:

Aware the student with the basics of Multimedia and Graphics. Students need to be familiar with various types and formats of animations, video and audio formats and learn Multimedia and animation Tools.

Detailed Syllabus

UNIT 1
Introduction to Multimedia and animation, Multimedia Systems, Design Fundamentals, Elements of multimedia and animation and their use, Back ground of Art, Color theory overview, Sketching & illustration, Storyboarding, different tools for animation

UNIT 2
Multimedia Skills, Hardware, Use of Graphics in Multimedia, Overview of Vector and Raster Graphics, Basic software tools, Multimedia Authoring Tools, Planning and Costing, Designing and Producing, Contents and talent, Delivering, Enhancing and Testing Multimedia Projects

UNIT 3
Paint and Draw Applications, Graphic effects and techniques, Image File Format, Anti-aliasing, Morphing, Multimedia Authoring tools, professional development tools.
.
UNIT 4
Introduction and Principles of Animations, Power of Motion, Animation Techniques, Animation File Format, Making animation for Rolling Ball, making animation for a Bouncing Ball, Animation for the web, GIF, Plug-ins and Players, Animation tools for World Wide Web.

UNIT 5

Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database. Content based retrieval for text and images, Video: Video representation, Colors, Video Compression, MPEG standards, MHEG.

Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, recent development in multimedia

Learning Outcome

After studying this course, you should be able to:
- Understand the fundamental principles of Multimedia and Animations.
- Understand the hardware requirement for graphics and animation.
- Understand various audio and video compression techniques and video streaming
- design experiments using UML, as well as to analyze and evaluate their models.

Text book [TB]:

1. **Multimedia, Making IT Work,** Tay Vaughan, Tata McGraw Hill,9th edition,2014

2. **Fundamentals of Multimedia,** Ze-Nian Li and Mark S.Drew, Pearson Education,1st edition,2003

Reference Books

1. **Multimedia systems design,** Prabhat K Andleigh, Kiran Thakrar, PHI Learning Private Limited, Delhi India.,1st Edition,1995

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA302	Subject Title	Probability and Statistics						
LTP	310	Credit	3.5	Subject Category	DC	Year	3	Semester	5

Course Objective:

To get the knowledge about probability, random variables, distributions and basics of statistics.

Detailed Syllabus

UNIT 1
Classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability, multiplication rule, total probability, Bayes' Theorem and independence, problems Random Variables: Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, probability and moment generating function, median and quintiles, Markov inequality, Chebyshev's inequality, problems

UNIT 2
Special Distributions: Discrete uniform, binomial, geometric, negative binomial, hyper geometric, Poisson, continuous uniform, exponential, gamma, Weibull, Pareto, beta, normal, lognormal, inverse Gaussian, Cauchy, d o u b l e exponential distributions, reliability and hazard rate, reliability of series and parallel systems, problems

UNIT 3
Joint Distributions: Joint, marginal and conditional distributions, product moments, correlation and regression, independence of random variables, bivariate normal distribution, problems, The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions, problems.

UNIT 4
Unbiasedness, consistency, the method of moments and the method of maximum likelihood estimation, confidence intervals for parameters in one sample and two sample problems of normal populations, confidence intervals for proportions, problems.

UNIT 5
Testing of Hypotheses: Null and alternative hypotheses, the critical and acceptance regions, two types of error, power of the test, the most powerful test and Neyman-Pearson Fundamental Lemma, tests for one sample and two sample problems for normal populations, tests for proportions, Chisquare goodness of fit test and its applications, problems.

Learning Outcome

After studying this course, you should be able to:
- Understand the meaning of probability and randomness
- Ability to use probability and other concepts in problem solving
- Ability to deal with different types of data and apply various statistical concepts on it

Text book [TB]:

1. **An Introduction to Probability and Statistics**, V.K. Rohatgi& A.K. Md. E. Saleh, Wiley-Interscience, 2nd edition, 2000

2. **Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences**, J.S. Milton & J.C. Arnold,4th Edition, McGraw-Hill Education, 2002

Reference Books:
1.**Probability and Statistics in Engineering**,W.W. Hines et al, Wiley, 4th edition,2003

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA303	Subject Title	Data Warehouse and Data Mining						
LTP	310	Credit	3.5	Subject Category	DC	Year	3	Semester	5

Course Objective:

Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying new trends and behaviors

Detailed Syllabus

UNIT 1

Dss Uses, definition, Operational Database. Introduction to DATA Warehousing. Data-Mart, Concept of Data- Warehousing, Multi-Dimensional Database Structures. Client/Server Computing Model & Data Warehousing. Parallel Processors & Cluster Systems. Distributed DBMS implementations.

