

Max. Theory Marks: 40

Min. Theory Marks: 13

OBJECTIVES: This course aims to familiarize the students with the basics of functions, limits, differentiation, vector and matrix operations. The application of the gained knowledge is expected to help students in solving real world problems and develop IT applications for scientific computing.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT - I

Review of concepts of function of one variable: define a function. Types of function:
Limits: define working rule for finding out the limit, fundamental property of limit, problems based on limits:
Continuity: define point of discontinuity, classification of discontinuity, problems based on continuity & discontinuity
Differentiability: condition for derivability and problems.

UNIT - II

Successive differentiation, Rolles theorem, Mean value theorem, Taylor's theorem, Taylor's & Maclaurin's series, Intermediate forms.

UNIT - III

Tangents, Normal, Curvature, asymptotes, integration of hyperbolic function and reduction formula

UNIT - IV

Differentiation of vector function, gradient, directional derivatives, divergence and curl, vector function of several scalar variables and their partial derivative, level surface gradient in Cartesian and polar coordinates, divergences of vector and curl of a vector.

UNIT - V

Matrix – definition, types of matrix, special matrix elementary transformation of matrix, inverse of matrix – adjoint methods and Gaussian elimination, normal form of matrix, rank of matrix, nullity of matrix (their applications) consistency and solution of linear simultaneous equations.

TEXT BOOK:

A text book of calculus by Dr. H.K.Pathak, & D.C. Agrawal 2010

REFERENCE BOOKS:

1. A text book of calculus by Dr. H.S.Sharma, Ratan Prakashan
2. Vector Calculus & Geometric by Dr. H.K.Pathak, & D.C. Agrawal
3. Discrete Mathematics by Dr. H.K.Pathak, & D.C. Agrawal – (shikha sahitya prakashan)

Sandilya
Ranjana



BCA -102: STATISTICS - I

Min. Theory Marks: 13

Max. Theory Marks: 40

OBJECTIVES: The aim of this course is to expose students to basics of statistics and its application in solving statistical problems. The course will help to prepare the foundations required for data mining, data science and big data analytics.

NOTE:
The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I
Variables & graphs: Statistics, population & sample, discrete & continuous variables, graphs, equations, inequalities, logarithms, Frequency distributions: frequency distributions, histogram, frequency polygons. Frequency curve, cumulative frequency distribution, ogives.

UNIT II
Measures of central tendency : The arithmetic mean, weighted arithmetic mean, geometric mean, harmonic mean, mean power of numbers, root mean square, median, mode, quartiles, deciles & percentiles.

Measures of dispersion: The range, mean deviation, semi inter quartile range for quartiles, deviation, absolute & related dispersion, coefficient of variation.


UNIT III
Moments skewness & kurtosis: Moments of various types, relation between moments, sheppard's correction to moments, skewness & kurtosis, moment generating function.
Elementary probability theory: sample space, events, classical definition of portability, relative frequency definition theorems of total & compound portability, Independent & dependent event, mutually exclusive event, mathematical expectation.

UNIT IV
Theoretical distributions discrete & continuous probability distribution. Basic concepts & applications of degenerate, Bernoulli, Binomial, geometric negative binomial. Hyper geometric & Poisson distributions, normal distribution
Curve fitting & the method of last squares: curve fitting the method of least square, the least square lines, the least square parabola, regression.

UNIT V
Correlation theory: Linear correlation, Measures of correlation, the least square regression lines expected & unexpected variation, coefficient of correlation, rank correlation, correlation index, multiple & partial correlation for three variables;
Theory of attributes: Consistency of data, association of attributes, coefficient of association, contingency tables.

REFERENCE BOOKS :

1. Statistics schaum's outline series, Spiegel, M.R.McGraw Hill Publishing Company.
2. Mathematical statistics Kapoor & Saxena : - S,Chand & sons.

Sanjay *Kailash* 



Max. Theory Marks: 50

Min. Theory Marks: 17

OBJECTIVES: This course aims to familiarize students with basic primitives of C language through decision control statements, loop control statements, arrays and structures. After completion of this course the student is expected to write efficient programs in 'C' language. The main focus is on problem solving techniques, algorithm design and writing efficient programs.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT -I

Algorithm for problem solving: An Introduction, Properties of an algorithm, classification, algorithm logic, flowchart.

Program design and implementation issues: programming system design technique, programming technique, basic constructs of structured programming, modular designing of programs.

Programming Environment: High level programming language, Low level programming language, Middle level programming language, assembler, compiler, interpreter.

UNIT- II

Introduction to C, Historical development of C.

Getting started with C : The C Character set, Types of C Constants , Types of C Variables, C keywords, identifiers literals.

C Instructions : Type Declaration Instruction, arithmetic Integer, Long, Short, Signed, unsigned, storage classes, Integer and Float Conversions, type conversion in assignment, hierarchy of operations.

UNIT - III

Operators: Logical operators, hierarchy of logical operators, arithmetic operators, relational operators, assignment operators, increment and decrement operators, conditional operators, bit wise operators, special operators, "&,*,,>,"sizeof"

Decision Control Structures: control instructions in C, if, if-else, switch statement

Loops control structures : while loop, for loop, do - while loop, odd loop, nested loop, break , continue, goto, exit statement

UNIT -IV

Array: Introduction, array initialization, bound checking, 1D array, 2D array initialization of 1D and 2D array, memory map of 1D and 2D array, Multidimensional array.

