Faculty of Engineering & Technology

Syllabus

For

Bachelor of Computer Application

(BCA)

(Program Code: ET0142)

(2019-20)

(Approved by the Academic Council vide Resolution No. 34.26 dated 20.06.2019)

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1. Program Educational Objectives (PEOs)

The program educational objectives are set in line with Institutional and Departmental mission statements. The program educational objectives of Bachelor of Computers are to produce Computer Graduate who takes the responsibility with following qualities:

PEO1. Apply basic knowledge of mathematics, principles of physics and chemistry for design and development.

PEO2. Demonstrate the application of exploration practices through development of innovative tools that are beneficial in production.

PEO3. Exhibit skills of design and construct machineries based on requirement and need of Technology operations.

PEO4. Exhibit strong, independent learning, analytical and problem solving skills with special emphasis on design, communication, and ability to work in teams.

PEO5. To have successful career as computer professional through lifelong learning in the field of Bachelor of Computer.

2. Graduation Attributes (GAs)

The graduate attributes in BCA are the summation of the expected course learning outcomes mentioned in the end of each course. Some of them are stated below.

GA1: **Discipline-specific Knowledge:** Capability of demonstrating comprehensive knowledge of BCA program and understanding of core branch so that it forms a foundation for a graduate program of study.

GA2: **Critical Thinking & Analytical Reasoning:** Ability to employ critical thinking in understanding the concepts relevant to the various branches of engineering. Ability to analyze the results and apply them in various problemsappearing in different streams.

GA3: **Research-related skills:**

To develop a sense of inquiry and capability for asking relevant and intelligent questions, problem identification, synthesizing and articulating; ability to recognize and establish cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.

GA4: **Problem Solving:** Capability to solve problems by using research-based knowledge and research methods including innovative thinking, design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

GA5: **Usage of Modern Tools (Information/digital literacy):**

To create, select, and apply appropriate techniques, resources, and modern science and IT tools including prediction and modeling to complex science activities with an understanding of the limitations.

GA6: Multicultural Competence:

Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

GA7: Self-directed learning with Environment : Ability to work independently and do in-depth study of variousproblems and requirements of society with natural available resources and sustainable development.

GA8. Moral and ethical awareness/reasoning:

Ability to identify unethical behavior such as falsification or misrepresentation of data and adopting objective, unbiased and truthful actions in all aspects of their program.

GA9. Leadership Readiness/Qualities:

Capability for mapping out the tasks in a team or an organization, self-motivating and inspiring team members to engage with the team objectives/vision; and using management skills to follow the mapped path to the destination in a smooth and efficient way.

GA10: Communication skills:

i. Ability to communicate various concepts of technical education effectively using practical approach and their geometrical visualizations.

ii. Ability to use courses as a precise language of communication in other branches of human knowledge.

iii. Ability to resolve unsolved problems and requirements of industries and societies

iv. Ability to show the importance of their technical knowledge as precursor to various scientific developments since the beginning of the civilization.

GA11: Project Management and Finance:

Ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

GA12: Lifelong learning:

Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning.

3. Program Outcomes (POs)

Students graduating with the BCA degree should be able to acquire.

PO1. Technical knowledge: Apply the knowledge of mathematics and science fundamentals to the solution of complex technical problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex technical problems reaching substantiated conclusions using first principles of mathematics and sciences.

PO3. **Design/development of solutions**: Design solutions for complex technical problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern technical and IT tools including prediction and modeling to complex technical activities with an understanding of the limitations.

PO6. **The technocrat and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional technical practice.

PO7. **Environment and sustainability**: Understand the impact of the professional technical solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the technical practice.

PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex technical activities with the technical community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of the technology and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of Graduate Attributes (GAs) and Program Outcomes (POs):

PO/ PGA	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
PO1	■											
PO2		■										
PO3			■									
PO4				■								
PO5					■							
PO6						■						
PO7							■					
PO8								■				
PO9									■			
PO10										■		
PO11											■	
PO12												■

4. Program Specific Outcomes (PSOs):

PSO1: Professionally empowering the student as technical manpower in industry or an entrepreneur for production analytics and innovation.

PSO2: Able to excel in various technological challenges and contribute for self-reliant society.

5. Course-Wise Learning Objectives, Structures and Outcomes (CLOSOs)

BCA Course Structure

Semester - I

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BCA 101	Computer Fundamentals	3	1	-	30	70	100	4
BCA 102	C Language	3	1	-	30	70	100	4
BCA 103	Mathematics	3	1	-	30	70	100	4
BCA 104	Basics of Internet Programming	3	1	-	30	70	100	4
BCA 105	Communication Skills	4	-	-	30	70	100	4
BCA 106	Principles of Management	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BCA 107	Lab-1: Computer Fundamentals & PC Computing	-	-	2	30	20	50	1
BCA 108	Lab-2: C language	-	-	2	30	20	50	1
BCA 109	Lab-3: Internet Programming	-	-	2	30	20	50	1
	TOTAL	**19**	**5**	**6**	**270**	**480**	**750**	**27**

Semester - II

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BCA 201	Digital Electronics	4	-	-	30	70	100	4
BCA 202	Computer Organization And Architecture	3	1	-	30	70	100	4
BCA 203	System Analysis & Design	4	-	-	30	70	100	4
BCA 204	Data Structure & Algorithms	3	1	-	30	70	100	4
BCA 205	Linux Environment	3	1	-	30	70	100	4
BCA 206	Environmental Studies	4	-	-	30	70	100	4
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BCA 207	Lab-1: Data Structure & Algorithms	-	-	2	30	20	50	1
BCA 208	Lab-2: Linux Environment	-	-	2	30	20	50	1
BCA 209	Lab-3: Personality Development Lab	-	-	2	30	20	50	1
	TOTAL	**21**	**3**	**6**	**270**	**480**	**750**	**27**

Semester - III

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	T	P	IA	EA	Total	Credits
BCA 301	Object Oriented Programming using C++	3	1	-	30	70	100	4
BCA 302	Database Management System	3	1	-	30	70	100	4
BCA 303	Front End Design Tool (VB)	3	1	-	30	70	100	4
BCA 304	Managerial Personality Development	4	-	-	30	70	100	4
BCA 305	Technical Communication	3	1	-	30	70	100	4
BCA 306	Discrete Mathematics	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BCA 307	Lab-1: OOPS Using C++	-	-	2	30	20	50	1
BCA 308	Lab-2: DBMS	-	-	2	30	20	50	1
BCA 309	Lab-3: Front End Design Tool (VB)	-	-	2	30	20	50	1
	TOTAL	**19**	**5**	**6**	**270**	**480**	**750**	**27**

Semester - IV

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	T	P	IA	EA	Total	Credits
BCA 401	Operating Systems	3	1	-	30	70	100	4
BCA 402	Computer oriented Numerical & Statistical Methods using C	3	1	-	30	70	100	4
BCA 403	Java Programming	3	1	-	30	70	100	4
BCA 404	Software Engineering	4	-	-	30	70	100	4
BCA 405	Data Mining & Data Warehousing	4	-	-	30	70	100	4
BCA 406	Communication Skills- Scientific & Technical Writing	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BCA 407	Lab-1: Java	-	-	2	30	20	50	1
BCA 408	Lab-2: S.E. Lab	-	-	2	30	20	50	1
BCA 409	Lab-3: C.T Lab/Seminar	-	-	2	30	20	50	1
	TOTAL	**20**	**4**	**6**	**270**	**480**	**750**	**27**

4-6 weeks training will be held after fourth semester, viva will be conducted in fifth sem.

Semester - V

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BCA 501	Computer Networks	3	1	-	30	70	100	4
BCA 502	System Software	4	-	-	30	70	100	4
BCA 503	Advanced Internet Programming	3	1	-	30	70	100	4
BCA 504	Advance Java	3	1	-	30	70	100	4
BCA 505	Computer Graphics	3	1	-	30	70	100	4
BCA 506	E-Commerce	4	-	-	30	70	100	4
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BCA 507	Lab-1: Advance Internet Programming	-	-	2	30	20	50	1
BCA 508	Lab-2: .Advance Java	-	-	2	30	20	50	1
BCA 509	Summer Project Seminar	-	-	2	30	20	50	1
	TOTAL	**20**	**4**	**6**	**270**	**480**	**750**	**27**

Semester - VI

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	T	**P**	**IA**	**EA**	**Total**	**Credits**
BCA 601	Advance Computer Networks	3	1	-	30	70	100	4
BCA 602	Management Information System	4	-	-	30	70	100	4
BCA 603	Artificial Intelligence	3	1	-	30	70	100	4
Elective (any one)								
BCA 604A	.NET Technology	3	1	-	30	70	100	4
BCA 604B	Fundamental of PHP	3	1	-	30	70	100	4
BCA 604C	Principles of Accounting	3	1	-	30	70	100	4
BCA 604D	Intellectual Property Rights	3	1	-	30	70	100	4
Elective (any one)								
BCA 605A	Social Implications of IT	3	1	-	30	70	100	4
BCA 605B	Mobile Computing	3	1	-	30	70	100	4
BCA 605C	Cyber Ethics & Crime	3	1	-	30	70	100	4
BCA 605D	Entrepreneurship	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE		**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
BCA 606	Lab-1: .NET/PHP Lab	-	-	2	30	20	50	1
BCA 607	Major Project	-	-	4	100	50	150	2
BCA 608	Seminar	-	-	2	30	20	50	1
	TOTAL	**16**	**4**	**8**	**310**	**440**	**750**	**24**
	Grand Total of Credits	**115**	**25**	**38**	**1660**	**2840**	**4500**	**159**

L=LECTURER, T= TUTORIAL, P=PRACTICAL, IA=INTERNAL ASSESSMENT, EA=EXTERNAL ASSESSMENT

The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to the project should be delivered one after starting of semester .The progress will be monitored through seminars and progress reports.

Note;--

1. The total number of the credits of BCA Program are = 159
2. Each student shall be required to appear for examinations in all courses. However, for the award of the degree a student shall be required to earn minimum of 159 credits.

BCA 101 - Computer Fundamentals

Course Objective:

- To know the importance of information systems for business and management.
- To evaluate the role of the major types of information systems in a business environment and their relationship to each other.
- To assess the impact of the Internet and Internet technology on business-electronic commerce and electronic business.
- To identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges.

UNIT – I Computer Basics: What are computers? The evolution of computers, Generations of Computers, classification of Computers, **Interfacing with the Computer:** What is Data Processing, Data and Information,Block Diagram,Input-output devices, Description of Computer input- Output Units, Hardwares and softwares.

Number System: Representation of integers, Representation of Fractions, Octal and Hexadecimal representation of numbers, Decimal to Binary Conversion. Binary addition, subtraction of numbers, Two's Complement representation of numbers, Addition/ subtraction of numbers in 2's Complement rotation, Binary multiplication, Binary division, Floating Point representation of numbers.

UNIT – II Computer Memory: Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to construct Memories, Magnetic Hard disk, Floppy Disk Drives, Compact Disk Read Only Memory, Magnetic Tape Drives. **Languages:** Programming Language, Assembly language, Low level and high level languages, assemblers, compilers, interpreters, linkers, algorithms, flow charting, decision tables, pseudo code.

UNIT – III Software concepts: System & application software packages. **Operating system:** Why do we need an Operating System? Batch operating system, Multiprogramming Operating system, Time sharing operating system, Personal Computer Operating System, Unix Operating System, On- line and Real time system.

UNIT – IV Data and Network Communication: Types of Communication, Need for computer communication networks, Internet and World Wide Web, Characteristics of Communication Channels. Allocation of Channel, Physical communication media, Computer Network Topologies, Communication Protocols, Local Area Networks, ATM Networks, Interconnecting Networks

UNIT – V Introduction to MS-Word, MS-Excel, MS-Power point: Introduction, Windows 2007 Interface, Customizing the Word Application, Document Views, Basic Formatting in MS Word 2007, Advanced Formatting, Navigating through a Word Document, Performing a Mail Merge, A Quick Look at Macros, Printing Documents, Print Preview ***Excel 2007:*** Introduction, Workbook, Worksheet, Formatting in excel, Advanced formatting in Excel, Working with formulas, Printing worksheets ***MS PowerPoint:*** Introduction, Creating a Presentation, Basic Formatting in PowerPoint, Advanced Formatting, Using Templates, Inserting charts, Inserting tables, Printing presentations

Textbooks:

1. "Introduction to Information Technology", ITL Education Solutions Ltd., Pearson Education

2. Sinha P. K. &SinhaPriti, “Computer Fundamentals”, BPB Publications.,

References:

1. Raja Raman V.,”Introduction to Computers”, PHI Publications
2. Leon Alex & Leon Mathews,”Introduction to Computers”, Vikas Publishing House
3. Norton. Peter,”Introduction to Computers”, TMH
4. SaxenaSanjay.,”A First Course in Computers”, Vikas Publishing House Pvt. Ltd.
5. NagpalD.P.,”Computer Fundamentals”, S. Chand Publications
6. BharihokeDeepak,”Fundamentals of Information Technology”, Excel Books

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Identify computer hardware and peripheral devices
CO2: Familiar with software applications
CO3: Understand file management
CO4: Accomplish creating basic documents, worksheets, presentations with their properties.
CO5: Experience working with email and recognize email netiquette.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	H	L	M	M	-	-	-	-	-	H	-	H	M	L
CO2	L2	L	M	M	H	M	-	-	-	-	L	-	M	M	M
CO3	L2	M	L	L	M	M	-	-	-	-	M	-	M	H	M
CO4	L6	H	H	H	H	H	-	-	L	-	H	L	H	H	L
CO5	L3	M	L	M	M	L	-	-	L	-	M	-	M	H	M

H- High, M- Moderate, L- Low, ‘-’ for No correlation

BCA 102 - C Language

Course Objective:

- To learn essential knowledge on the need of programming languages and problem solving techniques.
- To explore major concepts of computer science and the process of computer programming, including programming, procedural and data abstraction and program modularity.
- To learn effective usage of arrays, structures, functions, pointers and to implement thememory management concepts.
- To analyze and find the solution of computer specific problems.

UNIT – I **Overview of Programming Language:** Introduction to algorithms, Flow charts, Tracing Flow charts, Problem solving methods, Need for computer languages, History and importance of C, Reading programs written in C language. **C Basics:** C character set, Identifiers and Keywords, Data types, Declarations, Expressions, statements and symbolic constants, Input-Output: getchar, putchar, printf, gets, puts functions. Preprocessor commands, # include, #define, ifdef, preparing and running a complete C program.

UNIT – II **Loops, Operators and Expressions:** Arithmetic, Unary, Logical, bit-wise assignment and conditional operators, Library functions, Control statements, while, do-while, for statements, nested loops, if else, switch, break, continue and goto statements, comma operators.**Arrays :**Defining and processing, One-dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays. Enum

UNIT – III **Functions:** Defining and accessing: Passing arguments, Function protypes, Recursions, Use of library functions, Storage classes: Automatic, external and static variables **String functions:** strings, operations on strings, String handling functions: string comparing, concatenating, copying.

UNIT – IV **Pointers:** Pointer Declarations, accessing a variable through its pointer, chain of pointers, Passing to a functions, Operations on pointers, Pointer and arrays, Arrays of pointers, pointers to functions, pointers and structures. **Dynamic Memory allocation:** Dynamic memory allocation, allocating a block of memory: Malloc, allocating multiple blocks of memory: Calloc, releasing the used space: Free, Altering the size of a block: Realloc.

UNIT – V **Structures and Unions:** Defining and declaring structure variables, accessing structure variables, operations on structures, Arrays of structures, arrays within structures, passing to a function, size of structures, Unions.

File Management in C: Defining and opening and closing a file, input/output operations on files, error handling during I/O operations on unformatted data files.

Textbooks:

1. Balaguruswamy E., "*Programming in ANSI C"*, Third Edition, Tata McGraw Hill Publishing Company Limited.

References:

1. SubburajR.,"*Programming in C*", Vikas Publishing house Pvt. Ltd.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the basic terminology used in computer programming
CO2: Use different data types in a computer program.
CO3: Design programs involving decision structures, loops and functions.
CO4: Explain the difference between call by value and call by reference.
CO5: Understand the dynamics of memory by the use of pointers.
CO6: Use different data structures and create/update basic data files

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	L	L	L	M	M	-	-	-	-	L	-	L	H	L
CO2	L3,L4	M	M	M	H	L	-	-	L	L	M	L	M	M	M
CO3	L3,L6	H	H	H	H	M	-	-	M	M	H	M	M	M	L
CO4	L2,L3	M	M	M	M	L	-	-	-	-	M	-	L	H	L
CO5	L2	H	L	L	L	L	-	-	-	-	H	-	-	M	M
CO6	L2	L	L	L	M	L	-	-	-	-	L	-	L	M	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 103 - Mathematics

Course Objective:

- To perform the operations of addition, subtraction, multiplication, and division on whole numbers, fractions, and decimals, by hand.
- To evaluate numerical expressions involving whole number exponents and square roots.
- To identify basic geometrical figures and find their perimeter and area.
- To solve problems involving ratios and proportions.
- To solve problems involving percents.
- To apply knowledge of basic arithmetic skills to problem solving.
- To reason clearly and express them coherently in a mathematical context.
- To transfer basic arithmetic skills to subsequent courses such as pre- and introductory algebra.

UNIT – I - Algebra: Revision of equations reducible to quadratic form Simultaneous equations (linear and quadratic) upto 2 variables only. Determinants and their six important properties, solutions of simultaneous equations by Cramer's rules. Matrices, definition of special matrices (like unit, singular, diagonal matrices etc…) arithmetic operation on matrices, transpose, ad joint and inverse of matrix, solution of simultaneous equations using matrices. **Trigonometry:** Revision of angle measurement and T-ratios addition, subtraction and transformation formulae. T-ratio of multiple and allied angles.

Analytical plane geometry: Cartesian coordinates, distance between two points, area of triangle, locus of point, straight line, slope and intercept form, general equation of first degree.

UNIT – II - Differential Calculus: Limit of functions, differential coefficient, differentiation of standard functions, including functions of function (chain rule), differentiation of implicit functions, logarithmic differentiation, parametric differentiation, successive differentiation. **Integral Calculus:** Integration as inverse of differentiation, indefinite integrals of standard forms, integration by parts, by partial and by substitution, formal evaluation of definite integrals.

UNIT – III - Differential equations: Definition and formation of ordinary differential equations, equations of first order and first degree, variable separable, homogeneous equations, non homogeneous equations, linear equations and differential equations reducible to these types. **Statistics:** Measure of central tendency, ideal characteristics, mean, median, mode, GM, H.M. and weighted mean form, quartile, deciles, percentiles

UNIT – IV - Measures of dispersion, range, quartile deviation, standard deviation, mean deviation.Discrete and continuous frequency distribution .Calculation of standard deviation for discrete and continuous frequency distribution.Standard errors of means, coefficient of variation.