UNIT 2

DATA Warehousing. Data Warehousing Components. Building a Data Warehouse. Warehouse Database. Mapping the Data Warehouse to a Multiprocessor Architecture. DBMS Schemas for Decision Support. Data Extraction, Cleanup & Transformation Tools, Metadata.

UNIT 3

Business Analysis. Reporting & Query Tools & Applications. On line Analytical Processing (OLAP).Patterns & Models. Statistics. Artificial Intelligence.
.
UNIT 4

Knowledge Discovery, Data Mining. Introduction to Data-Mining. Techniques of Data-Mining. Decision Trees. Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms. Rule Introduction. Selecting &Using the Right Technique.

UNIT 5

Multimedia Data-Mining, Multimedia-Databases, Mining Multimedia Data, Data-Mining and the World Wide Web, Web Data-Mining, Mining and Meta-Data. Data Visualization &Overall Perspective. Data Visualization. Applications of Data-Mining.

Learning Outcome

After studying this course, you should be able to:

- Learning how to gather and analyze large sets of data to gain useful business understanding.

- Learning how to produce a quantitative analysis report/memo with the necessary information to make decisions.

- Describing and demonstrating basic data mining algorithms, methods, and tools

- Identifying business applications of data mining

Text book [TB]:

1 **Data Warehousing, Data Mining and OLAP,** AlexBerson and Stephen J.Smith, Tata McGraw – Hill Edition, Thirteenth Reprint, 2008.

2   **Data Mining Concepts and Techniques,**Jiawei Han and Micheline Kamber, Third Edition, Elsevier, 2012.

Reference Books:

1. **Insight into Data Mining Theory and Practice,** K.P. Soman, ShyamDiwakar and V. Aja, Eastern Economy Edition, Prentice Hall of India, 2006.

2. **Introduction to Data Mining with Case Studies,** G. K. Gupta, Eastern Economy Edition, Prentice Hall of India, 2006.

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA351	Subject Title	Cryptography & Network Security						
LTP	310	Credit	3.5	Subject Category	DE	Year	3	Semester	5

Course Objective:

his course provides students with concepts of computer security, cryptography, digital money, secure protocols, detection and other security techniques

Detailed Syllabus

UNIT 1
Introduction to security attacks, services and mechanism, Classical encryption techniques substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers, Modern Block Ciphers: Block ciphers principles,

UNIT 2
Shannon's theory of confusion and diffusion, fiestal structure, Data encryption standard(DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES

UNIT 3
Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm, Advanced Encryption Standard (AES) encryption and decryption Fermat's and Euler's theorem, Primality testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA
.

UNIT 4
Message Authentication Codes: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions, Secure hash algorithm (SHA) Digital Signatures: Digital Signatures, Digital signature standards (DSS)

UNIT 5
Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, X.509 Certificates, Public key Infrastructure. Authentication Applications

Learning Outcome

After studying this course, you should be able to:

- Understand, appreciate, employ, design and implement appropriate security technologies

- Apply policies to protect computers and digital information.

Text book [TB]:
1. **Cryptography and Network Security: Principals and Practice,** William Stallings, Pearson Education,6th Edition,2013

2. **Cryptography and Network Security,**Behrouz A. Frouzan, TMH,2nd Edition,2010

Reference Books
1. **Network Security and Cryptography**, Bernard Menezes, Cengage Learning,1st edition,2010

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA352	Subject Title	Mobile Computing						
LTP	310	Credit	3.5	Subject Category	DE	Year	3	Semester	5

Course Objective:

To provide basic knowledge on Wireless Communications, Mobile Internet and Mobile Content Services.

Detailed Syllabus

UNIT 1

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

UNIT 2

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

UNIT 3

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.
.

UNIT 4

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

UNIT 5

Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Learning Outcome

After studying this course, you should be able to:

- To learn the basics of Wireless voice and data communications technologies.

- To build working knowledge on various telephone and satellite networks.

