

SEMESTER-I

Course Name: Fundamentals of Computer Systems

Course Code: BCA001A

L	T/P	Pr	C
4	0		4

Objective: Students would be able to:

1. Know the importance of information systems for business and management.
2. Evaluate the role of the major types of information systems in a business environment and their relationship to each other.
3. Assess the impact of the Internet and Internet technology on business-electronic commerce and electronic business.
4. Identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges.

Unit -I

Introduction: Generation of Computer, Functional components of Computer

Number Systems: Number systems, fixed and floating point representation, addition, subtraction, multiplication and division of fixed point numbers.

Unit-II

Software: System Software, Application Software.

Human Computer Interface: Operating System as User Interface, System Tools, Control Panel settings and Utility Programs

Unit -III

Computer Architecture: Logic Gates, Boolean algebra, Circuits, Decoders, Multiplexers, Registers, Bus System, Instruction cycle, Instruction Format, Addressing Modes.

Unit -IV

Devices: Input and Output Devices.

Memory: Primary Memory, Secondary Memory and Cache Memory.

Unit -V

MS- Office Tools: Introduction to Word Processor, Electronic Spreadsheet, and Presentation tool.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Identify the components of a computer system; demonstrate basic understanding of commonly used applications;
2. Explain the impact of computers on society; explore computer careers; identify fundamental programming structures; and
3. Demonstrate proficiency in basic operating system functions.

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Text Books

1. M. M. Mano, Computer System Architecture, 3rd Edition, Prentice Hall of India, 2008.
2. V Rajaraman, Fundamentals of Computers, Fifth Edition, PHI, 2010.

Reference Books

1. W. Stallings, Computer Organization and Architecture-Designing for Performance, 8th Edition, Pearson Education/PHI, Inc., 2010.
2. J. P. Hayes, Computer Architecture and Organization, 3rd Edition, Tata McGraw-Hill, 2012.
3. P.K. Sinha, PritiSihna , Computers Fundamental, 6th Edition BPB Publication,2011.

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Course Name: Programming Fundamentals Using C-I
Course Code: BCA002A

L	T/P	Pr	C
4	0		4

Objective: Students would be able to:

1. Learn essential knowledge on the need of programming languages and problem solving techniques.
2. Explore major concepts of computer science and the process of computer programming, including programming, procedural and data abstraction and program modularity.
3. Learn effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.
4. Analyze and find the solution of computer specific problems.

Unit –I

Introduction: History of C - Features of C Language - Structure of a C program – Execution of C Program, Compiling, Link and Run a program - Diagrammatic representation of program execution process ,Programming constructs Basic data types, Constants and variables, Control structures in conditionals, Arithmetic and logical expressions.

Unit –II

Looping: Introduction to decision control statements, conditional branching statements, iterative statements, nested loops, break and continue statement, goto statement, pattern printing.

Unit –III

Functions: Introduction using functions, function declaration/function prototype, function definition, function call, return statement ,passing parameters to the function, call by value and call by reference, scope of variables, storage classes, recursive function.

Unit –IV

Arrays: Introduction, declaration of arrays, accessing elements of the array, storing values in arrays, calculating the length of an array, one dimensional array, bound checking of array in C

Unit - V

Strings: Introduction to character array in C, String input and output, String manipulation, Pointers and strings, library functions and user defined functions to compare 2 strings, string length, string reverse, string concatenation.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Exposes details of how the underlying hardware stores data and executes software.
2. Obtain the knowledge about the number systems this will be very useful for bitwise operations.

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3. Understand the basic terminology used in computer programming. Upon successful completion of this course, the student should be able to implement, test, debug, and document programs in C.

Text Books:

1. Ashok N. Kamthane, "Computer Basics and C Programming", Pearson Education.
2. YashwantKanetkar, "Let us C" eighth edition, 2002.
3. E. BalaGuruswamy, "Programming in ANSI C", 2008.

References:

1. HerbertSchildt, "C The Complete Reference" Fourth Edition, 2000.
2. V Rajaraman, "Computer Basics and C Programming", PHI.
3. Kernighan and d. Ritchie, "The ANSI C Programming Language", 2000.
4. StephennPrata, "C Primer Plus" Fourth Edition, 2001.
5. Schaum's Outline Series, "Programming with C", 2nd Edition, 1996.

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Course Name: Digital Electronics

Course Code: BCA015A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objective: Students would be able to:

1. Have a comprehensive introduction to digital logic design leading to the ability to understand number system representations.
2. Know binary codes, binary arithmetic and Boolean algebra, its axioms and theorems, and its relevance to digital logic design.
3. Know about combinational circuits (such as Karnaugh maps), synchronous sequential logic and Asynchronous sequential logic.

Unit I

IC Digital Logic Families - Characteristics of digital IC's, Transistor – Transistor Logic family, Standard TTL characteristics, Other TTL series, Open collector TTL, Wired OR/AND connection, Tristate TTL, Emitter-Coupled Logic family, ECL NOR/OR gate

Unit II

Simplification of Boolean Functions - Using Karnaugh map and Quine-Mccluskey methods, SOP, POS simplification, NAND and NOR implementations, other two-level implementation (AND-OR-INVERT).

Unit III

Combinational Logic Design- Design procedure, Adder: Half adder, Full adder, Serial adder, Parallel adder & Carry look-ahead adder, Subtractors : Half subtractor & Full subtractor, BCD to Excess-3 code convertor, BCD to 7-segment decoder, Parity generator and checker .

Unit IV

Combinational Logic Design using MSI Circuits - Application of typical IC's like 4-bit parallel adder (ex : 7483), Encoders (ex : 74148), Multiplexers (ex: 74151, 74153, 74157) and their use in realizing boolean functions, Multiplexer trees, Demultiplexer /Decoders (e.g.: 74138, 74154) and their use in realizing a boolean function and demultiplexer trees, 4-bit magnitude comparator (ex: 7485).

Unit V

Synchronous Sequential Logic- Analysis of clocked sequential logic, State reduction and assignment, Flip-flop excitation tables, Design procedure, Design of sequential circuits ex : 3-bit up/down counter (mod < 8), 3-bit up/down gray code counter, Serial adder.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Know how digital logic design is used to represent computer systems.
2. Understand number system representations, binary codes, binary arithmetic.
3. Know concepts of Boolean algebra, its axioms and theorems, and its relevance to digital logic design.

Text Books

1. M Morris Mano, Digital Design, 3rd Edition, 2006, PHI

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2. R. P Jain, Modern Digital Electronics, Second Edition, TMH

Reference Books

1. Tocci : Digital Systems PHI , 6e, 2001
2. Bignell& Donovan Digital Electronics, 4th Edition, 2007, Thomson Learning.

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Course Name: Fundamental of Computer Systems Lab
Course Code: BCA004A

L	T/P	Pr	C
0	0	2	2

Objectives: Students would be able to:

1. Analyze a problem and identify and define the computing requirements to solution.
2. Explain the function of system components, including CPU, motherboard, and system unit.
3. Learn ability to design, implement and evaluate a computer-based system, process, component or program to meet desired needs.

I -Document Preparation

1. Telephone Directory.
 - i) The heading should be 16-point Arial Font in bold
 - ii) The rest of the document should use 10-point font size
 - iii) Other headings should use 10-point Courier New Font.
 - iv) The footer should show the page number as well as the date last updated.
2. The time-table form for your college.
 - i) The first line should mention the name of the college in 16-point Arial Font and should be bold.
 - ii) The second line should give the course name/teacher's name and the department in 14-point Arial.
 - iii) Leave a gap of 12-points.
 - iv) The rest of the document should use 10-point Times New Roman font.
 - v) The footer should contain your specifications as the designer and date of creation.
3. Create the following one page document.
 - i) Compose a note inviting friends to a get-together at your house, including a list of things to bring for get together.
 - ii) Design a certificate in landscape orientation with a border around the document.
4. Create the following document:
 - i) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
 - ii) Convert following text to a table, using comma as delimiter Type the following as shown (do not bold). Color, Style, Item Blue, A980, Van Red, X023, Car Green, YL724, Truck Name, Age, Sex Bob, 23, M Linda, 46, F Tom, 29, M
 - iii) Use mail merge to create labels for invitations to all your clients in the Pacific Northwest to attend a seminar that you're offering in Portland and Oregon. To demonstrate the process, set up a sample filter that selects all records with a ZIP code greater than 95000.

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5. Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06.
 - i) Font specifications for Title(Grocery List): 14-point Arial font in bold and italics.
 - ii) The headings of the columns should be in 12-point and bold.
 - iii) The rest of the document should be in 10-point Times New Roman.
 - iv) Leave a gap of 12-points after the title.

6. XYZ Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.
 - i) The title of the book should appear in bold using 20-point Arial font.
 - ii) The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - iii) At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - iv) The details of the offices of the publisher (only location) should appear in the footer.

7. Create the following one page documents.
 - i) Design a Garage Sale sign.
 - ii) Make a sign outlining your rules for your bedroom at home, using a numbered list.

8. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Amit	1327	1423	1193
Shivi	1421	3863	2934
Om	5214	3247	5467
Ananya	2190	1278	1928
Anupama	1201	2528	1203
Maharshi	4098	3079	2067

 - i) Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

II -Electronic Spreadsheet

1. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using :-
 - Copy
 - Paste
 - Embedding
 - Linking

2. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term1, term2 and term3. Create 4th worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers.

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Make the column headings bold and italic. The 4th worksheet should contain college name as the first line. Make it bold, italic and center it.

3. Tabulate and graph the function

$$y = \sin(2x) - 4\cos(x) \text{ between } -5 \text{ and } +5.$$

$x = -5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5$

4. Using a simple pendulum, plot 1-T and 1-T² graph.

I	t1	t2	t3	Mean(t)	T=t/20	T ²
70						
80						
90						
100						

5. Consider the following employee worksheet

Full Name (First Last)	Grade 1/2/3	Basic Salary	HRA	PF	Gross	Net	(VA) Vehicle Allowance

HRA is calculated as follows:

Grade HRA % (of Basic)

- i. 40%
- ii. 35%
- iii. 30%

Gross = Basic + HRA + VA

Net = Gross – PF

PF is 8% for all Grades

VA is 15000, 10000 and 7000 for Grades 1, 2 and 3.

- i. Find max, min and average salary of employees in respective Grade
 - ii. Count no. of people where VA > HRA
 - iii. Find out most frequently occurring grade.
 - iv. Extract records where employee name starts with “A” has HRA > 10000
 - v. Print Grade wise report of all employees with subtotals of net salary and also grand totals. Use subtotal command.
 - vi. Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.
6. Create/Record a macro which can change the background color of a range of cells.
7. Consider the following nonlinear equation:
- $$f(x) = 5x^3 - 50x^2 + 200x + 18000 = 0$$
- a. Find the value of x that make f(x) = 0 using Goal Seek.

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8. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increase the sale of more of more items and getting the profit of Rs40,000/. Use Goal Seek to find out how many items you will have to sell to meet your profit figure.
9. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for $P - V$ and $P-I/V$. Sample observations are:-

Pressure(P)	Volume (V)	I/V	PV	P/V
75	20			
78.9	19			
83.3	18			
88.2	17			

10. Plot the Bar Chart for OHM's Law. Analyze the chart by changing it to line graph.
11. Plot the pie-chart for composition of air.
12. Plot the chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).
13. Create the following worksheet(s) containing an year wise sale figure of five salesmen in Rs.

Salesman	2002	2003	2004	2005
MOHAN	10000	12000	20000	50000
MITRA	15000	18000	50000	60000
SHIKHA	20000	22000	70000	70000
ROHIT	30000	30000	100000	80000
MANGLA	40000	45000	125000	90000

14. Apply the following Mathematical & Statistical functions:
- Calculate the commission for each salesman under the condition :-
 - If total sales is greater than Rs. 3,00,000/-, then commission is 10% of total sale made by the salesman. Otherwise, 4% of total sale.
 - Calculate the maximum sale made by each salesman.
 - Calculate the maximum sale made in each year.
 - Calculate the minimum sale made by each salesman.
 - Calculate the minimum sale made in each year.
 - Calculate the average sales made by each salesman.
 - Calculate the total sale made by each salesman.
 - Count the no. of sales persons.
 - Calculate the cube of sales made by Mohan in the year 2002.
 - Find the difference in sales by salesman Mitra between the year 2002 and 2003.
 - Find the absolute value of difference.
 - Also calculate the Mode, Stddev, Variance, Median for the sale made by each salesman.

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xii) Calculate the year wise Correlation coefficient between the sales man Mohan and Mitra year wise.

15. The following table gives a year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

- i. Calculate total sale year wise.
- ii. Calculate the net sales made by each salesman
- iii. Calculate the commission for each salesman under the condition
 - a. If total sales is greater than Rs. 4, 00,000/-, then commission is 5% of total sale made by the salesman.
 - b. Otherwise, 2% of total sale.
- iv. Calculate the maximum sale made by each salesman.
- v. Calculate the maximum sale made in each year.
- vi. Draw a bar graph representing the sale made by each salesman.
- vii. Draw a pie graph representing the sale made by salesmen in year 2001.

16. Consider the following worksheet for APS 1st year students:-

S.No.	Name	PH	CH	BY	MT	CS	Total Marks	%	Grade
1									
2									

Grade is calculated as follows:-

If % ≥ 90 Grade A

If % ≥ 80 & < 90 Grade B

If % ≥ 70 & < 80 Grade C

If % ≥ 60 & < 70 Grade D

Otherwise students will be declared fail.

- i) Calculate Grade using if function
- ii) Sort the data according to total marks
- iii) Apply filter to display the marks of the students having more than 65% marks.
- iv) Draw a pie chart showing % marks scored in each subject by the topper of the class.
- v) Draw the doughnut chart of the data as in
 - a. Enter the S.No. of a student and find out the Grade of the student using VLOOKUP.

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- vi) Extract all records where name
- Begins with “A”
 - Contains “A”
 - Ends with “A”

17. Enter the data as given below using spread sheet:

	A	B	C	D	E
1	Subjects	Marks			
2	Physics	76			
3	Maths	94			
4	Biology	88			
5	Chemistry	91			
6	English	----			
7					
8	Percentage	=	80%		
9					

- Use Goal Seek to find out the marks in English subject to get total percentage of marks which is set to 80%.

III Practical List for Presentation tool

- Create five Power point slides. Each slide should support different format. In these slides explain areas of applications of IT. Make slide transition time as 10 seconds.
- Create five Power Point slides to give advantages/disadvantages of computer, application of computers and logical structure of computer.
- Create five Power Point slides detailing the process of internal assessment. It should be a self-running demo.
- Create five Power Point slides, one having table, one having clip-art and others giving in brief the details of the two above slides. Create a self- running demo of the slides.
- Create a Power Point presentation to teach that area of a square is a^2 where a is the size of side of the square. Explain this feature with suitable diagram. Also explain that when a given square is divided into two equal parts, how do you calculate its area(area of part), with a suitable example.
- Create a Power Point presentation to explain the key feature of BSc program with proper coloring and formatting of the slides(at least 8 slides). Your slides should contain figures, graphs. During slide show, slides should run automatically after specified time (a suitable time).