UNIT – V - Probability: Events and Baye's theorem, probability distributions: Binomial, Poisson and Normal distribution.**Linear correlation and regression analysis:** Scatter

plots, methods of least squares, fitting of straight lines and parabolas. Pearsonian coefficient of correlation.Lines of regression. Regression coefficient

Textbooks:

1. Grewal . B.S., *"Elementary Engineering Mathematics*", Khanna publications 34th Ed., 1998.
2. Gupta, S. P and Kapoor V.K, *Fundamental of Mathematical Statistics*, Sultan Chand and Sons, New Delhi.

References:

1. Kreszyig E., "Advanced Engineering Mathematics", 5th Edition, John Wiley & Sons,1999
2. Dass . H.K., "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised
   a. Edition,2001.
3. Narayan . Shanti, "Integral Calculus", S. Chand & Company, 1999
4. Narayan . Shanti, "Differential Caluculs", S.Chand& Company, 1998

Course Outcomes

At the end of the course, the student will be able to:

CO1. Demonstrate competency in the areas that comprise the core of the mathematics major
CO2. Demonstrate the ability to understand and write mathematical proofs
CO3. Use appropriate technologies to solve mathematical problems
CO4. Construct appropriate mathematical models to solve a variety of practical problems
CO5. Obtain a full-time position in a related field or placement

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L3	-	L	M	-	M	-	-	-	-	-	-	-	L	M
CO2	L2,L3	L	L	H	-	H	-	M	L	-	-	-	L	M	L
CO3	L3,L4	H	-	H	-	-	-	L	H	-	L	L	-	L	M
CO4	L6	H	L	L	M	H	L	H	M	-	M	M	L	M	L
CO5	L2	-	M	-	-	L	-	-	-	-	-	-	-	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 104 - Basics of Internet Programming

Course Objective:

- To gain the skills and project-based experience needed for entry into web design and development careers.
- To use a variety of strategies and tools to create websites.
- To develop awareness and appreciation of the myriad ways that people access the web and will be able to create standards-based websites that are accessible and usable by a full spectrum of users.

UNIT – I **Introduction to Internet-** Web Browser, What the web browser does, Overview of famous web browsers, Web servers,Uniform resource locators (URL), what is www, Search Engines, Electronic mail, Email software

UNIT – II **HTML an introduction** What HTML is-and What It isn't, History of HTML, Structuring HTML page, The HTML><HEAD><TITLE><BODY>tags, Paragraphs, Font tags, Creating different types of Links, Introduction to lists, Different types of lists.

UNIT – III **Tables** Introduction, Table pats, Sizing tables, borders, cells, Table and cell color and alignment, Aligning your table content, spanning multiple rows and columns, grouping and aligning rows and columns.

UNIT – IV **Forms & Frames** Understanding forms and functions, Essential elements of forms, Displaying control labels, Grouping control with field set and legend, What are frames , Working with linked windows, Working with frames, Changing frame borders

UNIT – V **DHTML** What is DHTML, The concept of style sheets, Approaches to style sheets, commonly used style sheet properties and values, Controlling page layout CSS properties, Backgrounds, colors and images, setting border appearance Inline style sheets

References:

1. Jonathan Gennick with Tom Luers, 'Teach yourself HTML', 2nd Edition ,SAMS

2. HTML: A Beginner's Guide byWendy Willard (Author)

Course Outcomes

At the end of the course, the student will be able to:

CO1: Analyze a web page and identify its elements and attributes.
CO2: Create web pages using HTML and Cascading Styles sheets.
CO3: Build dynamic web pages using JavaScript (client side programming).
CO4: Create XML documents used in Web Publishing.
CO5: Create XML Schema for data transfer in distributed environment.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2,L4	H	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L6	M	M	M	H	M	-	-	M	-	H	L	M	M	M
CO3	L3,L6	L	M	M	M	M	-	-	L	-	M	-	H	H	L
CO4	L6	H	H	H	H	H	-	-	H	-	H	L	M	H	M
CO5	L6	M	M	M	H	M	-	-	H	-	H	M	M	M	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 105 - Communication Skills

Course Objectives:

- To identify common communication problems that may be holding learners back
- To identify what their non-verbal messages are communicating to others
- To understand role of communication in teaching-learning process
- To learn to communicate through the digital media
- To understand the importance of empathetic listening
- To explore communication beyond language.

Module 1: Listening

- Techniques of effective listening
- Listening and comprehension
- Probing questions
- Barriers to listening

Module 2: Speaking

- Pronunciation
- Enunciation
- Vocabulary
- Fluency
- Common Errors

Module 3: Reading

- Techniques of effective reading
- Gathering ideas and information from a given text
    i. Identify the main claim of the text
    ii. Identify the purpose of the text
    iii. Identify the context of the text
    iv. Identify the concepts mentioned
- Evaluating these ideas and information
    i. Identify the arguments employed in the text
    ii. Identify the theories employed or assumed in the text
- Interpret the text
    i. To understand what a text says
    ii. To understand what a text does
    iii. To understand what a text means

Module 4: Writing and different modes of writing

- Clearly state the claims
- Avoid ambiguity, vagueness, unwanted generalisations and oversimplification of issues

- Provide background information
- Effectively argue the claim
- Provide evidence for the claims
- Use examples to explain concepts
- Follow convention
- Be properly sequenced
- Use proper signposting techniques
- Be well structured
    i. Well-knit logical sequence
    ii. Narrative sequence
    iii. Category groupings
- Different modes of Writing -
    i. E-mails
    ii. Proposal writing for Higher Studies
    iii. Recording the proceedings of meeting
    iv. Any other mode of writing relevant for learners

Module 5: Digital Literacy

- Role of Digital literacy in professional life
- Trends and opportunities in using digital technology in workplace
- Internet Basics
- Introduction to MS Office tools
    i. Paint
    ii. Office
    iii. Excel
    iv. Powerpoint

Module 6: Effective use of Social Media

- Introduction to social media websites
- Advantages of social media
- Ethics and etiquettes of social media
- How to use Google search better
- Effective ways of using Social Media
- Introduction to Digital Marketing

Module 7: Non-verbal communication

- Meaning of non-verbal communication
- Introduction to modes of non-verbal communication
- Breaking the misbeliefs
- Open and Closed Body language

- Eye Contact and Facial Expression
- Hand Gestures
- Do's and Don'ts
- Learning from experts
- Activities-Based Learning

Textbooks:

1. SenMadhucchanda (2010), *An Introduction to Critical Thinking*, Pearson, Delhi
2. Silvia P. J. (2007), *How to Read a Lot*, American Psychological Association, Washington DC

Pedagogy :Instructor-Led Training, Supplemented by Online Platform (SWAYAM)

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Understand Communication and Types of Communication.

CO2: Know Grammar of Passive Voice, Reported Speech.

CO3: Understand different ways of writing Job Application and Curriculum-Vitae.

CO4: Describe different Short Stories for effective Learning.

CO5: Describe different poems for improving communication skills.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	Bloom's Level	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	-	-	-	-	L	M	-	-	-	H	-	M	M	L
CO2	L1	-	-	-	-	-	H	-	-	-	H	-	L	M	M
CO3	L2	-	-	-	-	-	M	-	-	M	H	-	M	M	L
CO4	L2	-	-	-	-	-	M	-	-	-	H	-	L	M	M
CO5	L2	-	-	-	-	-	M	-	-	-	H	-	L	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 106- Principles of Management

Course Objectives:

- To gain an understanding of principles and functions of management.
- To gain insights into history and development of management thought.
- To analyze the managerial issues and problems arising in an organization

Unit I- Introduction: Concept, Nature, Process and Significance of Management; Managerial levels, skills, Functions and Roles; Management vs. Administration; Coordination as Essence of Management; Development of Management Thought: Classical, Neo-Classical, Behavioral, Systems and Contingency Approaches.

Unit II - Planning: Nature, Scope and Objectives of Planning; Types of plans; Planning Process; Business Forecasting; MBO: Concept, Types, Process and Techniques of Decision-Making; Bounded Rationality.

UNIT III- Organizing: Concept, Nature, Process and Significance; Principles of an Organization; Span of Control; Departmentation; Types of an Organization; Authority-Responsibility; Delegation and Decentralization; Formal and Informal Organization.

Unit IV- Staffing: Concept, Nature and Importance of Staffing. Scope of staffing Motivating and Leading: Nature and Importance of Motivation; Types of Motivation

Unit V - Controlling: Nature and Scope of Control; Types of Control; Control Process; Control Techniques – Traditional and Modern; Effective Control System

Textbooks:

1. Gupta C.B., Principles and Practice of Management, Mayoor paperbacks

References:

1. Prasad L.M., Principles and Practice of Management, Sultan Chand and Sons.
2. Terry George R., Franklin Stephen G., C, A.I.T.B.S. Publisher sand Distributors
   Singh Nirmal, Principles of management, Deep and Deep Publications Pvt. Ltd

Course Outcomes:

After completion of the course the students will be able to:

CO1. Assume the roles and responsibilities associated with managerial functions.
CO2. Identify the key contributors and their contributions in the development of management thought.
CO3. Compare various approaches in management for problem solving.

Table: Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L1, L2	-	M	-	-	-	-	M	H	L	L	L	L	L	M
CO2	L2	-	M	L	-	-	L	L	M	H	M	L	-	M	L
CO3	L5	-	M	L	-	L	L	M	H	H	M	L	L	L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 107 - Computer Fundamental & PC Computing Lab

Course Objective(s):

- Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.
- Provide hands-on use of Microsoft Office 2010 applications Word, Excel, Access and PowerPoint. Completion of the assignments will result in MS Office applications knowledge and skills

LIST OF EXPERIMENTS:

1. Create simple news letter in ms word.
2. Create greeting card in ms word.
3. Create a mail merge letter in MS Word.
4. Create a macro for inserting a picture and formatting the text.
5. Create a simple presentation in MS Power Point to list simple dos commands, hardware, software.
6. In Power Point create an animation with video and sound.
7. In MS Excel create a report containing the pay details of the employee with followings:

   It contains: sl no, name, employee id

   Enter the following formula to calculate the respective values.

   da (60% of basic)

   hra (7.5% of basic)
8. Create a student result sheet:
9. Create a pie chart for a sample data and give legends
10. create a macro which creates a line chart using the data in the worksheet

Course Outcomes:

Upon completion of this course, the student will be able apply technical knowledge and perform specific technical skills, including:

CO1. Usage of computers and why computers are essential components in business and society.
CO2. Utilize the Internet Web resources and evaluate on-line e-business system.
CO3. Solve common business problems using appropriate Information Technology applications and systems.
CO4. Identify categories of programs, system software and applications. Organize and work with files and folders.
CO5. Describe various types of networks network standards and communication software.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	-	-	-	-	-	M	-	-	L	H
CO2	L2,L 5	H	M	M	H	M	-	-	-	-	H	-	H	M	M
CO3	L4	M	L	L	M	-	-	-	-	-	M	-	M	L	M
CO4	L2	L	L	L	M	-	-	-	-	-	L	-	L	H	H
CO5	L2	M	L	L	L	L	-	-	-	-	M	-	-	L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 108 - C Language Lab

Course Objectives:

- To provide a comprehensive study of the C programming language.
- To identify problems that requires programmed solution.
- To study, analyze and implement pointers, memory allocation, data handling through files and graphics in 'C'.

LIST OF EXPERIMENTS:

1 Write a program to calculate the area & perimeter of rectangle.

2 Write a program to calculate the area and circumference of a circle for a given radius.

3 Write a program to calculate simple interest for a given principal/amount.

4 Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

5 Write a program to find profit and loss (in percentage) of a given cost price and selling price.

6 Write a program to find out the maximum among the three given numbers.

7 Write C programs that use both recursive and non-recursive functions To find the factorial of a given integer.

8 Write a program to print the list of first 100 odd number.

9 Write a program to calculate the sum of the digits of a number and display it in reverse order.

10 Write a program to generate a Fibonacci series.

11 Write a program to generate the following series:

```
*
* *
* * *
 * * * * *
* * * * * *
```

12 Write a program to generate the following series:

```
01
0  1  0
0  1  0  1
0  1  0  1  0
```

13 Write a program using a function to check whether the given number is prime or not.

14 Write a program to check whether the given string is a palindrome or not.

15 Write a C program that uses functions to perform the following operations: To insert a sub-string in to given main string from a given position.

16 Write a C program to determine if the given string is a palindrome or not.

17 Write a program to swap two variables a & b using pointers.

18 Write a program to enter a line of text from keyboard and store it in the file. User should enter file name.

19 Write a recursive program for tower of Hanoi problem

20 Write a C program that uses functions to perform the following:

- Addition of Matrices.
- Multiplication of Matrices.

21. Write a program to copy one file to other, use command line arguments.

22. Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)

23. Write a program to perform the following operators an Strings without using String functions

    - To find the Length of String.
    - To concatenate two string.
    - To find Reverse of a string.
    - To Copy one sting to another string.

24. Write a Program to store records of an student in student file. The data must be stored using Binary File.Read the record stored in "Student.txt" file in Binary code.Edit the record stored in Binary File.Append a record in the Student file.

25. Write a programmed to count the no of Lowercase, Uppercase numbers and special Characters presents in the contents of File.

Course Outcomes:

By the end of the course students will be able to

CO1. Write programs using advance concepts of C- language.
CO2. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO3. Design graphics programs using C.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L6	M	M	M	H	H	-	-	M	-	H	L	H	M	L
CO2	L2,L3	M	L	L	M	L	-	-	L	-	M	-	M	M	M
CO3	L6	H	M	M	H	M	-	-	H	-	H	L	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 109 - Internet Programming Lab

Course Objectives:

- To study designing the web pages.
- To study formatting and validating web pages.
- To study designing web sites and deploying web sites on web servers.

LIST OF EXPERIMENTS

1. Web page creation using HTML
   - i)To embed an image map in a web page
   - ii) To fix the hot spots
   - iii) Show all the related information when the hot spots are clicked.
2. Web page creation with all types of cascading style sheets.
3. Create an attractive form using the html code.
4. Create an attractive CV using the html code.
5. Create a web page uses frame by the html code.
6. Write an html code for creates the ordered list.
7. Write an html code for creates the unordered list.
8. Write an html code for creates the definition list.
9. Web page creation using DHTML.
1. Web page creation using java script.

Course Outcomes:

Students will be able to

CO1. Design web pages.
CO2. Format and validate web pages.
CO3. Design web sites and deploy it on web servers.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L6	M	M	M	H	L	-	-	M	-	H	-	M	H	L
CO2	L5,L6	H	H	H	H	-	-	-	L	-	H	-	H	M	M
CO3	L6	M	M	M	M	M	-	-	H	-	M	-	M	H	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA- II SEMESTER

BCA 201 - Digital Electronics

Course Objective:

- To acquire the basic knowledge of digital logics and application of knowledge to understand digital electronics circuits.
- Understand the various types of Digital Structures and designs for making a System.
- Apply modern computational, analytical, tools and techniques to face the challenges in real environment.

UNIT – I **Number System & Codes** : Introduction, Types of Number Systems - Binary, Octal, Hexadecimal ,Signed & Unsigned Binary numbers, Binary Arithmetic – Addition, Subtraction, Multiplication, Division, Codes – BCD, EXCESS-3, Gray, Hexadecimal, Octal, ASCII, EBCDIC, Error Detection and Correction codes.

UNIT – II **Logic Gates & Boolean Algebra :**Digital Signals, Basic Digital Circuits , Boolean algebra & theorems. **Gate-Level Minimization :** Standard forms – SOP & POS, Karnaugh Map – 2, 3 & 4 variables , Simplification using K maps, Minterms&Maxterms, Don't care conditions. **Combinational Logic Design :**Half Adder, Full Adder, Half Subtractor, Full Subtractor Multiplexer / Encoder, Demultiplexer / Decoder, Comparator, Parity Generator / Checkers, Code Converters. **Sequential Logic**

UNIT – III- **Flip Flops:** Introduction, Types of FF - Clocked S-R FF, J-K FF, D-type FF, T type FF, Master Slave JKFF, Edge triggered flip flops, Excitation Tables of Flip Flops.

UNIT – IV- **Registers :**Introduction, Sequential Circuits, Shift Registers, Serial Input Serial Output, Serial Input Parallel Output, Parallel Output, Parallel Input Serial Output, Bi-directional Shift Registers, Universal Shift Register.

Counters : Introduction, Types – Asynchronous Counter or Ripple Counters, Synchronous Counters, Counter Design.

UNIT – V- **Introduction to Digital Logic Families:** Introduction, Characteristics of Digital IC's, Introduction about TTL & CMOS Logic, Tri – State Logic.

Text books:

1. M.Morris Mano ; "Digital Design" ; Prentice–Hall of India
2. Jain R.P. ; "Modern Digital Electronics" ; Tata McGraw-Hill

Reference books:

1. Ghoshal, D. Mohan, Dharminder Kumar, "Digital Elecronics", Galgotia Book Source.
2. Malvino Leech ; "Digital CompuerElecronics" ; Tata McGraw-Hill
3. Tokheim ; "Digital Electronics Principles & Applications" ; Tata McGraw-Hill

Course Outcome:

At the end of the course, a student will be able to:

CO:1. Convert different type of codes and number systems which are used in digital transmission and computer systems.

CO:2. Apply the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.

CO:3. Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.

CO:4. Design different types of with and without memory element digital electronic circuits for particular operation, within the real time of economic, performance, efficiency, user friendly and environmental constraints.

CO:5. Assess the nomenclature and technology in the area of various memory devices used and apply the memory devices in different types of digital circuits for real world application.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	H	L	L	M	-	-	-	-	-	H	-	L	L	M
CO2	L3	H	L	L	L	-	-	-	-	-	H	-	M	M	L
CO3	L4	M	M	M	M	-	-	-	L	-	M	-	-	H	M
CO4	L6	H	M	M	H	L	-	-	L	-	H	-	H	H	L
CO5	L3	M	L	L	M	-	-	-	-	-	M	-	M	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 202 - Computer Organization and Architecture

Course Objective:

- Have a thorough understanding of the basic structure and operation of a digital computer.
- Discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication &division.
- Study the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT – I- Register Transfer and Micro-operations: Register transfer language, Register transfer, control function, Memory transfer, Arithmetic Micro-operations, Logical Micro-operations. **Basic Computer Organization and Design**: Instruction Codes, Computer Instructions, Timing and Control, Instruction cycle

UNIT – II- Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes. **Pipelining**: parallel processing, Instruction Pipeline

UNIT – III- Micro programmed Control Unit: Control Memory, Address sequencing, Micro program sequencer.

UNIT – IVInput-Output Organization: Peripheral Devices, I/O Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupts, Direct Memory Access

UNIT – V - Memory Organization: Memory hierarchy, RAM & ROM chips, Auxiliary Memory, Cache Memory, Associative Memory, virtual Memory

Text books:

1. Mano .M.Morris ; "Computer System Architecture" ; Prentice–Hall of India

Reference books:

1. William Stallings ; "Computer Organization & Architecture – Designing for Performance" ; Prentice–Hall of India
2. Hayes . John P. ; "Computer Architecture and Organization" ; Tata McGraw-Hill

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the major components of a computer including CPU, memory, I/O and storage.

CO2: Students will understand the uses for cache memory.

