ADMISSION & EXAMINATION
BYE-LAWS

FOR

Bachelor of Computer Applications - (BCA)/
Bachelor of Science (Information Technology) - B. Sc. (IT)

CHOICE BASED CREDIT SYSTEM (CBCS)
With effect from (2019-20)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
School of Engineering Sciences & Technology
JAMIA HAMDARD
(DEEMED TO BE UNIVERSITY)
Hamdard Nagar, New Delhi-110 062
Ph. 011 26059688, Extn.-5858

JH/CSE/CBCS/BCA/2019-20

ADMISSION & EXAMINATION RULES
for
Bachelor of Computer Applications (BCA)/
Bachelor of Science (Information Technology) B. Sc. (IT)

1. **OBJECTIVE**

    To act as a feeder program for higher studies and to provide strong conceptual and theoretical background leading to skilled manpower in industrial and service sectors to meet global demands.

2. **THE PROGRAM**

    Highlights of the course are described in the following table:

a.	*Name of the Program*	Bachelor of Computer Applications (BCA)/ Bachelor of Science (Information Technology) B. Sc. (IT)
b.	*Nature*	Regular and Full Time
c.	*Duration*	Three Years (6 Semesters)
d.	*Total number of credits*	120
e.	*Medium of Instruction and English Examinations*	English
f.	*Eligibility Criteria*	A candidate must have: Passed Senior Secondary (12th Standard/Intermediate) examination with Mathematics as one of the passed subjects from CBSE or any other Board recognized by Jamia Hamdard as equivalent thereto, securing at least 50% marks or equivalent CGPA in aggregate. *(OR)* Passed Senior Secondary (12th Standard/Intermediate) examination with Commerce background having one paper Accountancy or Business Mathematics, securing at least 50% marks or equivalent CGPA in aggregate. *(OR)* Passed Senior-Secondary (12th standard/intermediate) examination having one Theory paper Computer Science / Multimedia and Web Technology / Information Technology securing at least 50% marks or equivalent CGPA in aggregate.
g.	*Selection procedure*	On the basis of merit of first five subjects in the qualifying examination.
h.	*Period of Completion*	Not more than 05 years (10 Semesters)
i.	*Commencement of the Program*	July of the every academic session

3. PROGRAM STRUCTURE

Semester-wise course structure, guidelines for teaching, practical and associated assessment of BCA/ B. Sc. (IT) programme is described in the following tables:

Course Type	Abbreviation	Credits
Program Core Course	PCC	40
Program Elective	PE	08
Open Elective	OE	08
Foundation Course	FC	12
Ability Enhancement Course	AEC	04
Skill Enhancement Elective	SEE	08
Laboratory	LAB	20
Dissertation	DISS	20
Non-Credit Course	NCC	00
Total Credits		**120**

L – T – P stands for number of contact hours as Lecture-Tutorial-Practical in a week.

Semester – I

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 101	Introduction to 'C' Programming	PCC	25	75	100	3-1-0	4
BCA 102	Computer System Architecture	PCC	25	75	100	3-1-0	4
BCA 103	Mathematical Foundation of Computer Science	FC	25	75	100	3-1-0	4
BCA 104	Communication Skills	AEC	25	75	100	2-0-0	2
BCA 105	Media and Information Literacy Communication	AEC	25	75	100	2-0-0	2
BCA 106	'C' Programming Lab	LAB	25	75	100	0-0-4	2
BCA 107	Computer System Architecture Lab	LAB	25	75	100	0-0-4	2
					Total	**13-3-8**	**20**

Semester – II

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 201	Introduction to Data Structures	PCC	25	75	100	3-1-0	4
BCA 202	Data communication and Computer Networks Basics	PCC	25	75	100	3-1-0	4
BCA 203	Fundamental Concepts of Operating Systems	PCC	25	75	100	3-1-0	4
BCA 204	Elementary Physics	FC	25	75	100	3-1-0	4
BCA 205	Data Structures Lab	LAB	25	75	100	0-0-4	2
BCA 206	Unix/Linux Lab	LAB	25	75	100	0-0-4	2
*BCA ES	Environmental Sciences	NCC	25	75	100	2-0-0	0
					Total	14-4-8	20

*This subject may be taught in both the semesters (Semester-I and Semester-II) at the discretion of the Department. However, Semester Examination will be conducted only at the end of Semester-II

Semester – III

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 301	Introduction to Object Oriented Programming	PCC	25	75	100	3-1-0	4
BCA 302	Introduction to Database Management System	PCC	25	75	100	3-1-0	4
BCA 303	Discrete Structures	PCC	25	75	100	3-1-0	4
	PE – 1	PE	25	75	100	3-1-0	4
BCA 304	'C++' Programming Lab	LAB	25	75	100	0-0-4	2
BCA 305	Database Management System Lab	LAB	25	75	100	0-0-4	2
					Total	12-4-8	20

Semester – IV

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 401	Fundamentals of Probability and Statistics	FC	25	75	100	3-1-0	4
BCA 402	Introduction to Artificial Intelligence	PCC	25	75	100	3-1-0	4
	SEE – 1	SEE	25	75	100	3-1-0	4
	OE – 1	OE	25	75	100	3-1-0	4
BCA 403	Artificial Intelligence Lab	LAB	25	75	100	0-0-4	2
BCA 404	Lab based on SEE – 1	LAB	25	75	100	0-0-4	2
					Total	12-4-8	20

Semester – V

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 501	Fundamentals of Software Engineering	PCC	25	75	100	3-1-0	4
	PE – 2	PE	25	75	100	3-1-0	4
	SEE – 2	SEE	25	75	100	3-1-0	4
	OE – 2	OE	25	75	100	3-1-0	4
BCA 502	Software Engineering Lab	LAB	25	75	100	0-0-4	2
BCA 503	Lab based on SEE – 2	LAB	25	75	100	0-0-4	2
					Total	12-4-8	20

Semester – VI

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Viva voce	Total		
BCA 601	Industrial Project and Dissertation	DISS	300	200	500	0-0-40	20

Grand Total of Credits = 120

PROGRAMELECTIVES (PE)

PE – 1	
BCA PE311	Introduction to Wireless Communication
BCA PE312	Introduction to Mobile Computing
BCA PE313	Web &E-Commerce Technologies
PE – 2	
BCA PE521	Introduction to Data Mining
BCA PE522	Introduction to Cloud Computing
BCA PE523	Introduction to Data Science and Big data

Skill Enhancement Electives (SEE)

SEE – 1	
BCA SEE411	Internet and Web Technology
BCA SEE412	Programming in Visual Basic
BCA SEE413	Fundamental Concepts of Microprocessor and Arduino Programming
SEE – 2	
BCA SEE521	Introduction to Java Programming
BCA SEE522	Fundamentals of .Net Programming
BCA SEE523	PHP Programming

OPENELECTIVES (OE)

OE – 1	
BCA OE411	Organization Behavior
BCA OE412	Financial Accounting
BCA OE413	Cyber Crimes & Cyber Laws
OE – 2	
BCA OE511	Startup Entrepreneurship
BCA OE512	Concepts of E-Governance and Smart City
BCA OE513	Digital Marketing and E-Commerce

Learning Outcomes

At the end of the program a student is expected to have:
1. An understanding of the theoretical foundations computing, Statistics, Mathematics and Management that helps them in pursuing higher degree.
2. Improved communication and awareness on ethics.
3. The ability and the mindset to continuously update and innovate.

4. MODE OF CURRICULUM DELIVERY

Mode of curriculum delivery includes classroom teaching, assignments, test, lab work, presentations, participation in relevant events and regularity.

5. ATTENDANCE

a. All students are supposed to attend every lecture and practical classes. However, the attendance requirement for appearing in the examination shall be a minimum of 75% of the classes held.
b. Each one-period teaching shall account for one attendance unit.
c. The concerned teacher will take a roll call in every scheduled class, maintains and consolidate the attendance record, which would be submitted to the Head of the Department at the conclusion of the semester.
d. Attendance on account of participation (with prior permission from the Head of the Department) in the co-curricular/extra-curricular activities can be granted by the Dean on receipt of certificates or recommendations of the respective activity issued by the Head of the Department.

e. Attendance records displayed on the Notice Board from time to time, in respect of short attendance, shall be deemed to be a proper notification and no individual notice shall be sent to the students/local guardian.

f. In case a student is found to be continuously absent from the classes without information for a period of 30 days, the concerned teacher shall report it to the Head of the Department.

g. Head of the Department may recommend for striking off the name of a student from rolls, after ensuring '**one month continuous absence'**, from all the concerned teachers.

h. A student, whose name has been struck off on account of long absence may apply to the Dean for readmission within 15 days of the notice of striking off the name. The readmission shall be effected on payments of prescribed readmission fees.

i. A student with less than 75% attendance in a subject shall not be allowed to appear in that subject in the semester examination. The Head of the Department shall recommend all such cases to the Dean of the School.

j. The Dean, on the recommendation of the Head of the Department, may consider the relaxation of attendance up to 10% on account of sickness and /or any other valid reason. No application for relaxation of attendance (duly certified by a Registered Medical Practitioner/Public hospital or a competent authority) will be entertained after 15 days from the recovery from illness etc.