Strings: Introduction, standard library string function strlen(), strcpy(), strcat(), strcmp(), 2D array of characters.

UNIT -V

Structure : Use of structure, declaration of structure, accessing structure elements, how structure elements are stored, array of structure, uses of structure

Preprocessor: features of C Preprocessor, macro expansion, macro with arguments, file inclusion, conditional, #if, #elif, miscellaneous directives, #include, #define, #undef, #pragma directives.

Sanjay Kaur




TEXT BOOK:

Y. Kanelkar, "Let us C", BPB Publications

REFERENCE BOOKS:

1. Programming with problem solving thought 'C'. (ELSEVIER) (for UNIT D)
2. "Programming in C", E. Balaguruswamy Tata McGraw Hill
3. "C The Complete Reference", H. Schildt, Tata McGraw Hill
4. First course in programming with 'C', T.Jeyapooan (VIKAS)
5. The C Programming language by Brian W. Kernighan Dennis M. Ritchie
Prentice Hall
6. Practical C Programming 3rd Edition A Nutshell Handbook O'Reilly.
7. Computer Programming and IT (for RTU), by Ashok N Kamthane et. al, Pearson
Education, 2011

Sandip Aravind 



List of practicals:

1. Write a C program to display "Hello Computer" on the screen.
2. Write a C program to display Your Name, Address and City in different lines.
3. Write a C program to find the area of a circle using the formula: $\text{Area} = \text{PI} * r^2$
4. Write a C program to find the area and volume of sphere. Formulas are: $\text{Area} = 4 * \text{PI} * R * R$ $\text{Volume} = 4/3 * \text{PI} * R * R * R$.
5. Write a C program to print the multiply value of two accepted numbers.
6. Write a C program to convert centigrade into Fahrenheit. Formula: $C = (F - 32) / 1.8$.
7. Write a C program to read in a three digit number produce following output (assuming that the input is, 347)
3 hundreds 4 tens 7 units
8. Write a C program to read in two integers and display one as a percentage of the other. Typically your output should look like
20 is 50.00% of 40
assuming that the input numbers were 20 and 40. Display the percentage correct to 2 decimal places.
9. Write a C program to find out whether the character presses through the keyboard is a digit or not (using conditional operator).
10. Write a C program to swap variable values of i and j.
11. To sum n difference number using array.
12. To generates Fibonacci series.
13. Find the sum of series.
i) $1 + 2 + \dots$ ii) $2 + 4 + \dots$ iii) $1 + 3 + \dots$ iv) $1 + 2 + 3 + \dots$
- v) $1 + x/1! + x^2/2! + x^3/3! + \dots$
- vi) $1 - x/1! + x^2/2! - x^3/3! + \dots$
14. Find the factorial of given number using for loop
15. Find whether given year is leap or not.
16. Write a C program to find the maximum from given three nos.
17. Write a C program to find that the accepted no is Negative, Positive or Zero.
18. Write a program which reads two integer values. If the first is lesser print the message up. If the second is lesser, print the message down if they are equal, print the message equal if there is an error reading the data, print a message containing the word Error.
19. Write a C program that prints the given three integers in ascending order using if- else.
20. Given as input three integers representing a date as day, month, year, print the number day, month and year for the next day's date.
Typical input: "28 2 1992" Typical output: "Date following 28:02:1992 is 29:02:1992".
21. Write a C program for calculator designing using switch /case loop?
22. Write a C program to convert decimal to binary.
23. Write a C program to convert decimal to octal.
24. Write a C program to convert decimal to hexadecimal.
25. Write a C program to find the sum of first 100 natural nos.
26. Write a C program to find the sum of first 100 odd nos. and even nos.
27. Write a C program to display first 25 Fibonacci nos.
28. Write a C program to display first 100 prime nos.
29. Write a C program to find factorial of accepted nos.
30. Write a C program to find the sum of digits of accepted no.
31. Write a C program to print the accepted no and its reverse no.
32. Write a C program to print all the Factors of accepted no.

Sanjay Kaur



- 33. Write a C program to find HCF of two given numbers.
- 34. Write a C program to find all the prime number between two given numbers.
- 35. Write C programs to print the terms of each of the following series:
 i. Sin(x) ii. Cos(x) iii. Log(1+x) iv. log(1-x) v. e^x vi. e^{-x}
- 36. Write a C program to print the sum of series.(will be given in class)
- 37. Display the following output on screen (assuming the value for input parameter n=5) :

a. * ** *** **** *****	b. 1 12 123 1234 12345	c. A AB ABC ABCD ABCDE	d. 1 23 345 4567 56789	e. 1 23 456 78910 101112131415
f. ***** ***** *** ** *	g. ABCDE ABCD AE AB A	h. * *** ***** *****	i. 1 123 12345 1234567 123456789	j. 1 121 12321 1234321 123454321
k. * ** *** **** *****	l. ABCDE ABCD AE AB A	m. 12 123 1234 12345	n. ***** 0000 *** 00 *	o. 1 10 101 1010 10101
p. 1 01 101 0101 10101	q. 1 22 333 4444 55555	r. A AB ABC AB A	s. ABCDEDCBA ABCD DCBA AE CBA AB A A	t. 1 121 12321 1234321 123454321