CO3: Understand a wide variety of memory technologies both internal and external.

CO4: Understand the role of the operating system in interfacing with the computer hardware.

CO5: Understand the basic components of the CPU including the ALU and control unit.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	-	-	-	-	-	M	-	M	L	L
CO2	L2	M	L	L	M	-	-	-	-	-	M	-	M	M	M
CO3	L1,L2	L	M	M	H	-	-	-	-	-	L	-	-	L	L
CO4	L2	M	L	L	L	-	-	-	-	-	M	-	M	M	L
CO5	L2,L3	L	M	M	M	-	-	-	-	-	L	-	L	L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 203 - System Analysis & Design

Course Objectives:

- Introduce variety of new software used by analysts, designers to manage projects.
- Analyze and document systems, design new systems and implement their plans.
- Have the coverage of UML, wireless technologies and ERP; web based systems for e-commerce and expanded coverage on RAD and GUI design.

UNIT – I Definition of System, Sub-System, Component with examples, Characteristics and elements of system And Different types of system.Discuss Business as a System and identify its sub-systems, components etc. Role and Need of System Analyst , Responsibilities of system analyst. Types of Information System(TPS, MIS, Expert System, DSS, OAS, KWS, ESS).

UNIT – II SDLC – System Development Life Cycle, Introduction and need. Discuss the different phases of waterfall model [SDLC], What is the problem, Feasibility study, Analysis, Design, Implementation, Post-Implementation and Maintenance.Types of Software Lifecycle Models

UNIT – III System study Course Objectives – Requirement analysis – fact finding techniques.Tools of structured Analysis – DFD, Data Dictionary, Decision Tables, Decision Tree, Structured English along with its pros and cons of each tool

UNIT – IV Outline design of input and output. Data and data dictionary.Physical system design – databases and its design, ER-Model. File structure and file organization-types and importance

UNIT – V Forms and form design its types, User Interface Design. Planning for implementation – education and training.System testing – need and types.Maintenance.Types of Maintenance

Textbooks

1. Elias M. AwadGalgotia Publication [P] Ltd……System Analysis and Design
2. Whitten, Jefrrey L BPB Publication……System Analysis and Design

Suggested Readings

1. Jeffrey L. Whitten, McGraw-Hill Lonnie D. Bentley……Analysis and Design of Information Systems
2. James A Senn McGraw…….Hill Analysis and Design of Information Systems

Course Outcomes

At the end of the course, the student will be able to:

CO1:Understand the major components of a computer including CPU, memory, I/O and storage.
CO2: Understand the uses for cache memory.
CO3: Understand a wide variety of memory technologies both internal and external.
CO4: Understand the role of the operating system in interfacing with the computer hardware.
CO5: Understand the basic components of the CPU including the ALU and control unit.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	L	L	L	M	-	-	-	-	-	L	-	M	L	L
CO2	L1,L2	M	M	M	H	-	-	-	-	L	M	-	L	M	M
CO3	L2,L4	H	M	M	H	M	-	-	L	M	H	-	H	M	M
CO4	L2	L	L	L	M	L	-	-	-	-	L	-	M	H	L
CO5	L2	M	L	L	L	-	-	-	-	-	M	-	M	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 204 - Data Structure & Algorithms

Course Objectives:

- Learn efficient storage mechanisms of data for an easy access, design and implementation of various basic and advanced data structures, introduce various techniques for representation of the data in the real world.
- Develop application using data structures, learn the concept of protection and management of data and improve the logical ability.
- Choose appropriate data structure as applied to specified problem definition, handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.

UNIT – I **Introduction:** Data Structures, data structure operations, complexity, Asymptotic Notation, Time/Space trade-off.

Linear Lists: Arrays, address calculation in single and multidimensional arrays, operations on array, sequential search, Binary Search and their complexity analysis.

UNIT – II **Linked lists and its operations:** linked list, representation of link list in memory, traversing a link list, insertion into a link list, deletion from a link list, header link list, two way link lists.

UNIT – III **Trees:** Definition of tree, Binary tree and related terms, Application of binary tree, Tree Traversals, Threaded tree, Binary Search Tree, heap , heap sort, General trees.

UNIT – IV **Graph:** introduction, sequentional representation of Graphs, adjacency matrix, path matrix, operations on graphs ,traversing a Graph, Warshall's algorithm.

UNIT – V **Sorting Techniques :** Selection, Insertion, Bubble, Merge, Quick, Radix sort, searching and hashing.

Textbooks:

1. Schaum Series, "Introduction *to Data Structures*", TMH.
2. R.B. Patel, "*Expert Data Structures with C*", Second Edition, Khanna Book publishing Co (P) Ltd.

References:

1. Tenenbaum, "*Data Structure using C++*", PHI.
2. Chattopadhyay S., Dastidar d G.andChattopadhyayMatangini., "*Data Structure through C language*", BPB publications.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Walk through insert and delete for different data structures.
CO2: Calculate and measure efficiency of code
CO3: Appreciate some interesting algorithms like Huffman, Quick Sort, and Shortest Path etc.
CO4: Walkthrough algorithm.
CO5: Improve programming skills.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2,L3	M	L	L	M	-	-	-	L	-	M	-	M	M	L
CO2	L3	L	L	L	M	-	-	-	-	-	L	-	L	M	L
CO3	L5	H	M	M	H	-	-	-	L	L	H	L	M	H	M
CO4	L1,L2	L	L	L	M	-	-	-	-	-	L	-	L	H	L
CO5	L6	H	M	M	M	-	-	-	M	M	H	L	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 205 - Linux Environment

Course Objective:

- This comprehensive course is designed to provide the knowledge and skills to students so that they can work in Linux environments.
- The course covers areas of Linux Architecture, file system and graphical environment, Linux commands, file permissions, process Management and shell meta characters, working of vi editors, different scripts.

UNIT – I Linux – The Operating System: Linux history, Linux features, Linux distributions, Linux's relationship to Unix, Overview of Linux architecture, Installation, Booting, Login and Shutdown Process, Start up scripts, controlling processes, system processes (an overview).
Linux Internals - System Calls, Process Management, Memory Management, Disk and filesystems ,Networking ,Security, Graphical User Interface, Device Drivers.

UNIT – II Files: File Concept, File System Structure, File Attributes, File types, The Linux File System: Basic Princples, Pathnames, Mounting and Unmounting File Systems,Different File Types, File Permissions, Directory Structure,System calls, file descriptors, low level file access – File structure related system calls (File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links.

UNIT-III Working with the Bourne again shell (bash):Introduction, shell responsibilities, types of shell,pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples Simple filters pr, head,tail etc. filter using regular expression-grep,sedinterrupt processing, debugging shell scripts.

UNIT-IV Process – Process concept, Kernel support for process, process attributes, process control process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs. Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions.
Interprocess Communication: Introduction to IPC, Pipes, and FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory.

UNIT-V Multithreaded Programming: Differences between threads and processes, Thread structure and uses Threads and Lightweight Processes, POSIX Thread APIs, Creating Threads, Thread Attributes, Thread Synchronization with semaphores and Mutexes.

Text books:

1. Unix System Programming using C++, T.Chan, PHI.(UNIT III to UNIT VIII)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.

Reference books:

1. Linux System Programming, Robert Love, O'Reilly, SPD.

2. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.

3. Unix Network Programming ,W.R.Stevens,PHI.

4. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Describe and use the LINUX operating system.

CO2: Describe and use the fundamental LINUX system tools and utilities.

CO3: Describe and write shell scripts in order to perform basic shell programming.

CO4: Describe and understand the LINUX file system.

Table: Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	L	L	L	M	-	-	-	-	-	L	-	M	M	H
CO2	L1,L2	M	L	L	L	-	-	-	-	-	M	-	M	M	M
CO3	L2,L6	H	M	M	H	M	-	-	M	-	H	-	H	H	L
CO4	L1,L2	M	L	L	M	-	-	-	-	-	M	-	M	H	H

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 206 - Environment Studies

Course Objective:

- The Environmental Studies major prepares students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective and Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

Unit-1 Ecosystem and Biodiversity: Components and types of ecosystem, Structure and functions of Ecosystem, Values, Type and levels of Biodiversity, Causes of extension, and Conservation methods of biodiversity.

Unit- 2Air Pollution: Definition, different types ofSources, effects on biotic and abiotic components and Control methods of air pollution.

Unit- 3Water pollution: Definition, different types ofSources, effects on biotic and abiotic components and treatment technologies of water pollution.

Unit- 4Noise Pollution: Introduction of noise pollution, differentSources, effects on abiotic and biotic environment and Control measures.

Unit-5 Non Conventional energy sources: Introduction, Renewable Sources of Energy: Solar energy, wind energy, Energy from ocean, energy from biomass, geothermal energy and Nuclear Energy.

Recommended Reference Books:

1. Brunner R.C., Hazardous Waste Incineration, McGraw Hill Inc. 1989.
2. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
3. Cunningham, W.P, Cooper, T.H. Gorhani, E & Hepworth, M.T. , Environmental Encycolopedia, Jaico Publishing House, Mubmbi, 2001.
4. De. A.K., Environmental Chemistry, Wiley Eastern Ltd.
5. Down to Earth, Centre for Science and Environment (R)
6. Gleick, H.P. Water in crisis, Pacific Institute for Studies in Dev., Environment &Security.StockholmEnv.Institute.Oxford Univ. Press.
7. Gilpin, Alan. Environmental Impact Assessment (EIA), cutting egde for the 21th century. Cambridge university Press.

Course outcomes

At the end of the course, the student will be able to:

CO1: Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving. Ecosystem Links between environmental components and their role.

CO2: Basic Structure of atmosphereand their functions Current problems related issuesStudents will apply knowledge of the sciences within an interdisciplinary context in solving nvironmental issues such as environmental health, food and agriculture, energy, waste and pollution, climate change, management, and loss of biodiversity.

CO3: Basic knowledge about water recourses, current problems related issues, water born diseases, technologies of water treatment.

CO4: Level of sound and their units, sources and effects of noise pollution, control measures.

CO5: Concept of non Conventional energy resources, types and various applications of renewable resources and current potentials of energy resources.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2,L 4	L	L	L	M	-	-	L	-	-	L	-	L	M	L
CO2	L2,L 4	H	M	M	H	-	-	M	-	-	H	-	H	H	M
CO3	L1,L 2	H	L	L	L	-	-	L	-	-	H	-	H	M	L
CO4	LI	H	L	L	M	-	-	L	-	-	H	-	H	M	M
CO5	L2	H	L	L	L	-	-	L	-	-	H	-	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 207 - Data Structures & Algorithms Lab

Course Objective:

- The course is designed to develop skills to design and analyze simple linear and non linear data structures.
- It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.
- It enables them to gain knowledge in practical applications of data structures.

List of Exercises

1 Write a program to insert an element at desire position in the array.

2 Write a program to delete an element at desire position from the array.

3 Write a program to replace an element at desire position in the array.

4 Write a program to search (linear search) an element in the array.

5 Write a program to search (binary search) an element in the array.

6 Write a program to addition and multiply of two matrices.

7 Write a program to implementation of stack using array.

8 Write a program to implementation of queue using array.

9 Write a program to implementation link list.

10 Write a program that sorts the array through Bubble sort.

11 Write a program that sorts the array through Quick sort.

12 Write a program that sorts the array through Merge sort.

13 Write a program that sorts the array through Insertion sort.

14 Write a program to BST (binary search tree) addition, deletion and searching.

Course Outcomes

At the end of the course, a student will be able to understand

CO:1. Design and analyze the time and space efficiency of the data structure

CO:2. Be capable to identity the appropriate data structure for given problem

CO:3. Have practical knowledge on the applications of data structures

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2,L6	H	M	M	M	L	-	-	L	L	H	-	M	H	H
CO2	L2,L4	M	L	L	M	-	-	-	-	-	M	-	M	M	M
CO3	L5	H	M	M	H	M	-	-	M	M	H	-	L	L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 208 - Linux Environment Lab

Course Objectives:

- To understand the basic concepts, design and structure of the Linux operating system.
- To implement various system calls.
- To acquire skills in Linux Shell programming.
- To learn basics of Linux system administration.

List of experiments

1. Write a shell script to ask your name, program name and enrollment number and print it on the screen.
2. Write a shell script to find the sum, the average and the product of the four integers entered
3. Write a shell program to exchange the values of two variables.
4. Find the lines containing a number in a file
5. Write a shell program to reverse the digits of five digit integer
6. Write a shell script to find the largest among the 3 given numbers
7. Write a shell program to search for a given number from the list of numbers provided using binary search method
8. Write a shell script to display the digits which are in odd position in a given 5 digit number
9. Write a shell program to concatenate two strings and find the length of the resultant string
10. Write a shell program to find the position of substring in given string
11. Write a shell program to display the alternate digits in a given 7 digit number starting from the first digit
12. Write a shell program to find the gcd for the 2 given numbers
13. Write a shell program to check whether a given string is palindrome or not.
14. Write a shell script to find the smallest of three numbers
15. Write a shell program to add, subtract and multiply the 2 given numbers passed as command line arguments

Course Outcomes:

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

CO1. Learn UNIX structure, commands, and utilities.
CO2. Describe and understand the UNIX file system.
CO3. Write shell scripts in order to perform shell programming.
CO4. Acquire knowledge about text processing utilities, process management and system operation of UNIX.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L1,L2	M	L	L	L	L	-	-	-	-	M	-	H	M	L
CO2	L2	M	L	L	M	-	-	-	-	-	M	-	M	M	L
CO3	L6	H	M	M	H	M	-	-	M	L	H	-	H	H	M
CO4	L2	M	L	L	M	L	-	-	-	-	M	-	M	H	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 209 - Personality Development Lab

Course Objectives:-

- To listen to different texts and comprehend them.
- To train students to use appropriate language for public speaking.
- To encourage students to make writing habit.
- To make the students understand the importance of working in teams in the present day scenario.
- To make students understand how setting goals in life is important.
- To make students realize how group decision making is better than decisions made individually.
- To help students better understand basic leadership qualities and personality traits.
- To stress upon students, the importance of time management.
- To facilitate critical thinking and analysis of activities and attitudes that support company's success.

List of Exercises

1. **Resume / Report Preparation / Letter Writing**
   Structuring the resume / report – Letter writing / Email Communication – Samples.
2. How to give your Self Introduction.
3. **Presentation skills:**
   Elements of effective presentation – Structure of presentation – Presentation tools – **Body language** – Video samples
4. Soft Skills
5. **Presentation Skills:** Students make presentations on given topics.
6. **Group Discussion:** Students participate in group discussions.
7. **Interview Skills:** Students participate in Mock Interviews

Course Outcomes:

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

CO1. Comprehend conversations and speeches.
CO2. Speak with clarity and confidence, thereby enhancing their employability skills.
CO3. Identify his/her creative self, and express effectively the same in writing.
CO4. Explain the advantages of teamwork and how the tasks could be completed effectively when done as a cohesive unit.
CO5.Realize that selecting goal is a fundamental component to long-term success of an individual.
CO6. Enable students to understand different aspects of leadership and evaluate in their own strengths.
CO7. Be more organized and disciplined.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L1	L	L	L	M	-	-	-	L	-	L	-	L	L	H
CO2	L2	M	L	L	L	-	-	-	L	-	M	-	M	M	M
CO3	L2	L	L	L	M	-	-	-	M	-	L	-	L	L	M
CO4	L2	M	L	L	L	-	-	L	L	-	M	-	M	H	H
CO5	L4	H	M	M	H	L	-	M	L	-	H	-	L	L	M
CO6	L2,L5	H	M	M	H	L	-	L	L	-	H	-	M	M	H
CO7	L1,L2	M	L	L	M	-	-	L	L	-	M	-	L	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA- III SEMESTER

BCA 301 - Object Oriented Programming Using C++

Course Objectives:

- Learn to design software using abstract data and control structures.
- Learn structures including lists, stacks, queues, trees, and graphs.
- Choose appropriate data structures and algorithms for problem solving.

UNIT – I **Introduction:** Introducing Object-Oriented Approach, Relating to other paradigms(functional, data decomposition).

Basis Features of OOPs: Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete operators.

UNIT – II **Classes and Objects:** Encapsulation, information hiding, abstract data types, Object &classes, attributes, methods, C++ class declaration, State identity and behavior of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Meta class/abstract classes.

UNIT – III **Inheritance and Polymorphism:** Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric polymorphism,

UNIT – IV **Generic function –** template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

UNIT – V **Files and Exception Handling:** Persistent objects, Streams and files, Namespaces,Exception handling, Generic Classes

Text/ Reference Books:

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.
2. S. B. Lippman& J. Lajoie, “C++ Primer”, 3rd Edition, Addison Wesley, 2000.
3. R. Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004.
4. D .Parasons, “Object Oriented Programming with C++”, BPB Publication.
5. Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication.
6. Schildt Herbert, “C++: The Complete Reference”, 4th Ed., Tata McGraw Hill, 1999.
7. Tony Gaddis, Watters, Muganda, “Object-Oriented Programming in C++”, 3rd Ed., Wiley Dreamtech, 2004.

Course Outcomes

At the end of the course, the student will be able to:

CO1:Understand object-oriented programming features in C++.

CO2: Apply these features to program design and implementation.

CO3: Understand object-oriented concepts and how they are supported by C++.

CO4: Gain some practical experience of C++.

CO5: Apply the facilities offered by C++ for Object-Oriented Programming.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	-	-	-	-	-	M	-	M	M	H
CO2	L3	M	L	L	L	-	-	-	-	-	M	-	M	M	M
CO3	L1,L2	L	L	L	M	-	-	-	-	-	L	-	L	H	M
CO4	L5	H	M	M	H	M	-	-	L	-	H	-	M	H	H
CO5	L3	M	L	L	M	-	-	-	-	-	M	-	H	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 302 - Database Management System

Course Objectives:

- Understand the role of database management system in an organization, basic database concepts, including the structure and operation of the relational data model.
- Construct simple and moderately advanced database queries using, Structured Query Language (SQL).
- Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.

UNIT – I **Basic Concepts:**Database Management system , Characteristics of a Database, Database Administrators, Types of Database system, Data Dictionary, Advantage and Disadvantages of databases systems, Data Models, Schemas & Instances, DBMS Architecture & Data Independence, Data Languages & Interfaces,

UNIT – II **Entity-Relationship Model:** Data modeling using the Entity-Relationship Approach. E-R Modeling: Entity types, entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities.

Conventional Data Models & Systems: Network Data Modeling concepts, Constraints in the Network model, Data Manipulation in a Network Database, Hierarchical Database Structures, Integrity Constraints and Data Definition in the Hierarchical Model.

UNIT – III **Relational Model and Relational Algebra:** Relational Model concepts, Relational Algebra: Terminology, Operators – Write, Operator –Retrieval, Select, Project, Union, Intersection, Difference, Cartesian Product, Join, Natural Join, Outer Join. RELATIONAL MODEL: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joints, Division

UNIT – IV **Relational Database Design:**Function Dependencies & Normalizations for Relational Database, Functional Dependencies, Normal Forms based on primary keys (INF, 2NF, 3NF & BCNF).