Learning Outcomes:

Upon successful completion of this subject students should be able to:

- Understand basic computer tools, working on word documents, excel sheets and PowerPoint.
- Have knowledge of these tools so they can make reports, presentations and they find scope of these things in their daily professional life.
- Use spreadsheet software to create workbooks including simple formulas with both relative and absolute cell references and charts.

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Course Name: Programming Fundamentals Lab - I

Course Code: BCA005A

L	T/P	Pr	C
0	0	2	2

Objective: Students would be able to:

1. Analyze a problem and identify and define the computing requirements to solution.
 2. Implement, test, debug, and document programs in C.
 3. Design, implement and evaluate a computer-based system, process, component or program to meet desired needs.
-
1. Write a Program to print the sum and product of digits of an integer.
 2. Write a program to reverse a number.
 3. Write a program to compute the sum of n terms of the following series $S = 1 + 1/2 + 1/3 + 1/4$
 4. Write a program to compute the sum of n terms of the following series $S = 1 - 2 + 3 - 4 + \dots$
 5. Write a program using iteration:
 - i) Display Fibonacci Series
 - ii) Calculate Factorial of a number.
 - iii) Calculate GCD of two numbers.
 6. Write a function to find whether a given no. is Prime or not. Use the same to generate prime numbers less than 100.
 7. Write a program to compute the factors of a given number.
 8. Write a program to print the triangle of stars as follows (take number of lines from user)
*

 9. Write a C program to print Pascal triangle
1
1 1
1 2 1
1 3 3 1
 10. Write a C program to print floyd's triangle
1
2 3
4 5 6
7 8 9 10
 11. Write a program to show the use of arithmetic operators using pointers.
 12. Write a program to convert decimal number into equivalent binary number.
 13. Write a menu driven program to perform following operations on strings (use Stringfunctions):
 - i) Concatenate two strings
 - ii) Compare two strings.
 - iii) Calculate the length of the string
 - iv) Calculate the number of vowels.
 14. Write a program to insert and delete an element in an array.
 15. Write a program to sort the elements of an array. (Selection and Insertion Sort) .
 16. Write a program to find the maximum and minimum element in an array.

17. Write a program to perform following actions on an array entered by the user:
- i) Print the even-valued elements.
 - ii) Print the odd-valued elements.
 - iii) Calculate and print the sum and average of the elements of user.
 - iv) Remove the duplicates from an array.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Create C programs, use of conditional statements, and different forms of looping.
2. Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs.
3. Develop solutions of different problems in C language program and understand data and data types so that they can select data accordingly in their solutions.

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Course Name: Internet Lab
Course Code: BCA006A

L	T/P	Pr	C
0	0	2	2

Objective: Students would be able to:

1. Learn the basics of internet and World Wide Web and will be INTERNET literate.
2. Learn the concepts of website designing, client & server side programming and web services.
3. Learn the usage of search engines and their importance.

List of experiments:-

1. Basic exposure to World Wide Web and internet.
2. Implementing properties and settings of internet browsers.
3. Exposure to internet browsing through Mozilla, Firefox opera etc.
4. Implementing the use of online transactions, exposure to online shopping and e-commerce site.
5. Exposure to different types of search engines.
6. Implementing the search options in various search engines like google, bing, alta vista etc.
7. Implementing the settings of Proxy server, firewall settings, security features etc
8. Exposure to social media.
9. Creating an account on Facebook
10. Exploring the features and creating an account on LinkedIn.
11. Creating account and exploring the features of Twitter, pin interest, Tumblr etc.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Operate the internet and Email and web sites.
2. Differentiate between Internet Protocols.
3. Differentiate between security and usage aspects of different browsers.

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Course Name: Digital Electronics Lab

Course Code: BCA056A

L	T/P	Pr	C
0	0	2	2

1. To study and verify the truth table of logic gates.
2. Design and implementation of Adder and Subtractor using logic gates.
3. Design and implementation of BCD to excess-3 code converter using logic gates.
4. Design and implementation of Binary to gray code converter using logic gates.
5. Design and implementation of 4 bit binary Adder/ subtractor using IC 7483
6. Design and implementation of 4 bit binary BCD adder using IC 7483
7. Design and implementation of 2 bit Magnitude Comparator using logic gates.
8. Design and implementation of 16 bit odd/even parity checker generator using IC74180.
9. Design and implementation of multiplexer using logic gates, IC74150 and IC74154.
10. Design and implementation of De-multiplexer using logic gates, IC74150 and IC74154
11. Design and implementation of encoder using logic gates, IC7445 and IC74147
12. Design and implementation of decoder using logic gates, IC7445 and IC74147
13. Construction and verification of 4 bit ripple counter.
14. Design and implementation of 3-bit synchronous up/down counter.
15. Implementation of SISO, SIPO, PISO and PIPO shift registers using Flip- flops

BCA Syllabus at JECRC University

Course Name: Basic Mathematics

Course Code: BCA007A

L	T/P	Pr	C
3	1		4

Objective: Students would be able to:

1. Learn topics including solving applied problems with whole numbers, decimals and fractions, ratios and proportions, rates, percentages and applications in sales tax, interest, commissions, and discounts, determining numerical averages, exponents and square roots, measurement, and geometry.
2. Solve quantitative problems and perform quantitative investigations in which they discover ideas and gain insights that develop questioning and solution-building skills.
3. Use mental strategies and technology accurately and appropriately.

Unit I:

Elements of Logic covering, necessary and sufficient conditions, theorems and proofs (direct and contra positive); Sets and Functions – elementary set theoretic operations,

Unit II

De Morgan's law, Convex sets, Relations and Correspondences, number systems; Modulus function (distance), sequences and series – convergence; Open and closed sets; Limits and Continuity;

Unit III:

Differential and Integral Calculus covering, concept of a derivative, standard rules of differentiation (including elementary trigonometric and transcendental functions), total and partial derivatives, Young's theorem, homogeneous functions, trace of a curve; Maxima and Minima;

Unit IV

Integration- basic concept, definite and indefinite integral, standard rules of integration, partial integration; Ordinary (first order) differential equation; Linear Mathematics covering, Matrices (types and operations including elementary row and column operations), inverse.

Unit V

Determinants (rules of computation); Linear Equations and Cramer's rule; Vector space (concepts of span/basis/dimension); Eigen values and Eigen vectors; Linear Programming (Graphical and Simplex solution); First order Difference equation (First order equations and solution); (10 Lectures)

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Demonstrate understanding and knowledge of properties of functions, which include evaluation, domain and range, related equations, and basic operations.
2. Understand and use the language and notation of calculus.
3. Provide an overview of discovering the experimental aspect of modern applied mathematics.
4. Create the ability to model, solve and interpret any physical or engineering problem.

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Course Name: Communication Skills-I
Course Code: BMC114A

L	T/P	Pr	C
3	1		4

Objective: Students would be able to:

1. Understand the basic concepts of three major forms of communications which are vital in academic and professional settings namely professional presentations, interviews and group communications respectively.
2. Have a deep insight into the techniques for delivering effective presentations, winning job interviews, and actively participating in various forms of group communication.
3. Apply the critical and creative thinking abilities necessary for effective communication in today's business world.

UNIT- I: Essentials of Grammar

1. Parts of Speech
2. Articles
3. Question Tags
4. Conditional Sentences
5. Modal Verbs

UNIT II: Applied Grammar

1. Tenses
2. Passive Voice
3. Indirect Speech
4. Relative Clauses

UNIT III: Composition

1. Dialogue Writing
2. Paragraph Writing
3. Precise Writing
4. Report, its importance and Report Writing

UNIT IV: Poems

1. The Character of A Happy Life: Sir Henry Wotton
2. No Men are Foreign: James Kirkup
3. If : Rudyard Kipling

UNIT V:

Short Stories

1. How Much Land Does a Man Need?: Leo Tolstoy
2. The Last Leaf: O. Henry

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Have the capability to apply an ability to properly carry out the purpose and significance of the channels of Communication.
2. Have the capability to write and speak confidently about their own ideas correctly.

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3. Avoid barriers of communication and use proper filters effectively and Use Interpersonal communication effectively.
4. Use grammar correctly and be capable to enhance employability skills and face the corporate world with full confidence.

Suggested Readings

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma & Binod Mishra, PHI Learning Pvt. Ltd.
2. English for Engineers: Made Easy, Aeda Abidi & Ritu Chaudhary, Cengage Learning, (New Delhi)
3. A Practical Course for Developing Writing Skills in English, J.K. Gangal, PHI Learning Pvt. Ltd., New Delhi.
4. Intermediate Grammar, Usage and Composition, Tickoo, A. E. Subramaniam & P. R. Subramaniam, Orient Longman (New Delhi)
5. The Written Word, Vandana R. Singh, Oxford University Press (New Delhi) R.T.U., Kota Scheme and
6. The Great Short Stories edited by D.C. Datta, Ram Narain Lal Publishers (Allahabad)
7. Professional Communication, Kavita Tyagi & Padma Misra, PHI Learning Pvt. Ltd., New Delhi.
8. "Learn Correct English: Grammar, Usage and Composition" by Shiv K. Kumar & Hemalatha Nagarajan, Pearson (New Delhi).
9. "Current English Grammar and Usage with Composition" by R.P. Sinha, Oxford University Press (New Delhi).
10. "Grammar of the Modern English Language", by Sukhdev Singh & Balbir Singh, Foundation Books (New Delhi).

BCA Syllabus at JECRC University

Course Name: Communication Skills Lab – I
Course Code: BMC115A

L	T/P	Pr	C
0	0	2	2

Objective: Students would be able to:

1. Present themselves professionally, they can understand how to communicate in industry, enhance their vocabulary.
2. Demonstrate clarity, precision, conciseness and coherence in your use of language.
3. Organize and express ideas in writing and speaking to produce messages suitably tailored for the topic, objective, audience, communication medium and context.

Building Advanced Vocabulary

1. Word Formation
2. Affixes
3. Words often Mis-spelt and Mis- Pronounced
4. Words often Confused
5. Homonyms and Homophones
6. One Word for Many.
7. Synonyms and Antonyms.
8. Jumbled Sentences
9. Practice Exercise of Linking Words (Conjunctions) on software
10. Practice Exercise of Tenses on soft ware
11. Practice Exercise of passive voice on software
12. Dialogue conversation Practice on software

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand the fundamental principles of effective business communication.
2. Present themselves professionally, they can understand how to communicate in industry, enhance their vocabulary.
3. Apply the critical and creative thinking abilities necessary for effective communication in today's business world.

Course Name: Seminar -I
Course Code: BCA055A

L	T/P	Pr	C
2	0	0	2

BCA Syllabus at JECRC University

Course Name: Environmental Studies

Course Code: BMC051A

L	T/P	Pr	C
4	0		4

Objectives: Students would be able to:

1. Define and use correctly the common terms of environmental science.
2. Explain what makes up the environment, how it functions, and how humans are part of it.
3. Apply the concepts and principles of environmental science to propose solutions to specific environmental problems;
4. Critique environmental writings and predictions and their impact on subsequent developments in human relationship with the environment; and evaluate the adequacy of conclusions about environmental phenomena.

UNIT -I

Introduction and Natural Resources: Multidisciplinary nature and public awareness, Renewable and nonrenewal resources and associated problems, Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Conservation of natural resources and human role.

UNIT -II

Ecosystems: Concept, Structure and function, Producers composers and decomposers, Energy flow, Ecological succession, Food chains webs and ecological pyramids, Characteristics structures and functions of ecosystems such as Forest, Grassland, Desert, Aquatic ecosystems.

UNIT -III

Biodiversity and Conservation: Definition, Genetic, Species, and Ecosystem diversity, Bio-geographical classification of India, Value of biodiversity at global, national, local levels, India as a mega diversity nation, Hot spots of biodiversity, Threats to biodiversity, Endangered and endemic species of India, In-situ and ex-situ conservation of biodiversity.

UNIT –IV

:Environmental Pollution- Definition, Causes, effects and control of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards, human role in prevention of pollution, Solid waste management, Disaster management, floods, earthquake, cyclone and landslides.

UNIT –V

:Social issues and Environment- Unsustainable to sustainable development, Urban problems related to energy, Water conservation and watershed management, Resettlement and re-habitation, Ethics, Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear accidents, holocaust, Waste land reclamation, Consumerism and waste products, Environment protection act, Wildlife protection act, Forest conservation act, Environmental issues in legislation, population explosion and family welfare program, Environment and human health, HIV, Women and child welfare, Role of information technology in environment and human health.

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Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand fundamental physical and biological principles that govern natural processes.
2. Understand fundamental concepts from the social sciences and the humanities underlying environmental thought and governance.
3. Integrate and apply perspectives from across the natural sciences, social sciences, and the humanities in the context of complex environmental problems.

Text Books:

1. Agarwal, K.C., Environmental Biology, Nidi Publication Ltd., Bikaner, 2001.
2. BharuchaErach, Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmadabad, 2002.

Reference Books:

1. Clark, R.S., Marine Pollution, Clanderson Press, Oxford, 2002.
2. Cunningham, W.P., et al., Environmental Encyclopedia, Jaico Publishing House, Mumbai, 2003.

SEMESTER –II

Course Name: Programming Fundamentals -II

Course Code: BCA008A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objective: Students would be able to:

1. Learn essential knowledge on the need of programming languages and problem solving techniques.
2. Get the knowledge of more features of C and can understand the use of arrays, pointers, strings and structures.
3. Do effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.

Unit-I

Arrays: Definition, declaration and initialization of one dimensional array, Accessing array element, Displaying array elements, Sorting arrays, Arrays and function, Two-Dimensional array declaration and initialization accessing and displaying memory representation of array-row major, Column major, Multi-dimensional array.

Unit-II

Pointers: Definition and declaration, Initialization, indirection operator, address of operator, pointer arithmetic, dynamic memory allocation, arrays and pointers, function and pointers.

Unit-III

Strings: Definition, declaration and initialization of strings, Usage of standard string library functions: `strlen()`, `strcpy()`, `strcat()`, `strcmp()` in complex C programs, Implementation without using standard library.

Structures: Definition and declaration, Variables initialization, Accessing fields and structure operations, Nested structures, Union: Definition and declaration, Difference between Union and Structure.

Unit-IV

Introduction to C Pre-processor, Macro substitution directives, File inclusion directives, Nesting of Macros, Macros with Arguments, Conditional compilation Directives, Format Specifiers for Input and output in C programs, Truth Tables and Masking of bitwise and shift operators.