6. INTERNAL ASSESSMENT

a. Internal assessment, to be made by concerned teachers, will be based on unit tests, quizzes, presentation, programming test, demonstrations and assignments.

b. There will be three (3) Internal Assessment (Unit Tests) with a total of 20 marks, and the best two (2) performances out of the three Unit tests of Internal Assessment will be counted. Other modes of assessment shall account for remaining 5 marks.

c. A unit test each shall be scheduled after the completion of first and second term.

d. Dates for unit test will be announced at the beginning of the semester, by the examination coordinator.

e. The teacher concerned shall maintain a regular record of the marks obtained by students in unit tests and display the same in due course.

f. The concerned teachers shall submit the compiled internal assessment marks to the Head of the Department, on the conclusion of teaching of the current semester.

g. The Head shall display a copy of the compiled sheet, of internal assessment marks of all the papers, before forwarding it to the Controller of Examination, i.e. at the conclusion of the semester.

h. A promoted candidate, who has to reappear in the examination of a paper, will retain internal assessment marks.

i. In the case of re-admission, the candidates shall have to go through the internal assessment process afresh and shall retain nothing of the previous year.

7. SEMESTER EXAMINATIONS

Prescriptions for conducting semester examinations of theory and lab papers, those shall be conducted after the conclusion of each of the semesters, are presented in the following table:

S.N.	Classification	Theory	Lab
1.	Mode	Written Only	Written, Demo, Programming and viva- voce etc.
2.	Duration	03 Hours	04 Hours
3.	Total Marks	75 (Seventy Five Only)	75 (Seventy Five Only)

8. DISSERTATION/INDUSTRIAL PROJECT

a. Each student of the final semester will have to go for a Dissertation/Industrial Project work either in the industry or in the Department under the guidance of one or two faculty members.

b. Period of completion of Dissertation/Industrial Project work shall be full one semester.

c. There shall normally be two supervisors-one internal and one *external (in the case of industry project form the place where the student is pursuing project-work)*.

d. All the students, who are pursuing the Dissertation/Industrial project work, shall be continuously in touch with the internal supervisor.

e. ***There shall be a mid-term evaluation of the progress*** and the internal supervisors will conduct it. However, an internal supervisor may ask the student to submit a confidential progress-report from the external supervisor *(in the case of industry project)*.

f. All the candidates shall submit **Two (02)** hard copies of the project reports that are duly approved and signed by internal as well as external *(if applicable)* supervisors.

g. An external examiner, appointed for the purpose, shall evaluate the project report.

h. The Head of the Department shall fix a date and time for viva-voce examinations, on receipt of the evaluation-report of the project reports from the external examiner.

i. Head of the Department shall forward the compiled total marks (awarded in internal assessment, project Report and Viva-voce Examination), in the project-semester of each of the candidate, to the Controller of Examination.

9. **EXAMINATION**

   a. The performance of a student in a semester shall be evaluated through continuous class assessment and end semester examination. The continuous assessment shall be based on class tests, assignments/ tutorials, quizzes/ viva voce and attendance. The end semester examination shall be comprised of written papers, practical and viva voce, inspection of certified course work in classes and laboratories, project work, design reports or by means of any combination of these methods.
   b. The marks obtained in a subject shall consist of marks allotted in end semester theory paper, practical examination and sessional work.
   c. The minimum pass marks in each subject including sessional marks (Theory, Practical or Project etc.) shall be 40%.

10. **PROMOTION SCHEME**

    a. A student will be required to clear minimum **40% of his/her papers** (including Labs; excluding non-credit papers) in a semester/annual examination to be eligible **for promotion to the next semester/year**. A student may appear in the supplementary examination after each semester/annual examination and can have a choice to appear in the backlog papers in the supplementary examination or in the subsequent regular semester/annual examination with a prescribed fee. A students detained due to shortage of attendance will repeat his/her paper in the subsequent semester concerned (even/odd).

    b. A **detained** Student is not allowed to re-appear in the internal assessment (Unit test). His/her old internal assessment marks will remain same.

    A student who cleared all the papers of a semester/annual examination of a programme/course will be eligible for improvement examination as per university rule.

    After having passed all the SIX semesters, the students shall be eligible for the award of Bachelor of Computer Applications (BCA) / Bachelor of Science (Information Technology) B. Sc. (IT) degree of JAMIA HAMDARD.

11. **THE GRADING SYSTEM**

As per University Rule

12. **CALCULATION OF SGPA AND CGPA OF A STUDENT IN A SEMESTER**

As per University Rule

After having passed all the SIX semesters, the students shall be eligible for the award of **Bachelor of Computer Applications (BCA) / Bachelor of Science (Information Technology) B. Sc. (IT)** degree of JAMIA HAMDARD.

13. **CLASSIFICATION OF SUCCESSFUL CANDIDATES**

The result of successful candidates, who fulfill the criteria for the award of **Bachelor of Computer Applications (BCA) / Bachelor of Science (Information Technology) B. Sc. (IT)**, shall be classified at the end of last semester, on the basis of his/her final CGPA (to be calculated as per university rule).

BCA 101 (INTRODUCTION TO 'C' PROGRAMMING)

Course Objectives:
1. To introduce the basic concepts of programming
2. To build the problem solving skills by converting real life problems into simple algorithms
3. To teach the skills required to code in C

Unit 1: Basic Concepts of Programming
Programming Fundamentals: Algorithms and Flowcharts, problem solving techniques, stepwise refinement; Programming in C: features of 'C', tokens, data type, operators, expression.

Unit 2: Branching and Looping
Branching Constructs: if-else, switch, conditional operator & goto statements; looping Constructs: white, do-while, for and Jumping statements.

Unit 3: Arrays and Functions
Arrays, string processing, Functions: categories of functions, recursion.

Unit 4: Pointers, Structures, and Unions
Pointers: operations on pointers, pointers & structures; Structures and Unions.

Unit 5: Debugging and File Handling
Development of efficient programs; Debugging, verification and testing of programs. File Management: Defining & opening a file, closing a file, input operations.

Text Books:
1. Yashwant Kanetkar, "Let us C" eighth edition, 2002.
2. Herbert Schildt, "C The Complete Reference" Fourth Edition, 2000.

Reference Books:
1. Kernighan and D. Ritchie, "The ANSI C Programming Language", 2000.
2. E. BalaGuruswamy, "Programming in ANSI C", 2008.
3. V Rajaraman, "Computer Basics and C Programming", PHI.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Understand the basics of computer programming
2. Write, compile, run, and debug C programs
3. Use different data types in a program
4. Design programs involving decision structures, loops and functions
5. Use different data structures and work with files

BCA 102 (COMPUTER SYSTEM ARCHITECTURE)

Course Objectives:
1. To provide the basic familiarity of Logic Gates and Number Systems.
2. To cover the basic principles of Computer Organization, Operation, and Performance
3. To introduce Pipelining and Parallel Processing

Unit 1: Introduction
Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.

Unit 2: Data Representation and Basic Computer Arithmetic
Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, and multiplication and division algorithms for integers.

Unit 3: Basic Computer Organization and Design
Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.

Unit 4: Central Processing Unit
Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

Unit 5: Memory and I/O Organization
Cache memory, Associative memory, mapping; Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Text Books:
1. M. Mano, Computer System Architecture, Pearson Education 1992.
2. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004.

Reference Books:
1. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009.
2. M.M. Mano, Digital Design, Pearson Education Asia, 2013.
3. Carl Hamacher, Computer Organization, Fifth edition, McGrawHill, 2012.

Learning Outcomes:
Upon successful completion of this course, students will be able to

1. Comprehend the binary and hexadecimal number systems
2. Understand the principles and the implementation of computer arithmetic
3. Be familiar with the basics of computer organization and design
4. Understand the fundamentals of different instruction set architectures and their relationship to the CPU design
5. Understand the issues (like pipelining and caching) affecting modern processors

BCA 103 (MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE)

Course Objectives:
1. To develop the essential tool of Matrix Algebra in a comprehensive manner
2. To introduce the idea of applying Differential Calculus to notions of Curvature
3. To familiarize the student with Conic Sections

Unit 1: Algebra of Matrices
Matrix Algebra including rank, inverse, linear system of equation, Eigen value & Caley Hamilton Theorem; Team working and management.

Unit 2: Introduction to Differential Calculus
Differentiation and partial differentiation, derivative of sum, dot product and cross product of two vectors, gradient, divergence and curl.

Unit 3: Successive and Partial Differentiations
Successive differentiation, libneitz theorem, partial differentiation.

Unit 4: Differential Calculus for curvatures
Curvature, asymptotes, singular points, concavity, points of inflexion and tracing of Cartesian curve, Differential equation of first order.

Unit 5: Coordinate Geometry
System of circles, standard equations and properties of parabola and Ellipse; General equation of second degree in two variables, tracing of conic sections, sphere.

Text Books:
1. Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons.
2. Babu Ram: Engineering Mathematics, vol 1 & vol 2.