- 38. Write a C program to find minimum, maximum, sum and average of the given one dimensional array.
- 39. Write a C program to perform the basic Matrix operations addition, subtraction, multiplication, Transpose.
- 40. Write a program to take a sentence as input and reverse every word of the sentence.
- 41. Write a program to find length of a string.
- 42. Write a program that accepts two strings and concatenate them.
- 43. Write a program to reverse a string entered by user.
- 44. Accept a string and convert it to uppercase string.
- 45. Write a program to count the number of words in a string.
- 46. Write a program to count the vowels, consonants and other special characters in the input string.
- 47. Write a program to take a sentence as input and reverse every word of the sentence.

NOTE:

- 1. Every student will be given 6 period /week laboratory(1 period: 45 minutes)
- 2. Every student will be work on independent computer(student: computer =1:1)

Sanjay Aravali



Max. Theory Marks: 50

OBJECTIVES: The course aims to make students understand the working of Windows Operating systems and database management systems. The students will be familiarized with the Microsoft Office packages. This course will help the students to operate the computers well and use the software packages effectively.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I

MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screen saver and appearance. Using windows accessories.

UNIT II

Documentation Using MS-Word - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

UNIT III

Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation.

UNIT IV

Database Management using MS Access: Creating Database, Tables, primary key, Relationship, Forms and Reports, DBMS Queries.

UNIT V

Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

TEXT BOOK:

Learn Microsoft Office – Russell A. Shultz – BPB Publication

REFERENCES BOOKS:

1. Microsoft Office – Complete Reference – BPB Publication
2. Courter, G Marquis. Microsoft Office 2000: Professional Edition. BPB.
3. PC Software – Shree Sai Prakashan, Meerut

Sandhya Chaitali



BCA- 108 PRACTICALS (PC SOFTWARE)

Max. Marks :25

Min. Marks : 09

Practical based on DOS: introduction to PCs with related Hardware, software, DOS its variations, and Starting DOS.

DOS Commands: internal External Commands, common Commands notation, files & file command. Disk Command, Batch files introduction to batch processing, creation of batch file special batch file, autoexec.bat hard disk setup, configuring a system, creation of subdirectories, pipelines, filter and miscellaneous.

WINDOWS

1. Creating folder, cut, copy, paste, managing file and folder in windows.
2. Arrange icons, set display properties
3. Adding and removing software and hardware
4. Setting date and time, screen saver and appearance.
5. Using windows accessories.
6. Settings of all control panel items
7. Search file
8. Windows – 2000 Desktop setting – new folder, rename, recycle bin operation, briefcase, control panel utility, Display properties, screen saver, background setting.

MS-Word

1. Creating & Editing Document
2. Formatting Document
3. Use of Auto-text, Autocorrect, Spelling and Grammar Tool,
4. Page Formatting, Page Border, Background,
5. Creation of MS-Word-Mail Merge, Macros, Tables.
6. Practice of Printing, page setup etc.

MS-Powerpoint

1. Creating, Manipulating & Enhancing Slides,
2. Inserting Organizational Charts, Excel Charts
3. Using Word Art
4. Putting Animations and Sounds
5. Inserting Animated Pictures
6. Inserting Recorded Sound Effect

MS-Excel

1. Creating & Editing Worksheet, Fill Handle
2. Use Formulas and Functions
3. Preparing Charts

MS-Access

1. Creating Database using template and blank database
2. Creating Tables using datasheet view and design view
3. Creating Relationship
4. Creating Query using query wizard and query design
5. Creating Reports
6. Creating Forms

NOTE:

1. Every student will be given 6 period /week laboratory (1 period: 45 minutes)
2. Every student will be work on independent computer (student: computer =1:1)

Handwritten signatures: Sandeep, Kaitali



BCA-105-DIGITAL COMPUTER ORGANIZATION

Max. Theory Marks: 40

Min. Theory Marks: 13

OBJECTIVES: The course covers the basic principles of computer hardware organization, peripherals, operations and their assembly. The course highlights the role of Number System, Logic Gates, Flip flops and Memory units in processor design. The students will understand basic computer organization which will act as the base of understanding other complex modern computer architectures like cloud. It will also prepare the students to understand the code generation process of compiler and develop efficient programs.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I

Block diagram of Computer, Stored program Concept, Word length and processing speed of the Computer, User interface, Hardware/Software Concepts, Microprocessor and Single chip microprocessor concepts.

Input and Output devices: Keyboard, mouse, joystick, scanner. Printers: printers and types of printers, plotters and display devices.

UNIT II

Number system and codes. Decimal, binary, octal, hexadecimal and their inter conversion. ASCII, grey code excess-3 code, BCD numbers, binary addition, subtraction, multiplication and division (1's and 2's compliment methods)

UNIT III

Logic gates: NOT, OR, AND, NAND, NOR, XOR, XNOR gates. Boolean Algebra, De Morgan's Theorem. Application of gates, half adder and full adder.