Unit-V

File handling: Introduction to File Management, Opening/Closing a File, Input/Output operations on Files, Standard file handling functions: `fopen()`, `fclose()`, `feof()`, `fseek()`, `rewind()` Using text files: `fgetc()`, `fputc()`, `fprintf()`, `fscanf()`, Error Handling During I/O Operations, Command Line Arguments.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

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1. Be graduates for professional careers in roles including, but not limited to, the following: computer programmer, software engineer, software systems designer, software applications developer, technical software project lead, computer systems analyst, computer systems programmer, software applications tester and maintainer.
2. Implement, test, debug, and document programs in C.
3. Solve memory access problems by using pointers. They can learn the basics of file handling mechanism that is essential for understanding the concepts in database management systems.

Text Books:-

1. Let us C-YashwantKanetkar.
2. Programming in ANSI C by Balaguruswamy
3. Programming with C, Gottfried, McGraw-Hill

References:

1. HerbertSchildt, "C The Complete Reference" Fourth Edition, 2000.
2. V Rajaraman, "Computer Basics and C Programming", PHI.
3. Kernighan and d. Ritchie, "The ANSI C Programming Language", 2000.

BCA Syllabus at JECRC University

Course Name: Structured System Analysis & Design
Course Code: BCA009A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Students would be able to:

1. Introduce variety of new software used by analysts, designers to manage projects.
2. Analyze and document systems, design new systems and implement their plans.
3. 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

System Concepts and Information Systems Environment: The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

UNIT-II

System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation and Maintenance. Role of the Systems Analyst, The Analyst/User Interface, Behavioral issues.

UNIT-III

Systems Planning and Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews and Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

UNIT-IV

Information Gathering: need, Information about the firms, Information gathering tools, Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives

UNIT-V

Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English. Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis. Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, and Requirements of form Design. H/W / S/W Selection, Make V/s Buy decision and Maintenance, Documentation: Importance, Types of documentation, Security and disaster planning and management.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand the principles and tools of systems analysis and design.
2. Understand the application of computing in different context.

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3. Understand the professional and ethical responsibilities of practicing the computer professional including understanding the need for quality.

Text Books

1. Systems Analysis and Design, Howryskiewicz, PHI
2. System Analysis & Design, Shelly Cashman Series, 4th Ed., Thomson Press

Reference Books

1. Analysis and Design of Information Systems, Senn, TMH
2. System Analysis and Design Methods, Whitten, Bentley
3. System Analysis and Design, Awad
4. Analysis and Design of Information Systems, Rajaraman, PHI

BCA Syllabus at JECRC University

Course Name: IT Infrastructure Management

Course Code: BCA010A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objective: Students would be able to:

1. Ensure adherence to standards, Do reduction in the duplication of effort, promote adaptability necessary for a changeable environment.
2. Ensure interoperability among organizational and external entities, Enhance the flow of information throughout an information system.
3. Ensure that management policies and practices are in tune with the IT needs.

UNIT-I

Infrastructure Management Overview: Definitions ,Infra structure Management Activities, Evolutions of Systems(Mainframe to Midrange to PC's to client server computing to new age systems)& their management ,growth of internet, current business demands and IT systems issues, complexity of today's computing environment Total cost of complexity issues, Value of system management for business.

UNIT-II

Preparing for Infrastructure Management: Factors to consider in designing IT Organization & IT infrastructure, Determining customer's requirement, Identifying system component to manage, Exist Processes, Data Application, tools& their integration patterns for IT System management.

UNIT-III

Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).

UNIT-IV

SERVICE DELIVERY PROCESSES: Service-level management, financial management and costing, IT services continuity management, Capacity management, Availability management

UNIT-V

SERVICE SUPPORT PROCESSES: Configuration Management, Service desk, Incident management, Problem management, Change management, Release management.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Know what includes in IT infrastructure.
2. Learn interoperability among organizational and external entities.
3. Understand the flow of information throughout an information system.

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Text Books:

1. It Infrastructure Management Anita Sengar
2. **Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation and Renovation** by W. Ronald Hudson (Author), WaheedUddin(Author), Ralph C. Haas (Author)
3. Recent Advances in Maintenance and Infrastructure Management Cigolini, **R.D.**, Deshmukh, **A.V.**, Fedele, **L.**, McComb, **S.A.** (Eds.)

BCA Syllabus at JECRC University

Course Name: Programming Fundamentals Lab-II

Course Code: BCA011A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Formulate problems and implement algorithms in C.
2. Analyze a problem and identify and define the computing requirements to solution.
3. Effectively choose programming components that efficiently solve computing problems in real-world.

1. C Program to Cyclically Permute the Elements of an Array
2. C Program to Find the Second Largest & Smallest Elements in an Array
3. C Program to Split an Array from Specified Position & Add First Part to the End
4. C Program to Sort Names in an Alphabetical Order
5. C Program to Accept an Array & Swap Elements using Pointers
6. C Program to merge and Sort Elements of 2 different Arrays
7. C Program to check if a given String is Palindrome
8. C Program to read two Strings & Concatenate the Strings
9. C Program to Replace Lowercase Characters by Uppercase & Vice-Versa
10. C Program to Count the Number of Vowels & Consonants in a Sentence
11. C Program to check if the Substring is present in the given String
12. C Program to Accepts two Strings & Compare them
13. C Program to Find the Length of a String without using the Built-in Function
14. C Program to Create a File and Store Information
15. C Program to Illustrate Reading of Data from a File
16. C Program to delete a specific Line from a Text File
17. C Program to replace a specified Line in a Text File
18. C Program to Find the Number of Lines in a Text File
19. C Program to Append the Content of File at the end of another
20. C Program that Merges Lines Alternatively from 2 Files & Print Result
21. C Program to List Files in Directory
22. C Program to Find Sum of Numbers given in Command Line Arguments Recursively
23. C Program to Display the Function Names defined in C Source File
24. C Program to Find the Size of File using File Handling Function
25. C Program to Capitalize First Letter of every Word in a File

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Develop more complex C programs with use of arrays, strings, functions and file-handling functions.
2. Develop solutions of some tricky problems in C language.
3. Do different C projects with these course basics.

BCA Syllabus at JECRC University

Course Name: Open Source Tools Lab
Course Code: BCA012A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Expose students to FOSS environment and introduce them to use open source packages.
2. Understand Kernel configuration, compilation and installation.
3. Design basic login forms for developing business applications.

1. **Kernel** configuration, compilation and installation: Download / access the latest kernel source code from kernel.org, compile the kernel and install it in the local system. Try to view the source code of the kernel
2. **Virtualization** environment (e.g., xen, qemu or lguest) to test an applications, new kernels and isolate applications. It could also be used to expose students to other alternate OSs like *BSD
3. **Compiling from source:** learn about the various build systems used like the auto* family, cmake, ant etc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf, automake etc.,
4. **Introduction to package management system:** Given a set of RPM or DEB, how to build and maintain, serve packages over http or ftp. And also how do you configure client systems to access the package repository.
5. **Installing various software packages** either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. Of course, this might need internet access.
6. **Install samba** and share files to windows Install Common Unix Printing System(CUPS)
7. **Write userspace drivers using fuse** — easier to debug and less dangerous to the system (Writing full-fledged drivers is difficult at student level)
8. **GUI programming:** a sample programme – using Gambas since the students have VB knowledge. However, one should try using GTK or Qt
9. **Version Control System** setup and usage using RCS, CVS, SVN
10. **Text processing with Perl:** simple programs, connecting with database e.g., MYSQL
11. **Running PHP** : simple applications like login forms after setting up a LAMP stack
12. **Running Python** : some simple exercise – e.g. Connecting with MySql database
13. **Set up the complete network** interface using ifconfig command like setting gateway, DNS, IP tables, etc

Resources:An environment like FOSS Lab Server (developed by NRCFOSS containinthe variouspackages)

OR Equivalent system with Linux distro supplemented with relevant packages

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Have knowledge of open source tools.
2. Know how to install packages and can work on open platform.
3. Develop GUI applications in python, PHP. Basic login forms, simple pages and small applications can be developed.

BCA Syllabus at JECRC University

Course Name: Introduction to Management Functions
Course Code: BCA013A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	0	0	3

Objectives: Students would be able to:

1. Get the knowledge about the important management concepts & their application.
2. Have an insight of various functional departments in an organization.
3. Improve their decision making abilities.

UNIT – I

Management: Meaning & concept, Management principles (Fayol& Taylor), Management process (in brief), Managerial levels, Roles & skills of a manager, Management Theories(Classical, Neo classical, Behavioral, Systems & Contingency)

UNIT – II

Planning: Meaning, Purpose & process, Decision making: Concept & process,Organizing: Process, Departmentation, Authority & Responsibility relationships,Decentralization. Staffing: Nature & Importance.

UNIT-III

Staffing: Concept, nature & importance of staffing.Directing: Motivation: concept & theories (Maslow's, Herzberg Two factor, McGregor's theory X & Y) , Leadership: Concepts & styles.

UNIT-IV

Controlling: Nature, Importance, significance & Process of control.

UNIT – V

Managing People - Meaning, Need of understanding human behavior in organization, Models of OB, Major concepts in OB (elementary)- Personality, Learning, Perception & Attitude Building.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand management concepts and decisions.
2. Understand the basic functions of management and their importance in one's life.
3. Learn the abilities to be a good leader.

TEXT BOOKS

1. Dr. C.B Gupta "Management concepts & practices" S.Chand& Sons, 2009.
2. Stoner,Freeman& Gilbert, "Management" 6th Edition, Pearson International.

BCA Syllabus at JECRC University

Course Name: Discrete Structures
Course Code: BCA014A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objectives: Students would be able to:

1. Introduce a number of Discrete Mathematical Structures (DMS) found to be serving as tools even today in the development of theoretical computer science.
2. Be computer engineers to solve problems occurred in the development of programming languages.
3. Know the importance of discrete structures towards simulation of a complete knowledge on various discrete structures available in literature.

UNIT-I

Introduction to Sets, Finite and Infinite Sets, Uncountably Infinite Sets. Introduction to Functions and relations, Properties of Binary relations, Closure, Partial Ordering Relations. Pigeonhole Principle, Permutation and Combinations, Mathematical Induction.

UNIT-II

Principle of Inclusion and Exclusion. Asymptotic Notations, Summation formulas and properties, Bounding Summations, Approximation by Integrals.

UNIT-III

Recurrence Relations, Generating Functions, Linear Recurrence Relations with constant Coefficients and their solution. Substitution Method, Recurrence Trees.

UNIT-IV

Master Theorem. Basic Terminology of Graphs, Models and Types, Multigraphs, Weighted Graphs, Graph Representation. Graph Isomorphism Graph Connectivity, Euler and Hamiltonian Paths and Circuits

UNIT -V

Planar Graphs, Graph Coloring, Basic Terminology of Trees, Properties of Trees, Spanning Trees. Logical Connectives Well Formed Formulas, Tautologies, Equivalence, and Inference Theory.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Know how Discrete Mathematical Structures (DMS) found to be serving as tools even today in the development of theoretical computer science.
2. Use Discrete Structures to solve problems occurred in the development of programming languages.
3. Identify, formulate and solve Engineering problems.

Text Books

1. C. L. Liu and D.P. Mohapatra, *Elements of Discrete Mathematics*, Third Edition, Tata McGraw Hill, 2008.

BCA Syllabus at JECRC University

2. K. Rosen, *Discrete Mathematics and Its Applications*, Sixth Edition, Tata McGraw Hill, 2007.
3. T.H. Cormen, C.E. Leiserson, R.L. Rivest, *Introduction to Algorithms*, Third Edition, Prentice Hall of India, 2010.

Reference Books

1. J.P. Trembley, R. Manohar, *Discrete Mathematical Structures with Application to Computer Science*, First Edition, Tata McGraw Hill, 2001.

BCA Syllabus at JECRC University

Course Name: Computer Architecture

Course Code: BCA057A

L	T/P	Pr	C
3	1		4

Objective: Students would be able to:

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

Unit –I

Digital Logical: Boolean algebra, Logic Gate

Unit –II

Digital Circuits: Flip-flops and counters, Combinational circuits, Decoders, Multiplexers, Flip-flops, Sequential circuits.

Unit–III

Basic Computer Organization and Design:

Computer registers, Common bus system, Instruction set, Control and Timing, Instruction cycle, Instruction formats and Types of instructions, Interrupt cycle.

Unit –IV

Micro programmed Organization: Micro programmed control, Instruction formats, Arithmetic and logical micro-operations
Central Processing Unit: Register organization, Stack organization, Instruction format, addressing modes.

Unit –V

Memory Organization: Random Access Memory, ROM, EPROM, Associative memory, Cache memory. Input-output Organization: Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand the major components of a computer including CPU, memory, I/O and storage. Students will understand the uses for cache memory.
2. Understand a wide variety of memory technologies both internal and external.
3. Understand the role of the operating system in interfacing with the computer hardware. Students will understand the basic components of the CPU including the ALU and control unit.

Text Books:

1. M. M. Mano, Computer System Architecture, 3rd Edition, Prentice Hall of India,
2. W. Stallings, Computer Organization and Architecture- Designing for Performance, 7th Edition, Pearson Education/PHI, Inc., 2008.

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Reference Books

1. J. P. Hayes, Computer Architecture and Organization, 3rd Edition, Tata McGraw-Hill.
2. A.S. Tanenbaum, Structured Computer Organization, 5th Edition, Pearson Education, Inc., 2006.

Course Name: Seminar-II
Course Code: BCA016A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	0	0	3

The students will present a seminar on a technical topic in front of class and faculty. The evaluation will be done on individual performance followed by submission of a written report on Seminar Topic.

BCA Syllabus at JECRC University

Course Name: Communication Skills –II
Course Code: BMC118A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	0	0	3

Objective: Students would be able to:

1. Understand the communication skills in detail.
2. Learn more industry related tools and applications.
3. Have a deep insight into the techniques for delivering effective presentations, winning job interviews, and actively participating in various forms of group communication.

Unit I

1. Elements of Communication:
 - (i) Definition and Meaning of communication,
 - (ii) Process of Communication
 - (iii) Essential components of the Process of Communication
 - (iv) Importance and Objectives of Communication
 - (v) Differences between general and technical communication

Unit II

1. **Types of Communication:**
 - (i) Extrapersonal communication,
 - (ii) Intrapersonal communication,
 - (iii) Interpersonal communication,
 - (iv) Organisational communication,
 - (v) Mass communication
2. **Verbal and Non-Verbal Communication:**
 - (i) Verbal communication, Oral Communication, Advantages of Oral Communication, limitation/Disadvantages of Oral Communication,
 - (ii) Non-verbal communication ,Body Languages, Sign Languages, Space Languages, Paralanguages ,Time Languages, Haptics or Languages of Touch ,Colour Languages ,difference between verbal and non verbal communication.
3. **Formal and Informal Channels of Communication:** Down ward Communication, Upward Communication, Horizontal /Lateral Communication, Diagonal /Clockwise Communication, and Merits & demerits of each type of communication.