Concurrency Control Techniques, Locking Techniques: Concept of concurrency control, Multivalued dependency and Join dependency. Concurrency Control: Lock Based Protocols; Time Stamped Based Protocols, Deadlock Handling, Recovery Techniques, Recovery Concepts, Database Backup and Recovery from catastrophic failures.

UNIT – V **SQL AND TRIGGERS:** Data Definition in SQL, view and queries in SQL. Specifying Constraints, DDL,DML,DCL, Union, Intersection and Except, Nested Queries, Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values, Triggers and Active Databases.

Text books:

1. Elmarsi R. and Navathe. SB "Fundamentals of Database Systems"., Addison Wesley publication.
2. "Oracle 9i": The Complete Reference,TMH ,Oracle Press.

Reference books:

1. Silberschatz. Abraham, Korth.Henry, Sudarshan. S. "Database Systems Concepts",McGraw Hill.
2. Desai Bipin "An Introduction to Database Systems"., Galgotia Publications
3. Date .C. J. "An Introduction to Database Systems"., Pearson Education Asia
4. Widom. Ullman "A First Course in Database Systems"., Pearson Education Asia
5. Leon.Alexis& Leon Mathews "Database Management System".,Vikas Publishing House pvt. Ltd.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand, appreciate and effectively explain the underlying concepts of database Technologies.
CO2: Design and implement a database schema for a given problem-domain
CO3: Normalize a database and Populate and query a database using SQL DML/DDL commands.
CO4: Declare and enforce integrity constraints on a database
CO5: Concept of transaction and concurrency.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L6	H	M	M	M	M	-	-	M	-	H	-	H	M	M
CO3	L2,L4	M	M	M	H	L	-	-	L	-	M	-	M	M	M
CO4	L3,L4	M	L	L	M	M	-	-	-	-	M	-	M	H	L
CO5	L2	L	L	L	M	-	-	-	-	-	L	-	-	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 303 - Front End Design Tool (VB)

Course objective:

- This course introduces computer programming using the Visual BASIC programming language with object-oriented programming principles.
- Emphasis is on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger.
- Should be able to design, code, test and debug at a beginning level.

UNIT – I **Visual Basic:** Variable Names, Data Types, Assignment, If-then, If-then-else, if then-elseif-else, expression, print statement, arrays, variable declaration, built-in & User defined types, Subroutine and functions, Boolean Operators, Arithmetic Operator, For- .next, do loop, while-wend, procedure/Public, Private and Static & Dim Statement.

UNIT – II Structure of VB program, Forms & built in controls, Properties and events, Code Module, Scale Modes, Printer Object (Printing text, setting Fonts, graphics), Common dialog Boxes, picture controls, image-controls, send keys, MS-Common Controls, Error Handling, Classes, Control Arrays, MDI, SDI.

File Handling – Text and Binary Files, Files System Orbit Object.

UNIT – III **Database Interface:** Review of ANSI SQL, ODBC, Pass through ODBC, DAO, MS-Jet Engine, DB-Engine, Workspaces, Databases, recordsets, Data bound controls, ActiveX controls, ADO, Active X Data controls, RDO.

UNIT – IV Data view Window, Data Environment Designer, Crystal Report and Data Report Utility Using Visual Basic (VB) for Transaction Management, Concurrency Control, Interfacing with RDBMS, Backend Stored procedure Usage.

UNIT – V **Visual Basic Lab:** Any 2 minor projects from the following

Develop an Application using Visual Basic : Bank transactions management, Hotel Management, Gas agency management, Office automation, Railway reservation, Computerisation course registration, Hostel management, Hospital management, Inventory management, Competitive examination database, Air line reservation, Transport management, College admission, Library management.

Note: Any Relational Database System can be used as back end.

Text books:

1. Petroutsos .E, “Mastering Visual Basic 6.0”, BPB Publications, 1998.
2. Perry, Greg, “Teach Yourself Visual Basic 6 in 21 Days”, Techmedia, 1998.

References books:

1. Petroutsos . E., “Mastering Database Programming with Visual Basic 6”, BPB Publications, 2000

2. Peter. Norton, “Peter Norton’s Guide to Visual Basic 6”, Techmedia, 1998.

Course outcome:

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

CO1: Design, create, build, and debug Visual Basic applications.

CO2: Explore Visual Basic‘s Integrated Development Environment (IDE).

CO3: Implement syntax rules in Visual Basic programs also Explain variables and data types used in program development.

CO4: Apply arithmetic operations for displaying numeric output.

CO5: Write and apply decision structures for determining different operations, loop structures to perform repetitive tasks.

CO6: Write and apply procedures, sub-procedures, and functions to create manageable code.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L6	M	M	M	H	H	-	-	M	L	M	M	M	H	L
CO2	L2	M	L	L	M	L	-	-	-	-	M	-	M	M	M
CO3	L3	L	M	M	H	-	-	-	-	-	L	-	H	M	M
CO4	L3	M	L	L	M	-	-	-	-	-	M	-	H	H	L
CO5	L3,L6	H	H	H	H	M	-	-	H	L	H	L	M	H	L
CO6	L3,L6	H	H	H	H	M	-	-	L	L	H	M	H	M	M

H- High, M- Moderate, L- Low, ‘-’ for No correlation

BCA 304 - Managerial Personality Development

Course Objective:

- Projecting the Right First Impression.
- Polishing manners to behave appropriately in social and professional circles.
- Enhancing the ability to handle casual and formal situations in terms of personal grooming, dining and entertaining etiquette.
- Developing and maintaining a positive attitude and being assertive.
- Mastering Cross Cultural Etiquette.
- Handling difficult situations with grace, style, and professionalism.
- Grooming for Success.
- Body Language, Poise, and Eye Contact.
- Pronunciation, Voice Modulation, and Diction.
- Self-Esteem and Confidence.

UNIT – I How to give a good Self-Introduction? Defining a good personality, Importance of Inter-personal skills, Developing self-confidence, Positive thinking.

UNIT – II Basic Etiquettes: Meeting & Greeting Skills, Mobile Etiquettes, Fax Manners, E-mail Manners & Dining Etiquettes.

UNIT – III Stress Management, Importance of Time Management, Wardrobe Management, How to handle a difficult boss & a difficult clients.

UNIT – IV Public Speaking, Presentation Skills, Importance of Voice Modulation & Body Language.

UNIT – V Basic Letter Writing, Interview Skills, GD tips, Mock GD & PI.

Text books:

1. Mcgrath . E.H., "Basic Managerial Skills for all" , Fourth Edition, , Prentice Hall of India Pvt. Ltd., New Delhi,1998.
2. Wood .F.T ., "Remedial English Grammer for foreign students"., , Mcmillan, New Delhi.

Reference books:

1. Steve Smith ., "Be your Best, Ed"., Quest.
2. Bunch .Meribeth ., "Creating Confidence" ., Kogan Page.

Course Outcomes

At the end of the course, a student will be able to understand

CO: 1.Develop and maintain a Reflection.
CO: 2. Develop and articulate a personal philosophy of meeting & greeting.
CO: 3.Grasp the exact mean of management in so many ways like time, wardrobe& stress.
CO: 4. Learn about- how to represent, effective skills & body language.
CO: 5. Grasp the practical knowledge in the form of GD and interview.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L6	M	M	M	H	-	-	-	M	L	M	-	H	L	H
CO2	L2,L6	H	M	M	M	-	-	-	M	M	H	-	M	M	M
CO3	L2	M	L	L	M	-	-	-	L	-	M	-	M	L	M
CO4	L1	M	L	L	L	-	-	-	L	-	M	-	-	L	H
CO5	L1,L2	M	L	L	M	-	-	-	L	-	M	-	M	L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 305 - Technical Communication

Course Objective:

- Understanding the characteristics of technical writing and the importance of purpose, audience, and genre for written communication in technical fields.
- Articulating complex engineering ideas appropriate for targeted audiences.
- Planning, drafting, revising, editing, and critiquing technical and professional documents through individual and collaborative writing.
- Writing effective technical and business documents that are grammatically and stylistically correct.
- Preparing and delivering professional technical presentations through applying principles of effective oral communication and slide design.
- Applying principles for the visual display of quantitative information.
- Researching, analyzing, synthesizing, and applying information to create technical reports.
- Recognizing ethical implications of technical communication in professional contexts.
- Understanding the contemporary issues in engineering from an environmental, societal, economic, and global perspective.

UNIT – I Technical Communication: Definition & Purpose, Characteristics of Technical Communication, Audience-Centered Communication: Description & Effectiveness, Rhetorical Awareness in Technical Communication, Legal and Ethical Communication: Description & Importance, Implicit and Explicit Rules of Communication: Definitions & Examples, Types of Technical Documents

UNIT – II Establishing Goals in Technical Writing, The Technical Writing Process: Prewriting, Writing & Rewriting, Connecting With Your Audience Through Writing, Understanding the Tone and Voice of Your Message, Selecting the Best Words for Your Message, Using Nondiscriminatory Language in Business Communication

UNIT – III Titles & Headings in Technical Documents, Types of Definitions Used in Technical Writing, Ethical Dilemmas in Technical Writing, Mistakes of Composing Definitions in Technical Writing, Writing Technical Descriptions, Writing Technical Specifications, Introductions of Technical Documents, Conclusions of Technical Documents, Recommendations in Technical Documents, Glossary, Footnotes & Appendix in Technical Documents

UNIT – IV The Role of Visuals in Communication, Using Visuals to Present Data: Textual Graphics vs. Visual Graphics, Ethical Considerations When Using Visuals in Workplace Communication

UNIT – V Types of Resumes, Parts of Your Resume: Sections & Relevant Information, Tailoring the Content of Your Resume for a Job, Formatting Your Resume: Layout & Distribution Types, The Cover Letter: Importance, Details & Format

Text/Reference Books:

1. Meenakshi Raman, SangeetaSharma,Technical Communication: Principles and Practice, Oxford University Press, 3rd Ed.

2. Barun K. Mitra, Effective Technical Communication: A Guide for Scientists and Engineers, Oxford University Press, 1st Ed.

Course Outcomes

At the end of the course, a student will be able to

CO:1. Describe that you can effectively communicate technical material in print.
CO:2. Demonstrate that you can present technical material orally with confidence and poise.
CO:3. Understand that you can present technical material using audiovisual materials.
CO:4. Demonstrate that you can communicate technical material to a variety of audiences, from members of the building and engineering trades and medical fields to government representatives and the general public.
CO:5. Explain that you can work well in teams

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	L	-	-	-	-	-	M	-	-	L	H
CO2	L3	H	L	L	M	-	-	-	-	-	H	-	M	M	M
CO3	L2	L	L	L	M	-	-	-	-	-	L	-	L	L	M
CO4	L3,L4	H	M	M	H	-	-	-	-	-	H	-	-	H	H
CO5	L2	M	L	L	L	-	-	-	-	-	M	-	M	L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 306 - Discrete Mathematics

Course Objectives:

- To develop logical thinking and its application to computer science (to emphasize the importance of proving statements correctly and de-emphasize the hand-waving approach towards correctness of an argument). The subject enhances one's ability to reason and ability to present a coherent and mathematically accurate argument. About 40% of the course time will be spent on logic and proofs and remaining 60% of the course time will be devoted to functions, relations, etc.

UNIT – I **Graphs**: Directed and undirected graphs, chains, circuits, paths, cycles, connectivity, adjacency and incidence matrices, Minima's path application (flow charts and state transition graphs, algorithms for determining cycle and minimal paths, polish notation and trees, flows ion networks.)

UNIT – II **Groups and Subgroups**: Group axioms, semi-groups, Permutation Groups, Subgroups, Cosets, Normal subgroups.

Applications of Groups: FREE Semi-groups, Applications, (modular arithmetic, error correcting codes, grammars, languages, Finite State Machine)

UNIT – III **Finite Fields:** Definition Representation, Structure, Integral domain, Irreducible polynomial, polynomial roots, Splitting fields.

UNIT – IV **Posets and Lattices:** Posets, Relations to partial ordering, Hasse diagram, Lattices.

Boolean algebra: Axiomatic definition of Boolean algebra as algebraic structures with two operations basic results truth values and truth tables.

UNIT – V Thealgebra of prepositional function.The Boolean algebra of truth-values, Application (Switching circuits, Gate circuits).

Text Books:

1. C.L.Liu *Elements of Discrete Mathematics*McGraw-Hill Book, 1985.
2. Kenneth G. Rosen, "*Discrete Mathematics and its applications*", McGraw – Hill International Editions, Mathematics Series
3. Kolman, Busby and Ross, *"Discrete Mathematical Structure*", PHI, 1996.
4. Sarkar . S.K., "*Discrete Maths*"; S. Chand & Co., 2000
5. ScymourLipschutz, "*Discrete Mathematics*", McGraw-Hill International Editions, Marc Lars Lipson, Schaum's Series.

Reference Books:,

1. Dass . H.K., "*Advanced Engineering Mathematics*", S. Chand & Company, 9th Revised Edition, 2001.
2. Richard Johnsonbough," *Discrete Mathematics"* Pearson Eduction Inc., 2002.

3. Alan Doerr, "*Applied Discrete Structures for Computer Science*", Galgotia Publications Pvt. Ltd

Course Outcome:

At the end of the course student will be able to know:

CO1. Reason at multiple levels of detail and abstraction, being aware, in particular, of the applicability and limitations of tools from mathematics and theoretical computer science.

CO2. Recognize the context in which a computer system may function, including its interactions with people and the physical world and able to communicate with, and learn from, experts from different domains throughout their careers

CO3. Possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves

CO4. Manage their own learning and development, including managing time, priorities, and progress

CO5. Encompass an appreciation of the interplay between theory and practice.

Table: Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	-	-	-	-	-	M	-	L	L	L
CO2	L1	L	L	L	M	-	-	-	-	-	L	-	L	M	M
CO3	L3	H	M	M	M	-	-	-	-	-	H	-	M	L	M
CO4	L2,L4	H	L	L	L	-	-	-	-	-	H	-	M	L	L
CO5	L4,L5	M	M	M	M	-	-	-	-	-	M	-	H	L	M

1- High, 2- Moderate, 3- Low, '-' for No correlation

BCA 307 - OOPS Using C++ Lab

Course Objectives:

- To know different programming paradigms.
- To study and understand the object oriented programming concepts and methodology.
- To implement object oriented programming concepts in C++.

List of Exercises

1 Write a program to Create Class with Static Data Member.

2 Write a program to define a class to represent a bank account. Include the following members

Data Members

a) Name of the depositor
b) Account number
c) Type of account
d) Balance amount in the account

Member Functions

a) To assign initial values
b) To deposit an amount
c) To withdraw an amount after checking the balance
d) To display name and balance

Write a program to test the program.

3 Write a program to using INLINE function.

4 Write a program to using FRIEND function

5 Write a program to using Operator Overloading Unary Minus.

6 Write a program to using inheritance

7 Write a program to using Function Overloading.

8. Write a program to create files with constructor function.

9. Write a program reading from two files simultaneously.

10. Write program containing a possible exception. Use a try block to throw it and a catch block to handle it properly.

Course Outcomes:

By the end of the course students will be able to

CO1. Understand key features of the object oriented programming language such as encapsulation (abstraction), inheritance, and polymorphism.
CO2. Design and implement object oriented applications.
CO3. Analyze problems and implement simple C++ applications using an object oriented software engineering approach.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	L	-	-	-	-	M	-	M	H	L
CO2	L6	H	M	M	H	H	-	-	M	M	H	M	H	M	M
CO3	L4	M	M	M	H	M	-	-	L	L	M	-	M	H	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 308 - DBMS Lab

Course Objectives:

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, and relational models.
- To understand and use SQL to query, update, and manage a database.
- To develop an understanding of essential DBMS concepts such as: transaction processing, integrity, concurrency, and recovery in databases.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

List of Exercises

1. Create the student/employee Table and construct the following requires for the database…
   1..1. Create the table for student/employee.
   1..2. Find out name of all students.
   1..3. Retrieve the list of name and the city of all students.
   1..4. List of all students/employee who stay in city "BOMBAY" or city DELHI".
   1..5. List of all students /employee who are located in "MADRAS".
2. (1)Apply these Operations on employee table
   2..1. Insert
   2..2. Select
   2..3. Update
   2..4. Drop
   2..5. Delete
   2..6. Alter
3. Create table with attributes emp. No., emp. Name, Designation, Salary, and Department no. Construct for following queries…..
   .1 Display complete information of all the employees working as a manager.
   .2 Display name of all the employees working as a clerk.
   .3 Suppose DA for manager is 75% of salary then display name of all managers.
   .4 Select names and designation whose salary is greater then 15000.
   5. Apply key constraints as Primary Key, Foreign Key etc as per requirement.
4. Between operation- list of all Employee Name & DOJ (date of joining) to join the Company in 2010
5. Join operation- list of all the employees along with their department information by using join operation.
6. AND/OR operation- make a table that have an employee Perform AND/OR operation.
7. Group by function-

Create the table for facilities having faculty-id, dept. no., designation name and group by similar dept.no. Facilities by using count function.

8. Order by ACS function-

   (a) Create a table for emp. Using following data:- emp. name, emp age, emp salary, emp city & display the emp salary in ascending and descending order.

9. Max-Min function- create a table for student having similar attributes s_name, S_marks, s_id, s_sec& remark.

   9..i. Find the maximum marks obtained by student.

   9..ii. Find the minimum marks obtained by student.

   9..iii. Sum of all students marks using sum function.

   9..iv. Find the average of marks using avg function.

10. Drop operation- Perform Drop Operation.

11. a) Define DBMS.
    b) Key Component- Entity, Attributes
    c) SQL
       1) DDL
       2) DML
    d) Relational data model-
       1) Relation
       2) Tuple
       3) Domain
       4) Degree

Course Outcomes:

By the end of the course students will be able to

CO1. Demonstrate an understanding of the relational data model.
CO2. Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.
CO3. Formulate, using relational algebra, solutions to a broad range of query problems.
CO4. Formulate, using SQL, solutions to a broad range of query and data update problems.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2,L3	M	L	L	M	L	-	-	-	-	M	-	M	H	L
CO2	L4	M	M	M	H	-	-	-	-	-	M	-	M	M	M
CO3	L4,L5	L	M	M	M	M	-	-	L	L	L	-	L	H	M
CO4	L4,L5	M	H	H	H	M	-	-	L	L	M	-	M	H	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 309 - Front End Design Tool (VB) Lab

Course objective:

- This course introduces computer programming using the Visual BASIC programming language with object-oriented programming principles.
- The objective of this course is to make the student to learnhowtodesign, code, test and debug programs using VC++ and VB.

List of Exercises

1. Write a vb code to make a simple calculator.
2. Write a vb code to generate a factorial of a number and star pattern.
3. Write a vb code for changing the font style & color of the given text.
4. Write a vb code to design a mark sheet & also calculate the grade.
5. Write a vb code to draw shapes like rectangle,oval,square,circle etc.
6. Write a vb code to add,remove,clear and count data from list box at execution time.
7. Write a vb code to design a form with following : menus,file,edit& format.
8. Write a vb code to show the implementation of sub-procedure & functions.
9. Write a vb code to find greatest amond eight elements in an array.
10. Create a table in oracle named as customer having field CUST_ID,CUST_NAME,Designation,address,DOB ,DOJ.
11. Write a vb code to create the connectivity with database using adode control and perform the following task insert,update& delete .