- To build skills in working with Wireless application Protocols to develop mobile content applications

Text book [TB]:

1. **Mobile Communications,** J. Schiller, PHI,2nd Edition,2003

2. **Mobile Computing,** Raj kamal, Oxford university Press,2nd Edition,2011

Reference Books

1. **Mobile Computing,Applications and services**, Griss, Martin, Yang, Guang, Springer,1st Edition,2011

Subject Code	CA353	Subject Title	Software Testing						
LTP	310	Credit	3.5	Subject Category	DE	Year	3	Semester	5

Course Objective:

To understand the basics of software testing, its need and implications on software development and its overall effect on software quality..

Detailed Syllabus

UNIT 1

Fundamentals of testing: Necessity of testing, what is it, Testing principles, Fundamental test Process, The psychology of testing

UNIT 2

Testing throughout the software life cycle: Software development models, Test levels, Test types: the targets of testing, Maintenance testing

UNIT 3

Static techniques: Reviews and the test process, Review process, Static analysis by tools

.
UNIT 4

Test design techniques: Identifying test conditions and designing test cases, Categories of test design techniques, Specification-based or black-box techniques, Structure-based or white-box techniques, Experience-based techniques

.
UNIT 5

Test management: Test organization, Test plans, estimates, and strategies, Test progress monitoring and control, Configuration management, Risk and testing, Incident management
Tool support for testing: Types of test tool, Effective use of tools: Potential benefits and risks, Introducing a tool in to an organization

Learning Outcome

After studying this course, you should be able to:

- To gain knowledge of various functional and structural testing techniques

- To gain knowledge of various activities and levels of testing

- To learn the issues in testing of object oriented and internet based applications

Text book [TB]:
1. **Software Testing Foundations**, Hans Schaefer, Andreas Spillner, Tilo Linz, Rocky Nook, 3rd Edition,2011

2. **Foundations of Software Testing**, Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black, Cengage Learning,1st Edition,2008

Reference Books:
1. **Software Testing**, Louise Tamres, Pearson Education,1st Edition,2002

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA304	Subject Title	Linux and System Administration						
LTP	302	Credit	4	Subject Category	DC	Year	3	Semester	5

Course Objective:

This course provides an intensely practical introduction to Unix System Administration using Linux. In addition to System Administration, TCP/IP network service administration and the use of scripting languages will be introduced.

Detailed Syllabus

UNIT 1

Fundamentals of UNIX & Linux Systems: Covers the history of UNIX & Linux, installation, navigation of the file system, the command line interface, piping, standard input/output redirection, basic text editors and common tools, shell scripting, process management, and booting

UNIT 2

User account management: Instructs how to add/modify/remove users & groups, modify UNIX permissions, set password & account policies, create access controls, monitor account activity, and set resource limits.

UNIT 3

Networking: Reviews the fundamentals of networking and the TCP/IP model, teaches how to remotely administer a large amount of UNIX machines, configure, maintain and troubleshoot essential network services, set up routing, VPN tunnels, and networked file systems.
.
UNIT 4

Software & Configuration Management: Teaches various practices to manage software packages, application updates, to track modifications to system configuration over time, and automate the system installation process.
.
UNIT 5

Logging, Performance Analysis, and System Monitoring: Provides an overview of metrics related to system performance, teaches how to analyze and store log files, set up tools to routinely monitor for important events, create automated notifications when system or services are unavailable, and Conduct analysis to resolve performance issues.

Learning Outcome

After studying this course, you should be able to:
- Demonstrate knowledge of the role and responsibilities of a Unix system administrator

- Install and configure the Linux operating system

- Manage the resources and security of a computer running Linux at a basic level

Text book [TB]:

1. **UNIX and Linux System Administration Handbook,**Evi Nemeth, Garth Snyder, Trent R. Hein, and Ben Whaley, Prentice Hall, 4th Edition, 2010

2. **The Linux Command Line: A Complete Introduction**, William E. Shotts Jr, No Starch Press, January 2012

Reference Books:

Running Linux, Matthias Dalheimer, and Matt Welsh, O'Reilly Media, 5th Edition, December

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA305	Subject Title	Java Programming						
LTP	302	Credit	4	Subject Category	DC	Year	3	Semester	5

Course Objective:

Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc

<p align="center"><u>Detailed Syllabus</u></p>

UNIT 1

Overview of Language: Simple Java Program structure, Comments in java, Command Line Arguments, Constants, Variables, Data Types, Variables, Constants, Standard Default Values, Operators, Expressions, Operator Precedence, Mathematical Functions.