Boolean functions & truth table. Simplification of logical circuits using Boolean algebra, SOP, POS, and Karnaugh maps.

UNIT IV

Flip- Flop, Registers and counters, RS-flip flop, level clocked D,F/P edge triggered D flip flop , edge triggered JK flip flop , racing in F/F, JK masters-slave flip flop, buffer registers, shift registers, ripple counters, synchronous counters , ring counters, Mod Counters.

UNIT V

Computer Memory: memory cell, memory organization. Random Access Memory. Read Only Memory, PROM, EPROM, EEPROM, building large memories, magnetic hard disk, pen drive, Cache memory, optical disk.

Transfer of information between I/O devices, CPU and Memory.

Sandali *Sandali*



TEXT BOOK:

Digital Design by M. Morris Mano, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS:

1. Digital Computer Electronics by Malvino and Brown, McGraw Hill
2. Computer Fundamental Architecture and Organization by B. Ram
3. Computer Architecture and Organization by Nicholas Carter, Schaum Series TMH Adaptation.
4. Computer Organization by Hayes.
5. Computer Fundamentals by P. K. Sinha & Priti Sinha, BPB Publications.

Sundil *Chaitali*



Max. Theory Marks: 40

Min. Theory Marks: 13

OBJECTIVES: This course is intended to improve the written and verbal communication skills of the students. The knowledge gained will help the students to better understand the requirement documents, prepare technical reports and training material in IT industry.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

Syllabus:

UNIT – I : Short- answer question.

UNIT – II : Reading Comprehensive and vocabulary.

UNIT – III : paragraph writing.

UNIT – IV : Letter Writing (both formal & informal)

UNIT – V : Grammar(20 Items from the prescribed text book to be asked and 15 to be attempted)

Structural Items :

1. Simple. Compound and complex sentences

2. Co-ordinate clauses (with, but, or, either-or, neither-nor, otherwise or else)

i) Subordinate clauses-noun, clause-as, subject object and complement : Relative clauses (restrictive and non- restrictive clauses): adverb Clauses(open and Hypothetical conditional with because, thought, here, so that, as soon as)

ii) Comparative clauses (as+=adjective/adverb + as-no sooner.....Than)

Tenses :

i) Simple present, progressive present perfect

ii) Simple past, progressive and past perfect

iii) Indication of futurity The passive (Simple present and past, present and past perfect and to infinitive structure) reported speech : i) declarative sentences, ii) imperatives, iii) Interrogative-wh-question. Exclamatory sentences.

iv) Modals (Will, Shall, Should, Would, Ought to, have to/ have got to, Can-could, may- might and need) Verb structures (infinitives and gerundial), Linking Devices

The above language items will be introduced to express the following communicative functions:

a) Seeking and imparting information.

b) Expressing attitudes- intellectual and emotional.

c) Persuasion and dissuasion etc.

Questions on all the units shall be asked from the prescribed text which will comprise specimens of popular creative writing and the following items:

i) Indian art Meaning of art Features of Indian art Elementary knowledge of paintings, music, dancing, Sculpture, Archaeology, Iconography and other social arts.

ii) Indian Literature ancient Indian Literature Elementary Knowledge of Vedic Literature, Mahabharat, Ramayan and other main Granthas.

iii) Indian freedom struggle. Freedom struggle of 1857 national consciousness, non-cooperation movement, Civil disobedient movement, contribution of revolutionaries in freedom struggle.

iv) Indian Constitution: Introduction, main features of Constitution, fundamental rights, fundamental duties.

TEXT BOOK :

English Language and Indian Culture: publication by M. P. Hindi Granth Academy

Sanjay *Aravali*



Max. Theory Marks: 40

Min. Theory Marks: 13

OBJECTIVES: This course aims to familiarize the students with the basics of Curve tracing, Gamma and Beta functions, integration, differentiation, maxima and minima functions. The application of the gained knowledge is expected to help students in solving problems for scientific computing.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT – I

Curve Tracing : Tracing curves with equations in Cartesian & Polar forms.
Improper integrals : Convergence of improper integrals. Evaluation of Convergent improper integrals.

UNIT – II

Gamma and Beta function and their properties, some important deductions (duplication formula)
Rectification L length curve, intrinsic equation.

UNIT – III

Multiple integrals : Integration of functions of two & three variables, Double & triple integrals, Dirichlet integral use double & triple integral in finding areas and volumes.
Vector Integration : Indefinite and definite, surface and volume integrals, Gauss and Stokes theorems and some applications.

UNIT – IV

Partial Differential: Function of several variables, Limits, Continuity and Differentiability, Partial Derivatives, Euler's Theorem, Mean Theorem & Taylor's Theorem.

UNIT – V

Maxima & Minima function of two and three variables.
Convergence and Divergence of series: Definition and various tests.

TEXT BOOK:

A text book of higher calculus for B.Sc II by Dr. H. S. Pathak & D.C. Agrawal , Shikha Sahitya Prakashan.

REFERENCE BOOK:

A text book of higher calculus for B.Sc II by Dr. H. S. Sharma Ratan Prakashan.