Course outcomes:

Upon successful completion of this lab course, students willbe able to

CO1:Design, create, build, and debug Visual Basic applications.
CO2:Apply arithmetic operations for displaying numeric output.
CO3:Applydecision structures for determining different operations.
CO4:Write and apply procedures, sub-procedures, and functions to create manageable code.
CO5:Create one and two dimensional arrays for sorting, calculating, and displaying of data.
CO6:Write Windows applications using forms, controls, and events.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	Bloom Level	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L6	H	M	M	H	M	-	-	M	-	H	-	M	M	L
CO2	L3	L	L	L	M	-	-	-	-	-	L	-	M	M	M
CO3	L3	L	L	L	M	-	-	-	-	-	L	-	L	M	M
CO4	L3,L6	H	M	M	M	M	-	-	M	-	H	-	M	H	L
CO5	L6	H	M	M	H	M	-	-	M	-	H	-	H	H	M
CO6	L6	H	M	M	H	H	-	-	-	-	H	-	M	M	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA- IV SEMESTER

BCA 401 - Operating Systems

Course Objectives:

- Understand the services provided by and the design of an operating system.
- Understand the structure and organization of the file system, understand what a process is and how processes are synchronized and scheduled.
- Understand different approaches to memory management. Students should be able to use system calls for managing processes, memory and the file system. Students should understand the data structures and algorithms used to implement an OS.

UNIT – I **Basic Concepts:** Basic elements of a computer system-Processor ,Main Memory,I/O Modules , System Bus Instruction Execution, Definition of Operating System, Functions of Operating System, Introduction to Batch Systems, Multi programmed batch systems, Time-sharing system, Personal Computer System, Parallel system, Distributed system, Real time systems.

UNIT – II **Operating system structures:** System components, operating system services, system calls, system programs, System structures, Virtual machines.

UNIT – III **Processes:** Process Concept, Process Scheduling, Operation on ProcessesCPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling,
Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

UNIT – IV **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT – V **Memory Management:** Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation
Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms,
Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations.

Textbooks:

1. Operating System Concepts,PearsonEducation,Silbersachatz and Galvin
2. Operating Systems,PHI,Tannenbaum

References:

1. An Introduction to Operating System Design,Addison Wesley Pub.Co.,H.M. Deital
2. Operating Systems,Prentice Hall of India.,W. Stallings
3. Operating Systems, TMH, Godbole

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the basic working process of an operating system.
CO2: Describe the importance of process and scheduling.
CO3: Understand the deadlock detection and recovery techniques.
CO4: Understand the issues in synchronization and memory management.
CO5: Understand the Files system and Distributed Operating System.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	L	L	L	M	-	-	-	-	-	L	-	L	M	L
CO2	L2	M	L	L	M	-	-	-	-	-	M	-	M	M	M
CO3	L1,L2	L	M	M	H	-	-	-	-	-	L	-	M	H	L
CO4	L2	L	L	L	L	-	-	-	-	-	L	-	L	H	L
CO5	L2,L3	M	M	M	H	-	-	-	-	-	M	-	M	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 402 - Computer Oriented Numerical & Statistical Methods Using C

Course Objective:

- To demonstrate understanding of numerical and statistical methods in support of the analysis, design and application for problem solving in the field of information technology.

UNIT – I **Computer Arithmetic:** Floating-point representation of numbers, arithmetic operations with normalized floating point numbers and their consequences. Error in number representation pitfalls in computing.

Iterative Methods: Bisection, False position, Newton Raphson methods, Finding 1/n th root by Newton Raphson, Discussion of Convergences, Polynomial evaluation, solving polynomial equations (Bairstow's Methods).

UNIT – II **Linear and Ordinary Differential Equations:** Solving of Simultaneous Linear Equations and ordinary Differential Equations by Gauss elimination method, Pivoting, ILL conditioned equations, Gauss Seidal Iterative methods, Taylors series and Euler methods, RungaKutta Methods (First, Second and Fourth Order), Predictors correctors methods(Milne's and Adams Predictor corrector)

UNIT – III **Interpolation:** Interpolation, concept, Extrapolation, Polynomial interpolation, Difference tables, Newton's Forward, Backward Interpolation Formulae, Central Difference Formulae, Stirling's and Bessels's Formulae, Newton's Divided difference, Lagrange's method, Inverse interpolation(Lagrange's Method, Iterative Method).

UNIT – IV **Numerical Differentiation and Integration:** Introduction, Concept, Differentiation formulae based on polynomial fit , pitfalls in differentiation, Trapezodial, Simpson's rules ($1/3^{rd}$, $3/8^{th}$) and Gaussian Quadrature, Errors in Trapezoidal and Simsons's $1/3^{rd}$ Rule.

Statistical Methods I: Introduction to Sampling, Types of sampling, Sample distributions. Z-Test

Statistical Methods II: Test of significance, χ^2, t (dependent and independent) and F test.

UNIT – V **Analysis of Variance (ANOVA 1) :** Analysis of Variances: Definition, Assumptions, Cochran's Theorem, One Way classification, ANOVA Table.

Analysis of Variance (ANOVA 2) : Two way classification (with one observation per cell).

Time Series analysis: Introduction, Components and Analysis of Time Series, Measurement of Trend(Graphical, Semi-Averages, Moving averages, Least Square Method),Seasonal Fluctuations(Ratio to Moving Average, Ratio to Trend, Link relative Method) and Cyclic movement.

Text books:

1. Grewal, B.S., "Numerical Methods in Engineering & Science with Programs in Fortran 77, C & C++", 7^{th} Edition, July 2005, Khanna Publishers.

2. Sastry, S.S.,"Introductory Methods of Numerical analysis", 4th Edition, Feb 2005, Prentice Hall of India.

Reference books:

1. Rajaraman, V.,"Computer Oriented Numerical Methods", 3rd Edition, Feb 2005, Prentice Hall of India.
2. Goyal, Manish, " Comprehensive Computer Based Numerical and Statistical Techniques", 2nd Edition, 2005, Laxmi Publications.
3. Jain, Iyengar, Jain, "Numerical Methods for Scientific and Enggineering Computation", 4th Edition, 2004, New Age International (P) Ltd.

Course Outcome:

At the end of the course student will be able to

CO1. Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
CO2. Apply various interpolation methods and finite difference concepts.
CO3. Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
CO4. Work numerically on the ordinary differential equations using different methods through the theory of finite differences.
CO5. Work numerically on the partial differential equations using different methods through the theory of finite differences.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L3	-	L	M	L	M	L	H	L	H	-	-	-	L	L
CO2	L3	L	L	H	H	H	L	M	-	H	-	H	-	M	L
CO3	L2	H	-	H	-	-	H	H	H	H	M	-	-	L	M
CO4	L2,L4	H	L	L	-	H	-	L	L	H	M	-	-	L	L
CO5	L2,L4	-	M	-	M	L	L	M	M	H	H	-		L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 403 - Java Programming

Course Objectives:

- Be familiarizing with good design and programming.
- Create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; use data types, arrays and other data collections.
- Implement error-handling techniques using exception handling.

UNIT – I Features of Java Programming Language; Introduction to JDK, JVM, Bytecode; Java Programming: Data types, accesspecifiers, operators, control statements, arrays; Classes: Fundamentals, objects, methods, constructors.

Polymorphism: method overloading, constructor overloading.

UNIT – II **Inheritance:** Types of inheritance; Concept of super class, sub class, this and super operator, method overriding, Use of final, packages, abstract class, interface.

UNIT – III **Exception Handling:** Exception Class, built in checked and unchecked exceptions, user defined exceptions, use of try, catch, throw, throws, finally.

Multi threaded programming: Overview, comparison with multiprocessing, Thread class and runnable interface, life cycle, creation of single and multiple threads, thread priorities.

UNIT – IV **Java Library:** String handling (only main functions), String Buffer class. Elementary concepts of Input/Output: byte and character streams, System.in and Sysem.out, print and println, reading from a file and writing in a file.

UNIT – V **Applets:** Introduction, Life cycle, creation and implementation, AWT controls: Button, Label, TextField, TextArea, Choice lists, list, scrollbars, check boxes, Layout managers, Elementary concepts of Event Handling: Delegation Event Model, Event classes and listeners, Adapter classes, Inner classes. Swings: Introduction and comparison with AWT controls.

Textbooks:

1. E. Balagurusamy, *Programming with Java*, TMH
2. Herbert Schieldt, *The Complete Reference:Java*, TMH
3. Horstmann, *Core Java*, Addison Wesley
4. Rich raposa, *Learning Java*, Wiley

Course Outcomes

At the end of the course, the student will be able to:

CO1: The students will have the competence in the use of Java Programming language.

CO2: The development of small to medium sized application programs that demonstrate professionally acceptable coding.

CO3: The students will have the competence in the use of Java Programming language.

CO4: An understanding of the principles and practice of object oriented programming in the construction of robust maintainable programs which satisfy the requirements.

CO5: Design and implement an application that demonstrates their competency with Java syntax, structure and programming logic, incorporating basic features of the language as well as some features from the I/O (Input/Output) or GUI libraries.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L1,L2	L	L	L	M	L	-	-	-		M	-	M	L	L
CO2	L6	H	H	H	H	H	-	-	M	L	H	M	H	M	M
CO3	L2,L3	M	M	M	M	M	-	-	-	-	M	-	M	L	M
CO4	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO5	L6	H	H	H	H	H	-	-	M	M	H	M	H	L	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 404 - Software Engineering

Course Objective:

- Introduce software engineering and to explain its importance in building large programs.
- Understand the process of developing new technology and the role of experimentation set out the answers to key questions about software engineering.
- Introduce ethical and professional issues and to explain why they are of concern to software engineers

UNIT – I **Software Engineering**: Introduction and Definition of Software Engineering. Software Crisis, Software Processes & Characteristics.

Software Process Models: Software development life cycle (SWDLC), Software development life cycle models:-Waterfall, Prototype, Evolutionary, RAD, and Spiral Models

UNIT – II **Software Requirements analysis & specifications**: Requirement analysis tasks, Analysis principles. Requirement elicitation techniques like FAST, QFD, Requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

UNIT – III **Software Project Management Concepts**: The Management spectrum, The People, The Problem, The Process, The Project.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Analysis.

UNIT – IV **Software Design**: Design fundamentals, Effective modular design: Data architectural and procedural design, Design documentation. Function Oriented Design, Object Oriented Design.

UNIT – V **Software Testing:** Testing Fundamental, Characteristics of Testable Software,Test Characteristics, Testing Techniques:-Black-box testing,White-box testing. Testing Strategies:-Unit Testing, Integration and System Testing.

Textbooks/reference books:

1. R. S. Pressman, "Software Engineering – A practitioner's approach", McGraw Hill Int. Ed.
2. I. Sommerville, "Software Engineering", Addison Wesley, 2004
3. Rajib Mall, "Fundamental of Software Engineering", 3rd Edition, PHI Learning Private Limited
4. K. K. Aggarwal&Yogesh Singh, "Software Engineering", 2nd Ed., New Age International, 2005.
5. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach", John Wiley & Sons.
6. PankajJalote, "An Integrated Approach to Software Engineering", Narosa, 3rd Ed., 2005.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the importance of the stages in the software life cycle.

CO2: Understand the various process models.

CO3: Understand the importance and organization of SRS.

CO4: Design software by applying the software engineering principles.

CO5: Perform Software testing, documentation and maintenance.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	L	L	L	M	-	-	-	-	-	L	-	L	H	L
CO2	L2	M	L	L	M	-	-	-	-	-	M	-	M	M	L
CO3	L1,L2	L	M	M	H	L	-	-	-	-	L	-	L	H	M
CO4	L6	M	M	M	H	M	-	-	L	-	M	-	M	H	M
CO5	L5,L6	H	M	M	M	M	-	-	M	-	H	-	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 405 - Data Mining & Data Warehousing

Course Objective:

- Data warehouse is used to manage the old data and mining is used for finding the appropriate information for decision making.
- The course provides knowledge of Data warehousingand Data mining.

UNIT – I What is Data Mining? Data mining Functionalities, Pattern Interestingnees, Classification of data mining system, major issues in data mining.
Why preprocess the data? Data cleaning, Data integration and Transformation, Data reduction

UNIT – II Difference between OLTP and OLAP.What is data warehouse, a multidimensional data model, Data warehouse architecture, Datawarehouseimplementation.Concept of Data mart.

UNIT – III Data Mining primitives, Data Mining Query language, Designing GUI based on DMQL, Architecture of Data Mining System.
Association rule Mining, Mining single-dimensional Boolean Association rules from relational databases &datawarehouses, Constraint based association mining.

UNIT – IV What is classification? What is prediction issues regarding classification prediction classification by decision tree induction, Bayslan classification, classification by back propagation.
What is cluster analysis, categorization of major clustering methods, partitioning methods, Hierarchical methods, outlier analysis

UNIT – V Application and trends in data mining, data mining applications, social impacts of data mining, trends in data mining.

Textbooks/reference books:

1. J. Han &MichelizeKamber, "Data mining-Concepts & techniques" , Morgan Kaufman Publisher.
2. Sam Anahory& Dennis Murray, "Datawarehousing", Pearson Education.
3. Micheal J.A. Berry, Gordan S. Linoff, "Mastering Data Mining" , John Willey & Sons.
4. ClandeSeidman, "Data Mining with Microsoft SQL server 2000", Prentice Hall India.

Course Outcomes

At the end of the course, the student will be able to:

CO1:Understand the Data Mining and its architecture.
CO2: Describe the Data Mining Techniques.
CO3: Understand the Frame work and architecture of Data Warehouse.
CO4: Understand the different Components of Data Warehouse.
CO5: Perform On-Line Analytical Processing.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	L	L	L	M	-	-	-	-	-	L	-	L	M	L
CO2	L2	M	M	M	H	-	-	-	-	-	M	-	M	M	M
CO3	L1,L2	L	L	L	M	-	-	-	-	-	L	-	L	H	M
CO4	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO5	L4,L5	H	M	M	H	-	-	-	-	-	H	-	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 406 - Communication Skills- Scientific & Technical Writing

Course objective:

- Students will learn to recognize and respond appropriately to specific communication tasks in different contexts;
- Students will learn how to search for, assemble, record, analyze, evaluate/validate, and present information needed to accomplish a given task.
- Students will learn to revise and edit documents to meet the standards expected of professionals in the field.
- Students' participation in course based projects that help solve community problems reconnects students' academic lives with their communities.
- Communication tasks which students perform as a team occur in a real world context of a term long client based open ended investigative project.
- To increase participant awareness and application of tools and exercises available to them to better present their research and knowledge in written form.

UNIT – I Basics of Communication Skills Vis-& - Vis Scientific and Technical organization, Flow of Communication in various scientific and technical organizations: upward, downward, lateral.

UNIT – II Communication networks in the scientific and technical organizations, History of various scientific and technical developments.

UNIT – III Awareness of general and applied scientific and technical events, popularization of scientific and technical writings,

UNIT – IV Precautionary measures in scientific and technical writings, Media coverage of scientific and technical writings.

UNIT – V Writing science feature, article, editorial, Special article, interviewing a scientist, facing a press conference by a scientist, Writing a Press Release on the subject relating to science and technology, Delivering a public speech on the matter relating to Science and Technology.

Textbooks/reference books:

1. Sinha K.K., Business communication, Kalyani Publications.
2. Bahl .Sushil ,Business Communication Today, Sage Publication.
3. Pal .Rajendra, .Korlahalli .J.S, Essentials of Business Communication, Sultan Chand &Sons

Course Outcomes

At the end of the course, a student will be able to understand

CO1. Understand how to apply technical information and knowledge in practical documents for a variety of a.) Professional audiences (including peers and colleagues or management) and b) public audiences.

CO2. Recognize, explain, and use the rhetorical strategies and the formal elements of these specific genres of technical communication: technical abstracts, data based research reports, instructional manuals, technical descriptions, web pages, wikis, and correspondence.

CO3. Participate actively in writing activities (individually and in collaboration) that model effective scientific and technical communication in the workplace.

CO4. Recognize, explain, and use the rhetorical strategies and the formal elements of these specific genres of technical communication: technical abstracts, data based research reports, instructional manuals, technical descriptions, web pages, wikis, and correspondence. Revise and edit effectively in all assignments, including informal media (such as email to the instructor).

CO5. Collect, analyze, document, and report research clearly, concisely, logically, and ethically; understand the standards for legitimate interpretations of research data within scientific and technical communities.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L2	L	M	M	H	-	-	-	-	-	L	-	M	M	M
CO3	L6	H	H	H	H	H	-	-	M	M	H	-	H	M	M
CO4	L2,L4	M	M	M	H	-	-	-	L	-	M	-	H	H	L
CO5	L4	M	M	M	M	L	-	-	L	L	M	-	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 407 - Java Lab

Course Objectives:

- To understand object oriented features of java and implementing it in java programming.
- To learn and understand inheritance, interfaces, multithreading and exception handling.
- To understand different input/output objects (input vs. output, character vs. byte, data vs. processing, object) and methods and the structure of the java.io package.
- To learn and understand the use of applets and file handling.

List of Exercises

Practical 1: Write a program to compute the sum of the digits of a given integer number.

Practical 2: Given a number, write a programming using (while/ do..while/for) loop to reverse the digits of the number. For example, the number 12345 should be written as 54321.

Practical 3: Write a program (making use of class and methods), which will read a string and rewrite it in the alphabetical order. For example, the word JAIPUR should be written as AIJPRU.

Practical 4: Write a program that accepts a shopping list of five items from the command line and stores them in a vector.

Practical 5: Write a program to show the application of interface and abstract class.

Practical 6: Define an exception called "NoMatchException" that is thrown when a string is not equal to "India". Write a program that uses this exception.

Practical 7: Write a program to implement multithreading making use of **Thread** class and/or **Runnable** interface.

Practical 8: Write a program to implement the concept of packages.

Practical 9: Develop an applet that receives three numeric values as input from the user and then displays the largest of the three on the screen. Write a HTML page and test the applet.

Practical 10: Develop an applet which runs a banner with text "Welcome to JaganNath University" making use of multithreading.

Course Outcomes:

At the end of the course, a student will be able to understand

CO1. Explain The model of object oriented programming and fundamental features of an object oriented language.
CO2. How to test, document and prepare a professional looking package for each business project.
CO3. Ability to write a computer program to solve specified problems and to use the Java SDK environment to create, debug and run simple Java programs.
CO4.Explain and develop programs for inheritance, multithreading, applets, exception handling and file handling.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L1,L2	M	L	L	M	-	-	-	-	-	M	-	H	M	M
CO2	L3.L5	M	M	M	H	-	-	-	L	-	M	-	L	H	L
CO3	L6	H	H	H	H	M	-	-	M	M	H	-	H	M	M
CO4	L4,L6	M	H	H	H	H	-	-	L	H	M	-	M	H	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 408 – Software Engineering Lab

Course Objectives:

- To understand various concepts of Unified Modeling Language.
- To learn and implement UML views, static views, design views etc.
- To understand deployment view, model management views.