Reference Books:
1. Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa, 2003.
2. Ramana, "Higher Engineering mathematics", TMH.
3. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Understand the basics of Matrix Algebra
2. Do the sums on Normal and Partial Differentiation
3. Apply Differential Calculus on Curvatures
4. Write and interpret the equations of system of circles, parabola, and ellipse
5. Trace Conic Sections

BCA 104 (COMMUNICATION SKILLS)

Course Objectives:
1. To give a brief summary of rules of Grammar
2. To impart effective reading, writing, and speaking skills
3. To teach drafting and presentation skills

Unit 1: Grammar, Dictionary, and Thesaurus
Review of English Grammar; Written and Spoken language; Common Errors in language; Punctuation (purpose, role, importance and use); Effective use of dictionary, thesaurus, encyclopedia, OED; Figures of speech.

Unit 2: Language, Phonetics, and Writing
Language Skills (listening, Speaking, Reading, Writing); Meaning what you mean; Listening: Effective and efficient listening in various situations (discussions, lectures, news, seminars, speech, telephone calls etc.); Speaking: Phonetics, intonation, accent, usage; strategies for a good rhetoric; Reading: Purpose; Comprehension; Tactics and strategies for good reading; Writing: Guidelines for good writing; various writing styles (General and technical writing styles).

Unit 3: Effectiveness and Efficiency in Communication
Communication (purpose, role importance, elements); Effective and efficient communication; role of content, context and language; Spoken and written communication Presentation and delivery; Role of speaker and audience.

Unit 4: Presentation Skills
Style and body language; Discussion and presentation skills of conferences meeting, seminars.

Unit 5: Drafting the Documents
General and Technical documents (correspondence applications, letter, resumes, CV), drafts, essays, memos; minutes, notes, proposals , précis, reports, summary, synopsis, references, table of contents, acknowledgements, prologue, epilogue, revision; Use of Audio-Visual Aids: OHP, Slides, Charts, Computers etc.

Text Books:
1. Maison, Margaret M., "Examine your English".
2. R S Sharma, "Technical Writing".

Reference Books:
1. R. Sudarshanam, "Understanding Technical English".
2. Bansal, R.K. and J. B. Harrison, "Spoken English for India: A Manual of Speech and Phonetics", Hyderabad: Orient Longman, 1983.
3. Lewis, Hedwig. Body Language, "A Guide for Professionals", 2000.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Understand the basic rules of Grammar

2. Avoid committing common mistakes
3. Read, comprehend, and pronounce correctly
4. Give effective presentations
5. Know the pitfalls of General and Technical Writings

BCA 105 (MEDIA AND INFORMATION LITERACY COMMUNICATION)

Course Objectives:
1. To introduce the fundamentals of media and information literacy
2. To help the students recognize the need and purpose of media and information literacy in today's world
3. To delineate the various role of media and information literacy in the society

Unit 1: Media Education and Literacy
Introduction to Media Education, History of Media Education; Perspectives on Media Education: The Inoculation Model, the Demystification Model, the Creative Participation Model.

Unit 2: Information Literacy
Introduction to Information Literacy, The politics of Information Literacy; The fellow Travelers to Information Literacy, Key moments in the History of Information Literacy.

Unit 3: Leveraging the Power of Computing
Introduction to the History of the Delivery of Computing Power; The Closeness of Computing technology, Mainframes, Micro and Personal Computers; Luggable Computers, Portable Computers, and the Laptop; Pocket Computers, Phones, and the Tablet; Wearable Computing and Augmented Reality Devices.

Unit 4: Digital Media Content
Introduction to Digital Media Content; the nature of Digital Media content; Participatory Culture; Trans media; Converged Content.

Unit 5: Digital Divides
Introduction to Digital Divides; First-Order Digital Devides – Access; Second-Order Digital Devides – Skills; Third-Order Digital Devides – Participation and Outcomes.

Text Books:
1. Marcus Leaning, "Media and Information Literacy – An Integrated Approach for the 21st Century" Chandos Publishing (An imprint of Elsevier) 2017.

Reference Books:
1. Michael C. Alewine and Mark Canada, "Introduction to Information Literacy for Students", Wiley Blackwell, 2017.
2. Forest Woody Horton Jr., "Overview of Information Literacy Resources Worldwide", UNESCO, 2013.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Develop familiarity with the history of Media and Information Literacy
2. Understand fundamental concepts and various perspectives
3. Appreciate the power of computing technology
4. Understand the nature of Digital Media content

5. See different orders of Digital Divide

BCA 201 (INTRODUCTION TO DATA STRUCTURES)

Course Objectives:
1. To impart basic Data Structure Concepts
2. To introduce the basic concepts of Stacks, Queues, Lists, Trees, and Graphs
3. To give a brief account of Searching and Sorting Techniques

Unit 1: Data Representation
Representation of data, Data types, ADTs and Data Structures, linear and non – linear data structures.

Unit 2: Arrays, Structures, and Lists
Single and multidimensional arrays, Structures, Static and Dynamic implementation of arrays, Creation, insertion and deletion of linked list, doubly list, circular list etc.

Unit 3: Stack and its operations
Stacks and its application: Definition and examples, Implementing Push and Pop operations, Stack using dynamic memory allocation, Use of stack in problem solving, infix, prefix and postfix notations and conversions, Recursion using stack.

Unit 4: Queues
Queues: Definition and examples, Sequential and dynamic implementation, Implementation of Insert and remove operations.

Unit 5: Tree, Graph, Searching and Sorting
Introduction to tree and graph, Searching techniques: Linear Search, Binary Search, Sorting: Bubble Sort, Quick Sort, Merge Sort, Insertion Sort, Selection Sort.

Text Books:
1. Seymour Lipschutz, "Data Structures with C", Schaum's Outline Series.
2. Langsam Yedidyah, Augenstein J Moshe, Tenenbaum M, "Data Structures using C and C++", PHI.

Reference Books:
1. Horowitz, Sahni, Freed, "Fundamentals of Data Structures in C", Silicon Press
2. Kruse R., "Data Structures and Program Design in C", Pearson Education India.
3. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C and C++, Second edition, PHI, 2009.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Demonstrate familiarity with basic data structures.
2. Use Data Structures for Problem Solving.

3. Determine which data structure to use in different scenarios and be familiar with writing recursive methods.
4. Demonstrate understanding of the properties of various data structures such as stacks, queues, lists, trees and graphs and Use various data structures effectively in application programs.
5. Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, and quick sort.

BCA 202 (DATA COMMUNICATION AND COMPUTER NETWORKS BASICS)

Course Objectives:
1. To introduce the basics of Data Communication
2. To present the fundamentals of Computer Networks
3. To facilitate the familiarity with various functions and protocols of different layers

Unit 1: Introduction to Computer Networks
Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite;

Unit 2: Introduction to Data Communication
Analog and digital signal; data-ratelimits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

Unit 3: Arrays and Functions
Circuit switching; packetswitching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

Unit 4: Data Link Layer and Multiple Access Protocols
Error detection and error correction techniques;data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet; Routing: routing algorithms; network layer protocolof Internet- IP protocol, Internet control protocols.

Unit 5: Transport and Application Layer Functions and Protocols
Transport services- error and flow control,Connection establishment and release-three way handshake; Overview of DNS protocol; overview of WWW &HTTP protocol.

Text Books:
1. B. A. Forouzan: Data Communications and Networking, Fourth edition, THM, 2007.

Reference Books:
1. Andrew S Tanenbaum: Computer Networks, 4th Edition, Pearson Education
2. William stallings: Data and computer communications, 7th Edition Pearson Education

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Define, use and implement Computer Networks and the basic components of a Network system.
2. Differentiate the various types of network configurations and applying them to meet the changing and challenging networking needs of organizations.

3. Understand the layers of OSI and TCP and get knowledge about congestion control and network security
4. Define the different protocols, software, and network architectures.
5. Analyze why networks need security and control, what errors might occur, and how to control network errors.

BCA 203 (FUNDAMENTAL CONCEPTS OF OPERATING SYSTEMS)

Course Objectives:
1. To introduce the basic concepts of Operating Systems
2. To explain the mechanisms of OS to handle processes and their communication
3. To explain the mechanisms involved in memory and storage management in contemporary OS

UNIT WISE SYLLABUS

Unit 1: Introduction to Operating Systems
Overview of Operating System: Computer System Structure, Operating Systems Structure, Operating System functions; Computing Environments: Traditional Computing, Client-Server Computing, Peer-to-Peer Computing, Web based Computing, and Mobile Computing.

Unit 2: Process Management
Process Management: Process Concept, Process Scheduling, Inter Process Communication, Multithreading; Scheduling Algorithms: FCFS, SJF, RR, and Priority.

Unit 3: Deadlocks and Synchronization
Deadlocks: introduction, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock; Process Synchronization: The Critical-Section Problem, Semaphores, Classic Problems of Synchronization.

Unit 4: Memory Management
Memory management: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation; Virtual Memory Management: Demand Paging, Page Replacement Algorithms, Thrashing.

Unit 5: Storage Management
Storage Management: File System, File Concept, Access Method, Directory and Disk Structure, File Sharing; Secondary-Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Scheduling; I/0 Systems: Overview, I/O Hardware, Application I/O Interface.

Text Books:
1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne: Operating System Concepts. 8th Edition, John Wiley and Sons.