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BCA – 202: STATISTICS – II

Max. Theory Marks: 40

Min. Theory Marks: 13

OBJECTIVES: This course is designed to use and apply advance statistical measures like estimation theory, hypothesis testing, Significance testing, Test Design and Analysis of variance in real world problems. The knowledge imparted to students will help them to better analyze data required for effective decision making.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Estimation Theory : Unbiasedness, Consistency, efficiency and sufficiency of estimations, Maximum likelihood estimates and their properties (without proof), Cramer Rao Inequality and Minimum variance estimates.

UNIT- II

Testing of Hypotheses : Simple and composite hypothesis, error of kind-I and kind – II, critical region, level of significance, size and power of a test, Neymann Pearson's fundamental lemma and its application(with Proof)

UNIT – III

Test of significance: Test of simple hypothesis, Beta, gamma distributions and properties, Chi-square, T, F, Z distribution and test based on them.

UNIT – IV

Non- parametric Test : Sign test, Median test, Wilcoxon's run test, Wilcoxon's signed rank test. Contingency tables.

UNIT- V

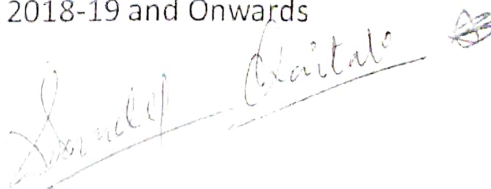
Analysis of Variance : one –way & Two – way classification with one observation per cell, basic designs of experiments : completely randomized design, randomized block design & latin square design.

TEXT BOOK:

Mathematical Statistics by J. N. Kapoor & H.C. Saxena , S. Chand & co.

REFERENCE BOOK:

Fundamental of Statistics Vol. I M. Goon, B. Dasgupta, M.K. Gupta, The World Press Pvt. Ltd.

Sandeep Chaitale 



BCA -203: PROBLEM SOLVING AND PROGRAMMING THROUGH C -II

Max. Theory Marks: 50

Min. Theory Marks:17

OBJECTIVES: This course is designed to provide a comprehensive study of C language primitives like functions, pointers, files and graphics. It will help to provide students the knowledge of writing modular code. The main emphasis of the course will be on developing efficient pointer based programs.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT - I

Functions: definition, declaration, calling & use, passing values b/w function, scope rule of function.

Advanced feature of functions: Function declaration & prototypes, call by value, call by reference, back to function calls, macro verses function, Recursion, need of recursion, types of recursion.

UNIT- II

Pointer: Definition & declaration, pointer assignment, pointer & arrays, passing entire array to function, pointers & 2D array, pointers array, pointer to array, array of pointer to string, Pointer to structures, uses of pointers, malloc(), calloc(), realloc(), free() library function.

Union: Union definition & declaration, accessing a union member, union of structures, initialization of union member, uses of union, use of user defined data types

UNIT-III

Types of I/O, Console I/O function, Formatted console I/O function, printf(), scanf(), unformatted consol I/O functions.

Disk I/O function: File opening modes, reading and writing, closing files., String I/O in files, formatted disk I/O function, text verses binary mode, record I/O in files, detecting error in reading & writing, Command line arguments.

UNIT-IV

Components of VDU: Display Adapters, Display Screens (monitor), Video Display modes, resolution

Text or Graphics: Color in text in modes, color in graphic mode, video pages, writing to VDU memory in text mode.

UNIT-V

Graphic programming: lines, stylish lines, drawing & filling images, patterns with differences, bar ()

Filling regular & non-regular shapes, palettes & colors, outputting text, justifying text, animation basics.

TEXT BOOK:

Let Us 'C' by Y. Kanetkar , BPB Publication.

BCA PART I Scheme: 2018-19 and Onwards


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REFERENCE BOOKS:

1. Programming in 'C' Balaguruswami.
2. First course in Programming with 'C' by T. Jeyapoovan(VIKAS)
3. The C programming Language by Brian W. Kernigham and Dennis M. Ritchie
4. Practical C programming, 3rd edition (anetshell handbook) O'Reilly
5. Computer Programming and IT (for RTU) by Ashok N Kamthane et. al,
Pearson Education, 2011

Donald *Acitals* 




BCA -207 PRACTICAL
PROGRAMMING & PROBLEM SOLVING THROUGH C -II

Max. Marks: 25

Min. Marks: 09

List of Practical's:

1. Write program to find square root of a number without using built in function
2. To find factorial of a no. using recursion
3. To reverse digit of number
4. To reverse the given string
5. Write a C Function for the following task
 - a. Calculating Factorial
 - b. Find value of a given Fibonacci term
 - c. Swapping the values of two variable
 - d. Minimum/maximum value from the given input
6. Write User Defined Function and test them in the main program for the following standard functions
 - a. int myatoi(Char *s)
 - b. char *myitoa(int i)
 - c. int mystrlen(char *s)
 - d. char *mysubstr(char *s, int i, int j)
 - e. char *mystreat(char *s1, char *s2)
 - f. int mystremp(char *s1, char *s2)
 - g. int mystrechr(char *s, char c, int i)
 - h. char *mystrev(char *s)
 - i. int mystrend(char *s, char *t)
 - j. char *myreplace(char *s, char *old, char *new)
 - k. int abs(int i)
 - l. char *mytoupper(char *)
 - m. char *mytolower(char*)
 - n. int isupper(char *s)
 - o. int islower(char *s)
 - p. int mypower(int a, int b)
7. Write a program which ask date of birth in dd/mm/yy format and spell it in word.
8. To find out twins prime number.
9. To enter a four digit number and print it in all combination.
10. Write a program to remove duplicate elements in an array.
11. Write a program to sort the names in an array.
12. Write the following recursive C Function
 - a. Factorial of a given number
 - b. Nth Fibonacci number
 - c. Reverse of a given String
 - d. Reverse of a give Number
 - e. Sin(x)
13. Write a program that creates a record having five fields and create a structure array. Accept the records of the students. Accept a name of student and search it. Print the details if the record is found else print error message.
14. Write a C program to exchange the value of two variable using function.
15. Write a program to add two number using pointer
16. Write a program to create a file and write data into it.