Tool Required: Rational Rose Enterprise Edition

List of Experiments:

1. Write down the problem statement for a suggested system of relevance.
2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4. To perform the user's view analysis for the suggested system: Use case diagram.
5. To draw the structural view diagram for the system: Class diagram, object diagram.
6. To draw the behavioral view diagram : State-chart diagram, Activity diagram
7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram
8. To perform the implementation view diagram: Component diagram for the system.
9. To perform the environmental view diagram: Deployment diagram for the system.
10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system.
11. 10 Perform Estimation of effort using FP Estimation for chosen system.
12. 11 To Prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Text Books:

1. K.K. Aggarwal&Yogesh Singh, "Software Engineering", New Age International, 2005
2. PankajJalote, "An Integrated Approach to Software Engineering", Second Edition, Springer.

NOTE: - At least 8 Experiments out of the list must be done in the semester.

Course Outcomes:

At the end of the course, a student will be able to understand

CO1. To Create models for software applications.
CO2. How to Use the different UML notations for designing software.
CO3. The ability to write a computer program to solve specified problems

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	Bloom Level	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L6	M	M	M	M	L	-	-	M	L	M	-	M	H	H
CO2	L4,L6	H	H	H	H	H	-	-	M	-	H	M	M	M	M
CO3	L6	M	H	H	H	M	-	-	L	L	M	L	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 409 – Communication Technical Lab

Course Objectives

- To develop soft skill.
- To study and understand current trends in Information Technology and prepare presentation material.
- To improve oral communication skills through presentation.
- To prepare original technical write up on the presentation.

Objective I: Prepare an article on "Computers and their relevance in Indian Society".

Objective II: Practice Interview Techniques

Objective III: Practice the art of preparing a resume.

Objective IV: Seminar:

Practice the art of giving presentations on various subjects

CourseOutcomes

At the end of the course, a student will be able to understand

CO1. Improvement in proficiency in English
CO2. Improvement in presentation skill
CO3. Improvement in analytical and reasoning ability
CO4. Improvement in technical writing

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2,L 6	L	H	H	H	-	-	-	-	-	L	-	M	H	M
CO2	L6	M	H	H	H	-	-	-	-	-	M	-	H	M	M
CO3	L4,L 6	M	H	H	H	-	-	-	-	-	M	-	M	M	L
CO4	L5,L 6	M	H	H	H	-	-	-	-	-	M	-	M	H	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA- V SEMESTER

BCA 501 - Computer Networks

Course Objectives:

- Explain the importance of data communications and the Internet in supporting business communications and daily activities; explain how communication works in data networks and the Internet.
- Recognize the different internetworking devices and their functions.
- Explain the role of protocols in networking and analyze the services and features of the various layers of data networks.

UNIT – I Introduction: History and Development of Computer Networks, Advantage of Computer Networks, Topologies, Network Hardware, Network Software, OSI and TCP.IP reference models.LAN, WAN & MAN.

UNIT – II Physical Layer: Theoretical basis for data communication, transmission media, type of transmission.Medium Access Sub layer: Channel allocation Problem in Multiple access protocols. Local Area Networks: Introduction, Primary attributes of LAN, IEEE LAN standards: 802.3, 802.4, 802.5, 802.6, (MAN), FDDI.

UNIT – III Data Link Layer: Data link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures. Design Issues, Routing algorithms, Congestion Control algorithms, Internetworking.

UNIT – IV Transport Layer: Transport layer functions, connection management, functions of session layers, presentation layer and application layer. The transport service, Elements of transport protocols.

UNIT – V Application Layer: Services of Application Layer, Network Security, DNS, E-mail, SNMP, USENET, Worldwide Web, Multimedia, IP Spotting Introduction of ISDN and ATM.

Text Books/Reference Books

1. Andrew S.Tanenbaum, "Computer Networks", 4th Edition, Prentice Hall of India publishing Pvt. Ltd.,
2. Uyless Black, "Computer Networks Protocols, Standards and Interfaces, 2nd Edition, Prentice Hall of India publishing Pvt. Ltd.

Course Outcomes

At the end of the course, the student will be able to:

CO1:Explain the importance of data communications and the Internet in supporting business Communications and daily activities.

CO2: Explain how communication works in data networks and the Internet.
CO3: Recognize the different internetworking devices and their functions.
CO4: Explain the role of protocols in networking.
CO5: Analyze the services and features of the various layers of data networks.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	-	-	L	-	-	M	-	-	H	L
CO2	L2	M	M	H	H	L	-	M	-	-	M	-	L	M	M
CO3	L2	H	L	L	M	L	-	-	-	-	H	-	-	M	L
CO4	L2	M	M	H	H	-	-	-	-	-	M	-	L	H	M
CO5	L4	H	L	L	M	H	-	L	-	-	H	-	M	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 502 - System Software

Course Objectives:

- To introduce student the fundamental model of the processing of high level language programs for execution on computer system.
- To explain the basic operations that are performed from the time a computer is turned on until a user is able to execute programs.
- To understand and implement the structure and design of Assembler, Loader, Linkers, Macros & Compilers.

UNIT I System software introduction, Evolution of Components of a Programming System, General Machine Structure - Memory, Registers, Data and Instructions. Machine Language - No Looping, Address modification using instruction as Data and Index registers, Looping. Assembly Language Program using Literals and pseudo -ops.

UNIT II Introduction to Assemblers - General design procedure, Design of Assembler- Statement of Problem, Data Structures, Format of Databases, Algorithm (2-pass assembler) in brief with flowchart

UNIT III Macro Language and the Macro Processor: Macro instructions, Features of Macro facility - Macro instruction argument, Conditional Macro expansions, Macro call within Macros and Implementation- Two-Pass macro processor with flowchart

UNIT IV Loaders and Linkers: - Loader Schemes, Compile and Go Loader, General Loader scheme, Absolute Loaders, Subroutine Linkages, Relocating Loaders, Direct-Linking Loaders, Binders, Linking loaders, Overlays, Dynamic Binders. Design of an Absolute Loader

UNIT V Introduction to Compilers: Different phases- Lexical Phase, Syntax Phase, Interpretation Phase, Optimization Phase, Storage Assignment Phase, Code Generation Phase and Assembly phase.

Text Books/Reference Books

1. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 1999
2. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2000.
3. M. Joseph "System Software", Laxmi Publications First edition, 2007

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand SIC architecture, features of utility software's such as assemblers, loaders, linkers, editors and macro processor.
CO2: Design simple assembler for Simple instruction computer.
CO3: Design linker and loaders for simple instruction computer.
CO4: Design elementary macro processor for simple assembly level language.
CO5: Design and implement simple laxer and parser using lex and yacc tools.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	M	L	M	M	-	-	-	-	-	M	-	M	H	L
CO2	L6	M	M	H	H	M	-	-	M	L	M	-	M	M	M
CO3	L6	H	L	M	M	H	-	-	H	M	H	-	H	H	L
CO4	L6	M	M	H	H	H	-	-	H	L	M	-	M	H	L
CO5	L5,L6	H	M	H	H	M	-	-	M	-	H	-	H	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 503 - Advance Internet Programming

Course Objective:

- To study and designing the web pages in ASP.
- To study formatting and validating web pages in ASP.
- To Learn Web Service Essentials.
- To gain knowledge of Rich Internet Application Technologies.
- To study and designing web sites and deploying web sites on web servers.

UNIT – I Introduction to dynamic web designing and scripting languages , client side and server side scripting , Introduction to ASP, ASP set up, ASP running, ASP first script, ASP syntax, ASP with VB script and java script, Displaying date , time and text.

UNIT – II PROGRAMMING FEATURES OF ASP-Operators, variables, If statement, select statement, static and dynamic arrays, ASP procedures, Do loop, for loop, Subroutines and include virtual, Strings

UNIT – III COOKIE- Creation of Cookies, retrieval of cookie values, cookies with keys, ASP SESSION OBJECT- starting and ending of session, storing and retrieval of session values, removing session variables. ASP APPLICATION OBJECT-store and retrieval of application variables lock and unlock application

UNIT – IV Global.asa file, send email, displaying pictures from an asp file, asp objects, asp comments, asp components, asp special characters, asp vs PHP, open read and creates files

UNIT – V ASP forms- forms with get and post method, accessing a database from an asp page, Ado- active x data objects, ADO database connection, display records, add records, sort records, delete rercords, update records from an asp page through ADO's .

Text Books/Reference Books

1. Greg Buczek, "ASP Developer's Guide", TMH.
2. SAMS book co-written by the course author/instructor, Paul Litwin, and Mike Amundsen

Course Outcomes

At the end of the course, the student will be able to:

CO1:Analyze a web page and identify its elements and attributes.
CO1: Design, Format and validate web pages in ASP.
CO2: Build dynamic web pages using ASP.
CO3: Create Database using ADO.
CO4: Create XML documents used in Web Publishing.
CO5: Design web sites and deploy it on web servers.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L4	M	M	M	M	L	-	-	L	-	M	-	M	H	L
CO2	L6	M	H	H	H	M	-	-	M	M	M	-	M	M	M
CO3	L5,L6	H	M	M	M	H	L	-	L	L	H	-	H	M	L
CO4	L6	M	H	H	H	H	M	-	M	M	M	-	M	H	L
CO5	L6	H	M	M	M	M	L	-	H	L	H	-	H	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 504 - Advance Java

Course Objectives:

- Objective of this course is to provide the ability to design console based, GUI based and web based applications.
- Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications

UNIT-I Introduction to Java & Object Oriented Programming, Importance of Java for Internet , Java Magic, Byte Code Java Buzzwords Simple program of java Using super keyword Dynamic method dispatch· Final class and Methods Packages, Access Protections Interfaces Exception Handling Fundamentals Working with finally clause

UNIT-II Threads and MultithreadingBasicsCreating and Running a Thread The Thread control MethodsThread life cycleThreadPrioritiesThread synchronization,

The Applet & Event Handling Applet Fundamentals Applet Architectures An Applet skeleton The HTML APPLET tag Passing parameters to Applet Delegation based Event handling Event classAction Event Window Event Mouse Event Key Event.

UNIT-III **Introduction to AWT: Working with windows, Graphics Text** AWT ClassesWindows fundamentals working with Frame windowworking with GraphicsWorking with Colors & Fonts.

A Tour of SwingJApplet Icons& Labels Button & Label, Text Field &Buttons,Checkboxes, Radio buttonsCombo Box & Various controls of Swing.

UNIT-IV **String Handling, Streams and Input/Outputs Programming** String class String Buffer class Java I/O Stream classes**JavaBeans** Introduction & Advantages of JavaBeans Application Building Tools Bean Development Kit JAR Files Developing Simple Bean Using the BDK The Java Bean API.

UNIT-V IntroductionOf Servlets**,** Life cycle of servlet , Handling HTTP Get Request, Handling HTTP Post Request , Introduction of JSP , Life cycle of JSP, custom tag library of JSP , event handling of JSP and servlet.

Text Books/Reference Books

1. Java The Complete Reference- by Herbert Schildt Tata McGraw-Hill
2. Mastering Java2 J2SE1.4- by John Zukouski PBP Publication
3. JavaTM How to Program sixth Edition- By H.M Deitel, P.J. Deitel
4. JAVA 2, J2SE 1.4 Complete, BPB Publication.

Course Outcomes

At the end of the course, the student will be able to:

CO1:Develop Swing-based GUI.

CO2: Develop client/server applications and TCP/IP socket programming

CO3: Update and retrieve the data from the databases using SQL

CO4: Develop component-based Java software using JavaBeans.

CO5: Develop server side programs in the form of servlets.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L6	H	H	H	H	M	-	-	M	M	H	-	M	H	L
CO2	L5,L6	H	H	H	H	M	-	-	H	L	H	-	M	M	M
CO3	L4	H	M	M	M	L	-	-	M	M	H	-	L	M	L
CO4	L6	M	H	H	H	H	-	-	H	H	M	-	H	H	L
CO5	L6	H	M	H	H	H	-	-	M	L	H	-	H	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 505 - Computer Graphics

Course Objective:

- Understand contemporary graphics principles and graphics hardware.
- Have a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
- Have thorough introduction to computer graphics techniques, focusing on 3D modeling, image synthesis, and rendering.

UNIT I Introduction to Raster scan displays, Storage tube displays, refreshing, flicking, interlacing, color monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball , tablets and joysticks, graphical input techniques, positioning techniques ,rubber band techniques, dragging etc.

UNIT II can conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Beizier Method, B-sp-line Method.

UNIT III 2D & 3D Co-ordinate system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite, transformation, world coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen.

UNIT IV Algorithms: Point Clipping. Line Clipping Algorithms, Polygon Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading ray tracing, color models like RGB, YIQ, CMY, HSV etc.

UNIT V Multimedia components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation tools, Authoring tools, presentation.

Text Books/Reference Books

1. Foley et.al, Computer Graphics Principles & Practice, Addision , 1999
2. David F.Rogers, Procedural Elements for Computer Graphics, McGraw Hill Book Company
3. D.Heam and P.Baker, Computer Graphics, Prentice Hall 1986
4. R.Plastock and G.Kalley, Theory and Problems of Computer Graphics, Schaum's Series., McGraw Hill.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Demonstrate an understanding of contemporary graphics hardware.

CO2: Create interactive graphics applications in C++ using one or more graphics.

CO3: Create interactive graphics applications in C++ using one or more graphicsapplication programming interfaces.

CO4: Write program functions to implement graphics primitives.

CO5: Write programs that demonstrate geometrical transformations.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L3	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L6	M	M	M	H	L	-	-	-	L	M	-	M	M	M
CO3	L6	H	L	L	M	L	-	-	-	M	H	L	H	M	L
CO4	L6	M	H	H	H	M	-	-	-	L	M	-	M	H	M
CO5	L6	H	M	M	H	-	-	-	-	L	H	L	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 506 - E-Commerce

Course Objective:

- Define e-commerce and compare and contrast it from e-business.
- Identify some business applications of e-commerce, identify, define and differentiate the various forms of e-commerce.
- Recognize the business impact and potential of e-Commerce.

Unit I Introduction to E-Commerce: The Scope of Electronic Commerce, Definition of Electronic Commerce, Electronic Commerce and the Trade Cycle, Electronic Markets, Electronic Data Interchange, Internet Commerce, E-Commerce in Perspective.

Business Strategy in an Electronic Age: Supply Chains, Porter's Value Chain Model, Inter Organizational Value Chains, Competitive Strategy, Porter's Model, First Mover Advantage, Sustainable Competitive Advantage, Competitive Advantage using E-Commerce, Business Strategy, Introduction to Business Strategy, Strategic Implications of IT, Technology, Business Environment, Business Capability, Existing Business Strategy, Strategy Formulation & Implementation Planning, E-Commerce Implementation, E-Commerce Evaluation.

Unit II Business-to-Business Electronic Commerce: Characteristics of B2B EC, Models of B2B EC, Procurement Management Using the Buyer's Internal Marketplace, Supplier-Oriented Marketplace, Intermediary-Oriented Marketplace, Just-in-Time Delivery, Other B2B Models, Auctions and Services from Traditional to Internet-Based EDI, Integration with Back-end Information Systems, The Role of Software Agents for B2B EC, Electronic Marketing in B2B, Solutions of B2B EC, Managerial Issues, Electronic Data Interchange (EDI), EDI: The Nuts and Bolts, EDI & Business.

Unit III Intranet and Extranet: Automotive Network Exchange, The Largest Extranet, Architecture of the Internet, Intranet, and Extranet, Intranet Software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment, The Extranets, The Structure of Extranets, Extranet Products & Services, Applications of Extranets, Business Models of Extranet Applications, Managerial Issues.

Unit IV Electronic Payment Systems: Is SET a Failure, Electronic Payments & Protocols, Security Schemes in Electronic Payment Systems, Electronic Credit Card System on the Internet, Electronic Fund Transfer and Debit Cards on the Internet, Stored-Valued Cards and E-Cash, Electronic Check Systems, Prospect of Electronic Payment Systems, Managerial Issues.

Public Policy: From Legal Issues to Privacy: EC-Related Legal Incidents, Legal, Ethical & Other Public Policy Issues, Protecting Privacy, Protecting Intellectual Property, Free Speech, Internet Indecency & Censorship, Taxation & Encryption Policies, Other Legal Issues: Contracts, Gambling & More, Consumer & Seller Protection in EC.

Unit V Internet Protocols, Web-Based client/ Server, Internet Security, Selling on the Web, chatting on the Web, Multimedia delivery, Analyzing Web Visits, Managerial issues.

Economics, Global & Other Issues in EC: Competition in Market space, Some Issues in Digital Economy and Success Factors, Impacts on Industry Structure, Intermediaries, and Others, virtual Communities, Global Electronic Commerce, Electronic Commerce in Small

companies, Research in EC, The Future of EC

Text Books/ Reference Books

1. David Whiteley, "E-Commerce", Tata McGraw Hill, 2000 Eframi Turban, Jae Lee, David King, K. Michale Chung, "Electronic Commerce", Pearson Education, 2000

Course Outcomes

At the end of the course, the student will be able to:

CO1: Have knowledge of e-commerce, its components, structure of e-banking, rules and regulations on e-commerce.

CO2: Acquire a good knowledge of e-commerce, both the technical and business aspects;

CO3: Understand the principles and practices of e-commerce and its related technologies;

CO4: Discuss the trends in e-Commerce and the use of the Internet.

CO5: Explain the economic consequences of e-Commerce.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L1,L 2	M	L	L	L	-	-	-	-	-	M	-	-	M	M
CO2	L2	M	L	L	M	-	-	-	-	-	M	-	L	M	L
CO3	L2	H	L	L	M	-	-	-	-	-	H	-	-	H	M
CO4	L2	M	M	M	H	-	-	-	-	-	M	-	M	H	L
CO5	L2	H	L	L	M	-	-	-	-	-	H	-	L	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 507 - Advance Internet Programming Lab

Course Objectives:

- To design and deploy web application using servlets.
- To design and deploy web application using JSPs.
- To design and deploy web application using Ajax.

List of Experiments

1. Web page creation using HTML
    i) To embed an image map in a web page
    ii) To fix the hot spots
    iii) Show all the related information when the hot spots are clicked.
2. Web page creation with all types of Cascading style sheets
3. Client side scripts for validating web form controls using DHTML
4. Java programs to create applets
    i) Create a color palette with matrix of buttons
    ii) Set background and foreground of the control text area by selecting a color from color palette.
    iii) In order to select foreground or background use check box control as radio but-tons.
    iv) To set background images.
5. Programs in java using servlets
6. Programs in java to create three-tier applications using JSP and Databases
    i) for conducting online examination
    ii) for displaying students mark list.
7. Programs using XML-schema-XSLT/XSL
8. Programs using AJAX
9. Implementation of web services and databases.