Reference Books:
1. William Stallings: Operating Systems Internals and Design Principles, 6th Edition, Prentice Hall.

2. Andrew S Tanenbaum: Modern Operating Systems, 3rd Edition, Prentice Hall.

Learning Outcomes:

Upon successful completion of this course, students will be able to

1. Understand the creation of processes and threads
2. Comprehend the algorithms for process scheduling in terms of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time
3. optimally allocate memory to processes by increasing memory utilization and for improving the access time
4. Apply various Page Replacement Algorithms on a given input string
5. Understand different File Systems and Directory Structures

BCA 204 (Elementary Physics)

Course Objectives:
1. To introduce the elementary concepts of Physics
2. To impart the basic knowledge of Mechanics, Electromagnetism, Optics, and Solid-state Physics
3. To inculcate the ability to solve qualitative and quantitative problems of Physics.

UNIT WISE SYLLABUS

Unit 1: Mechanics
Units and dimensions; Newton's laws; Conservation of linear momentum; Conservative and non-conservative force; Concept of potential energy; Work energy theorem; Periodic and oscillatory motion; Simple harmonic motion: Time period, Frequency, Phase and phase constant, Energy in simple harmonic motion.

Unit 2: Electromagnetism
Coulomb's law; Superposition principle; Concept of electric field and electric potential: Gauss's law, Simple applications of Gauss's law; Electric Current and current density: Ohm's law, Combination of resistors in series and parallel; Salient features of electromagnetic spectrum.

Unit 3: LASER
Conventional sources of light and LASER, Spontaneous emission, Stimulated Emission, Population inversion, Principle of LASER, Einstein's coefficients, Working of helium-neon and Ruby lasers.

Unit 4: Fiber Optics
Total internal reflection, Introduction of fiber optics, Numerical aperture, Step index and graded index fibers, Attenuation and dispersion mechanism, Application of optical fibers.

Unit 5: Elementary Ideas of Semiconductors
Classification of semiconductors: intrinsic and extrinsic semiconductors, Doping, P-type and N-type semiconductors; Band gap: Classification of materials on the basis of band gap, Formation of P-N junction, Depletion width, Forward biased and reverse biased P-N junction, I-V characteristics; Working of Light Emitting Diode (LED) and solar cell.

Text Books:
1. Halliday, Resnick and Walker: Fundamentals of Physics, Wiley India.
2. Subrahmanyam and Brijlal: A Text Book of Optics, S. Chand.

Reference Books:
1. David J. Griffiths: Introduction to Electrodynamics, PHI.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Understand the basics of Physics

2. Think critically and to use appropriate concepts to analyze situations involving the fundamental principles of physics
3. Use appropriate mathematical techniques and concepts to obtain solutions to problems in physics

BCA 301 (INTRODUCTION TO OBJECT ORIENTED PROGRAMMING)

Course Objective:

1. To introduce standard tools and techniques for software development, using object oriented approach.
2. To describe the use of a version control system, an automated build process.
3. To develop an appropriate framework for automated unit and integration tests.

Unit – I: Principles of Object Oriented Programming (OOP)
Concepts of structured and object oriented programming; advantage of OOP methodologies.

Unit – II: Characteristics of OOP languages
Objects, classes, Data Abstraction, Encapsulation, inheritance, reusability, polymorphism and operator overloading, function overloading.

Unit – III: Introduction to C++
Keywords, Data types, Constants, Variables, Expressions and statements, Operators; Control Structures: if, if… else, switch; Repetitive Statements: for, while, do… while; Pointers, arrays and strings.

Unit – IV: Functions in C++
Parameter passing, Friend Functions, Inline Functions, Function Overloading, Operator overloading; Classes and Objects; Constructors and Destructors.

Unit – V: Inheritance
Single Inheritance, Multilevel inheritance, Multiple inheritance, Hierarchical Inheritance, Hybrid Inheritance; Pointers, Virtual Functions and Polymorphism.

Text books:
1. E Balaguruswamy, "Object oriented programming with C++", Fifth Edition, Tata McGraw Hill.

Reference books:
1. E Bjarne Stroustrup, "The C++ Programming Language", Special Edition, Pearson Education.
2. Bruce Eckel, "Thinking in C++", 2nd Edition, Pearson Education.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.

BCA 302 (INTRODUCTION TO DATABASE MANAGEMENT SYSTEM)

Course Objective:

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
3. To understand and use data manipulation language to query, update, and manage a database.

Unit – I: Introduction & Database System Architecture

Overview of Database Management System, DBMS architecture, Characteristics of database approach, Various views of data, data models, Schemes, data independence, Advantages of DBMS over file processing systems, Responsibility of database administrator, Introduction to Database Languages & Environments.

Unit – II: E-R Modeling

Entity types, Entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, Sub classes; Super classes, inheritance, specialization and generalization.

Unit – III: Relational Data Model

Relational model concepts, relational constraints, relational algebra SQL: SQL queries, programming using SQL. EER and ER to relational mapping: Data base design using EER to relational language.

Unit – IV: Transaction Processing Concepts

Transaction system, testing of serializability, Serializability of schedules, Conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, Checkpoints, deadlock handling.

Unit – V: Data Normalization

Functional Dependencies, Normal form up to 3rd normal form. Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi-version Schemes, Recovery with concurrent transaction.

Text books:

1. Abraham Silberschatz, Henry Korth, S.Sudarshan, "Database Systems Concepts", 6th Edition, McGraw-Hill.
2. Date C J, "An Introduction to Database System", Addison Wesley.

Reference books:

1. R. Elmasri, S. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education.
2. Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", Morgan Kaufmann Publishers, 1993.

3. A.K.Majumdar, P. Bhattacharya, "Database Management Systems", TMH, 1996.

Learning Outcomes:

Upon successful completion of this course, students will be able to

1. Write relational algebra expressions for a given query query and optimize the developed expressions
2. Design the databases for a given specification of the requirement using ER method and normalization
3. Construct the SQL queries for a given specification for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2
4. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system
5. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

BCA 303 (DISCRETE STRUCTURES)

Course Objective:

1. To apply logic reasoning to solve a variety of problems.
2. To construct correct direct and indirect proofs.
3. Students being able to use division into cases in a proof.

Unit – I: Introduction to prepositional calculus
Introduction to prepositional calculus: Statements, logical operations; truth tables of logical identities, Equivalence of logical identities, Tautologies and contradiction, Negation and De Morgan's law, Conditional and biconditional; Introduction to Boolean algebra: Basic definition and theorems, Boolean expressions, Sum-Of-Products form.

Unit – II: Sets and related operations
Cardinality, Union, Intersection, Complement, Difference, Symmetric Difference, Cartesian Product, subset, superset , power set , Venn diagram , Algebra of Sets, Duality; Properties of operators: commutative, associative, distributive; De Morgan's law, Standard sets.

Unit – III: Relations and their properties
Properties of relation: reflexive, irreflexive, symmetric, asymmetric, antisymmetric, transitive; Matrix of relations, relations represented as digraph, Equivalence relation, partition and equivalence class.

Unit – IV: Functions and its properties
Types of functions: One-to-one, onto, into, everywhere defined, Domain and range, Invertible functions, Composition of functions.

Unit – V: Introduction to recurrence relation
Homogeneous and non-homogeneous recurrence relations, Order and degree of a recurrence relation, Formulation of recurrence relations, Characteristic relation, Solution of recurrence relations.

Text books:
1. Keneth H. Rosen, "Discrete Mathematics and Its Applications", TMH, 1999.
2. C.L. Liu, "Elements of Discrete Mathematics", TMH, 2000.

Reference books:
1. Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI, 1996.
2. Narsingh Deo, "Graph Theory With Application to Engineering and Computer Science", PHI.
3. J. P. Trembly & P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1997.

Learning Outcomes:
Upon successful completion of this course, students will be able to

1. Express a given logic sentence in terms of predicates, quantifiers, and logical connectives.
2. Derive the solution for a given a problem using deductive logic and prove the solution based on logical inference.
3. Classify the algebraic structure for a given a mathematical problem.
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
5. Develop the given problem as graph networks and solve with techniques of graph theory.

BCA 401 (Fundamentals of Probability and Statistics)

Course Objective:

1. To familiarize the students with statistical techniques.
2. To equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.

Unit – I: Overview of Probability
Introduction, Events & Different Types of Events, Addition & Multiplication Law, Conditional Probability, Bayes' Theorem.

Unit – II: Probability Distribution
Random Variables, Expectation of Discrete Random Variables & Its Properties Continuous & Discrete Probability Function, Binomial, Poison & Normal Distribution.

Unit – III: Measures of Central Tendency
Definition, Function & Scope of Statistics, Arithmetic Mean, Weighted A.M., Median, Mode, Geometric & Harmonic Mean and Their Merits & Demerits.

Unit – IV: Measures of Variation
Measures of Variation: Range, The Interquartile Range or Quartile Deviation, Average (Mean), Deviation Standard Deviation, Coefficient of Variation, Skew ness, Moments & Kurtosis.

Unit – V: Correlation and Regression Analysis
Introduction, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient, Regression Analysis: Difference Between Correlation & Regression, Regression Lines, Regression Equations, Regressions Coefficient.