Control Statements and Loops: Decision making and Branching Statements, Looping Statements, Labeled loops, Jumping Statements.

UNIT 2

Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Arrays, Strings and Vectors, Wrapper Classes.

Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.

UNIT 3

Interfaces: Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, Implementing Multiple Inheritance using Interfaces.

Packages: System Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes.

Errors and Exceptions: Types of Errors, Exceptions, Exception Handling using Try, Catch and Finally block: Throwing Our Own Exceptions, Using Exceptions for Debugging

.**UNIT 4**

JAVA AWT: Java AWT package Containers, Basic User Interface components, Layouts

Applet Programming: Introduction, How Applets Differ from Applications, Applet Life Cycle, Creating an Executable Applet, Passing Parameters to Applets, Aligning the Display, More about HTML Tags, Displaying Numerical Values, Getting Input from the User.

Graphics Programming: The Graphics Class, Lines and Rectangles, Circles and Ellipses, Drawing Arcs, Drawing Polygons, Line Graphs, Using Control Loops in Applets, Drawing Bar Charts.

Event Handling: Event delegation Approach, ActionListener, Adjustment Listener, Mouse Listener, Mouse Motion Listener, Window Listener, Key Listener, Item Listener

UNIT 5

JAVA I/O Handling : I/O File Handling(Input Stream & Output Streams, File Input Stream & File Output Stream, Data I/P and O/P Streams, File Class, Reader and Writer Streams, Random Access File).

<p align="center">Approved by the Academic Council at its 6th Meeting held on 13.05.2017</p>

Java Database Connectivity: Introduction to JDBC,JDBC Drivers & Architecture, Database Programming using JDBC

Learning Outcome

After studying this course, you should be able to:

- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be aware of the important topics and principles of software development.

Text book [TB]:

1. **Programming with Java**, E-Balagurusami, Tata McGraw Hill, 5th edition,2014

2. **Java The Complete Reference,** Herbert Schildt, TMH,9th Edition,2014

Reference Books:

1. **Beginning Java-2**, Ivor Horton, SPD Publication,

2. **Java: How to program** ,Deitel,PHI,9th edition,2011

e	CA311	Subject Title	Software Project Management					
LTP	310	Credit	3.5	Subject Category	DC	Year	3	Semester	6

Course Objective:

Upon completion of this course in Project Management, student will be able to demonstrate professional level competencies in the key areas of project management and project management leadership.

Detailed Syllabus

UNIT 1
Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process

UNIT 2
Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

UNIT 3
Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance(CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews and Types of Review.

.**UNIT 4**
Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

UNIT 5
Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Learning Outcome

After studying this course, you should be able to:

- Manage the selection and initiation of individual projects and of portfolios of projects in the enterprise.

- Conduct project planning activities that accurately forecast project costs, timelines, and quality. Implement processes for successful resource, communication, and risk and change management.

Text book [TB]:

1. **Software Project Management,** Hughes,5th Edition, McGraw Hill Education,2011

2. **Applied Software Project Management** , Andrew Stellman, Jennifer Greene O'Reilly Media,1st Edition,2005

Reference Books:

1. **Introduction to Software Project Management**, Adolfo Villafiorita, Auerbach Publications,1st Edition,2014

Subject Code	CA312	Subject Title	Artificial Intelligence						
LTP	310	Credit	3.5	Subject Category	DC	Year	3	Semester	6

Course Objective:

Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms).

Detailed Syllabus

UNIT 1

Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence

UNIT 2

Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing. Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.
.
UNIT 3

Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory.

UNIT 4

Supervised and unsupervised learning, Decision trees, Bayesian Networks

UNIT 5

Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data – EM algorithm, Artificial neural Networks, Reinforcement learning

Learning Outcome

After studying this course, you should be able to:

- Understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving

- Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information

Text book [TB]:

1. **Artificial Intelligence,** Elaine Rich and Kevin Knight, McGraw-Hill,2nd Edition,1991

2. **Artificial Intelligence – A Modern Approach,** Stuart Russell, Peter Norvig, Pearson Education,3rd Edition,2009

Reference Books:

1. **Artificial Intelligence: The Basics**, Kevin Warwick, Routledge,1st Edition,2006

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA313	Subject Title	Python Programming						
LTP	302	Credit	4	Subject Category	DC	Year	3	Semester	6

Course Objective:

To understand why Python is a useful scripting language for developers

Detailed Syllabus

UNIT 1
Introduction to python, Installation and versions of python, variables, expression and data types, conditional statements, Loops and iterations, functions, strings ,strings functions, Sequences: List, tuples ,Sets and Dictionaries, indexing and slicing lists, Functions, Functions parameters, closures, decorators, lambda functions, map, reduce and filters

UNIT 2
list comprehensions, dictionary comprehensions, set comprehensions , Numpy basics: ndarrays, data types for ndarrays, operations between array and scalar, indexing, slicing ,transposing, swapping axes, conditional logics, mathematical and statistical methods, linear algebra, random number generation

UNIT 3
Classes and objects: string representation of instances, making objects, encapsulating name in a class, managed attributes, inheritance, constructors, modules and packages: import everything, import submodule, splitting a module into multiple files, reloading modules.

UNIT 4
Pandas: series, data frame, index object, indexing ,dropping, selection, filtering, reindexing, data alignment, function application and mapping, sorting ,ranking, summarizing, missing data, hierarchical indexing, data loading, file formats, combining, merging, reshaping, pivoting

UNIT 5
Plotting and visualization: figures ,subplot, colors markers, line style, tick, label, legends, annotation, drawing, line plots, bar plots, histogram and density plots, scatter plots, chaco, mayavi and other packages
List of practicals:

Learning Outcome

After studying this course, you should be able to:

- To learn how to use lists, tuples, and dictionaries in Python programs

- To define the structure and components of a Python program

- To learn how to read and write files in Python.

- To learn how to use exception handling in Python applications for error handling

Text book [TB]:

1. **Python Cook Book**,david Beazley et al, 3rd edition, O'reilly media, 2013,

2. **Python for Data Analysis**, Wes Mckinney,1stedition,O'reilly media,2012

Reference Books:

1. **Trending on Python Vol I**,Matt Harrison, 1st edition, 2013

2. **Trending on Python Vol II**,Matt Harrison, 1st edition, 2013

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA361	Subject Title	Ethical hacking & Cyber law						
LTP	310	Credit	3.5	Subject Category	DE	Year	3	Semester	6

Course Objective:

Students identify and analyze statutory, regulatory, constitutional, and organizational laws that affect the information technology professional.

Detailed Syllabus

UNIT 1
Introduction to Ethical Hacking, Ethics, and Legality: Ethical Hacking Terminology, Different Types of Hacking Technologies, Different Phases Involved in Ethical Hacking and Stages of Ethical Hacking: Passive and Active Reconnaissance, Scanning, Gaining Access, Maintaining Access, Covering Tracks, Types of Hacker Classes, Ways to Conduct Ethical Hacking, Creating a Security Evaluation Plan, Types of Ethical Hacks, Testing Types, Ethical Hacking Report.

UNIT 2
Foot printing and Social Engineering: Foot printing, Information Gathering Methodology, Competitive Intelligence, DNS Enumeration Who is and ARIN Lookups, Types of DNS Records, Traceroute, E- Mail Tracking, Web Spiders, Social Engineering, Common Types Of Attacks, Insider Attacks, Identity Theft, Phishing Attacks, Online Scams, URL Obfuscation, Social-Engineering Countermeasures.

UNIT 3
Scanning, types of Scanning , CEH Scanning Methodology ,Ping Sweep Techniques, N map Command Switches, SYN, Stealth, XMAS, NULL, IDLE, and FIN Scans, TCP Communication Flag Types, War-Dialing Techniques, Banner Grabbing and OS Fingerprinting Techniques, Proxy Servers.

UNIT 4
Understanding Password - Cracking Techniques, Understanding the LAN Manager Hash Cracking Windows 2000 Passwords, Password - Cracking Countermeasures, Understanding Different Types of Passwords Passive Online Attacks, Active Online Attacks, Offline Attacks Non electronic Attacks.
.
UNIT 5

Electronic Banking: Banking and Bookkeeping, Legal recognition of digital signature, The Cyber Crime: Tampering with computer source document, Hacking with computer system, At least two case studies on each topic, IT Act 2000, IT Amendment Act 2006 & 2008

Learning Outcome
After studying this course, you should be able to:
* Students locate and apply case law and common law to current legal dilemmas in the technology
* field.
* Students apply diverse viewpoints to ethical dilemmas in the information technology field and
* recommend appropriate actions.
* Students distinguish enforceable contracts from non-enforceable contracts

Text book [TB]:
1. **CEH official Certfied Ethical Hacking Review Guide**, Kimberly Graves, Wiley India, 1st Edition 2007.