Course Outcomes:

At the end of the course, the student will be able to:

CO1. Design and deploy web application using servlets.
CO2. Design and deploy web application using JSPs.
CO3. Design and deploy web application using Ajax.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L6	M	M	M	H	H	-	-	M	L	M	H	L	H	L
CO2	L6	M	H	H	H	H	-	-	M	L	M	M	M	M	M
CO3	L6	H	M	M	H	H	-	-	H	M	H	H	H	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 508 - Advance Java Lab

Course Objective:

- Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
- Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
- Design and develop Web applications
- Designing Enterprise based applications by encapsulating an application's business logic.
- Designing applications using pre-built frameworks.

List of Experiments

1. Write a program to show How Exception Handling is in JAVA
2. Write a program to show Inheritance
3. Write a program to show Polymorphism
4. Write a program to show Interfacing between two classes
5. Write a program to Add a Class to a Package
6. Write a program to demonstrate AWT.
7. Write a program to Hide a Class
8. Write a program to implement String Operation
9. Write a program to show "HELLO JAVA " in Explorer using Applet
10. Write a Program to calculate mathematical operation using JSP
11. Write a program to demonstrate multithreading using Java.
12. Write a program to demonstrate applet life cycle.

Course Outcomes:

At the end of the course, the student will be able to:

CO1. Learn the Internet Programming, using Java Applets

CO2. Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings

CO3. Apply event handling on AWT and Swing components.

CO4. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).

CO5. Create dynamic web pages, using Servlets and JSP.

CO6. Make a resusable software component, using Java Bean.

CO7. Invoke the remote methods in an application using Remote Method Invocation (RMI)

CO8. Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	P01 1	PO1 2	PSO 1	PSO 2
CO1	L1	H	L	L	M	-	-	-	-	-	H	-	H	M	L
CO2	L6	M	H	H	H	H	-	-	L	M	M	-	M	M	M
CO3	L3	H	L	L	M	-	-	-	-	-	H	-	H	L	M
CO4	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO5	L6	H	M	M	M	H	-	-	M	L	H	-	H	H	M
CO6	L6	M	H	H	H	H	-	-	M	H	M	-	M	H	M
CO7	L6	H	H	H	H	M	-	-	H	H	H	-	H	M	L
CO8	L2	M	L	L	M	-	-	-	-	-	M	-	M	M	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 509 - Summer Project Seminar

Course Objectives:

- To create a communication style for individual & team building.
- To Use values in improving one's own professionalism.
- To develop the higher cognitive abilities that is analysis, synthesis and evaluation.
- To Ability to identify, formulate and present model problems.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Personalize and create a communication style for individual & team building.

CO2: Use values in improving one's own professionalism

CO3: Develop the higher cognitive abilities that are analysis, synthesis and evaluation.

CO4: Ability to identify, formulate and present model problems.

Table: Mapping of Course Outcomes with Program Outcomes

Course Outcome	Bloom Level	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	P01 1	PO 12	PS O1	PS O2
CO1	L2	M	H	L	H	L	-	-	-	-	L	-	L	M	M
CO2	L3	M	L	H	H	L	-	-	-	-	L	-	M	H	M
CO3	L6	M	H	M	M	L	-	-	-	-	L	-	M	M	M
CO4	L2	M	M	M	M	L	-	-	-	-	M	-	L	M	H

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 510 - Industrial Visit

BCA- VI SEMESTER

BCA 601 - Advance Computer Networks

Course Objectives:

- The course isaimed at providing basic understanding of Computer networks starting with OSI Reference Model, Protocols at different layers with special emphasis on IP, TCP & UDP and Routing algorithms.
- Some of the major topics which areincludedin this course areCSMA/CD, TCP/IP implementation, LANs/WANs, internetworking technologies,Routing and Addressing.
- Provide the mathematical background of routing protocols.
- Aim of this course is to develop some familiarity with current research problems and research methods in advance computer networks

UNIT – I Foundation: Building a Network, Getting Connected: encoding, links, framing error detection, Reliable transmission, Ethernet &MAC.Internetworking: Switching & Bridging, Basic Internetworking, Routing, Implementation,Performance.

UNIT – II Advance Internetworking: The global Internet, Multicast, MPLS, and Routing among mobile Devices.End to End Protocols: Simple Demultiplexer, Reliable Byte Stream (TCP), RPC, RTP

UNIT – III Congestion Control & Resource Allocation: Issues, Queuing Disciplines, TCP Congestion Control Avoidance mechanisms.

UNIT – IV Quality of Service. Multimedia Networking: MultimediaNetworking applications, RTSP, RTCP, SIP, H.323.And discussion of Various RFC of SIP 3261.

UNIT – IV Network Security: Cryptographic Building Blocks, Symmetric Key Encryption, Public Key Encryption, authentication protocols, PGP, TLS, SSL, Firewalls, Intrusion Detection

Text Books/ Reference Books

1. Computer Networks, Fifth Edition: A Systems Approach (The Morgan Kauf Man Series).
2. Computer Networking: A Top Down Approach (Fifth Edition), James F. Kurose.
3. W. Stallings, Networks Security Essentials: Application & Standards, Pearson

Course Outcomes

At the end of the course, the student will be able to:

CO1: Illustrate reference models with layers, protocols and interfaces.&Summarizefunctionalities of different Layers.

CO2: Combine and distinguishfunctionalities of different Layers

CO3: DescribeandAnalysisofbasic protocols of computer networks, and how they can be used to assist in network design and implementation

CO4: Identify and describedevelopment history of routing protocols

CO5: Describe Sub-netting and Addressing of IP V4.LT

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L3	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L2,L3	M	M	M	H	-	-	-	-	-	M	-	M	M	M
CO3	L2	H	M	M	M	-	-	-	-	-	H	-	H	M	M
CO4	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO5	L2	H	L	L	M	-	-	-	-	-	H	-	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 602 - Management Information System

Course Objectives:

- Get the knowledge about the important management concepts & their application, to have an insight of various functional departments in an organization.
- Discuss the importance of security, privacy, and ethical issues as they relate to information systems.
- Identify some of the strategies employed to lower costs and improve service.

UNIT – I **Basics of MIS:** Introduction, Structure of MIS, Purpose, Objectives, Benefits, Limitations, Requirements, Characteristics, Role of MIS in Organizations, Nature and Scope, Foundation of IS- IS classification, General Support System, Information system for decision making , The role of system analyst , Data base management system.

UNIT – II **System Study:** SDLC, System Designing models, System Analysis Tools : DFD. Decision Trees, Decision Tables, Structured English, Data Dictionary along with its Pros and Cons.

UNIT – III **Trends and applications of IS:** Information Concepts:- Types, Information Quality, Dimensions of Information.System Concepts- Kinds of System, System Related Concepts.
Information Technology, a Managers overview, managerial overview of Computer hardware & software, Telecommunication, Database management.

UNIT – IV **IS for Business Applications:** Business application of Information Technology, internet & electronic commerce, intranet, extranet & Information system for managerial decision support system and Types of Decisions in Organization, information system for strategic advantage.

UNIT – V **Advanced Concepts of IS:** Enterprise Resource planning, Supply chain management, Customer Relationship Management (CRM), Procurement Management System, Implementation Process, System Maintenance and System Evaluation, IS Security and Ethical responsibility

Text books/reference books:

1. Brian, "Management Information System", TMH.
2. Alter, "Information Systems: A Management Perspective" Addison Wesley
3. Jawadegar, "Management Information System", TMH.
4. Bansal, "Information System Analysis & Design", TMH.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the usage of MIS in organizations and theconstituents of the MIS.

CO2: Understand the classifications of MIS, understanding of functionalMIS and the different functionalities of these MIS. This would be followed by case studyon Knowledge management.

CO3: This module lead to linking MIS to business strategy and the areas in which MIS wouldlead to strategic advantage. This would be followed by case study and guest lecture.

CO4: Learns the functions and issues at each stage of system development. Furtherdifferent ways in which systems can be developed are also learnt.

CO5: Provides understanding about emerging MIS technologies like ERP, CRM,SCM and trends in enterprise applications.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L2	M	M	M	H	-	-	-	-	-	M	-	M	M	M
CO3	L4	H	M	M	M	-	-	-	-	L	H	-	H	M	M
CO4	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO5	L4	H	M	M	H	-	-	-	-	M	H	-	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 603 - Artificial Intelligence

Course Objective:

- To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements.
- To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems.
- To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
- To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. That plays an important role in AI programs.
- To introduce advanced topics of AI such as planning, Bayes networks, natural language processing and Cognitive Computing.

UNIT – I Introduction to AI, AI Applications. AI techniques, Criteria for success. Problems solving in AI.Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem.

UNIT – II Heuristic search techniques: Generate and test, hill climbing, best first search technique. A* Algorithm, AO* Algorithm.

UNIT – III Knowledge representation: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation.Using Predicate and Propositional Logics: Representing Simple Facts in logic, representing instances and is a relationship.

UNIT – IV Learning: Introduction learning, Rote learning, learning by taking advice, learning in problem solving, learning from example-induction, Explanation based learning. Expert System: Introduction, Expert system shells, Example of Expert System.

UNIT – V Introduction to NLP, Steps of NLP, LISP and other AI Programming Language.

Text books/reference books:

1. Rich. E and Knight .K, "Artificial intelligence", TMH, 2nd ed., 1999.
2. Patterson . D.W., "Introduction to AI and Expert Systems", PHI, 1999
3. Nilsson . Nils J ,"Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.
4. Charnaik . E and McDermott . D., "Introduction to artificial Intelligence",Addison-Wesley Publishing Company.

Course Outcomes

At the end of the course, the student will be able to:

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

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

CO3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing

CO4: Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.

CO5: Formulate and solve problems with uncertain information using Bayesian approaches.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L3	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L4	M	M	M	H	-	-	-	-	-	M	-	M	M	M
CO3	L6	H	M	M	H	M	-	-	M	M	H	-	H	H	M
CO4	L2	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO5	L6	H	M	M	H	M	-	-	L	M	H	-	H	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 604A - .Net Programming

Course Objective:

- Get the Knowledge about different Object Oriented Features and to understand disconnected architecture of .Net.
- To acquire knowledge on the usage of recent platforms in developing web applications.
- Learn Visual Basic .NET to create graphical user interface applications.

UNIT – I An overview of the .NET framework ,.Net Architecture,components of Framework: (CLR), CTS, CLS, the .NET Framework class library (FCL), Know the role of the Common Intermediate Language (CIL), Platform independent .NET., Languages supported by .NET will also be discussed. An introduction to Visual Studio .NET. , Namespaces

UNIT – II What is C#, why C#, characteristics of C#, rules for writing, declaration and initializing variables, scope of the variables, converting variable types. , Statements and Expressions ,Operators, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations. C# - Types , Reference Types ,Value Types ,Boxing ,

UNIT – III Classes and Objects: Constructors .Reference Types ,Object Oriented Programming Access Modifiers,, Inheritance, operator overloading, function overloading,method overriding, constructor invocation in inheritance, Polymorphism, sealed class, sealed method, virtual method,Abstract class and method,Interfaces, Parameter passing making, nullable types, contatntdata,readonly fields, static constructor,static class, method and properties in class.

UNIT – IV Errors and Exceptions.:Handling errors and throwing exceptions The Root object class. DateTime and Time Span Class,overriding object class method, Delegates, Events, System.collection, System.I.O namespace.:DirectoryInfoClass, FileInfo Class, streams

UNIT – V Application Development on .NET: Building Windows Applications,Introduction to ADO.Net Connected Architecture , Disconnected Architecture , Windows Form :Introduction to Windows Form ,Form Controls ,User Define Controls ,Accessing Data with ADO.NET. Updating retrieving and deleting data using LINQ to SQL

Text books/ reference books:

1. C# 4.0 in Nut shell by O' Reilly
2. Beginning Visual C# by Rocks Publicatio

Course Outcomes

At the end of the course, the student will be able to:

CO1: Contrast and compare major elements of the .NET Framework and explain how C# fitsinto the .NET platform.

CO2: Analyze the basic structure of a C# application and be able to document, debug, compile,and run a simple application.

CO3: Create methods (functions and subroutines) that can return values and take parameters.

CO4: Demonstrate use of common objects and reference types.

CO5: Demonstrate ability to create a C# Windows and web application using Visual Studio.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2,L6	H	H	H	H	M	-	-	H	-	H	-	H	M	L
CO2	L4	M	M	M	M	-	-	-	-	-	M	-	M	M	M
CO3	L6	L	H	H	H	H	-	-	M	-	L	-	L	H	L
CO4	L3	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO5	L3,L6	M	H	H	H	M	-	-	M	-	M	-	M	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 604B - Fundamental of PHP

Course Objective:

- Understand the basics of the PHP.
- Examine how web pages are developed using PHP.
- Learn certain specific PHP variables and syntax.

UNIT I Introduction of web applications.Introduction to web designing with HTML and Cascaded Style Sheets. Concept of Client Side Scripting and Server Side Scripting. Static website vs Dynamic website development. Web Servers: Local Servers and Remote Servers.

UNIT II Introduction to PHP, Installing Web servers, PHP configuration in IIS &Apache Web server. Data types in PHP, Variables, Constants, operators and Expressions. PHP Operator: Conditional Structure - if, switch case & Looping Structure - for, while, do while, foreach

UNIT III Introduction to Arrays: Initialization of an array, Iterating through an array, Sorting arrays, Array Functions, Functions: Defining and Calling Functions, Passing by Value and passing By references, Inbuilt Functions: String Function, Math Function, Date Function and Miscellaneous Function.

UNIT IV Working with Forms: Get and Post Methods, Query strings, HTML form controls and PHP, Maintaining User State: Cookies, Sessions and Application State. Working with Files: Opening and Closing Files, Reading and Writing to Files, Getting Information on Files

UNIT V PHP Database Connectivity: Introduction to MYSQL, Creating database and other operations on database, connecting to a database, Use a particular database, Sending query to database, Parsing of the query results, Checking data errors.

Text/ Reference Books:

1. Steven Holzner " PHP: The Complete Reference"
2. Tim Converse, Joyce Park "PHP Bible", 2nd Edition
3. Dave W. Mercer, Allan Kent, Steven D. Nowicki, David Mercer, Dan Squier, Wankyu Choi with HeowEide-Goodman, Ed Lecky-Thompson, Clark Morgan "Beginning PHP5"

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand process of executing a PHP-based script on a webserver.

CO2: Develop a form containing several fields and be able to process the dataprovided on the form by a user in a PHP-based script.

CO3: Understand basic PHP syntax for variable use, and standard language constructs, such asconditionals and loops.

CO4: Understand the syntax and use of PHP object-oriented classes.

CO5: Understand the syntax and functions available to deal with file processing for files on theserver as well as processing web URLs.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	H	L	L	M	-	-	-	-	-	H	-	L	H	L
CO2	L6	M	H	H	H	M	-	-	-	M	M	H	H	M	M
CO3	L2	L	L	L	M	-	-	-	-	-	L	-	L	M	M
CO4	L1,L2	M	L	L	L	-	-	-	-	L	M	-	M	H	L
CO5	L2.L3	M	M	M	H	M	-	-	-	L	M	-	L	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 604C - Principles of Accounting

Course Objectives:

- To understand the concept and role of accounting in financial reporting in modern economy
- To develop the understanding of basic accounting concepts and techniques of and accounting system. Principles and procedures underlying the accounting process
- To provide an understanding, importance of accounting; preparation of final accounts for profit making organization
- To identify errors in the preparation of accounts.
- To use various software in preparation of Accounts.

Unit1 I Accounting: Definition, Need for Accounting, Learning Objectives, Functions of Accounting, **Basic Components of Financial Statements-**Account classes, Account groups, Accounts, Subsidiary accounts, Basic accounting equation.

Unit II Branches of Accounting-Financial Accounting, Cost Accounting and Management Accounting. Systems of Book Keeping, Journal, Rules of Debit and Credit, Journal Entries, Ledger Posting, Trial Balance, Revenue & Capital Expenditure, Cash Book and other Subsidiary Books.

Unit-III Journalizing Transactions Related to Expenses- Cost accounting accounts, Cost accounting records, Transferring cost accounting records to financial accounting by using transfer accounts.

Unit-IV Rectification of Errors, Depreciation Accounting, Preparation of Final Accounts with and without adjustment including Manufacturing Accounts.

Unit-V Computer Accounting: Accounting Package, Tally Micro Studies. Bank Reconciliation Statement: Advantages of Keeping Bank Account Cause of Difference, Meaning and Objective of Reconciliation, Technique for Preparation.

Text books/ reference books:

1. Grewal . T.S ; Double Entry Keeping ; 21st Edition ; Sultan chand Publications ; 2006
2. Tulsian .P.C ; Financial Accounting ; Pearson Education.
3. Sharma &Bhardwaj; Book keeping & Accounting, RBD; Jaipur.
4. Sharma, Shah &Agarwal; Financial Accounting, Shiv Book Depo; Jaipur.
5. Agarwal, Shah, Goyal& Sharma; Fundamentals of Accounting, Vol. I, NBH; New Delhi.
6. Maheshwari S.N & S.K. Maheshwari ; An Introduction to Accountancy ; Eighth Edition ; Vikas Publishing Company 2003.
7. Monga J.R ; Girishahuja ; Financial Accounting ; Eighteenth edition ; Mayoor Paper Backs ; 2003

Course Outcomes:

After the completion of this course, students will be able to:

CO1. Demonstrate the role of accounting in business in economic world.

CO2. Explain the principles of accounting and book keeping

CO3. Apply accounting rules in determining financial results and preparation of financial statement.

CO4. Rectify errors caused during preparation of Final accounts.

CO5. Use software in preparation of Financial Statements.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L3	M	L	L	M	-	-	-	-	-	M	-	M	H	L
CO2	L2	L	L	L	M	-	-	-	-	-	L	-	L	M	L
CO3	L3	L	L	L	L	-	-	-	-	M	L	-	L	M	M
CO4	L4	M	M	M	M	-	-	-	-	-	M	-	M	H	L
CO5	L2,L3	H	L	L	M	-	-	-	-	L	H	-	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 604D - Intellectual Property Rights

Course Objectives:

- To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.
- To disseminate knowledge on patents, patent regime in India and abroad and registration aspects
- To disseminate knowledge on copyrights and its related rights and registration aspects
- To disseminate knowledge on trademarksand registration aspects
- To disseminate knowledge on Design, Geographical Indication (GI), Plant Variety and Layout Design Protection and their registration aspects
- Toaware about current trends in IPR and Govt. steps in fostering IPR

Unit1 I Copyright-I

a. Nature and Meaning
b. Scope of protection

Unit II Copyright-II

a. Procedure for protection
b. Enforcement and Remedies

Unit-III Patents

a. Nature and Meaning
b. Scope of protection
c. Procedure for protection
d. Enforcement and Remedies

Unit-IV Trademarks

a. Nature and Meaning
b. Scope of protection
c. Procedure for protection
d. Enforcement and Remedies

Unit-V Designs

a. Nature and Meaning
b. Scope of protection
c. Procedure for protection
d. Enforcement and Remedies

Suggested Readings:

1. R. Anita Rao&BhanojiRao: Intellectual Property A Primer
2. Nair and Kumar: Intellectual Property Rights (N. Delhi: Allied, 1994);
3. Narayanan, P.: Patent Law (Kolkata: Eastern Law House, 998)
4. N.S. GopalKrishman& T.G. Agitha: Principal of Intellectual Property
5. Cornish, W. R. :*Intellectual Property* (London: Sweet & Maxwell, 1996);
6. Robert A. Gorman and Jane C. Ginsburg: Copyright: Cases and Materials (New York: Foundation Press, 2002).