Sandip *Daitali* 



17. Write a program to open an existing file, read data from it and display it on the screen.
18. Write a C program to create a file of integers and write data into the file. Open the file, read numbers from it and write even and odd numbers to separate file.
19. Write a program to append contents into an existing file.
20. Write a program that merges the contents of two file and write it in the third file.
21. Write a program that copies the contents from one file to another.
22. Write a program to read character from one text file convert into upper case and write into other file.
23. Write a C program that creates an Employee text file. The fields of the records are empid, empname, designation, qualification, salary, experience, no. of papers published, address, city, and phone no. The program must implement the operation to modify a record, delete a record and append new records.
24. Write a payroll program using file handling
25. Write a mark sheet program using file handling
26. Write C programs for the following operation to work like DOS Commands (use command line arguments):
 - a. type abc.txt
 - b. copy source1.txt source2.txt
 - c. copy source1.txt source2.txt source3.txt source4.txt
 - d. compare source1.txt source2.txt
 - e. concat source1.txt source2.txt
27. Write a C program to open two files containing integers (in sorted order) and merge their contents.
28. Write a C program to count the number of vowels, consonants, digits, spaces, other symbols, words and lines in a given text file.
29. Write C code to check if an integer is a power of 2 or not
30. Write a C program to count bits set in an integer.
31. Write a C program to set a particular bit in a given number.
32. Write a C program to reset a particular bit in a given number.
33. Write a program to display rainbow.
34. Write a C program to implement moving car.
35. Write a program that displays a bouncing ball.
36. Write a program that displays a rotating fan.

NOTE:

1. Every student will be given 6 period /week laboratory (1 period: 45 minutes)
2. Every student will be work on independent computer (student: computer =1:1)

Sundil *Ravati* 



BCA 205: INTRODUCTION TO INFORMATION SYSTEM

Max. Theory Marks: 50

Min. Theory Marks: 17

OBJECTIVES: The main objective of this course is to provide students with an overall understanding of the information systems and to highlight the importance of information systems in modern organizations. This course will help the student to understand different types of information systems, system development life cycle, communication systems and the concept of E-commerce.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I: Introduction to Information System: Definition, Meaning of Information System, System Concept, Need to learn Information System, Competitive advantage, Careers in Information System, Fundamentals of Data Processing, Components of Computer system, Applications of Computer Based System.

UNIT II: A System Approach to Problem Solving: The Scientific Method, The System Approach, Understanding a Problem or opportunity, Developing & Implementing a solution, A System Solution Methodology, Applying the Solution Methodology, Types of Information Processing System: Overview of six major types of systems - Transaction Processing System, Office Automation System, Knowledge Work Systems, Management Information System, Decision Support Systems and Executive Support System.

UNIT III: System Concepts and The Information Systems Environment: The System Concept: Definition, Characteristics of a System, Central Objective, Element of a system, Types of Systems, The Systems Development Life Cycle: Recognition of Need, Feasibility Study, Analysis, Design, Implementation and The Role of System Analyst.

UNIT IV: The Meaning and use of MIS system in view of Business, Process of MIS, System Design: System Design Consideration, input/output design, forms design, file organization and database, data management, file design.

UNIT V:

E -Commerce: Introduction to E-Commerce, types of E-commerce, E-Commerce Applications, electronic payment systems, Overview of Communication System, Use and functioning of the internet, WWW, Digital Marketing, Search Engine Optimization.

Text Books:

1. Ralph Stair, "Principle of Information System", Thomson course technology.
2. Elias M. Awad, "System Analysis and Design", Galgotia Publishing Pvt. Ltd., New Delhi.

Reference Books:

1. James A Senn, "Analysis and Design of Information Systems", McGraw-Hill Publishing Company, Delhi.
2. Muneesh Kumar, "Business Information Systems", Vikas Publishing House Pvt. Ltd., New Delhi.
3. James A. O'Brien, "Management Information System", Galgotia Publications Pvt. Ltd. New Delhi.
4. Kenneth C. Laudon & Jane P. Laudon, "Management Information System", Prentice Hall of India Ltd., New Delhi



BCA 208: PRACTICAL
INTRODUCTION TO INFORMATION SYSTEM

Max. Marks: 25

Min. Marks: 09

1. Exposure to Internet, Web Browser, Search engines and Search Engine Marketing, Digital Marketing.
2. Email creation, email writing ethics, campaign creation and management.
3. Key Word Analysis and Web Page ranking.
4. Understanding and creating Google form, Google Adword and Adword Analytics.
5. Search Engine Optimization.
6. Exposure to Social Media, Social Media Mining, Marketing through Face book.
7. YouTube including creating a channel on YouTube.
8. Social Media Measuring, Monitoring, Reporting, Tracking and Monitoring platforms.
9. Creating and Using Blog.
10. Use of Blogs for Forum and discussion.