Text books:
1. S.P. Gupta & M.P. Gupta, "Business Statistics", Sultan Chand & Sons.
2. S.C. Gupta & V.K. Kapoor,"Fundamental of Mathematical Statistics", Sultan Chand & Sons.

Reference books:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
3. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
4. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

Learning Outcomes:

Upon successful completion of this course, students will be able to:
1. Learn the ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
2. Learn the basic ideas of statistics including measures of central tendency, correlation and regression.
3. Understand the statistical methods of studying data samples.

BCA 402 (INTRODUCTION TO ARTIFICIAL INTELLIGENCE)

Course Objective:

1. Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, inference and logic.
2. To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.
3. To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning.

Unit – I: Overview of Artificial IntelligenceI
Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success; Scope of Artificial Intelligence, intelligent agents; Expert systems.

Unit – II: Problem Solving
Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem, Solving Problems by Searching, heuristic search techniques, constraint satisfaction problems, stochastic search methods.

Unit – III: Game Playing and Knowledge
Minimax, alpha-beta pruning; Knowledge: Definition and importance of knowledge, Knowledge representation, Various approaches used in knowledge representation, Issues in knowledge representation.

Unit – IV: Knowledge Representation and Reasoning
Building a Knowledge Base: Propositional logic, first order logic, situation calculus, theorem proving in First Order Logic; Planning, partial order planning; Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks.

Unit – V: Learning
Overview of different forms of learning, Learning Decision Trees, Neural Networks; Introduction to Natural Language Processing.

Text books:
1. E. Rich and K. Knight: Artificial intelligence, TMH, 2nd ed., 1999.
Reference books:

1. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999
2. Nils J Nilsson ,"Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Compare AI with human intelligence and traditional information processing, and discuss its strengths and limitations and its application to complex and human-centered problems.
2. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
3. Implement classical Artificial Intelligence techniques, such as search algorithms, minimax algorithm, neural networks, tracking, robot localization.
4. Apply Artificial Intelligence techniques for problem solving.
5. Review research articles from well-known AI journals and conference proceedings regarding the theories and applications of AI.

BCA 501 (FUNDAMENTALS OF SOFTWARE ENGINEERING)

Course Objective:

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

Unit – I: Software and Software Engineering
The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI)

Unit – II: Software Requirement Analysis
Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.

Unit – III: Software Development Management
Estimation in Project Planning Process, Project Scheduling, Software Risks, Risk Identification, Risk Projection and Risk Refinement, RMMM Plan, Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.

Unit – IV: Design Engineering
Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software
Architecture, Modeling Component Level Design.

Unit – V: Software Testing Strategies & Tactics
Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System testing, Black-Box Testing, White-Box Testing and their type, Basis Path Testing.

Text Books:
1. Pressman S.Roger, Software Engineering, Tata McGraw-Hill.
2. Yogesh Singh, Software Testing, Cambridge University Press.2011.

Reference Books:
1. Sommervillelan, Software Engineering, 5th ed., Addison Wesley-2000.
2. Fairley Richard, Software, Software Engineering Concepts, Tata McGraw-Hill.

3. Jalote Pankaj, An integrated approach to software engineering, Narosa Publishing House.

Learning Outcomes:

Upon successful completion of this course, students will be able to

1. Evaluate and analyze the SDLC and basic architecture SRS documents.
2. Understand the concept project management.
3. Understand the software testing principles.

BCA PE311 (INTRODUCTION TO WIRELESS COMMUNICATION)

Course Objective:

1. This course is intended to introduce to students into the basics of wireless systems – concepts, theory, limitation and costs of systems mainly for VHF and above.
2. To have an understanding of various multiple access techniques and the cellular concept as well as some 2G and 3G systems.
3. To identify the requirements of mobile communication as compared to static communication.

Unit – I: Introduction to Basic Principles
Liberalization of communications Industry, Digitalization of content, changes in spectrum management, cellular reuse, drive towards broadband, Evolution of mobile communications, mobile radio systems- Examples, trends in cellular radio and personal communications.

Unit – II: Cellular Concept
Frequency reuse, channel assignment, hand off, Interference and system capacity, tracking and grade of service, Improving Coverage and capacity in Cellular systems. Cellular telephony: frequency reuse principle, transmitting, receiving, roaming, GSM network architecture, GSM channel structure, GPRS.

Unit – III: Mobile radio propagation
Free space propagation model, reflection, diffraction, scattering, link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse model, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, statistical models for multipath fading channels.

Unit – IV: Second Generation and Third Generation Wireless Networks and Standards
WLL, Bluetooth. AMPS, GSM, IS-95 and DECT Satellite networks: orbits, footprint, categories of satellites. Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Capacity of Cellular CDMA and SDMA.

Unit – V: Introducing the Mobile Internet
Key Services for the mobile Internet, Business opportunities. WAP: the Mobile Internet Standard: Challenges and Pitfalls, Overview of the Wireless Application Protocol, Implementing WAP Services: The Wireless Markup Language, Enhanced WML: WML Script and WTAI,

Text books:
1. T.S.Rappaport, "Wireless Communications: Principles and Practice", Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint 2003.
2. R. Blake, "Wireless Communication Technology", Thomson Delmar, 2003.

Reference books:
1. W.C.Y.Lee, "Mobile Communications Engineering: Theory and applications", Second Edition, McGraw-Hill International, 1998.
2. Stephen G. Wilson, "Digital Modulation and Coding", Pearson Education, 2003.

Learning Outcomes:

Upon successful completion of this course, students will be able to
1. Summarize the principles and applications of wireless systems and standards.
2. Discuss the cellular system design and technical challenges.
3. Analyze the Mobile radio propagation, fading, diversity concepts and the channel modeling.
4. Analyze Multiuser Systems, CDMA, WCDMA network planning and OFDM Concepts.
5. Describe and differentiate four generations of wireless standard for cellular networks

BCA PE312 (INTRODUCTION TO MOBILE COMPUTING)

Course Objective:

1. To learn about the concepts and principles of mobile computing.
2. To explore both theoretical and practical issues of mobile computing.
3. To discuss the features of IEEE 802.11 Wireless LAN's.

Unit – I: Mobile communication Introduction

Mobile computing devices mobile computing function, mobile computing architecture, evaluation of wireless technology (1G, 2G, 3G, 4G technology).

Unit – II: PCS and GSM

PCS Architecture, GSM architecture, Location tracking and call setup, Mobility management: Handover Security-GSM, SMS, International roaming for GSM.

Unit – III: GPRS and Packet Data Network

GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Limitations of GPRS, Spread Spectrum technology, Third Generation Networks, Applications on 3G.

Unit – IV: Wireless Networks

Wireless LAN: IEEE 802.11, Standards, Architecture, Services, Mobile Ad hoc Networks: WiFi and WiMAX, Wireless Local Loop, Bluetooth.

Unit – V: Emerging Mobile Communication Technology

Mobile IP, Cellular IP, VoIP, SIP, LTE, 4G goal and architecture.

Text books:
1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education.
2. William Stallings, "Wireless Communications and Networks", Pearson Education.

Reference books:
1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.
3. C.K. Toh, "Adhoc mobile wireless networks", PHI, 2002.

Learning Outcomes:

Upon successful completion of this course, students will be able to

1. Assess the capabilities of next-generation networks and the role of wireless technologies in network design and operation.
2. Evaluate network protocols, routing algorithms, connectivity methods and characteristics.
3. Evaluate wireless network topologies, wireless connectivity and characteristics, and the impact of wireless networks on security and Internet communications.

4. Select appropriate wireless technologies in commercial and enterprise applications.

BCA PE313 (WEB & E-COMMERCE TECHNOLOGIES)

Course Objective:

1. The aim of the course is to acquaint the students with the basics of internet technologies.
2. This course demonstrates an in-depth understanding of the tools and Web technologies necessary for business application design and development.
3. Provides an overview of business and technology topics, business models, virtual value chain, and innovation and marketing strategies.

Unit – I: An introduction to Electronic commerce

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

Unit – II: The Internet and WWW

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

Unit – III: Internet Security

Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime (Laws, Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus (How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorisation and Authentication, Firewall, Digital Signature (How it Works).

Unit – IV: Electronic Data Exchange

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

Unit – V: Planning for Electronic Commerce and Internet Marketing

Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites; Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Text books:

1. G.S.V.Murthy, "E-Commerce Concepts, Models, Strategies", Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag , "E- Commerce", 2005.

Reference books:
1. Gray P. Schneider, "Electronic commerce", International Student Edition, 2011.
2. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, "E-COMMERCE, FUNDAMENTALS AND APPLICATIONS", Wiely Student Edition, 2011.

Learning Outcomes:

Upon successful completion of this course, students will be able to
1. Have a good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
2. Outline the history of the web, and technologies that makes the web pages and publishing them.
3. Analyze the impact of E-commerce on business models and strategy.
4. Recognize the fundamental principles of e-Business and e-Commerce.
5. Explain the added value, risks and barriers in the adoption of e-Business and e-Commerce

BCA PE521 (INTRODUCTION TO DATA MINING)

Course Objective:

1. To identify the scope and necessity of Data Mining.
2. Describe the designing of Data Mining Techniques.
3. To develop ability to understand various algorithms based on data mining tools.