Unit III

1. **Barriers to Communication:** Physical Barrier, Semantic/language Barrier, Socio-psychological Barrier, Organizational/hierarchical Barrier, Emotional Barrier, Cultural Barrier, Information overload, Poor listening, Wrong assumption, Selective perception
2. Methods to overcome barriers to Communication
3. Qualities of Good Communication

Unit IV

Composition

1. Need and function of Business Letter, planning and layout of Business Letter, kinds of Business Letter

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2. Drafting of business Letter : Sales, Credit, Enquiry, Order, Claim, Complaint, Job Applications, etc.

Unit V

1. Preparation of Notices & circular, Memo, Declaration
2. Telephone etiquettes
3. E-mail writing

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Have the ability to properly carry out the purpose and significance of the channels of Communication.
2. Write and speak confidently about their own ideas, correctly and avoiding Indianism of English.
3. Avoid barriers of communication and using proper filters effectively.

Suggested Readings

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma and BinodMishra, PHI Learning Pvt. Ltd.(New Delhi)
2. English Grammar and Composition, Gurudas Mukherjee, Ane Books Pvt. Ltd.(New Delhi)
3. Current English Grammar and Usage with Composition, R.P. Sinha, Oxford University Press (New Delhi)
4. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw Hill (New Delhi)
5. Business Communication, Meenakshi Raman &Prakash Singh, Oxford University Press (New Delhi)
6. Professional Communication, ArunaKoneru, Tata McGraw Hills, New Delhi.
7. A Practical Course for Developing Writing Skills in English, J.K. Gangal, PHI Learning Pvt. Ltd., New Delhi.
8. “Communicative English for Engineers and Professionals”, by NitinBhatnagar&MamtaBhatnagar, Pearson (New Delhi).
9. “The Ace of Soft Skills”, by Gopalswamy Ramesh &Mahadevan Ramesh, Pearson (New Delhi)

BCA Syllabus at JECRC University

Course Name: Communication Skills Lab –II
Course Code: BMC119A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Learn the art of public speaking and facing interviews.
2. Build up the learner's confidence in oral and interpersonal communication by reinforcing the basics of pronunciation specially focusing on interviews / corporate meetings / international business travels.
3. Know the techniques of seminars and paper presentation. To explain the importance of oral communication to business.

- | | |
|--|----------------------------|
| 1. Phonetics: | Total- (3 lecture) |
| (i) The Organs of Speech | |
| (ii) The Description and Classification of Speech Sounds | |
| (iii) The Description and Classification of Vowels | |
| (iv) The Description and Classification of Consonants | |
| (v) Phonetic symbols and the IPA | |
| (vi) Phonemic and Phonetic Transcription & Phonology | |
| (vii) The Syllable | |
| (viii) Word Accent and Rhythm in Connected Speech | |
| 2. Email Writing: | (2 lecture) |
| 3. Telephone etiquettes: | (1 lecture) |
| 4. Seminar presentation (given topic) | (2 lecture) |
| 5. Group Discussion (given topic) | (2 lecture) |
| 6. Mock Interview | (1 lecture) |
| 7. Debates / Declamation | (1 lecture) |

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand the requirement of communication skills in industry.
2. Develop their skills and enhance knowledge of English.
3. Have the techniques to present themselves, can deliver seminars.

Suggested Readings and Packages

1. Advanced Manual for Communication Laboratories and Technical Report Writing, D.Sudha Rani, Pearson, (New Delhi)
2. A Course in Phonetics and Spoken English, J. Sethi & P.V. Dhamija, PHI Learning Pvt.Ltd. (New Delhi)
3. English Language Laboratories: A Comprehensive Manual, NiraKonar, PHI Learning Pvt .Ltd. (New Delhi)
4. Communication Skills for Engineers and Scientists, Sangeeta Sharma and Binod Mishra, PHI Learning Pvt. Ltd.(New Delhi).
5. Oxford English Learning Package.(With CDs: Headway Series)

SEMESTER -III

Course Name: Introduction to Database Systems

Course Code: BCA017A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Students would be able to:

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

UNIT-I

Basic Concepts - Purpose of database systems-Components of DBMS – DBMS Architecture and Data Independence- Data modeling - Entity Relationship Model, Relational – Network- Hierarchical and object oriented models-Data Modeling using the Entity Relationship Model.

UNIT-II

Structure of relational databases – relational databases – relational algebra- tuple relational calculus. Data definition with SQL, insert, delete and update statements in SQL – views – data manipulation with SQL

UNIT-III

Introduction to Transaction Processing- Transaction and System Concepts- Desirable properties of Transactions- Schedules and Recoverability- Serializability of Schedules-Query processing and Optimization-Concurrency Control- -assertions – triggers. Oracle case study: The basic structure of the oracle system – database structure and its manipulation in oracle-storage organization in oracle - Programming in PL/SQL- Cursor in PL/SQL

UNIT-IV

Database Design– Design guidelines– Relational database design – Integrity Constraints – Domain Constraints- Referential integrity – Functional Dependency- Normalization using Functional Dependencies, Normal forms based on primary keys- general definitions of Second and Third Normal Forms. Boyce Codd Normal Form– Multivalued Dependencies and Forth Normal Form – Join Dependencies and Fifth Normal Form – Pitfalls in Relational Database Design.

UNIT-V

Distributed databases: Distributed Database Concepts- Data Fragmentation, Replication and Allocation Techniques- Different Types- Query Processing – semijoin - Concurrency Control and Recovery.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Install, configure, and interact with a relational database management system.
2. Describe, define and apply the major components of the relational database model to database design.
3. Learn and apply the Structured Query Language (SQL) for database definition and manipulation; Utilize a database modeling technique for a single entity class, a one-to-one (1:1) relationship between entity classes, a one-to-many (1:M) relationship between entity classes, a many-to-many (M:M) relationship between entity classes, and recursive relationships.

Text Books

1. Fundamentals of Database System Elmasri and Navathe (4rd Edition), Pearson Education Asia (2008)
2. Database System Concepts - Henry F Korth, Abraham Silbershatz, McGraw Hill 2nd edition. (2005)
3. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems, 6th edition, Pearson Education, 2010.

Reference Books

1. An Introduction to Database Systems - C.J.Date (7th Edition) Pearson Education Asia (2006)
2. A.Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts*, 5th Edition, McGraw Hill, 2010.
3. R. Ramakrishnan, J. Gehrke, *Database Management Systems*, 3rd edition, McGraw Hill International Edition, 2007.

BCA Syllabus at JECRC University

Course Name: Data Communications and Computer Networks

Course Code: BCA018A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Students would be able to:

1. 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.
2. Recognize the different internetworking devices and their functions.
3. Explain the role of protocols in networking and analyze the services and features of the various layers of data networks.

UNIT-I

Introduction: Network definition, Network topologies, Network classifications, Layered network architecture, protocol and interface, Overview of ISO-OSI reference model, Overview of TCP/IP protocol suite. Data Communication Fundamentals and Techniques: Analog and digital signal, Data-rate limits, Digital to digital line encoding schemes, Pulse code modulation, Digital to analog modulation- ASK, FSK, PSK, QAM, multiplexing techniques- FDM, TDM, WDM, transmission media.

UNIT-II

Networks Switching Techniques and Access mechanisms: Circuit switching; Packet switching- Connectionless datagram switching, Connection-oriented virtual circuit switching. Data Link Layer Functions and Protocol: Error detection and error correction techniques, Data-link control- framing and flow control, Error recovery protocols- Stop and wait ARQ, Go-back-n ARQ, Selective repeat ARQ, Point to Point Protocol on Internet.

UNIT-III

Multiple Access Protocol and Networks: ALOHA, CSMA/CD protocols, Ethernet LANs, connecting LAN and back-bone networks- Repeaters, Hubs, Switches, Bridges, Router and Gateways.

UNIT-IV

Networks Layer Functions and Protocols: Routing, Routing algorithms, Network layer protocol of Internet- IP protocol, Internet control protocols.

UNIT-V

Transport Layer Functions and Protocols:

Transport services, Berkeley socket interface overview, Transport layer protocol of Internet- UDP and TCP. Overview of Application layer protocol: Overview of DNS protocol, Overview of WWW & HTTP protocol.

Learning Outcomes

Upon successful completion of this subject students should be able to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.

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4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5. Identify the different types of network devices and their functions within a network
6. Understand and building the skills of sub netting and routing mechanisms.

Text Books

1. B. A. Forouzan: Data Communications and Networking, 4th edition, Tata McGraw Hill Education Private Ltd., 2007.
2. A. S. Tanenbaum: Computer Networks, 4th edition, PEARSON, 2003.

Reference Books

3. D. E. Comer, M.S.Narayanan, Computer Networks and Internets with applications, Fourth Edition, PEARSON ,2008.

BCA Syllabus at JECRC University

Course Name: Operating Systems

Course Code: BCA019A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objectives: Students would be able to:

1. Understand the services provided by and the design of an operating system.
2. Understand the structure and organization of the file system, understand what a process is and how processes are synchronized and scheduled.
3. 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

Introduction: Operating Systems functions, Types of operating systems, Multiprogramming systems, Batch systems, Time-sharing systems, Operating system operations, Special purpose operating systems, Distributed systems, Different computing environments.

Operating System Organization: Processor and user modes, user operating system interface, Kernels, System calls and its types, System programs, Operating system structures, Virtual machines.

UNIT-II

Process Management: Process states, Process Scheduling, Process hierarchy, Threads, Threading issues, Multithreading models, Non-pre-emptive and pre-emptive scheduling algorithms, Concurrent processes, Critical section, Semaphores, methods for inter-process communication, Deadlocks.

UNIT-III

Memory Management: Physical and virtual address space, Memory allocation strategies, Paging, Segmentation, Virtual memory and Demand paging, Page replacement algorithms.

UNIT-IV

File and I/O Management: Directory structure, File operations, Files system mounting, File allocation methods, Device management, Disk scheduling algorithms.

UNIT-V

Protection and Security: Policy mechanism, Program, Security problem, user authentication, program and system threats, Cryptography. Case study of UNIX operating system

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand what is an operating system and the role it plays.
2. Understand the structure of operating systems, applications, and the relationship between them.
3. Have some knowledge of the services provided by operating systems. Also have some exposure to some details of major OS concepts.

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Text Books

1. A. Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th edition, John Wiley Publications, 2008.

Reference Books

1. G. Nutt, Operating Systems: A Modern Perspective, 2nd edition Pearson Education, 1997.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd edition, Pearson Education, 2007.
3. W. Stallings, Operating Systems, Internals & Design Principles, 5th edition, Prentice Hall of India, 2008.

BCA Syllabus at JECRC University

Course Name: Data Structures Using C

Course Code: BCA020A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objectives: Students would be able to:

1. 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.
2. Develop application using data structures, learn the concept of protection and management of data and improve the logical ability.
3. 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

Single and Multidimensional arrays, Sequential Allocation, Address Calculations, Sparse Matrices and their efficient representation. Recursion, application of stacks to recursion problems.

UNIT-II

Singly and Double Linked Lists Operations on all these structures and applications of these structures. Circular Linked Lists, Self Organizing Lists , Stacks, Applications of stacks eg.: Infix to Postfix

UNIT-III

Queues, Overview of priority queue, Trees, Binary Trees, Complete Binary trees and almost complete Binary trees, BST, Tree traversal algorithms, Searching in Binary Search Tree

UNIT –IV

Introduction to Threaded Trees. BST Insertion & Deletion, Sorting Techniques (without efficiency): Bubble Sort, Selection Sort, Insertion Sort

UNIT-V

Searching Techniques (without efficiency): Linear search, Binary search, Hashing with Collision handling methods. Multiway trees – B-Tree, B+ Tree.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Learn good principles of algorithm design.
2. Learn how to analyze algorithms and estimate their worst-case and average-case behavior (in easy cases).
3. Become familiar with fundamental data structures and with the manner in which these data structures can best be implemented; become accustomed to the description of algorithms in both functional and procedural styles.
4. Learn how to apply their theoretical knowledge in practice (via the practical component of the course).

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Text Books

1. Adam Drozdek, *Data Structures and algorithm in C++*, Third Edition, Cengage Learning, 2012.
2. SartajSahni, *Data Structures, Algorithms and applications in C++*, Second Edition, Universities Press, 2011.
3. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, *Data Structures Using C and C++*, Second edition, PHI, 2009.

Reference Books

4. D.S Malik, *Data Structure using C++*, Second edition, Cengage Learning, 2010.

BCA Syllabus at JECRC University

Course Name: Programming in C++ - I

Course Code: BCA021A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Students would be able to:

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

Unit -I

Introduction and Features : Fundamentals of object oriented programming – procedure oriented programming, object oriented programming (OOP) Object oriented programming concepts – Classes, reusability, encapsulation, inheritance, polymorphism, dynamic binding, message passing.

Unit-II

Language Constructs Review of constructs of C used in C++ : variables, types and type declarations, userdefined data types; increment and decrement operators, relational and logical operators; ifthen else clause; conditional expressions, input and output statement, loops, switch case, arrays, functions, ; preprocessor directives

Unit-III

Classes and Objects Creation, accessing class members Private Vs Public Constructor and Destructor Objects. Member Functions Method definition Inline Implementation Constant member functions

Unit-IV

Overloading Member Functions Need of operator overloading, prefix and postfix, overloading binary operators, operator overloading, instream/outstream operator overloading.

Unit-V

Inheritance Definition of inheritance, protected data, private data, public data, inheriting constructors and destructors, constructor for virtual base classes, constructors and destructors of derived classes, and virtual functions, size of a derived class, order of invocation, types of inheritance, single inheritance, hierarchical inheritance, multiple inheritance, hybrid inheritance Polymorphism and Virtual Functions Importance of virtual function, function call binding, virtual functions, implementing late binding, need for virtual functions, abstract base classes and pure virtual functions, virtual destructors.

Learning Outcome

Upon successful completion of this subject students should be able to:

1. Understand object-oriented programming features in C++.
2. Apply these features to program design and implementation.
3. Understand object-oriented concepts and how they are supported by C++.
4. Gain some practical experience of C++.

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Text Books

1. C++: An introduction to programming by Jense Liberty Tim Keogh: BPB Publications, NewDelhi
2. OO Programming in C++ by Robert Lafore: ,Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi

Reference Books

1. Object Oriented Programming Using C++, SanjeevSofat, Cyber Tech. Publication, NewDelhi
2. Object Oriented Programming in C++ by E. Balaguruswamy, TMH Publishing Co. Ltd.,

BCA Syllabus at JECRC University

Course Name: Database Systems Lab

Course Code: BCA022A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Be able to design, and implement Database management system with the help of an organization example.
2. Run different queries on the created database and show how they are working and get the required results.
3. Learn the different constructs of SQL, PL/SQL and implement them.