Reference Books:

1. Raghvendra K., Shruthi Prabhakar, "Digital Marketing", Himalaya Publishing House, Mumbai.



Max. Theory Marks: 40

OBJECTIVES: The objective of the course is to provide basic knowledge of operating system modules like process and memory management. The student after completion of the course will be able to understand the internal working of an operating system that will help in identifying and troubleshooting application errors.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I

Introduction to Operating Systems, Operating system services, multiprogramming, time sharing system, storage structures, system calls, multiprocessor system, Device Management. Device Drivers.

UNIT II

Process concept, Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/O devices organization, I/O buffering.

UNIT III

Inter-process communication, precedence graphs, critical section problem, semaphores, Classical problems of synchronization.

UNIT IV

Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.

UNIT V

Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation. Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.

TEXT BOOK:

Operating System Concepts, Addison Wesley, 4th Edition, A. Silberschatz and P. Galvin.

Latest Edition.

REFERENCE BOOKS:

1. Operating System by Deitel
2. Operating systems, 4th Edition, William Stallings, Pearson Education, 2003.

Saurabh

Rohit

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NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

ईकाई 1

- क मानक हिन्दी भाषा
1. मानक हिन्दी के लक्षण और उदाहरण, 2. मानक हिन्दी का स्वरूप 3. मानक हिन्दी के प्रकार
ख अशुद्धियों और उनका संशोधन
1. अशुद्धियों के उदाहरण, 2. अशुद्धियों के प्रकार (उच्चारण गत, वर्तनी गत, शब्द और अर्थ गत, व्याकरण गत)

ईकाई 2

- क हिन्दी का शब्द भंडार:
1. शब्दों के प्रकार, 2. शब्दों की रचना, 3. नये प्रयोग
ख हिन्दी की वाक्य रचना
4. वाक्यों के प्रकार, 5. वाक्य विन्यास, 6. वाक्य गत सामान्य अशुद्धियाँ, 7. विराम चिन्ह

ईकाई 3

- क पत्र लेखन, सार लेखन, पल्लवन:
1. पत्रों के उदाहरण, 2. पत्रों के प्रकार, 3. पत्र लेखन की विशेषताएँ (पत्र लेखन, संशोधन, अत में दिनांक आदि डालना), 4. सार लेखन, 5. पल्लवन

ईकाई 4

भारतीय संस्कृति, भारत देश और उसके निवासी, भारतीय समाज की संरचना, सामाजिक गतिशीलता - अद्यतन, कार्य और दर्शन

ईकाई 5

भारतीय संस्कृति, का विश्व पर प्रभाव, मध्य प्रदेश का सांस्कृतिक वैभव

पाठ्यपुस्तक: भारतीयता के अंगर स्वर, प्रकाशन: म.प्र. हिन्दी ग्रंथ अकादमी, भोपाल।

अनुक्रमिका

खण्ड एक: पाठ्य सामग्री

ईकाई 1

- 1 भारत बंदना
2 रघुतन्त्रता एकारती
3 गड़े घर की बेटे

सूर्यकान्त त्रिपाठी भनिराला
जयशंकर भप्रसाद
प्रेमचन्द

ईकाई 2

4. एक गधे की वापसी
5 टेलीफोन

कूरनचन्दर
हरीशंकर परसाई

ईकाई 3

- 6 अफ़रार
7 स्तौन्दर्य की नदी नर्मदा

शरद जोशी
अमृतलाल वेगडे

ईकाई 4

- 8 बरत में बाबा
9 युद्ध की करुणा

शानी
डॉ सिद्ध तिस्त

ईकाई 5

- 10 सादगी
11 योग की शक्ति
12 शिकानो से स्वामी विवेकानन्द का पत्र

महात्मा गांधी
हरिवंशराय भबच्चन

खण्ड दो: हिन्दी भाषाय सम्प्रेषण कौशल

ईकाई 1

- क. मानक हिन्दी भाषा
ख. अशुद्धियों और उनका संशोधन

ईकाई 2

- क. हिन्दी का शब्द भंडार
ख. हिन्दी की वाक्य रचना और विराम चिन्ह

ईकाई 3

- क. पत्र लेखन, सार लेखन, पल्लवन

खण्ड तीन: भारतीय संस्कृति

ईकाई 4

- क. भारत देश और उसके निवासी
ख. भारतीय समाज की संरचना
ग. सामाजिक गतिशीलता
घ. धर्म और दर्शन

ईकाई 5

- क. भारतीय संस्कृति का विश्व पर प्रभाव
ख. मध्य प्रदेश का सांस्कृतिक वैभव

DEVI AHILYA VISHWAVIDYALAYA, INDORE, (M.P.)