Unit – I: Data Mining Concepts
Data mining primitives, Basics of data mining, Data Mining Functionalities, Classification of Data Mining Systems, Architectures of data mining system.

Unit – II: Association Rules In Large Databases
Association Rule Mining, Mining Single Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint Based Association Mining.

Unit – III: Classification And Prediction
Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

Unit – IV: Cluster Analysis In Data Mining
Types of Data in Cluster Analysis. A Categorization of Major Clustering Methods, Partitioning Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Outlier Analysis.

Unit – V: Data Warehousing and various Issues in Data Mining :
Introduction to Data Warehouse, Data warehousing and its characteristics, Online analytical processing (OLAP), characteristics of OLAP system, Scalability and data management issues in data mining algorithms, measures of interestingness

Text Books:
1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Education.2005.
2. Richard Roiger, Michael Geatz, Data Mining: A Tutorial Based Primer, Pearson Education 2003.

Reference book:
1. G.K. Gupta, Introduction to Data Mining with Case Studies, PHI, 2006.
2. Soman K P, Diwakar Shyam, Ajay V Insight into Data Mining: Theory and Practice, PHI, 2006.

Learning Outcomes:
Upon successful completion of this course, students will be able to

1. Understand Data Mining concept and various associative rule.

2. Understand the concept of Cluster Analysis In Data Mining
Understand the concepts of Data Ware Housing.

BCA PE522 (INTRODUCTION TO CLOUD COMPUTING)

Course Objective:

1. To identify the scope and necessity of Data Mining.
2. Describe the designing of Data Mining Techniques.
3. To develop ability to understand various algorithms based on data mining tools.

Unit – I: Introduction to Cloud Computing
Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, History of Cloud Computing, Cloud service providers, Benefits and limitations of Cloud Computing.

Unit – II: Cloud Computing Architecture
Comparison with traditional computing architecture (client/server), Services provided at various levels, Service Models- Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), How Cloud Computing Works, Deployment Models such as Public cloud, Private cloud, Hybrid cloud, Community cloud,

Unit – III: Case Studies
Case study of NIST architecture, Case study of Service model using Google App Engine, Microsoft Azure, Amazon EC2, Eucalyptus.

Unit – IV: Service Management in Cloud Computing
Service Level Agreements (SLAs), Billing & Accounting, Comparing Scaling Hardware such as Traditional vs. Cloud, Economics of scaling.

Unit – V: Cloud Security
Network level security, Host level security, Application level security, Data security and Storage- Data privacy and security Issues, Jurisdictional issues raised by Data location, Authentication in cloud computing.

Text Books:
1. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
2. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011.
3. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012

Reference book:
1. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010
2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical

Learning Outcomes:

Upon successful completion of this course, students will be able to

1. Understand Data Mining concept and various associative rule.
2. Understand the concept of Cluster Analysis In Data Mining
3. Understand the concepts of Data Ware Housing.

BCA PE523 (Introduction to Data Science and Big data)

Course Objective:

1. To identify the scope and necessity of Data Science and Big Data.
2. Describe the designing of NoSQL Data Management.
3. To develop ability to understand various algorithms based on Hadoop.

Unit – I: Understanding Big Data
What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing fraud and big data, risk and big data ,credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data mobile business intelligence, Crowd sourcing analytics ,inter and trans firewall analytics

Unit – II: NoSQL Data Management
Introduction to NoSQL , aggregate data models ,aggregates ,key-value and document data models, relationships, graph databases, schema less databases ,materialized views, distribution models, sharding , master-slave replication , peer-peer replication, sharding and replication, consistency , relaxing consistency , version stamps , mapreduce, partitioning and combining , composing map-reduce calculations

Unit – III: Basics Of Hadoop
Data format , analyzing data with Hadoop , scaling out , Hadoop streaming, Hadoop pipes, design of Hadoop distributed file system (HDFS), HDFS concepts, Java interface , data flow, Hadoop I/O, data integrity, compression, serialization, Avro file-based data structures.

Unit – IV: Map Reduce Applications
Map Reduce workflows, unit tests with MRUnit , test data and local tests – anatomy of Map Reduce job run, classic Map-reduce , YARN , failures in classic Map-reduce and YARN, job scheduling , shuffle and sort , task execution, MapReduce types , input formats, output formats.

Unit – V: Hadoop Related Tools
Hbase, data model and implementations, Hbase clients, Hbase examples– praxis.Cassandra ,cassandra data model , cassandra examples , cassandra clients, Hadoop integration. Pig , Grunt , pig data model , Pig Latin , developing and testing Pig
Latin scripts. Hive , data types and file formats , HiveQL data definition , HiveQL data manipulation – HiveQL queries

Text Books:

1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012. 5. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.

Reference Books:
1. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012. 7. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011.
2. Eben Hewitt, "Cassandra: The Definitive Guide", O'Reilley, 2010.
3. Alan Gates, "Programming Pig", O'Reilley, 2011.

BCA SEE411 (INTERNET AND WEB TECHNOLOGY)

Course Objectives:
1. To teach the basics of internet, its applications and the tools and technologies involved in publishing content on the World Wide Web
2. To introduce HTML, CSS, XML, the fundamentals of how the Internet and the Web function, and a general grounding introduction to more advanced topics such as programming and scripting using JavaScript
3. To expose students to the basics of e-commerce and the security issues associated with the web

Unit 1: Introduction to Internet and WWW
Introduction to Internet: History of World Wide Web; Protocols governing the web; Understanding the Internet: syntax of URLs, web page and browsers, search engine; Introduction to Cyber Laws in India.

Unit 2: Internet Applications
Internet applications: FTP, Telnet, Email, Chat; Internet addressing: identification of each computer using domain name and IP addresses, DNS.

Unit 3: Formatting Web Pages
Introduction to HTML, XML, DHTML and CSS; Formatting Web Pages with the help of different HTML tags, HTML table, HTML form; using CSS for formatting different objects; using DHTML for dynamic designing of web page.

Unit 4: JavaScript
Introduction to Javascript: Advantages of Javascript, Javascript Syntax, documents, forms, Datatype, Variable, Array, Operator and Expression, Looping Constructor, Event Handling, cookies.

Unit 5: E-Commerce and emerging trends
E-Commerce and security issues; Emerging trends: Internet telephony, virtual reality over the web, etc.; Intranet and extranet; firewall design issues.

Text Books:
1. Raymond Greenlaw and Ellen Hepp, "Fundamentals of Internet and World Wide Web", TMH.
2. Ivan Bayross, "Web Technologies Part II", BPB Publications.

Reference Books:
1. Thomas A Powell, "HTML The Complete Reference", Tata McGraw Hill Publications.
2. Burdman, "Collaborative Web Development", Addison Wesley.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Understand fundamental tools and technologies and protocols governing the web.
2. Analyze a web page and identify its elements and attributes.

3. Create web pages using HTML and Cascading Style Sheets.
4. Build dynamic web pages using JavaScript (Client side programming).
5. Develop an understanding of electronic commerce and emerging internet trends.

BCA SEE412 (Programming in Visual Basic)

Course Objectives:

1. To understand event-driven programming methods, including creating and manipulating objects, classes and using object-oriented tools such as the class debugger.
2. To make the students able to design, code, test and debug at a beginning level.

Unit – I: Introduction to VB
Visual & Non-Visual programming, Procedural, Object-Oriented, Object-Based and Event-Driven Programming Languages, VB as Even-Driven and Object-Based Language, VB Environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate window, Default Controls in Tool Box Visual Development and Event Driven programming.

Unit – II: Basics of Programming
Variables: Declaring Variables, Types of variables, Converting Variables Types, User Defined Data Types, Forcing Variable Declaration, Scope & Lifetime of Variables; Constants: Named & Intrinsic, Operators: Arithmetic, Relational & Logic.

Unit – III: Decision Statements in VB
If statement, if-then-else, select-case; Looping Statements in VB: do-loop, for-next, while-wend; Exit statement, Nested Control Structure; Arrays: Declaring and using Arrays, One-dimensional, Two-dimensional and Multi-dimensional Arrays, Static and Dynamic arrays, Array of Arrays.

Unit – IV: Procedures
General & Event Procedures, Subroutines, Functions, Calling Procedures, Arguments - Passing Mechanisms, Optional Arguments, Named Arguments, Functions Returning Custom Data Types Simple Program Development in VB such as Sum of Numbers, Greatest among Numbers, Checking Even/Odd Number, HCF of Two Numbers, Generate Prime Numbers, Generate Fibonacci Series, Factorial of a Number, Searching, Sorting, etc.

Unit – V: VB Objects and Monitoring Mouse Activity
Dialog Boxes, Common Controls, Menus, MDI Forms, Testing, Debugging and Optimization – Working with Graphics.
Monitoring Mouse Activity: File handling, File system controls, File system objects, DLL Servers.

Text Books:

1. Steven Holzner, "Visual Basic 6 Programming: Black Book", Dreamtech Press.
2. Evangelos Petroutsos, "Mastering Visual Baisc 6", BPB Publications.
3. Julia Case Bradley & Anita C. Millspaugh, "Programming in Visual Basic 6.0", Tata McGraw- Hill Edition.