2. **Handbook of Cyber and E-commerce Laws**, Bakshi P.M and Suri R.K., Bharat Publishing House, 2nd Edition, 2002.
Reference Books:

1. **Insider Computer Fraud**, Kenneth C. Brancik, Auerbach Publications Taylor & Francis Group, 2ndEdition , 2008
   .
2. **Ethical Hacking**, Ankit Fadia, Macmillan India Ltd, 2nd Edition, 2006

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA362	Subject Title	Cloud computing						
LTP	310	Credit	3.5	Subject Category	DE	Year	3	Semester	6

Course Objective:

Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud

Detailed Syllabus

UNIT 1
Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage –Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT 2
Developing Cloud Services: Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service –Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT 3
Cloud Computing For Everyone: Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists –Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

.
UNIT 4
Using Cloud Services 10: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

UNIT 5
Other Ways to Collaborate: Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

Learning Outcome
After studying this course, you should be able to:
- Develop and deploy cloud application using popular cloud platforms.

- Compare, contrast, and evaluate the key trade-offs between multiple approaches to cloud system design, and Identify appropriate design choices when solving real-world cloud computing problems.

- Write comprehensive case studies analysing and contrasting different cloud computing solutions.

Text book [TB]:
1. **"Handbook of Cloud Computing"**,Furht, Borko, Escalante, Armando, Springer, USA, 1/e,2010

2. **"Cloud Computing: Concepts, Technology & Architecture",** Thomas Erletal, Prentice Hall,USA,1/e 2013

Reference Books:
1. **"A Road to Cloud Computing: A Beginner's Perspective"** Harjot Dhawan,LAP Lambert Academic Publishing,USA,2012

2. **"Cloud Computing for Dummies",** Judith Hurwitz,, ,John Wiley &Sons,USA,1/e 2010

3. **"Cloud Computing: Principles and Paradigms"**,Rajkumar Buyya,,John Wiley &Sons,USA,1/e 2011

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA363	Subject Title	Enterprsise Resource Planning					
LTP	310	Credit	3.5	Subject Category	DE	Year	3	Semester	6

Course Objective:

In-depth knowledge of major ERP components, including material requirements planning, master production scheduling, and capacity requirements planning; knowledge of typical ERP systems, and the advantages and limitations of implementing such systems.

Detailed Syllabus

UNIT 1

ERP Introduction, Benefits, Origin, Evolution and Structure: Conceptual Model of ERP, The Evolution of ERP, The Structure of ERP.

UNIT 2

Business Process Reengineering, Data ware Housing, Data Mining, Online Analytic Processing(OLAP), Product Life Cycle Management(PLM),LAP, Supply chain Management.

UNIT 3

ERP Marketplace and Marketplace Dynamics: Market Overview, Marketplace Dynamics, The Changing ERP Market. ERP-Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications.

.**UNIT 4**

ERP Implementation Basics, ERP Implementation Life Cycle, Role of SDLC/SSAD, Object Oriented Architecture, Consultants, Vendors and Employees,

.
UNIT 5

ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture. Using ERP tool: either SAP or ORACLE format to case study

Learning Outcome

After studying this course, you should be able to:
- examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components

- understand production planning in an ERP system, and systematically develop plans for an enterprise

Text book [TB]:

1. **Concepts in Enterprise Resource Planning,** Ellen Monk, Bret Wagner ,4th Edition,2012

2. **ERP: Making It Happen: The Implementers' Guide to Success with Enterprise Resource Planning,** Thomas F. Wallace, Michael H. Kremzar,Wiley,1st Edition,2001

Reference Books:

1. **Enterprise Resource Planning: Fundamentals of Design and Implementation,** K., Mohapatra, S., Anbuudayasankar, S.P., Sivakumar,springer,1st Edition,2014

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA314	Subject Title	E-commerce						
LTP	310	Credit	3.5	Subject Category	DC	Year	3	Semester	6

Course Objective:

Understand the basic concepts of e-commerce, security and other issues and their solutions. Design the framework to implement an e-commerce application . Analyze real business cases regarding their e-business strategies and transformation processes and choices

Detailed Syllabus

UNIT 1

Introduction: Definition of Electronic Commerce, E-Commerce: technology and prospects, incentives for engaging in electronic commerce, needs of E-Commerce, advantages and disadvantages, framework, Impact of E-commerce on business, E-Commerce Models.