7. Stewart, S.M.: International Copyright and Neighbouring Rights (London: Butterworth's, 1983) Recommended Cases:

Course Outcomes

At the end of the course, the student will be able to:

CO1. The students once they complete their academic projects, shallget an adequate knowledge on patent and copyright for their innovative research works

CO2. During their research career, information in patent documents provide useful insight on novelty of their idea from state-of-the art search. This provide further way for developing their ideaor innovations

CO3. Pave the way for the students to catch up Intellectual Property(IP) as an career option R&D IP Counsel, Government Jobs –Patent Examiner, Private Jobs, Patent agentand Trademark agent, Entrepreneur

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	H	L	L	M	-	-	-	M	M	H	-	M	H	L
CO2	L2,L5	H	M	M	H	-	-	-	L	-	H	-	L	M	M
CO3	L4,L5	H	M	M	M	-	-	L	M	L	H	-	M	M	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 605A - Social Implications of IT

Course Objective:

- Acquaint student with contemporary and possible future moral problems that arise due to Computerization.
- Give a deeper understanding of nature of moral choices.
- Help to understand social, economic, legal and cognitive effects of technology.
- To identify ethical conflicts and think through the implications of possible solutions to Ethical conflicts

UNIT-I Introduction: Importance of social dimensions of science and technology, concept of demystification, definition of the term IT, Its advantages and disadvantages, trends in IT, IT and quality of life.

UNIT-II Future trends of IT: AI, Robots, Neural Networks, Fuzzy logic, Virtual Reality, Developments in hardware and software, economic role of IT (Banking and Finance, Stock market), IT and Manufacturing, IT in Retail Marketing, Presentation on future trends.

UNIT-III Social and Technical choice reshaping the people, concept of digital factors affecting nature, initiative to bridge digital divide, debate on digital divide.

UNIT-IV IT in office automation, concept of Intelligent house hold, IT role in learning and education, focus on alternative ways in which IT professionals, IT and home automation.

UNIT-V Privacy and surveillance in everyday life, impact of IT on culture, ethical issue of IT, concept of software piracy.

Text Books/Reference Books

1. Dutton, W.H. "Society on the line: Information politics in digital age" , Oxford University Press, 1999.
2. Castell M., " The Internet Galaxy" Oxford University Press,
3. Teich, A.H., "Technology and the future", 8th edition, Network St. Martin Press.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the consequences of ignoring and non-compliance with ethical imperatives.

CO2: Learn about the best ethical practices and models.

CO3: Develop a sound methodology in resolving ethical conflicts and crisis.

CO4: Learn about the issues directly related to information technology environment and professionals.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	L	L	L	M	-	-	-	M	M	M	-	M	H	L
CO2	L1,L2	M	L	L	M	-	-	-	L	-	M	-	M	M	M
CO3	L6	H	H	H	H	-	-	-	M	L	H	M	H	M	L
CO4	L2	L	L	L	M	-	-	-	L	L	H	L	H	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 605B - Mobile Computing

Course Objectives:

- To understand the various terminology, principles, devices, schemes, concepts,generations, and different methodologies used in Mobile and Wireless CommunicationNetworks.
- To introduce the student to the major concepts involved in Wireless LAN (IEEE 802.11),and Bluetooth.
- To study the operation of basic cellular system and performance criterion, handoffmechanism, etc.
- To expose students to emerging technologies and their potential impact.

UNIT – I Introduction: Applications, A short history of wireless communications, a market for mobile communications, some open research topics, a simplified reference model.

UNIT – II Wireless transmission: Frequency for radio transmission, signals, Antennas, Signal propagation, multiplexing, modulation, cellular systems.

UNIT – III` GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT – IV (Wireless) Medium Access Control : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT – V Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Text Books/Reference Books

1. JochenSchiller,“MobileCommunications”,Addison-Wesley. (Chapters 4,7,9,10,11),second edition, 2004.
2. Stojmenovic and Cacute, “Handbook of Wireless Networks and Mobile Computing”, Wiley, 2002, ISBN 0471419028. (Chapters 11, 15, 17, 26 and 27)
3. T. Rappaport, "Wireless Communication: Principles and Practice", Pearson Education.
4. Mobile computing,RajKamal,Oxford University press.
5. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden ,Schwiebert, Loren, “Fundamentals of Mobile and Pervasive Computing”, ISBN: 0071412379, McGraw-Hill Professional, 2005.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understanding of different generations, terminologies, systems, operations anddesign of wireless and mobile communications.

CO2: Acquire sufficient knowledge about IEEE 802.11 and Bluetooth standards.

CO3: Appreciate the contribution of Mobile and Wireless Communication networks to overall technological growth

CO4: Understand the concepts and technology involved in 3G, 4G and 5G Networks

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	L	L	L	L	-	-	-	L	-	L	-	L	M	L
CO2	L1,L2	M	M	M	M	M	-	-	-	-	M	-	M	M	M
CO3	L2	M	L	L	M	L	-	-	-	-	M	-	M	H	L
CO4	L2	M	L	L	L	M	-	-	L	-	M	-	M	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 605C - Cyber Ethics & Crime

Course Objective:

- To understand the basics of cyber law, its related issues and ethical laws of computer for different countries.
- To examine how the online digital world has been inflicted with new cybercrimes, implications for society and law enforcement response and investigating how the computer and electronic devices have become both a target of attack and a tool for criminal activity

Unit I Introduction to Cyber Law Evolution of Computer Technology, emergence of Cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, Cyberspace- Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access.

Unit II Information technology Act Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

Unit III Cyber law and related Legislation Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

Unit IV Electronic Business and legal issues: Evolution and development in E-commerce, paper vs paper less contracts E-Commerce models- B2B, B2C,E security.

Unit V Application area: business, taxation, electronic payments, supply chain, EDI, E-markets Emerging Trends.

Text Books/ Reference Books

1. Cyber Laws: Intellectual property & E Commerce, Security- Kumar K, dominant Publisher.
2. Information Security policy &implementation Issues, NIIT, PHI.
3. Cyber CRIME notorious Aspects of the Humans & net Criminals activity in Cyber World
4. Barna Y Dayal D P Dominant Publisher.
5. Cyber Crime Impact in the new millennium, Marine R.C. Auther press
6. Spam Attack, Cyber Stalking & abuse, Barna Y, Dayal D P Dominant publisher

7. Frauds & Financial criouses in Cyber space, Barna Y, Dayal D P , Dominant publisher
8. Information Security , NIIT: PHI

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the consequences of ignoring and non-compliance with ethical imperatives.

CO2: Learn about the best ethical practices and models.

CO3: Develop a sound methodology in resolving ethical conflicts and crisis.

CO4: Learn about the issues directly related to information technology environment and professionals.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	M	L	L	L	-	-	-	M	M	M	-	M	M	L
CO2	L1,L2	L	L	L	M	-	-	-	L	-	L	-	L	M	M
CO3	L6	H	H	H	H	M	-	-	M	L	H	-	H	H	L
CO4	L2	M	L	L	M	M	-	-	L	-	M	-	M	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 605D - Entrepreneurship

Course Objectives:

- To simulate the real life activities of entrepreneurs in the startup age of a new venture.
- To provide the skills to start and build enterprise, implement it successfully
- To inculcate skills to manage the transition of a start up to a full-fledged business entity.

UNIT – I Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies.Entrepreneurial growth and development.

UNIT – II Creativity and Innovation: Creativity and Innovation: Concepts Shifting Composition of the Economy Purposeful Innovation & the 7 Sources of Innovative Opportunity The Innovation Process.

Innovative Strategies : Strategies that aim at introducing an innovation. Innovation &entrepreneurship: Can they work together? Planning-incompatible with Innovation &entrepreneurship.

UNIT – III Entrepreneurial Motivation: Need for continuous learning & relearning Acquiring Technological Innovation Entrepreneurial motivation (nAch story) Achievement Motivation in Real life. Case Study.

UNIT – IV International Entrepreneurship: Concepts and Nature of International Entrepreneurship.The changing International environment. Ethics and International Entrepreneurship.Strategic Issues in International Entrepreneurship.

UNIT – V Problem Identification and Problem Solving: Problem Identification. Problem solving.Innovation and Diversification

Course Outcome:

After completion of this course, students will be able to:

CO1. Examine the characteristics of an entrepreneur as well their role in the economic development of the country.
CO2. Process & develop business plan , foreseeing the entry barriers to the industry
CO3. Identify stages of growth in entrepreneurial ventures along with changing face of family business in India

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	L2	L	L	L	L	-	-	-	M	M	L	-	L	M	M
CO2	L3,L6	M	M	M	H	-	-	-	L	L	M	-	M	M	L
CO3	L2	L	L	L	M	-	-	-	M	L	L	-	L	H	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 606 - .Net Lab

Course Objectives:

- To learn programming in C# and dot NET framework.
- To develop web applications using C# and dot NET framework.

List of Experiments :-.Net Lab

Q.1 Write a C# Program to Get a Number and Display the Number with its Reverse

Q.2 Write C# Program Counts number of Vowels and consonants from a given String.

Q.3 Write a C# Program Demonstrates Jagged Arrays.

Q.4 Write a Program in C# to multiply two matrices of size 3*3.

Q.5 Write a Program to implement Add, Less and multiply operation for Money, design Money class.

Q.6 Write a program in C# to implement operator over loading to overload;- '+' , '-' , '*' and / operators.

Q.7. C# Program Demonstrates Properties of the Class. Here it demonstrates how properties are declared and used.

Q.8 Write a C# program to keep records and perform statistical analysis for a class of 20 students. The information of each student contains ID, Name, Sex, quizzes Scores (2 quizzes per semester), mid-term score, final score, and total score. The program will prompt the user to choose the operation of records from a menu

Q.9 Write a program to implement constructor invocation in multilevel inheritance.

Q.10 Write a C# Program Demonstrates IndexOutOfRange Exception.

Q.11 Write a program to implement delegates with multicasting for three methods of arithmetic operation i.e. sum, divide and multiplication of tow integers.

Q.12 Write a program to create a data file that contains roll no, Name and marks of student. The program should read values until -1 is entered as a roll no. And then write code to read and display contents of student data.

Q.13 Write a program to store name of product with price and display them using SortedList.

Q.14. Write a program to implement abstract class and inheritance.

Q.15 Write a GUI program to create a simple Text Editor. Your editor has the following basic functions:

-A user can choose a file to open

-A user can save the text to the existing file.

-A user can save the text in a new file name.

Q.16 Create a Form that receives the user name, address, date, nationality, country preferred for working and skill sets from the user and stores . The country preferred data should appear in a dropdown list whereas; others should be entered in a textbox. Validate all the controls. The date should appear between "1/1/1900" and "1/1/2090". When submit the

values the whole entries should be displayed on a label and ask for user to confirm by **Write a simple Windows Forms MessageBox statement.**

Q.17 Create a phoneBook application Oledb data provider. The application contain the following feature:

- Add a new record to phone book
- Delete a record
- Update the th number
- Display phone number of a person

Course Outcomes:

After completion of this course student should be able to

CO1. Design console application and windows application.

CO2. Design web application.

CO3: Learn about the issues directly related to information technology environment.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L6	H	H	H	H	M	-	-	M	-	H	-	H	H	L
CO2	L6	M	H	H	H	H	-	-	H	-	H	-	H	M	M
CO3	L2	L	L	L	L	M	-	-	M	-	M	-	M	H	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 606 - PHP Lab

Course Objectives:

- To understand how server-side programming works on the web.
- To learn PHP Basic syntax for variable types and calculations.
- To use PHP built-in functions and creating custom functions.
- To understanding POST and GET in form submission.
- To provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP.

Experiment 1: Design the following static web pages required for online book store.

a) **Home page: -** the static home page must contains three pages
b) **Top: -** logo and college name and links to homepage, login page, registration Page, catalogue page and cart page
c) **Left: -** at least four links for navigation which will display the catalogue of Respective links
d) **Right: -** the pages to links in the left frame must be loaded here initially it Contains the description of the website

Experiment 2: Create registration and cart page in the previous created web site.

Experiment 3: Write a java script to validate the following fields in a registration page

a) userName (should contains alphabets and the length should not be less than 6 characters)
b) userPassword (should not be less than 6 characters)
c) userEmail (should not contain invalid addresses)
d) userCity (should select city from drop down)
e) userGender (Should select gender)

Experiment 4: Implement CSS on the above create WebPages.

Experiment 5: Write an XML file which displays the book details that includes the following:

1) Title of book 2) Author name 3) Edition 4) Price Write a DTD to validate the above XML file and display the details in a table.

Experiment 6: Create a php program to demonstrate the different file handling methods.

Experiment 7: Create a php program to demonstrate the different loops in php.

Experiment 8: Create a php program to demonstrate the different predefined function in array, Math.

Experiment 9: Create a php program to demonstrate the different predefined function in Data & Regular Expression, date.

Experiment 10: Create a HTML form and process the HTML form in PHP.

Experiment 11: Create a php program to connect to MySQL Server.

Experiment 12: Create a php program to execute more SQL queries.

Course Outcomes

At the end of the course, the student will be able to:

CO1: Understand the PHP and scripting.

CO2: Understand Basics of PHP Language .

CO3: Working with Databases and Forms.

CO4: Working with cookies.

CO5: Working on Data and Tables in MYSQL.

Table : Mapping of Course Outcomes with Program Outcomes

Course Outcomes	**Bloom Level**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	P011	PO12	PSO 1	PSO 2
CO1	L2	H	L	L	L	-	-	-	L	-	H	-	H	H	L
CO2	L2	M	L	L	M	M	-	-	L	L	M	-	M	M	M
CO3	L3,L4	L	M	M	M	M	-	-	M	L	L	-	L	H	L
CO4	L3	M	L	L	M	H	-	-	M	M	M	-	M	H	H
CO5	L3	M	M	M	M	M	-	-	H	H	M	-	M	M	L

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 607 - Major Project

Course Objective:

- To introduce the concept and methods required for the construction of large software intensive system.
- To develop a broad understanding of the discipline of software engineering and management of software system.
- To provide an understanding of both theoretical and methodological issues involve in modern software engineering project management and focus strongly on practical techniques.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Capability to acquire and apply fundamental principles of engineering.

CO2: Be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.

CO3: Identify, formulate and model problems and find engineering solution based on a systems approach.

CO4: Capability and enthusiasm for self-improvement through continuous professional development and life-long learning.

Table: Mapping of Course Outcomes with Program Outcomes

Course Outcome	Bloom Level	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	P01 1	PO 12	PS O1	PS O2
CO1	L3	M	M	H	L	M	-	-	-	-	M	-	L	M	M
CO2	L3	M	L	H	L	M	-	-	-	-	L	-	L	M	M
CO3	L3	M	M	H	L	M	-	-	-	-	M	-	L	M	M
CO4	L4	M	M	H	L	M	-	-	-	-	M	-	L	M	M

H- High, M- Moderate, L- Low, '-' for No correlation

BCA 608 – Seminar

Course Objectives:

- To Awareness of how to use values in improving your own professionalism.
- To Learning about personal and communication styles for team building.
- To identify, formulate and present model problems.
- To Learning management of values.

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Capability to acquire and apply fundamental principles of engineering.

CO2: Become master in one's specialized technology

CO3: Become updated with all the latest changes in technological world.

CO4: Ability to identify, formulate and model problems and find engineering solution based on a systems approach.

Table: Mapping of Course Outcomes with Program Outcomes

Course Outcome	Bloom Level	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	P01 1	PO 12	PS O1	PS O2
CO1	L2	M	H	L	H	L	-	-	-	-	L	-	L	M	M
CO2	L3	M	L	H	H	L	-	-	-	-	L	-	M	H	M
CO3	L6	M	H	M	M	L	-	-	-	-	L	-	M	M	M
CO4	L2	M	M	M	M	L	-	-	-	-	M	-	L	M	H

H- High, M- Moderate, L- Low, '-' for No correlation

6. Teaching-Learning Process/ Methodology (TLM):

The teaching-learning process should be aimed at systematic exposition of basic concepts so as to acquire knowledge of physical sciences in a canonical manner. In this context, applications of physical science and linkage with the theory constitute a vital aspect of the teaching-learning process. The course offers many modes of learning and assessment methods. Students have great freedom of choice of course which they can study. The various components of teaching learning process are summarized in the following heads.

1. **Class room Lectures:** The most common method of imparting knowledge is through lectures.There are diverse modes of delivering lectures such as through blackboard, power point presentation and other technology aided means. A judicious mix of these means is a key aspect of teaching-learning process.

2. **Tutorials:** To reinforce learning, to monitor progress, and to provide a regular pattern ofstudy, tutorials are essential requirements. During these tutorials, difficulties faced by the students in understanding the lectures, are dealt with. Tutorials are also aimed at solving problems associated with the concepts discussed during the lectures.

3. **Practical:** To provide scientific visualization and obtaining results of Physical sciences inpractical sessions. These sessions provide vital insights into scientific concepts and drawlearner's attention towards limitations of scientific computations. During practical, scientific models arising in real life problems can also be simulated.

4. **Choice based learning/Open elective:** LOCF in this undergraduate programprovidesgreat flexibility both in terms of variety of courses and range of references in each course.

5. **Field based learning:** Students may enhance their knowledge through field based learningwhile understanding the practical importance.

6. **Textbooks learning:** A large number of books are included in the list of references of eachcourse for enrichment and enhancement of knowledge.

7. **E-learning:** Learner may also access electronic resources and educational websites for betterunderstanding and updating the concepts.

8. **Self-study materials:** Self-study material provided by the teachers is an integral part oflearning. It helps in bridging the gaps in the classroom teaching. It also provides scope for teachers to give additional information beyond classroom learning.

9. **Assignment/Problem solving:** Assignments at regular intervals involving applications oftheory are necessary to assimilate basic concepts of courses. Hence, it is incumbent on the part of a learner to complete open-ended projects assigned by the teacher.

10. **Internships:** The teaching-learning process needs to be further supported by other activitiesdevoted to subject-specific and interdisciplinary skills, summer and winter internships. During these internships it is expected that a learner will interact with experts and write a report on a topic provided to the learner.

11. **Institute visits:** Institute visit by a learner is also a part of learning process. During suchvisits a learner has access to knowledge by attending academic activities such as

seminars, colloquia, library consultation and discussion with faculty members. These activities provide guidance and direction for further study.

12. **Industrial visits:** Industrial visits offer an opportunity to observe applications of scientificconcepts. These visits also give an opportunity to realize the power of mathematical ideas and their translation in problem solving.
13. **Training programs:** Training programs organized by various agencies/institutesprovide an opportunity to learn various dimensions of courses.

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