Reference books:

1. KMichael Halvorson, "Step by Step Microsoft Visual Basic 6.0 Professional", PHI.
2. "Visual basic 6 Complete", BPB Publications.
3. Scott Warner, "Teach Yourself Visual basic 6", Tata McGraw-Hill Edition.
4. Brian Siler and Jeff Spotts, "Using Visual Basic 6", Special Edition, PHI.

Learning Outcomes:

1. Students should be able to implement syntax rules in visual basic programs.
2. Students will have the understanding of variables and data types used in program development.
3. Students will be able to apply decision structures for determining different operations, apply loop structures to perform repetitive tasks.

BCA SEE413 (Fundamental Concepts of Microprocessor and Arduino Programming)

Course Objectives:

1. Do assembly language programming.
2. Do interfacing design of peripherals like I/O, A/D, D/A, timer etc.
3. Develop systems using different microcontrollers.

Unit – I: Fundamentals of Microprocessor

Fundamentals of Architecture: 8 & 16 bit Microprocessor and Microcontroller and its comparison, Embedded System & its Characterization. 8051 Architecture Family: Block Diagrams, CPU, ALU, Family of Bus, Registers, Pointers. Timing Diagrams and Execution Cycles, Overview of Microprocessor Family, I/O Interfacing.

Unit – II: Instruction Set and programming

Addressing modes: Introduction, Instruction syntax, Data types, Subroutine, Types of Addressing. 8051 Instruction set, Instruction timings, Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction. Assembly language programs, C language programs, Assemblers and compilers.

Unit – III: Introduction to Arduino

Fundamentals of Arduino, Serial Monitoring, Digital and Analog Inputs, Understanding variables, If-Else Statement, comparison Operators and Conditions, While statement, Analog I/O and Serial Communications.

Unit – IV: Programming using Arduino

Arduino Environment, C Programming used for Arduino, ArduinoToolchain, Cross-Compilation, Arduino Sketches, Classes, Pins, Input and Outputs, Debugging, UART protocol, UART parity and Stop.

Unit – V: Applications

Microprocessor: LED, LCD and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing.
Arduino: Traffic Light Count Down Timer, Parking Lot Counter, Weighing Machines, Emergency Light for railways, Security Systems.

Text books:

1. M. A. Mazidi, J. G. Mazidi and R. D. McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Pearson Education, 2007.
2. R. S. Gaonkar, ", Microprocessor Architecture: Programming and Applications with the 8085", Pen ram International Publishing, 1996.
3. Byron Francis, "Arduino : The Complete Beginner's Guide - Step By Step Instructions".

Reference books:

1. K. J. Ayala, "8051 Microcontroller", Delmar Cengage Learning, 2004.
2. R. Kamal, "Embedded System", McGraw Hill Education, 2009.
3. D. A. Patterson and J. H. Hennessy, "Computer Organization and Design: The Hardware/Software interface", Morgan Kaufman Publishers, 2013.
4. D. V. Hall, "Microprocessors & Interfacing", McGraw Hill Higher Education, 1991.

Learning Outcomes:

1. Students will learn the general construction of Microprocessor and Microcontroller system and compare them.
2. Students will have the basic idea of introduction to programming.
3. Students will be able to implement small programs to solve well-defined problems on an embedded platform and develop familiarity with programming used to for various applications of Microprocessor and Arduino.

BCA SEE521 (Introduction to Java Programming)

Course Objective:

1. To identify the scope and necessity of Java Programming.
2. Describe the designing of Java Programming Techniques.
3. To develop ability to understand various algorithms based on Java Programming.

Unit – I: Introduction to Java

Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting, Java Methods (Defining, Scope, Passing and Returning Arguments, Type Conversion and Type and Checking, Built-in Java Class Methods).

Unit – II: Arrays, Strings and I/O

Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects, Manipulating Strings, String Immutability & Equality, Passing Strings To & From Methods, String Buffer Classes. Simple I/O using System out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.

Unit – III: Object-Oriented Programming Overview

Principles of Object-Oriented Programming, Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection. Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes, Autoboxing/Unboxing, Enumerations and Metadata.

Unit – IV: Exception Handling, Threading, Networking and Database Connectivity

Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi-threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resuming threads. Using java.net package, Overview of TCP/IP and Datagram programming. Accessing and manipulating databases using JDBC.

Unit – V: Applets and Event Handling

Java Applets:Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms,Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using the AWT controls, Swing components of Java Foundation Classes such as labels, buttons, textfields, layout managers, menus, events and listeners; Graphic objects for drawing figures such as lines, rectangles, ovals, using different fonts. Overview of servlets

Text Books:
1. Programming with Java, E Balagurusamy, Second edition, TMH.
2. Java -The Complete Reference, Patrick Naughton and Herbertz Schidt.

3. Core Java Volume-I and II 2nd edition-Sun MicroSystem.

Reference book:
1. The Java Programming Language, Ken Arnold, James Gosling, David Homes.
2. Cay S. Horstmann, GaryCornell, "Core Java 2 Volume 1 ,9th Edition,Printice Hall.
3. Bruce Eckel, "Thinking in Java", 3rd Edition, PHI, 2002.

Learning Outcomes: Understand Java Programming concept and various rule.

BCA SEE522 (Fundamentals of .Net Programming)

Course Objective:

1. To identify the scope and necessity of .Net Programming.
2. Describe the designing of C# Programming Techniques.
3. To develop ability to understand various Windows Forms and Managing States.

Unit – I: Introduction to .NET Framework and C#
.NET framework, MSIL, CLR, CLS, CTS, Namespaces, Assemblies The Common Language Implementation, Assemblies, Garbage Collection, The End to DLL Hell - Managed Execution, Name Spaces - Constructor and Destructors, Function Overloading & Inheritance, Operator Overloading, Modifiers - Property and Indexers , Attributes & Reflection API, When to use Console Applications - Generating Console Output, Processing Console Input.

Unit – II: C#.NET and ADO.NET:
Creating Language Features and Creating .NET Projects, Namespaces Classes and Inheritance -, Namespaces Classes and Inheritance -, C, Exploring the Base Class Library -, Debugging and Error Handling -, Data Types -, Exploring Assemblies and Namespaces, String Manipulation ,Files and I/O ,Collections, Benefits of ADO.NET, ADO.NET compared to classic ADO -, Datasets, Managed Providers -, Data Binding: Introducing Data Source Controls -, Reading and Write Data Using the Sql DataSource Control

Unit – III: Windows Forms and Controls in details
The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs – ToolTips, Apply Inheritance techniques to Forms, Creating Base Forms, Programming Derived Forms, Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls

Unit – IV: Connectivity ASP.NET - Themes and Master Pages:
Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NETValidation Controls, Using the Simple Validations, Using the Complex Validators Accessing Data using ADO.NET, Using the Complex Validators Accessing Data using ADO.NET, Configuration Overview, Creating a Consistent Web Site, ASP.NET 2.0 Themes - Master Pages, Displaying Data with the GridView Control Introducing the GridView Control, Filter Data in the GridView Control, Allow Users to Select from a DropDownList in the Grid, Add a Hyperlink to the Grid, Deleting a Row and Handling Errors.

Unit – V: Managing State:

Preserving State in Web Applications and Page-Level State, Using Cookies to Preserve State, ASP.NET Session State ,Storing Objects in Session State, Configuring Session State, Setting Up an Outof-Process State Server, Storing Session State in SQL Server, Using Cookieless Session IDs, Application State Using the DataList and Repeater Controls, Overview of List-Bound Controls, Creating a Repeater Control and DataList Control

Text Books:
1. ASP.NET Complete Reference, Matthew Macdonald and Robert Standefer, TMH Professional
2. C# .Net, Christian Nagel, Wrox Publication
3. C# The Basics, Vijay Mukhi, BPB Publications

BCA SEE523 (PHP Java Programming)

Course Objective:

1. To identify the scope and necessity of PHP Programming.
2. Describe the designing of HTML form with PHP.
3. To develop ability to understand various algorithms based PHP Programming.

Unit – I: Introduction to PHP
Java PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.), PHP with other, technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator. PHP
operator Precedence and associativity

Unit – II: Handling HTML form with PHP
Capturing Form Data, GET and POST form methods Dealing with multi value fields, Redirecting a form after submission. PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else), Switch case, while, For, and Do While Loop, Goto, Break, Continue and exit.

Unit – III: PHP Functions
Function, Need of Function, declaration and calling of a function, PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference, Scope of Function Global and Local.

Unit – IV: Connectivity String Manipulation and Regular Expression
Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String , String Related Library functions, Use and advantage of regular expression over inbuilt function, Use of preg_match(), preg_replace(), preg_split() functions in regular expression.

Unit – V: Array
Anatomy of an Array ,Creating index based and Associative array, Accessing array, Looping with Index based array, with associative array using each() and foreach(), Some useful Library function.

Text Books:
1. PHP : The Complete Reference, Steven Holzner, Mcgraw Higher Ed.
2. PHP Beginner's Practical Guide, Pratiyush Guleria, Bpb publications.
3. Web Programming With Php And Mysql: A Practical Guide, Max Bramer, Springer.