1. Create and use the following database scheme to answer the given queries.

EMPLOYEE Scheme

Field	Type	NULL	KEY	DEFAULT
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO		NIL
Job_type	Varchar(50)	NO		NIL
Manager	Char(3)	Yes	FK	NIL
Hire_date	Date	NO		NIL
Dno	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES		NIL
Salary	Decimal(7,2)	NO		NIL

EMPLOYEE State

Eno	Ename	Job_type	Manager	Hire_date	Dno	Commission	Salary
765	Martin	Sales_man	198	1981-04-22	30	1400.00	1250.00
756	Jones	Manager	783	1981-04-02	20	0.00	2300.00
752	Ward	Sales_man	769	1981-02-22	30	500.00	1300.00
749	Allan	Sales_man	769	1981-02-20	30	300.00	2000.00
736	Smith	Clerk	790	1980-12-17	20	0.00	1000.00
793	Miller	Clerk	788	1982-01-23	4	0.00	1300.00
792	Ford	Analyst	756	1981-12-03	20	0.00	2600.00
790	James	Clerk	769	1981-12-03	30	0.00	950.00
787	Adams	Clerk	778	1983-01-12	20	0.00	1150.00
784	Turner	Sales_man	769	1981-09-08	30	0.00	1450.00
783	King	President	NULL	1981-11-17	10	0.00	2950.00
788	Scott	Analyst	756	1982-12-09	20	0.00	2850.00
778	Clark	Manager	783	1981-06-09	10	0.00	2900.00
769	Blake	Manager	783	1981-05-01	30	0.00	2870.00

DEPARTMENT Scheme

Field	Type	NULL	KEY	DEFAULT
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL
Location	Varchar(50)	Yes		New Delhi

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DEPARTMENT State

Dno	Dname	Location
10	Accounting	New York
20	Research	Dallas
30	Sales	Chicago
40	Operation	Boston
50	Marketing	New Delhi

Query List

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than \$2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of \$1500 and \$2850.
8. Query to display Employee Name and Department No. Of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.
10. Query to display Name and Job of all employees who don't have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission. Sort the data in descending order of Salary and Commission.
12. Query to display Name of all the employees where the third letter of their name is 'A'.
13. Query to display Name of all employees either have two 'R's or have two 'A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.
14. Query to display Name, Salary and Commission for all employees whose Commission Amount is greater than their Salary increased by 5%.
15. Query to display the Current Date.
16. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
17. Query to display Name and calculate the number of months between today and the date each employee was hired.
18. Query to display the following for each employee:-
<E-Name> earns < Salary> monthly but wants < 3 * Current Salary >.
Label the Column as Dream Salary.

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19. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with 'J', 'A' and 'M'.
20. Query to display Name, Hire Date and Day of the week on which the employee started.
21. Query to display Name, Department Name and Department No for all the employees.
22. Query to display Unique Listing of all Jobs that are in Department # 30.
23. Query to display Name, Dept Name of all employees who have an 'A' in their name.
24. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
25. Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.
26. Query to display Name, Dept No. And Salary of any employee whose department No. And salary matches both the department no. And the salary of any employee who earns a commission.
27. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies \$100.
28. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
29. Query to display the number of employees performing the same Job type functions.
30. Query to display the no. Of managers without listing their names.
31. Query to display the Department Name, Location Name, No. Of Employees and the average salary for all employees in that department.
32. Query to display Name and Hire Date for all employees in the same dept. As Blake.
33. Query to display the Employee No. And Name for all employees who earn more than the average salary.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Have knowledge how database is created and are able to implement the different query structures.
2. Run different constructs of SQL queries, also they are able to execute variations of queries.
3. Understand how query are being processed and executed.

BCA Syllabus at JECRC University

Course Name: Data Structures Using C Lab

Course Code: BCA023A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objectives: Students would be able to:

1. Implement storage mechanisms of various basic and advanced data structures.
 2. Introduce various techniques for representation of the data in the real world, and develop application using data structures.
 3. Choose appropriate data structure as applied to specified problem definition, handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
-
1. Write a menu driven program to implement the following sparse matrices using one-dimensional array:
 - i) Diagonal Matrix
 - ii) Lower Triangular Matrix
 - iii) Upper Triangular Matrix
 - iv) Symmetric Matrix
 2. Write a program to compute b^r using recursion where b represent base and r represents power.
 3. Write a program to reverse a user entered string using recursion.
 4. Write a program to perform the following Queue operations using Circular Array implementation (Use Templates):
 - i) Enqueue
 - ii) Dequeue
 5. Write a program to add two large integers using stack.
 6. Write a program to evaluate postfix expression using stack.
 7. Write a program to implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
 8. Write a program to perform the following Stack operations using linked list.
 - i) Push
 - ii) Pop
 - iii) Clear
 9. Write a program to create and perform the following operations on Queues using linked list:
 - i) Enqueue
 - ii) Dequeue
 10. Write a program to implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
 11. Write a program to implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
 12. Write a program to add two polynomials using linked list representation.
 13. Write a menu driven program to implement the following operations in an ordered linked list:
 - i) Insertion
 - ii) Deletion

- iii) Merging
- 14. Write a Program to reverse elements of a Stack using an additional Stack.
- 15. Write a Program to reverse elements of a Stack using an additional Queue.
- 16. Write a Program to implement the following operations in a Binary Search Tree
 - i) Insertion.
 - ii) Deletion by copying or by merging.
 - iii) Search a number in BST.
 - iv) Display the contents in one of preorder, postorder and inorder traversals using recursion.
 - v) Display the contents by level-by-level traversal.
 - vi) Count the leaf and non-leaf nodes of the tree.
 - vii) Display the height of the tree.
 - viii) Create the mirror image of the tree.
- 17. Write a menu driven program to implement the following sorting and searching algorithms
 - i) Selection Sort,
 - ii) Insertion Sort
 - iii) Binary Search
 - iv) Bubble Sort

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Learn good principles of algorithm design.
2. Differentiate in use of various types of data structures like stack, queue, and linked list. With the implementation of these structures they can see practical approach.
3. Use various data structures effectively in application programs.

BCA Syllabus at JECRC University

Course Name: Operating System Lab

Course Code: BCA024A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objectives: Students would be able to:

1. Learn UNIX architecture.
2. Learn different commands to operate this system, file structure of UNIX.
3. Know the introduction to Shell Programming and control structure.

BASIC UNIX COMMANDS

1. File Manipulation functions
 - Create,
 - open,
 - read,
 - write,
 - close,
 - mv,
 - cp,
 - rm.
2. Directory Manipulation functions such as mkdir, rmdir, cd, pwd.
3. ls with options such as -l, -s, etc
4. wc
5. diff
6. cmp
7. chmod
8. who
9. who am i
10. passwd
11. du
12. date
13. cal
14. grep
15. cat
16. sort and tail

Learning Outcomes: Upon successful completion of this subject students should be able to:

1. Learn Basic UNIX Commands.
2. Work on UNIX architecture.
3. Operate it with the help of commands, have knowledge of file structure.

BCA Syllabus at JECRC University

Course Name: Programming in C++-Lab
Course Code: BCA025A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.
 2. Write small/medium scale C++ programs with simple graphical user interface.
 3. Do object modeling in C++.
-
1. Write a function using variables as arguments to swap the values of a pair of integers.
 2. An election is contested by five candidates. The candidates are numbered 1 to 5 & voting is done by marking the candidate number on the ballot paper. Write a program to read the ballot & count the votes cast for each candidate using an array, variable count. In case, a number read is outside the range 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballot.
 3. Write a program to read a matrix of size m*n from the keyboard and display the same on the screen.
 4. Define a class to represent a bank account including the following members: - Data members
 - a. Name of the depositors
 - b. Account number
 - c. Type of account
 - d. Balance amount in the account Member function
 - To assign initial values
 - To deposit an amount
 - To withdraw an amount after checking the balance
 - To display the name and balance.
 5. Modify the class and the program of practical 4 for handling 10 customers.
 6. Create 2 classes OM and DB which store the value of distance. DM store distances in meters and cm and DB in feet and inches. Write a program that can read values for the class objects and add 1 object OM with another object of DB. Use a friend function to carry out the addition operation the object that stores the results may be a DM object or a DB object, depending upon the units in which the results are require. The display should be in the format of feet and inches or meters and cms depending on the object on display.
 7. A book shop maintains the inventory of books that are being sold at the shop the list includes details such as author, title and publisher and stock position. Whenever a customer wants the book, the sales person inputs the title and author and the system search the list and display whether it is available or not. If it is not, a appropriate message is displayed, if it is, then the system displays the book details and requests for the number of copies require. If the requested are available, the total cost of the required copies is displayed: otherwise the message "Required copies not in stock" is displayed. Design a system using a class called books with suitable member functions and constructors. Use new operator in constructor to allocate memory space requires.

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8. Define a class string that could work as a user defined string type include constructors that will enable us to create an .un-initialized string. String s1; \therefore string with length 0 And also to initialize an object with string constant at the time of creation like String s2("well done"); . Include a function that adds two strings to make a third string.
9. Create a class float that contains 2 float data member. Over load all the 4 arithmetic operators so that do operate on the objects of float.
10. Create a class MAT of size m*o. Define all possible matrix operation for MAT type objects.
11. Create a base class called shape use this class to store two double type values that could be used to compute the area of fig. Derive the specific class called TRIANGLE and RECTANGLE from the data shape. Add to base class, a member function get - data () to initialize base class data members and another member and another member function display – area() to compute and display the area of the fig. Make display – area () as a virtual function and redefine function in the derived classes to suit their requirements,Using these 3 classes design a program that will accept dimension of RECTANGLE or TRIANGLE interactivity and display the area.Remember the 2 values given as input will be treated as length of 2 sides in the case of rectangle and as base and height in the case of triangles and used as follows:

$$\text{Area of rectangle} = x*y$$

$$\text{Area of triangle} = 1/2 *x*y$$

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Implement the concepts of C++ like inheritance, polymorphism, dynamic binding also they can use generic structures in building reusable code.
2. Write small/medium scale C++ programs with simple graphical user interface.
3. Do Data manipulation through file in C++

Course Name: Seminar-III
Course Code: BCA026A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

BCA Syllabus at JECRC University

Course Name: Value Education

Course Code: BMC109A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	0	0	3

UNIT-I

Values and Self Development-Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non-moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

UNIT –II

Personality and Behavior Development- Soul and scientific attitude, God and scientific attitude, Positive thinking, Integrity and discipline, Punctuality, Love and kindness, Avoiding fault finding, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness vs. suffering love for truth, Aware of self-destructive habits, Association and cooperation, Doing best, Saving nature.

UNIT-III

Character and Competence- Science vs. God, Holy books vs. blind faith, Self-management and good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of women, All religions and same message, Mind your mind, Self-control, Honesty, Studying effectively.

UNIT IV

Human Rights- Jurisprudence of human rights nature and definition, Universal protection of human rights, Regional protection of human rights, National level protection of human rights, Human rights and vulnerable groups.

UNIT-V

Legislative Procedures- Indian constitution, Philosophy, fundamental rights and duties, Legislature, Executive and Judiciary, Constitution and function of parliament, Composition of council of states and house of people, Speaker, Passing of bills, Vigilance, Lokpal and functionaries.

Text Books

1. Chakraborty, S.K., Values and Ethics for Organizations Theory and Practice, Oxford University Press, New Delhi, 2001.
2. Kapoor, S.K., Human rights under International Law and Indian Law, Prentice Hall of India, New Delhi, 2002.
3. Basu, D.D., Indian Constitution, Oxford University Press, New Delhi, 2002.

Reference Books

1. Frankena, W.K., Ethics, Prentice Hall of India, New Delhi, 1990.
2. Meron Theodor, Human Rights and International Law Legal Policy Issues, Vol. 1 and 2, Oxford University Press, New Delhi, 2000.

Semester – IV

Course Name: Computer Graphics

Course Code: BCA027A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objective: Students would be able to:

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

UNIT-I

Introduction: Basic elements of Computer graphics, Applications of computer graphics. Graphics Hardware, Architecture of Raster and Random scan display devices, input/output devices.

UNIT-II

Drawing Primitives: Raster scan line, circle and ellipse drawing algorithms, Polygon filling, line clipping and polygon clipping algorithms

UNIT-III

Transformation and Viewing: 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations, Vanishing points.

UNIT-IV

Geometric Modeling: Representing curves (Hermite and Bezier). Visible Surface determination: (5 L) Z-buffer algorithm, List-priority algorithm and area subdivision algorithm.

UNIT-V

Surface Rendering: Color Models, Illumination and shading models, Computer Animation

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand graphics, how to capture basic primitives, transformation between them.
2. Understand and demonstrate computer graphics animation.
3. Understand and demonstrate geometrical transformations.

Text Books

1. Computer Graphics: Principles and Practice in C (2nd Edition) James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, Addison-Wesley Professional, 1995.
2. D. Hearn, Baker: Computer Graphics, (2nd Edition) Prentice Hall of India, 2008.

BCA Syllabus at JECRC University

Course Name: Multimedia Technology

Course Code: BCA028A

L (Hr.)	T (Hr.)	P (Hr.)	C
4		0	4

Objective: Students would be able to:

1. Present a step-by-step approach to multimedia systems design.
2. Introduce multimedia standards and compression and decompression technologies.
3. Provide a detailed analysis of the various storage technologies.

Unit I

Introduction to Multimedia: Hardware for Multimedia computer, Software for multimedia, ; Sound/Audio, Images and Graphics, Video and Animation.

Unit II

Data Compression, Optical Storage Media; Computer Technology, Multimedia Operating Systems

Unit III

Networking Systems, OSI network layer, TCP/IP protocol, Basics of Multiplexing, Local Area Network, Wide Area Networks, Multimedia Communication Systems; wireless networks, Database Systems;

Unit IV

Multimedia Architecture; Multimedia Documents, Hypertext and MHEG; Hypertext and Hypermedia, World Wide Web, Hypertext markup Language

Unit V

User Interfaces, Synchronization, Abstractions for Programming; Multimedia Application Development, Virtual Reality; Future Directions;

Learning Outcome:

Upon successful completion of this subject students should be able to:

1. Understand different realizations of multimedia tools and their usage.
2. Implement various multimedia standards and compression technologies.
3. Be capable of analyzing various storage technologies.

Text Books

1. "Multimedia Computing Communications & Applications " by Ralf Steinmetz, KlaraNahrstedt, Pearson Education (2004)
2. Principles of Multimedia by Parekh Ranjan, Tata McGraw-Hill(2007)

Reference Books

1. Multimedia Systems, By John E Koegal, Buford, IIBK. (1994)

BCA Syllabus at JECRC University

Course Name: Software Engineering

Course Code: BCA029A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objective: Students would be able to:

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

UNIT-I

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

UNIT-II

Requirement Analysis: Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques. Design Engineering: Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture.