UNIT 2

Network Infrastructure for E- Commerce: Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY). Mobile Commerce: Introduction, Wireless Application Protocol, WAP technology, Mobile Information device

UNIT 3

Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.
.
UNIT 4

Encryption: Encryption techniques, Symmetric Encryption: Keys and data encryption standard, Triple encryption, Secret key encryption; Asymmetric encryption: public and private pair key encryption, Digital Signatures, Virtual Private Network

UNIT 5

Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking. EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.

Learning Outcome
- Integrate user-centered design guidelines in developing user-friendly websites

- Evaluate the bullwhip effect in a supply chain, analyze the causes, and recommend possible solutions.

- Analyze different types of portal technologies and deployment methodologies commonly used in the industry.

Text book [TB]:
1. **Electronic Commerce: A Managerial and Social Networks Perspective,** Turban, E., King, D., Lee, J.K., Liang, T.-P., Turban,Springer,1st Edition,2015
2. **E-Business and E-Commerce Management ,** Dave Chaffey,5th Edition,2011

Reference Books:

1. **E-Commerce,** Kenneth C Loudon, Pearson 13th edition,2017

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA315	Subject Title	Mobile Application Development using Android						
LTP	302	Credit	4	Subject Category	DC	Year	3	Semester	6

Course Objective:

Demonstrate knowledge of different software engineering techniques for mobile applications and apply this knowledge to develop an application for a mobile device.

Detailed Syllabus

UNIT 1

Introduction to Android, Brief History of Embedded Device Programming, Introduction to Android, Downloading and Installing Eclipse, Downloading and Installing the Android SDK

UNIT 2

Android SDK, Application Life Cycle: Standard ASP Application Life Cycle, Android Application Life Cycle, Creating Android Project in Eclipse, Examining the Android-

UNIT 3

Created Files: AndroidManifest.xml, Referenced Libraries, Directories, Hello World! XML-Based UI, Hello World! CODE-Based UI, Using Intents and the Phone Dialer, Intents, Using the Dialer, Placing a Call from Your Activity
.
UNIT 4

Adding the Intent to Your Activity, Modifying the Android Phone Dialer, Adding a Button, Implementing an Edit Text View

UNIT 5

Lists, Menus, and Other Views, Building the Activities, Intent Code for the .xml File, Intent Code for the .java File, Using the Menu, Creating the Activity for AutoComplete, Button, Check Box, Edit Text, Radio Group

Learning Outcome

- Identify and apply relevant problem solving methodologies

- Design components, systems and/or processes to meet required specifications

- Communicate effectively in ways appropriate to the discipline, audience and purpose.

Text book [TB]:

1. **Head First Android Development**, Dawn Griffiths, O'reilly Media,1/e, June 2015

2. **Programming Android**, Zigurd Mednieks, O'reilly Media,2/e,2012

Reference Books:
1. **Professional Android**, Retro Meier,Wiley,4/e,2017

Course Structure& Syllabus of BCA
Applicable for Batch: 2017-2020

Subject Code	CA317	Subject Title	Industrial Project						
LTP	0 0 32	Credit	16	Subject Category	PRJT	Year	3	Semester	6

Student of BCA Final Semester can opt the four/six month Internship in an Industry in lieu of regular final semester.

During the Internship the evaluation process shall be as:

 i. Student will work on one industrial project on one industrial project in consultation with mentor at Industry and one guide from University.
 ii. University Guide shall be responsible for continuous monitoring of student during the entire duration of Internship.
 iii. Student shall send the progress report, duly signed by the mentor at Industry, to the Guide at University.
 iv. The last date of obtaining NOC for the Industrial Internship shall be two weeks from the commencement of final semester. After that no NOC shall be issued to the student.
 v. The final presentation/final assessment will take place during the End Term Examination.
 vi. The result will be declared with regular result declaration.
 vii. Students who will get placement without support of the placement procedure followed by the University, the Career Service Department will check the company background.
 viii. Student should not have any backlog.
 ix. Continuous monitoring of the training progress and project assigned to the student during the Industrial Internship should be undertaken.

Sr. No.	Evaluation	Marks
1	Supervisor	20
2	Industry Feedback	40
3	Presentation	20
4	Project Report	20