BCA OE411 (Organization Behavior)

Course Objective:

1. To improve students understanding of human behavior in organization and the ability to lead people to achieve more effectively toward increased organizational performance.
2. To make the students understand group behavior in organizations, including communication, leadership, power and politics, conflict and negotiations.
3. To make the students understand organizational system, including organizational structures, culture, human resources and change.

Unit – I: Overview of Organization Behavior
Nature, Scope, Definition and Goals of organizational Behaviour, Fundamental Concepts of Organizational Behaviour, Models of Organizational Behaviour, essential attributes, Psychological dimensions and relevance in the emerging society.

Unit – II: Learning
Styles and principles, Skinner, Thorndike and Piaget theories, Conditions of learning; Memory: Short term and long term; Efficient and effective ways in respect of thinking, problem solving and decision making.

Unit – III: 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, Mc Gregcrs's Theory 'X' and Theory 'Y.

Unit – IV: Personality and Stress
Models of personality, factors and desirable features of a healthy personality; Basic Needs and their hierarchy: Mallow model and self actualizing personalities; Work stress: Meaning and definition of Stress, Symptoms of Stress, Sources of Stress, Stress management.

Unit – V: Conflict in organization
Nature of Conflict, Process of Conflict, Levels of Conflict - Intrapersonal, Interpersonal, Sources of Conflict, Effect of Conflict, Conflict Resolution, Meaning and types of Grievances & Process of Grievances Handling.

Text books:

1. Stephen P. Robins, "Organisational Behavior", PHI Learning / Pearson Education, 11th edition.
2. Fred Luthans, "Organisational Behavior", McGraw Hill, 11th Edition, 2001.

Reference books:

1. Schermerhorn, Hunt and Osborn, "Organisational behavior", John Wiley, 9th Edition.

2. Udai Pareek, "Understanding Organisational Behaviour", 2nd Edition, Oxford Higher Education.

Learning Outcomes:

1. Students should be able to discuss the development of the field of organizational behavior.
2. Able to identify the processes used in developing communication and resolving conflicts.
3. Students should be able to identify the various leadership styles and the role of leaders in a decision making process.

BCA OE412 (Financial Accounting)

Course Objective:

1. To understand the concept and role of accounting and financial reporting.
2. To have understanding of basic accounting concepts, accounting principles and techniques of posting basic business changes.
3. To understand structure and content of financial statements.

Unit – I: Overview of Financial Accounting

Meaning and Nature of Financial Accounting, Scope of Financial Accounting, Financial Accounting & Management Accounting, Accounting concepts & convention, Accounting standards in India.

Unit – II: Basics of accounting

Capital & Revenue items, Application of Computer in Accounting Double Entry System, Introduction to Journal, Ledger and Procedure for Recording and Posting, Introduction to Trail Balance, Preparation of Final Account, Profit & Loss Account and related concepts, Balance Sheet and related concept.

Unit – III: Financial statement analysis

Ratio analysis, Funds flow analysis, concepts, uses, Preparation of funds flow statement, simple problem, Cash flow analysis, Concepts, uses, preparation of cash flow statement, simple problem, Break – even analysis.

Unit – IV: Definition nature and Objective of Financial Management

Long Term Sources of Finance, Introductory idea about capitalization, Capital Structure, Concept of Cost of Capital, introduction, importance, explicit & implicit cost, Measurement of cost of capital, cost of debt.

Unit – V: Concept & Components of working Capital

Factors Influencing the Composition of working Capital, Objectives of working Capital Management – Liquidity Vs. Profitability and working capital policies. Theory of working capital: Nature and concepts. Cash Management, Inventory Management and Receivables Management.

Text books:

1. Maheshwari & Maheshwari, "An Introduction to Accountancy", 8th Edition, Vikas Publishing.
2. Gupta R.L., Gupta V.K., "Principles & Practice of Accountancy", Sultan Chand & Sons, 1999.

Reference books:

1. Maheshwari S.N., "Principles of Management Accounting", 11th Edition, Sultan Chand & Sons.

Learning Outcomes:

1. Students should be able to conceptually define accounting and bookkeeping.
2. Identify the accounting rules required for business enterprises.
3. Apply the accounting rules in determining financial results.

4. Connect knowledge and record business changes.
5. Compare the specificity of different accounts within the accounting policies.

BCA OE413 (CYBER CRIMES & CYBER LAWS)

Course Objective:

1. To introduce the cyber world and cyber law in general.
2. To explain about the various facets of cyber-crimes.
3. To enhance the understanding of problems arising out of online transactions and provoke them to find solutions.

Unit – I: Introduction to IT laws & Cyber Crimes
Internet, Hacking, Cracking, Viruses, Virus Attacks, Software Piracy.

Unit – II: E-Mail Investigation
E-Mail Tracking, IP Tracking, E-Mail Recovery, Encryption and Decryption methods, Search and Seizure of Computers.

Unit – III: Introduction to Cyber Crime Investigation
Cyber Forensics, Investigation Tools, e-Discovery, Digital Evidence Collection, Evidence Preservation, Forensics Tools and Softwares, Recovering deleted evidences, Password Cracking, Cyber Security.

Unit – IV: Intellectual property, Legal System of Information Technology
Social Engineering, Mail Bombs, Bug Exploits, Law of Intellectual Property: Copy Right Act, Trade and Merchandise Act, Patent Act, Domain Name Disputes, Cyber-Squatting.

Unit – V: International Perspective of Cyber Law
Electronic Data Interchange, EDI: Concept and legal Issues. Electronic Signature Law's of Major Countries, Cryptography Laws, Cyber Law's of Major Countries.

Text books:
3. Chris Reed and John Angel, "Computer Law", OUP, New York, 2007.
4. Justice Yatindra Singh, "Cyber laws", Uiversal Law publishing Co, New Delhi, 2012.

Reference books:
2. SK Verma and Raman Mittal, "Legal dimensions of cyber space", Indian Law Institute, New Delhi, 2004.
3. SR Bhansali, "Information Technology Act 2000", University book house pvt. ltd., Jaipur.

Learning Outcomes:
Upon successful completion of this course, students will be able to
1. Describe laws governing cyberspace and analyze the role of Internet Governance in framing policies for Internet security.
2. Discuss different types of cybercrimes and analyze legal frameworks of different countries to deal with these cybercrimes.
3. Explain the importance of jurisdictional boundaries and identify the measures to overcome cross jurisdictional cyber-crimes.

4. Illustrate the importance of ethics in legal profession and determine the appropriate ethical and legal behavior according to legal frameworks.
5. Identify intellectual property right issues in the cyberspace and design strategies to protect ones intellectual property

BCA OE511 (Startup Entrepreneurship)

Course Objective:

1. To Understand the importance of Entrepreneurship
2. To know various methods to gain finance for startup.
3. To develop ability to Launch and manage a new startup

Unit – I: Introduction to Entrepreneurship
Meaning and concept of entrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, agencies in entrepreneurship management and future of entrepreneurship, Meaning of entrepreneur, the skills required to be an entrepreneur, the entrepreneurial decision process, and role models, mentors and support system.

Unit – II: Business Opportunity Identification and Planning
Capturing Business ideas, methods of generating ideas, and opportunity recognition, Preparing a Business Plan: Meaning and significance of a business plan, components of a business plan, and feasibility study

Unit – III: Financing the New Venture
Importance of new venture financing, types of ownership securities, venture capital, types of debt securities, determining ideal debt-equity mix, and financial institutions and banks

Unit – IV: Launching and Managing the New Venture
Choosing the legal form of new venture, protection of intellectual property, and marketing the new venture, Characteristics of high growth new ventures, strategies for growth, and building the new venture capital

Unit – V: Harvesting Rewards
Exit strategies for entrepreneurs, bankruptcy, and succession and harvesting strategy

Text Books:
1. Fundamentals of Entrepreneurship and Small Business Management, Vasant Desai, Himalaya Publishing House.

BCA OE513 (Digital Marketing and E-Commerce)

Course Objective:

1. To Understand the importance of Digital Marketing
2. To know various methods of E-Commerce.
3. To understand Marketing startup process

Unit – I: History, Nature and Impact of E-Commerce
Internet and E-Commerce, The Nature of E-Commerce, Retailing on the Internet, Global E-Commerce, Doing Business on the Internet

Unit – III: E-Commerce Essentials
Distribution in E-Commerce, Customer Service and Web Site Personalization, Advertising for E-Commerce.

Unit – III: Marketing management
Marketing Information Management, Conducting Marketing Research, Creating a Web Site, Fundamentals of Internet Marketing.

Unit – IV: Business Structures and the Business Plan in E-Commerce
Business Structures and Economics in E-Commerce, Revenue Models and the Business Plan in E-Commerce

Unit – V: Marketing Entrepreneurship
Building a Career in E-Commerce, Ethical, Legal, and Social Responsibilities in E-Commerce Risk Management, Financing the Business.

Text Books:

1. Fundamentals of Digital Marketing by Pearson Paperback by Puneet Singh Bhatia, Pearson Publications.
2. Marketing 4.0: Moving from Traditional to Digital by Philip Kotler, Hermawan Kartajay and Iwan Setiawan, Published by Wiley