UNIT-III

Quality Management: Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects. Software Metrics: Product Metrics, Measures, Metrics and Indicators, Function Based Metrics, Process and Project ,Metrics, Software Measurements, and Metrics for software quality.

UNIT-IV

Estimations and Scheduling: Estimations for Software Projects, Empirical Estimation Models, Project Scheduling. Testing Strategies & Tactics: Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Black-Box Testing, White-Box Testing, Basis Path Testing.

UNIT-V

Risk Management: Software Risks, Risk Identification, Risk Projection and Risk Refinement, Risk Mitigation, Monitoring and Management.

Learning Outcome

Upon successful completion of this subject students should be able to:

1. Design and conduct experiments, as well as to analyze and interpret data.
2. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
3. Identify, formulates, and solves engineering problems.

BCA Syllabus at JECRC University

4. Have an understanding of professional and ethical responsibility.
5. Understand the impact of engineering solutions in a global, economic, environmental, and societal context.

Text Books

1. R.S. Pressman, Software Engineering: A Practitioner's Approach, McGraw-Hill, Ed 7, 2010.
2. P. Jalote, An Integrated Approach to Software Engineering, Narosa Publishing House, Edition 3, 2011.

Reference Books

3. R. Mall, Fundamentals of Software Engineering, Prentice-Hall of India, 3rd Edition, 2009. 4.I. Sommerville, Software Engineering (9th edition), Addison Wesley, 2010

BCA Syllabus at JECRC University

Course Name: E-Commerce Banking and Security Transaction
Course Code: BCA030A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objective: Students would be able to:

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

UNIT-I

Introduction: Definition of Electronic Commerce, The scope of Electronic Commerce, The value chain, Competitive advantage, Business strategy. Business to Business Electronic Commerce: Electronic markets, Electronic data interchange (EDI), EDI: the nuts and bolts, EDI and Business Inter-organizational E-Commerce.

UNIT-II

E-banking: Definition, Transaction websites components, E-banking Support Services, Wireless Banking. E-Banking Risk: Transaction/Operation Risk, Credit Risk. Risk Management of E-Banking Activities.

UNIT-III

Board Management Oversight, Managing outstanding relationship, Information Security Program, Administrative controls, Legal and compliance Issue.

UNIT-IV

Electronic Payment System, Need of E-Payment System, Online Payment Mechanism, Payment Gateway, Digital Currencies, Plastic Money: Debit Card, Credit Card, NEFT, RTGS

UNIT-V

E-Security: Security Issues in E-banking, Increasing concerns on security, Threats and Security Measures in E-banking, Secure Electronic Transitions, Role of RBI and Legal issues, Government Policies and Agenda.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Have knowledge of e-commerce, its components, structure of e-banking, rules and regulations on e-commerce.
2. Discuss the trends in e-Commerce and the use of the Internet.
3. Explain the economic consequences of e-Commerce.

Text Books

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison Wesley.
2. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH
3. P. Loshin, John Vacca, "Electronic commerce", Firewall Media, New Delhi

BCA Syllabus at JECRC University

Course Name: Computer Graphics Lab

Course Code: BCA031A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Implement different computer graphics algorithms, these algorithm make them learn about the creation of primitives of graphics, storage and generation.
2. Create interactive graphics applications in C++ using one or more graphics application programming interfaces.
3. Write programs that demonstrate geometrical transformations.

1. Write a program to implement Bresenham's line drawing algorithm,
2. Write a program to implement mid-point circle drawing algorithm
3. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
4. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
5. Write a program to fill a polygon using Scan line fill algorithm.
6. Write a program to apply various 2D transformations on a 2D object (use homogenous coordinates).
7. Write a program to apply various 3D transformations on a 3D object and then apply parallel and perspective projection on it.
8. Write a program to draw Hermite/Bezier curve.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Have knowledge how the graphics are stored, created and processed in computer systems, they are able to implement the basic primitives.
2. Write programs that demonstrate computer graphics animation.
3. Write programs that demonstrate 2D image processing techniques.

BCA Syllabus at JECRC University

Course Name: Software Engineering Lab

Course Code: BCA032A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Implement the concepts of software engineering.
2. Introduce software engineering and to explain its importance in building large programs, understand the process of developing new technology and the role of experimentation,
3. 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.

1. Problem Statement
Process Model
2. Requirement Analysis:
 - i. Creating a Data Flow
 - ii. Data Dictionary, Use Cases
3. Project Management:
 - i. Computing FP
 - ii. Effort
 - iii. Schedule, Risk Table, Timeline chart
4. Design Engineering:
 - i. Architectural Design
 - ii. Data Design, Component Level Design
5. Testing:
 - i. Basis Path Testing

Sample Projects:

1. Criminal Record Management : Implement a criminal record management system for jailers, police officers and CBI officers
2. DTC Route Information Online information about the bus routes and their frequency and fares.
3. Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
4. Patient Appointment and Prescription Management System
5. Organized Retail Shopping Management Software
6. Online Hotel Reservation Service System
7. Examination and Result computation system
8. Automatic Internal Assessment System
9. Parking Allocation System.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Implement the concepts of software engineering.
2. Have the understanding of the process of developing new technology and the role of experimentation.
3. Manage a project from beginning to end.

BCA Syllabus at JECRC University

Course Name: Multimedia Technology Lab

Course Code: BCA 033A

L (Hr.)	T/P (Hr)	Pr (Hr.)	C
0	0	2	2

Objectives: Students would be able to:

1. Have foundation knowledge of multimedia computing, e.g. media characteristics, multimedia representation, data formats, multimedia technology development.
2. Be provided programming training in multimedia computing, multimedia system design and implementations.
3. Understand basics of multimedia tool FLASH. Implement motion and shape animation effect on objects using C language programming.

List of Experiments

1. Write a program to show a bitmap image on your computer screen.
2. Write a program to create a file splitter.
3. Write a program for tossing up a coin.
4. Write a program to produce animation effect of triangle transform into square and then into circle.
5. Write a program to draw a moving airplane using c.
6. Write a program to create motion effect. Using FLASH & Dreamweaver
 - a. Procedure to create an animation to represent the growing Moon.
 - b. Procedure to create an animation to indicate a ball bouncing on steps.
 - c. Procedure to simulate movement of a cloud.
 - d. Procedure to draw the fan blades and to give proper animation.
7. Procedure to create an animation with the following features. Represent the word "Good Morning" with following effect
 - a. Letters should appear one by one
 - b. The fill color of the text should change to a different colour after the display of the full word.
8. Procedure to simulate a ball hitting another ball.
9. Procedure to display the background given (filename:Tullip.jpg) through your name using mask.
10. Procedure to change a circle into a square using flash.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Use multimedia tool FLASH to develop applications.
2. Implement motion and shape animation effect on objects using C language programming.
3. Describe different realizations of multimedia tools and the way in which they are used.

BCA Syllabus at JECRC University

Course Name: Probability Theory and Statistical Computing
Course Code: BCA034A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objectives: Students would be able to:

1. Know basic concepts of descriptive statistics, probability and their distributions, and inferential statistics and their applications in different areas.
2. Identify existing pattern of data and their applications.
3. Apply statistical tools and techniques in rational ways. Analyze the data scientifically and interpret them meaningfully

UNIT-I

Introduction to the notion of probability, Random experiment, Sample space & Events, Probability defined on events, Algebra of events, Conditional probabilities, Independent events, Bayes' theorem. Random Variables, cumulative distribution functions, probability mass/density functions,

UNIT-II

Discrete Random Variables (Binomial, Poisson and Geometric). Continuous Random Variables (Normal, Exponential, Uniform and Gamma). Expectation of a Random Variable (Discrete & Continuous cases). Expectation of Function of a Random Variable. Variance of a Random Variable. Jointly distributed Random Variables, Joint distribution functions, Independent Random Variables, Co-variance of Random Variables.

UNIT-III

Joint probability Distribution of Function of Random Variables, Moment Generating Functions. Introduction to Conditional Probability – Discrete and Continuous, Conditional Expectation, Matching Rounds Problem, Quicksort, Conditional Variance, Variance in Matching Rounds Problem, Best Prize Problem

UNIT-IV

Some more Applications: List Model, Random Graphs, Left Skip free random walks, Limits and bounds Markov inequality, Chebyshev's inequality, Chernoff's bound, Central Limit Theorem, Strong Law of Large Numbers.

UNIT-V

Markov Chains: Introduction to stochastic processes, Chapman–Kolmogorov equations, classification of states, Limiting and Stationery probabilities. Statistical Analysis: Simple Linear Regression Model, Linear Probabilistic Model, Estimating Model Parameters, Sample Correlation Coefficient, Inferences about the Population Correlation, Coefficient.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Have knowledge of basic concepts of descriptive statistics, probability and their distributions, and inferential statistics and their applications in different areas.
2. Able to test the hypothesis using suitable statistical test.
3. Able to calculate coefficient of correlation and regression lines.

BCA Syllabus at JECRC University

Text Books

1. Sheldon Ross, Introduction to Probability Models, Tenth Edition, Academic Press/Elsevier, 2012.
2. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, Eighth Edition, Cengage Learning, 2012.

Reference Books

1. K.S. Trivedi, Probability and Statistics with Reliability, Queuing and Computer Science Applications, Second Edition, Wiley, 2013.
2. James L. Johnson, Probability and Statistics for Computer Science, Wiley, 2008.
3. Jane Horgan, Probability with R: An Introduction with Computer Science Applications, Wiley, 2008.

Course Name: Seminar-IV
Course Code: BCA035A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	0	0	3

A seminar on any technical topic.

BCA Syllabus at JECRC University

Course Name: Management Information Systems

Course Code: BCA036A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Students would be able to:

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

UNIT – I

STRATEGIC VIEW OF MIS: Management Information Systems in a Digital Firm, E-Business Enterprise: A Digital Firm, Strategic Management of Business Performance, Information Security Challenges in E-Enterprises, Information Technology: Impact on Society.

UNIT – II

BASICS OF MANAGEMENT INFORMATION SYSTEMS: Decision – Making Information, Knowledge, Business Intelligence,. Systems Engineering: Analysis and Design, Development Process of MIS, Strategic Design of MIS, Business Process Re-Engineering (BPR)

UNIT-III

APPLICATIONS OF MANAGEMENT INFORMATION SYSTEMS TO E-BUSINESS Applications in Manufacturing Sector, Applications in Service Sector. Decision Support Systems and Knowledge Management. Enterprise Management Systems

UNIT-IV

INFOTECH INFRASTRUCTURE

Technology of Information Systems, Unified Communication and Networks, Database and Client Server Architecture. Data Warehouse: Architecture to Implementation E-Business Technology

UNIT-V

COMPREHENSIVE CASES ON MANAGEMENT INFORMATION SYSTEMS

Tata Home Finance Ltd. (A Comprehensive Case Study on MIS), Techno-Cases in E-Enterprise Management. Case Digest of SCM, FS Square Infotech Ltd. (FSIT) Home Land Groceries and Stores (HLGS)

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Apply critical thinking skills in decision making in the context of systems development.

BCA Syllabus at JECRC University

2. Compete in ethical reasoning and judgment addressing complexities in life and business.
3. Control costs by giving information about idle time, labor turnover, wastages and losses and surplus capacity.

TEXT BOOKS

1. Management Information Systems: Waman S Jawadekar
2. Dr. C.B Gupta “Management concepts & practices” S.Chand& Sons, 2009.
3. Stoner,Freeman& Gilbert, “Management” 6th Edition, Pearson International.

Semester – V

Course Name: Web Designing Techniques

Course Code: BCA037A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objective:

1. To gain the skills and project-based experience needed for entry into web design and development careers.
2. To use a variety of strategies and tools to create websites.
3. 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

The Internet – Basic of internet, file transfer, telnet, usenet, gopher, wais, archie and veronica. Basics of World Wide Web (WWW)

Web Servers, Browsers and Security – Web Browser and its architecture, The web server, the proxy server, How does web server work, How does web browser work, the fast ready connections on the web, web browsers, netscape communication suite, Microsoft internet explorer, the virus menace in the internet, firewalls, data security.

Unit-II

The World Wide Web (WWW): HTML History, Hypertext and Hypertext Markup Language.

HTML Documents: Tags, Elements of an HTML Document: Text Elements, Tag Elements, Structural elements of HTML documents, Header tags, Body tags, Paragraphs, Title.

List: Numbered list, Non-Numbered lists, Definition lists

Unit-III

Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed),

Managing images in html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images.

Frames Tables in HTML documents: Tags used in table definition, Tags used for border thickness, Tags used for cell spacing, Tags used for table size, Dividing table with lines, Dividing lines with cells, Cell types: Titles cells, Data cells

Unit-IV

Hypertext and Link in HTML Documents URL/FTP/HTTP, Types of links: Internal Links, External Link, Link Tags, Links with images and buttons, Links that send email messages Special effects in HTML documents.

Unit-V

Web Designing with PHP (Introduction): Introduction to PHP, Installation of PHP and MySQL, PHP configuration in IIS & Apache Web Server and features of PHP, Writing PHP, How PHP code is parsed, Embedding PHP and HTML Executing PHP and viewing in Browser.

Text Books

1. Internet and web technology by Raj Kamal, TMH Publication
2. [Steven Holzner](#), The Complete Reference PHP, Tata McGraw - Hill Education
3. [Steve Suehring](#), [Tim Converse](#), [Joyce Park](#), [PHP6 And My SQL Bible](#), Wiley India Pvt Ltd

Upon successful completion of this subject students should be able to:

1. 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.
2. Able to design front end web page and connect to the back end databases.
3. Understand the fundamentals of Web Hosting.

BCA Syllabus at JECRC University

Course Name: Programming in java

Course Code: BCA038A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Students would be able to:

1. Be familiarizing with good design and programming.
2. 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.
3. Implement error-handling techniques using exception handling.

Unit-I

Java Fundamentals, Features of Java, OOPs concepts, Java virtual machine, Reflection byte codes, Byte code interpretation, Data types, variable, arrays, expressions, operators, and control structures, Objects and classes.

Unit-II

Java Classes: Abstract classes, static classes, Inner classes, Packages, Wrapper classes Interfaces, This, Super, Access control

Unit-III

Exception handling: Exception as objects, Exception hierarchy, Try catch finally, Throw, throws

Unit-IV

IO package: Input streams, Output streams, Object serialization, Deserialization, Sample programs on IO files, Filter and pipe streams.

Unit-V

Multi-threading: Thread Life cycle, Multi-threading advantages and issues, Simple thread program, Thread synchronization .GUI: Introduction to AWT programming, Layout and component managers, Event handling, Applet class, Applet life-cycle, passing parameters embedding in HTML

Learning Outcome:

Upon successful completion of this subject students should be able to:

1. Know the programming concepts and techniques using the Java language in a way appropriate for students without a programming background.
2. Create and event-driven GUI using Swing components; and implement I/O functionality to read from and write to text files.
3. Know the usage of Servlets and JSP.

Text Books

1. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill Companies
2. Java Programming John P. Flynt Thomson 2nd
3. The complete reference JAVA2, Herbert schildt. TMH

BCA Syllabus at JECRC University

Course Name: Business Economics

Course Code: BCA039A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	0	0	3

Objectives: Students would be able to:

1. Apply the basic theories of economics in critical thinking and problem solving.
2. Identify and use economics terminologies in oral and written communications.
3. Explain and analyze key principles of management: planning, organizing, leading, and controlling in business organizations.

UNIT I

The Scope and Method of Economics, The Economic Problem: Scarcity & Choice, The Price Mechanism, And Demand & Supply Equilibrium: The concept of Elasticity and its Applications.

UNIT-II

The Production Process: Output decisions – Revenues, Costs and Profit Maximization Laws of Returns & Returns to Scale; Economies and Diseconomies of Scale.

UNIT III

Market Structure: Equilibrium of a Firm and Price, Output Determination under Perfect Competition, Monopoly, Monopolistic Competition & Oligopoly.

UNIT IV

Macro-Economic Concerns: Inflation, Unemployment, Trade-Cycles: Circular Flow upto Four Sector Economy, Government in the Macro Economy: Fiscal Policy, Monetary Policy, Measuring National Income and Output.

UNIT V

The World Economy – WTO, Globalization, MNCs, Outsourcing, Foreign Capital in India, Trips, Groups of Twenty (G-20), Issues of Dumping, Export- Import Policy

Learning outcomes:

Upon successful completion of this subject students should be able to:

1. Demonstrate the ability to recognize when change is appropriate, to adapt to change as it occurs, and to take the lead in creating change as the country's economic environment changes.
2. Explain concepts of Financial Management for good governance of organization.
3. Understand the fundamentals of consumer behavior and analyze different case studies.

TEXT BOOKS:

1. Ahuja H.L., "Business Economics", S. Chand & Co., New Delhi, 2001
2. Karl E. Case & Ray C. Fair, "Principles of Economics", Pearson Education, Asia, 2000

BCA Syllabus at JECRC University

Course Name: Programming in Java lab

Course Code: BCA040A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objectives: Students would be able to:

1. Implement the concepts of JAVA.
 2. Understand the concept of byte code, also they implement the programs and find the difference in C++, JAVA programming.
 3. Implement, compile, test and run Java programs.
-
1. Write a program that produces the following output:
Hello World!
"It's been nice knowing you "
Goodbye world!
 2. State the order of evaluation of the operations in each of the following Java statements and implement them to show the value of x after each statement.
 $x = 7 + 3 * 6 / 2 - 1;$
 $x = 2 \% 2 + 2 * 2 - 2 / 2;$
 $x = (3 * 9 * (3 + (9 * 3 / (3))));$
 3. Write an application that declares 5 integers, determines and prints the largest and smallest in the group.
 4. Write an application that takes 3 parameters as sides of triangle and calculate area of triangle.
 5. Write an application that declares two integers, determines whether the first is a multiple of the second and print the result. [Hint: Use the remainder operator.]
 6. Write a program to find all prime numbers between 100 and 1000.
 7. Write a program to check whether the given number is palindrome or not.
 8. Write an application that evaluates the factorial of the integers from 1 to 5.
 9. Write a program that accepts an integer from user and check whether the number is Fibonacci number or not.
 10. Read a positive integer value, and compute the following sequence: If the number is even, halve it; if it's odd, multiply by 3 and add 1. Repeat this process until the value is 1, printing out each value. Finally print out how many of these operations you performed. Typical output might be:
Initial value is 9
Next value is 28
Next value is 14
Next value is 7
Next value is 22
Next value is 11
Next value is 34
Next value is 17
Next value is 52
Next value is 26
Next value is 13
If the input value is less than 1, print a message containing the word Error

BCA Syllabus at JECRC University

Learning Outcome:

Upon successful completion of this subject students should be able to:

1. Know the programming concepts and techniques using the Java language in a way appropriate for students without a programming background.
2. Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
3. Develop programs using the Java Collection API as well as the Java standard class library.

BCA Syllabus at JECRC University

Course Name: Microprocessor

Course Code: BCA041A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objectives:

Students would be able to:

1. Learn architecture, addressing modes and programming of a typical 8-bit microprocessor.
2. Learn architecture and programming of typical 16-bit microprocessors.
3. Learn microprocessor interfacing and applications.

UNIT – I

Introduction to Microprocessors , microcontrollers and microcomputers, Study of 8085 8 bit Microprocessor, pin-out, its internal architecture, addressing modes, 8085 Microprocessor complete instruction set and timing. Arithmetic, logic , branch instructions, programming techniques- looping, counting, indexing, stacks and subroutines, code conversion, BCD Arithmetic.

UNIT - II

Counters and time delays using programming, Software development systems and assemblers, writing complete programs for 8085. Basic interfacing concepts, interfacing memory, interfacing keyboards and output displays , memory mapped and isolated I/O. Interrupts and their processing, 8259, Interrupt interface circuits using 8259.

UNIT - III

General purpose programmable peripheral devices-8255,8253 programmable interval timer,8257 DMA controller, serial I/O and data communication,RS-232C standard, Serial I/O lines, 8251A Programmable communications interface.

UNIT – IV

Introduction to 8086/8088 microprocessors, pin-out, architecture, segmented memory, timing diagrams, addressing modes, instruction set. Comparison of 8085, 8086, 8088 microprocessors

Learning Outcome: Upon successful completion of this subject students should be able to:

1. Analyze, specify, design, write and test assembly language programs of moderate complexity.
2. Select an appropriate ‘architecture’ or program design to apply to a particular situation; e.g. an interrupt-driven I/O handler for a responsive real-time machine. the student will be able to design and build the necessary programs.
3. Identify and explain the operations of peripherals and memories typically interfaced with microprocessors and microcontrollers.

TEXT BOOKS:

1. Microprocessor Architecture, Programming & Application with 8085, Gaonkar, Penram Int. publication 2000.
2. Lyla B. Das,” The X86 Microprocessors” ,Pearson 2011

BCA Syllabus at JECRC University

Course Name: Microprocessor Lab
Course Code: BCA 042A

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective : To understand the internal organization of INTEL 8086 Microprocessors, 8051 microcontroller and Assembly Language Programs using the instruction sets of processors and to study the interfacing of the processor with various peripheral devices.

- Write a program using Microprocessor 8086 to add two 8 bits numbers.
 - Write a program using Microprocessor 8086 to subtract two 8 bits numbers.
 - Write a program using Microprocessor 8086 to add two 16 bits numbers.
 - Write a program using Microprocessor 8086 to add ten 16 bits numbers with carry.
- Write an assembly language program to find whether the given number is even or odd.
 - Write an assembly language program to find the number of even and odd numbers from given series of 16 bit numbers.
 - Write an assembly language program to find the number of 1's in a given number.
 - Write an assembly language program to find whether the given number has even parity or odd parity.
- Write an assembly language program to find the largest number from an array of 16 bit numbers.
 - Write an assembly language program to find the smallest number from an array of 16 bit numbers.
 - Write an assembly language program to arrange the given array of 16 bit numbers in ascending order.
 - Write an assembly language program to arrange the given array of 16 bit numbers in descending order.
- Write an assembly language program to find the number of +ve and -ve numbers from given series of 16 bit numbers.
 - Write an assembly language program to perform 1 byte BCD addition
 - Write an assembly language program to perform addition, subtraction, Multiplication and Division of given operands. Perform BCD addition and subtraction.
 - Write an assembly language program to move 16 bytes from the offset 0200H to 0300H.
- Write an assembly language program to find whether the given byte is present in the string or not.
 - Write an assembly language program to compare two given strings.
 - Write an assembly language program to find square of the given number.
 - Write an assembly language program to find square of the given array of 16 bit number.
- Display a message “ very large scale integration”

- (b) Write an assembly language program to convert BCD number 0 to 9 to their 7 segment codes, using look up table.
- (c) Write an ALP for (i) addition and (ii) Multiplication of two 3x3 Matrices.
- 7. a) Write a program to calculate squares of BCD number 0 to 9 and store them sequentially from 2000H offset onward in the current data segment. The number and their square are in BCD format. Write a subroutine for the calculation of square of number.
- b) Write a program to change a sequence of 16 two byte number from ascending to descending order and store them in same data segment.
- 8. a) Write a program to generate a delay of 100ms using an 8086 system that runs on 10MHz frequency.
- (b) Write a program to generate delay of 1Minutes.
- 9. (a) Write a program in 8051
 - (i) to clear the accumulator and add 3 to accumulator 10 times.
 - (ii) to load accumulator with the value 55H and complement the accumulator 700Times.
- (b) Write a program to toggle all the bits of port1. put a time delay in between each issuing of data to port 1.
- 10. (a) Write a program to generate a delay of 1µsec. assuming that crystal frequency is 11.05MHz.
- (b) Write a program in 8051 to perform the following
 - (i) Keep monitoring the port P2.2 bit until it becomes high
 - (ii) When it becomes high write a value 45H to port 0 send a high to low pulse to P3.3.
- 11. (a) Write a program to get X value from P1 and send X^2 to P2 continuously.
- (b) Assume P1 is I/P port and connected to a temperature sensor. Write a program to read the temperature and test it for the value 75. according to test result place the temperature value into the registers indicated by the following
 - If $T = 75$ then $A = 75$
 - If $T < 75$ then $R1 = T$
 - If $T > 75$ then $R2 = T$
- 12. (a) Write a program to find number of 1's in given number.
- (b) Write a program for conversion of packed BCD to ASCII
- 13. Write a program to Interface 7-segment LED displays to a microprocessor and displaying a real-time clock.
- 14. Write a program for the implementation of a traffic signal controller.
- 15. Write a program for implementation of a programmable frequency synthesizer using timers.
- 16. Write a program to interfacing ADC & DAC -capturing a waveform from signal generator and CRO display.
- 17. Write a program to interfacing a stepper motor to a 8051 microcontroller.

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Course Name: Software Project Management

Course Code: BCA043A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objective: Students would be able to:

1. Do actions related to planning, organizing, leading, and controlling programs and projects and understanding of Strategy, organization and leadership in managing projects.
2. Deliver successful software projects that support organization's strategic goals.
3. Create project plans that address real-world management challenges.

UNIT I

Project Evaluation and Planning - Activities in Software Project Management, Overview of Project Planning, Stepwise planning, contract management, Software processes and process models. Cost Benefit Analysis, Cash Flow Forecasting, Cost-Benefit Evaluation Techniques, Risk Evaluation. Project costing, COCOMO 2, Staffing pattern, Effect of schedule compression, Putnam's equation, Capers Jones estimating rules of thumb.

UNIT II

Project Sequencing and Scheduling Activities, Scheduling resources, Critical path analysis, Network Planning, Risk Management, Nature and Types of Risks, Managing Risks, Hazard Identification, Hazard Analysis, Risk Planning and Control, PERT and Monte Carlo Simulation techniques

UNIT III

Monitoring And Control- Collecting Data, Visualizing Progress, Cost Monitoring, review techniques, project termination review, Earned Value analysis, Change Control, Software Configuration Management (SCM), Managing Contracts, Types Of Contracts, Stages In Contract Placement, Typical Terms of A Contract, Contract Management and Acceptance.

UNIT IV

Quality Management and People Management- Introduction, Understanding Behavior, Organizational Behavior, Selecting The Right Person For The Job, Motivation, The Old man – Hackman Job Characteristics Model, Working in Groups, Organization and team structures, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety. ISO and CMMI models, Testing, and Software reliability, test automation

UNIT V

Overview of project management tools.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand and practice the process of project management and its application in delivering successful IT projects.
2. Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities.

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3. Understand and use risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales.

Text Books

1. Bob Hughes, Mike Cotterell, “Software Project Management”, Tata McGraw Hill. (2009)

Reference Books

2. Royce, “Software Project Management”, Pearson Education. (2005).
3. Robert K. Wysocki, “Effective Software Project Management”, Wiley.(2006)

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Course Name: Web Designing Techniques Lab
Course Code: BCA 044A

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: This course demonstrates an in-depth understanding of the tools and Web technologies necessary for business application design and development. The course covers client side scripting like HTML, JavaScript.

1. Create an admission form of your college which includes: College name and its website address that links to the website numbered list of various fields Check boxes,
2. Create form having image for photograph combo box and submit button
3. Design a set of web pages to organize the content on the topic 'Web Designing Techniques' or any other topic of your choice using frames.
4. Create a table with different data in different rows and Head.
5. Create a form using different forms tag.
6. Create a page using different HTML tags with background images.
7. Put validation checks on all possible fields on admission form (Practical 1) using JavaScript.
8. Create an interactive multiple-choice quiz using JavaScript.
9. Create an HTML page for accepting a user ID and password from the user, and check if the user ID and password are correct.
10. Create own domain name and make a web site using different HTML tags.
11. Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.
12. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

Upon successful completion of the Lab. course students should be able to:

1. The students will be able to learn & implement the Web Scripting for websites development.
2. The students will be able to learn & implement the XML and Javascript for their dynamic web pages development.
3. The students will be able to learn & implement the CSS for webpages development.

Course Name: Minor Project
Course Code: BCA046A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	8	8

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Course Name: Software Project Management Lab
Course Code: BCA 045A

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

1. Introduction to MS Project 2010
 - i. Understanding Projects
 - ii. Managing Projects & Project Management software
 - iii. Taking a first look at project – Starting Project, Entering information, Changing Views.
2. Creating a new project
 - i. Gathering Information
 - ii. Opening a Project file
 - iii. Establishing Basic Project Information
 - iv. Looking at Project Calendars
 - v. Entering Tasks
 - vi. Adding subtasks
 - vii. Saving Projects files, Working with project outline-Adjusting tasks in an outline, Copying task
3. Building Tasks
 - i. Establishing Timing for Tasks
 - ii. Assigning Task timing
 - iii. Using Recurring Tasks
 - iv. Establishing Constraints and deadline dates
 - v. Manipulating Gantt chart to view timing
 - vi. Entering Task notes
 - vii. Establishing Dependencies among tasks, Viewing Dependencies
4. Creating Resources & Assigning Costs
 - i. Understanding Resources, Creating Resources List, Modifying Resource Information, Using Resources and Tasks, Handling Costs.
 - ii. Understanding Basics of Views, Examine Indicators, Admiring Views ,Calendars, Detail Gantt Chart ,Leveling Gantt, Tracking Gantt, Multiple Baselines,
 - iii. Gantt Resource Allocation, resource Form, Resource Graph, Resource Name Form, Resource Sheet, Resource Usage, Roll up views, Task Details Form, Task Entry ,Task Form
5. Tracking Project progress
 - i. Understanding the principles of tracking, Using baseline, Changing Baseline, Viewing Progress with tracking Gantt Chart
 - ii. View Interpretation, Task Variance Table, Task Cost Table ,ask work Table ,Understanding Tracking Strategies.

SEMESTER-VI

Course Name: Programming in VB.net

Course Code: BCA047A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	1	0	4

Objective: Students would be able to:

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

UNIT I

Introduction: Introduction to .Net, Two tier and Three tier client server model, .NetArchitecture, Features of .Net, Advantages of .Net, .Net Framework, CLR, CTS, CLS,Assemblies, Memory management issues – Garbage Collector and collection process, ExceptionHandling, Code Access Security.

UNIT – II

Introduction to Visual Basic.Net IDE: Creating a project, Types of project in .Net, Exploringand coding a project, Solution explorer, toolbox, properties window, Output window, Object Browser.

UNIT-III

VB.Net Programming Language: Similarities and Differences with Visual Basic, Variables,Comments, Data Types, Working with Data Structures – Arrays, Array Lists, Enumerations,Constants, Structures; Introduction to procedures, calling procedures, argument passingmechanisms, scope of variable.Control Flow Statements – conditional statement Loops, Nesting of Loops, MsgBox andInput Box.

UNIT-IV

GUI Programming: Introduction to Window Applications, Using Form – Common Controls,Properties, Methods and Events. Interacting with controls - Textbox, Label, Button, Listbox,Combobox, Checkbox, Picture Box, Radio Button, Panel, scroll bar, Timer, ListView,TreeView, toolbar, Status Bar. Dialog Controls, Creating and Using MDI applications, Toolbar,Status Bar, Creating custom controls, Creating Menus. Object Oriented Features: Classes and Objects, Access Specifiers: Private, Public andProtected, Building Classes, Reusability, Constructors, Inheritance, and Overloading, Overriding,Creating and Using Namespaces.

UNIT V

Introduction to ADO: ADO vs ADO.Net, ADO.Net data namespaces, ADO.Net Object Model, Accessing data from Server Explorer, Creating Connection, Command, Data Adapter,Data Reader and Data Set with OLEDB and SQLDB, Data Binding.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

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1. Have knowledge of a new framework .NET, they are able to create application on this platform.
2. Access and manipulate data in a Microsoft Access or Microsoft SQL Server database by using Microsoft ADO.NET.
3. Create a simple Visual Basic .NET-based Web Forms application that uses an XML Web Service.

TEXT BOOKS

1. Visual Basic 2010 programming Black Book, by Kogent Learning Solutions, Wiley India
2. Visual Basic 2010 Step By Step, Michael Halvorson, PHI

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Course Name: Information Security

Course Code: BCA048A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objective: Students would be able to:

1. Explain the objectives of information security
2. Analyze the trade-offs inherent in security
3. Describe the enhancements made to IPv4 by IPSec
4. Understand the basic categories of threats to computers and networks
5. Discuss issues for creating security policy for a large organization

UNIT I

Elements of Number Theory: Divisibility and Euclid Algorithm, Primes and the Sieve of Eratosthenes, testing for primes, Prime Number Theorem, Euler's, Fermat's Little theorems, Congruences, Computing Inverse in Congruences, Legendre and Jacobi Symbols, Chinese Remainder Theorem,

Algebraic Structures in Computing (Definitions, properties and Elementary Operations Only): Groups, subgroup, order of group, cyclic group, ring, field, division algorithm, polynomial over a field. Galois Field Elements of Information Theory: Entropy, redundancy of language, Key Equivocation & Unicity Distance, equivocation of a simple cryptographic system

UNIT II

Security Attacks: Active V/S Passive, Security Services, Security Mechanisms. Symmetric Cipher Model, Types of attacks on Encrypted messages. Classical Cipher Techniques: Caesar, Affine, Mono-alphabetic, Transposition, Polyalphabetic Ciphers Private Key Cryptosystems: Block Cipher Principles, Fiestel Cipher, Concept of 'Confusion' and 'Diffusion' in block ciphers, Product Ciphers, Lucifer Algorithm. DES Algorithm, DES modes of operations, IDEA. Differential & Linear Cryptanalysis (Introduction Only). S-box theory: Boolean Function, S-box design criteria, Bent functions, Propagation and nonlinearity, construction of balanced functions, S-box design. Link Vis End-to-End Encryption, Key Distribution in Symmetric Encryption

UNIT III

Public Key Cryptosystems: Principles of Public Key Cryptosystems, Factorization, RSA Algorithm, security analysis of RSA, Exponentiation in Modular Arithmetic. Key Management in Public Key Cryptosystems: Distribution of Public Keys, Distribution of Secret keys using Public Key Cryptosystems. Discrete Logarithms, Diffie-Hellman Key Exchange.

Message Authentication & Hashing: Birthday Paradox and General case of Duplications, Basic functions of Message Authentication and Hashing, Introduction to Hash & MAC algorithms.

UNIT IV

Digital Signatures: RSA Based, ElGamal Signatures, Undeniable Signatures. Authentication: Model of Authentication Systems, Impersonation, Substitution and spoofing games, Authentication schemes for mutual authentication based on shared secret, two-way public key, one-way public key, Mediated Authentication, One way Authentication.

UNIT V

X.509 Authentication Service: Certificates, Authentication Procedure, X.509 Version 3.E-Mail Security: PGP including management of keys in PGP, S/MIME. Network Security: IPSec, AH & ESP in Transport and Tunnel mode with multiple security associations (Key Management not Included). SSL (Protocols Only) Intrusion Detection: Audit Reports, Statistical Anomaly Detection, Rule based detection, honeypots, intrusion detection exchange formats. Password Protection: Lamport Hash, EKE Protocol.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Understand the concepts of information security.
2. Learn about different attacks and countermeasures of information security.
3. Apply cryptographic algorithms for encrypting and decryption for secure data transmission.
4. Understand the importance of Digital signature for secure e-documents exchange.

Text Books

1. Stalling Williams: Cryptography and Network Security: Principles and Practices, 4th Edition, Pearson Education, 2006.
2. Kaufman Charlie et.al; Network Security: Private Communication in a Public World, 2nd Ed., PHI/Pearson.

Reference Books

1. Pieprzyk Josef and et.al; Fundamentals of Computer Security, Springer-Verlag, 2008.
2. Trappe & Washington, Introduction to Cryptography, 2nd Ed. Pearson.

BCA Syllabus at JECRC University

Course Name: Human Computer Interface

Course Code: BCA049A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Students would be able to:

1. Know what the user-centered design cycle is and how to practice this approach to design your own website or other interactive software systems
2. Critique existing website and other interactive software using guidelines from human factor theories
3. Analyze one after another the main features of a GUI: the use of colors, organization and layout of content, filling the interface with useful and relevant information, and communication techniques; and to critique designs in order to provide better solutions

Unit-I

Introduction0 The human, The computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles, and Theories

Unit-II

Design Process- Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User support

Unit-III

Models and Theories0 Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modeling rich interaction

Unit-IV

Interaction Styles- Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation

Unit-V

Design Issues- Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization Module6: Outside the Box- Group ware, Ubiquitous computing and augmented realities, Hypertext, multimedia, and the world wide web

Learning Outcomes: - Upon successful completion of this subject students should be able to:

1. Explain the human components functions regarding interaction with computer
2. Explain Computer components functions regarding interaction with human
3. Demonstrate Understanding of Interaction between the human and computer components.
4. Use Paradigms, implement Interaction design basics, Use HCI in the software process
5. Apply Design rules, Produce Implementation supports, Use Evaluation techniques

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Text Books:

1. “Human Computer Interaction” by Alan Dix, Janet Finlay , ISBN :9788131717035, Pearson Education (2004)
2. “Designing the User Interface - Strategies for Effective Human Computer Interaction”, by Ben Shneiderman ISBN : 9788131732557, Pearson Education (2010).

Reference Books:

1. Usability Engineering: Scenario-Based Development of Human-Computer Interaction , by Rosson, M. and Carroll, J. (2002)

BCA Syllabus at JECRC University

Course Name: Introduction to Cloud Computing
Course Code: BCA050A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objectives: Get a clear understanding of Cloud Computing fundamentals and its importance to various organizations. Master the concepts of IaaS, PaaS, SaaS, Public and Private clouds. Get hands-on experience in Cloud Programming.

Unit I

Cloud Computing Fundamental: Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

Unit II

Cloud Applications: Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages

Unit III

Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics: Cloud Computing infrastructures available for implementing cloud based services.

Unit IV

Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft and Google, Salesforce.com, Ubuntu and Redhat) Application Development: Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

Unit V

Best Practice Cloud IT Model: Analysis of Case Studies when deciding to adopt cloud computing architecture. How to decide if the cloud is right for your requirements. Cloud based service, applications and development platform deployment so as to improve the total cost of ownership (TCO)

Learning Outcomes

BCA Syllabus at JECRC University

By the end of this course students are able to apply the concepts of cloud, they have the knowledge of cloud computing, have knowledge of cloud applications and services.

Text Books:

1. GautamShroff, Enterprise Cloud Computing Technology Architecture Applications
2. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach

BCA Syllabus at JECRC University

Course Name: PHP Programming

Course Code: BCA051A

L (Hr.)	T (Hr.)	P (Hr.)	C
4	0	0	4

Objective: Students would be able to:

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

Unit-I

Introduction to PHP, Installation of PHP and MySQL, PHP configuration in IIS & Apache Web Server and features of PHP, Writing PHP, How PHP code is parsed, Embedding PHP and HTML Executing PHP and viewing in Browser.

Unit-II

Data types, Operators, PHP variables: static and global variables, Comments in PHP, Control Structures, Condition statements, If...Else, Switch, ? operator, Loops, While, Break Statement Continue. Do...While, For, For each, Exit, Die, Return

Unit-III

Arrays in PHP, Working With Data, FORM element, INPUT elements, Validating the user input, Passing variables between pages,

Passing variables through GET, Passing variables through POST, Passing variables through REQUEST, Working With Data, Built-in functions, String Functions: chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim, substr, strcmp, strcmp, strpos, strrpos, strstr, strstr, str_replace, strrev, echo, print, Math Functions: abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand.

Unit-IV

Array Functions: count, list, in_array, current, next, previous, end, each, sort, rsort, asort, array_merge, array_reverse User Defined Functions. Sessions and cookies, Concept of Session Starting session, Modifying session variables, Un registering and deleting session variable Concept of Cookies.

Unit-V

Introduction of MySQL, Types of tables in MySQL, Query in MySQL: Select, Insert, Update, and Delete. Truncate Alias, Order By. Database connectivity of PHP with MySQL

Learning Outcomes: Upon successful completion of this subject students should be able to:

1. Use the basics of the PHP for developing applications.
2. Understand how PHP, HTML and MYSQL work together to produce dynamic pages.
3. Learn validation and I/O of forms using PHP.

References Books:

1. Core PHP Programming Leon Atkinson Pearson publishers
2. The Complete Reference PHP Stever Holzner McGraw Hill
3. Beginning PHP 5.0 Database Christopher Scollo, Harish, Rawat, Deepak Thomas, Wrox Press

BCA Syllabus at JECRC University

Course Name: PHP Programming Lab

Course Code: BCA052A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Learn the Web Designing.
 2. Examine how web pages are developed using PHP.
 3. Understand the basics of Perl programming.
-
1. Write a Perl program to display various Server Information like ServerName, Server Software, Server protocol, CGI Revision etc.
 2. Write a Perl program to accept UNIX command from a HTML form and to display the output of the command executed.
 3. Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages.
 4. Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
 5. Write a Perl program to display a digital clock which displays the current time of the server.
 6. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
 7. Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.
 8. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

Learning Outcomes:

Upon successful completion of this subject students should be able to:

1. Use the basics of the PHP for developing applications.
2. Understand how PHP, HTML and MYSQL work together to produce dynamic pages.
3. Learn validation and I/O of forms using PHP.
4. Get a job in software industry as web developer.

BCA Syllabus at JECRC University

Course Name: Programming in VB.Net Lab
Course Code: BCA053A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	2	2

Objective: Students would be able to:

1. Learn the concepts of GUI.
 2. Implement the concepts of GUI in VB.Net
 3. Code the application in a new environment of GUI.
-
1. Create an application to accept a character from console and check the case of the character.
 2. Write a VB.Net program to accept any character from keyboard and display whether it is vowel or not.
 3. Write a VB .NET program to accept a string and convert the case of the characters.
 4. Develop a menu based VB .NET application to implement a text editor with cut, copy, paste, save and close operations.
 5. Write a program to implement the calculator with memory and recall operations.
 6. Develop a form in VB .NET to pick a date from calendar control and display the day, month, year in separate textboxes.
 7. Develop a VB .NET application to perform timer based quiz of 10 questions.
 8. Develop a VB .NET application using the File and Directory controls to implement a common dialog box.
 9. Develop a Database application to store the details of students using ADO.NET.
 10. Develop a Database application using ADO.NET to insert, modify, update and delete operations.
 11. Develop a VB.NET application using Datagrid to display record.
 12. Develop a VB.NET application using Datagrid to add, edit, and modify records.

Course Name: Major Project
Course Code: BCA054A

L (Hr.)	T (Hr.)	P (Hr.)	C
0	0	10	1 0

BCA Syllabus at JECRC University

Course Name: Accounting Principles and Practices
Course Code: BCA055A

L (Hr.)	T (Hr.)	P (Hr.)	C
3	0	0	3

Objectives: Students would be able to:

1. Know about the important concepts and characteristics of accounting.
2. Study the application of accounting in the general business environment.
3. To prepare the estimate for various business activities such as purchase, sale, production and cash budgets.

UNIT I

Meaning and nature of accounting, Scope of financial accounting, Interrelationship of Accounting with other disciplines, Branches of Accounting, Accounting concepts and convention, accounting standards in India.

UNIT – II

Journal, Rules of Debit and Credit, Sub Division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Purchase Return, Sales Journal, Sales Return Journal, Ledger, Trial Balance.

UNIT-III

Preparation of Final Accounts, Profit & Loss Account, Balance Sheet-Without adjustments and with adjustments.

UNIT – IV

Meaning of Inventory, Objectives of Inventory Valuation, Inventory Systems, Methods of Valuation of Inventories-FIFO, LIFO and Weighted Average Method, Concept of Depreciation

UNIT-V

Causes of Depreciation, Meaning of Depreciation Accounting, Method of Recording depreciation, Methods of Providing Depreciation.

Learning Outcome:

Upon successful completion of this subject students should be able to:

1. Get the Knowledge about the important concepts and characteristics of accounting.
2. Able to understand the budget preparation and control of a company.
3. Be prepared of fiscal policies of the organization.
4. Decide about the state of affairs of a particular firm/company.

TEXT BOOKS

1. Maheshwari, S.N. and Maheshwari, S. K., (2009) An Introduction to Accountancy, Eighth Edition, Vikas Publishing House.
2. Tulsian, P.C., (2009) Financial Accountancy, 2nd edition, Pearson Education.