SEMESTER WISE SCHEME

AND

SYLLABUS

FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)

2018-19 Academic Year ONWARDS,

Sanwani
4/5/19

Dilahi

Sandip
4/5/19

Smit

Rathore

BCA Scheme Effective for Students admitted in July 2018 or Later



BCA Second Year Semester Scheme: 2019-20 and Onwards

BCA - III Semester Examination Scheme

Course	Theory Max. Marks		Practical Max. Marks	Max. Marks	Min. Marks
	Internal	External			
BCA 301- Discrete Mathematics	10	40	--	50	04+13
BCA 302 – Data Structure using C	--	50	--	50	17
BCA 303 – Object Oriented Programming using C++	--	50	--	50	17
BCA 304 – Unix Operating System	--	50	--	50	17
BCA 305 – Accounting and Financial Management	10	40	--	50	04+13
BCA 306 – Communication Skills	05	20	--	25	02 + 07
BCA 307 – Practical (Data Structure)	--	--	25	25	09
BCA 308 – Practical (Object Oriented programming using C++)	--	--	25	25	09
BCA 309 – Practical (Unix Operating System)	--	--	25	25	09
Total Marks	25	250	75	--	--
Grand Total	--	--	--	350	--

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

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BCA Scheme Effective for Students admitted in July 2018 or Later

Page 2



BCA Second Year Semester Scheme: 2019-20 and Onwards

BCA IV Semester Examination Scheme

Course	Theory Max. Marks		Practical Max. Marks	Max. Marks	Min. Marks
	Internal	External			
BCA 401- Computer Oriented Numerical Methods (Using "C" Language)	--	50	--	50	17
BCA 402 – Software Engineering	10	40	--	50	04+13
BCA 403 – Database Management System	--	50	--	50	17
BCA 404 – Programming with Java	--	50	--	50	17
BCA 405 – Environmental Awareness and Green Computing	10	40	--	50	04+13
BCA 406 – Entrepreneurship	05	20	--	25	02 + 07
BCA 407 – Practical (Computer Oriented Numerical Methods (Using "C" Language))	--	--	25	25	09
BCA 408 – Practical (Database Management System)	--	--	25	25	09
BCA 409 – Practical (Programming with Java)	--	--	25	25	09
Total Marks	25	250	75	--	--
Grand Total	--	--	--	350	--

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

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Pratik

BCA Scheme Effective for Students admitted in July 2018 or Later

Page 3



BCA-301: DISCRETE MATHEMATICS

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES: The aim of this course is to enhance mathematical reasoning of students so that they can understand various Discrete Structures and algorithms used in Computer Science. Concepts of Logic, Boolean algebra, Propositions, predicates, set theory and Functions, Combinatorics and Recurrence relations, relational algebra will be studied along with their importance in computer science. Students will study non-linear data structures such as graph, tree and also understand the concept of languages and grammar.

COURSE OUTCOMES:

On completion of the course students will

1. develop an understanding about Logic and Boolean algebra.
2. Be able to understand the importance of sets and combinatorics in computer science.
3. be able to categorize function types, differentiate between the terms functions and relations and understand the importance of relations in computer science.
4. develop an understanding about relations and their properties, nary relations and their applications, representing relations, closures of relations, equivalence relations.
5. develop an understanding of the concepts of graph, tree and applications.
6. be acquainted with language theory and will categorize language types.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT-I

Algebra of logic:

Recall of Statements & Logical Connectives, Tautologies & Contradictions, Logical Equivalence, Propositions, Predicates, Quantifiers: Universal & Existential Quantifiers.

Boolean algebra:

Boolean Algebra and its Properties, De- Morgan's Laws.

UNIT-II

Sets and Functions: Introduction to set theory, set operations: Union, Intersection, Difference, complement, fuzzy sets.

Mathematical reasoning: Introduction to Methods of proof, mathematical induction. Use of mathematical induction to solve different problems.

UNIT-III

Combinatorics: The basics of counting, The sum rule, The product rule, The Pigeonhole Principle, Permutations with repetitions, Permutations without repetitions, Circular Permutations, Applications of combinations, Applications of Combinatorics to solve Committee problems, word problems, puzzle problems etc. Advanced counting techniques, recurrence relations, solving recurrence relations.

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UNIT- IV

Relations: Relation definition , Importance of relations in computer science. Relations and their properties, Unary relations , Binary relations, Ternary relations , n-ary relations and their applications, closures of relations, equivalence relations. Representing relations. composite relation. Operations on relations – union, intersection and join.

UNIT- V

Graph: Graph terminology, types of graph connected graphs, components of graph. Euler graph, Hamiltonian path and circuits, Graph coloring, Chromatic number.

Tree: Definition, types of tree (rooted, binary), properties of trees. binary search tree.

Languages and Grammars: Introduction, Phrase-Structure Grammars, Importance of grammar and language theory in Computer Science,

TEXT BOOK:

Kenneth H. Rosen, "Discrete Mathematics and its Applications", Mc.Graw Hill, 2002.

REFERENCE BOOKS:

1. J.P.Tremblay& R. Manohar, "Discrete Mathematical Structure with Applications to ComputerScience", Mc.Graw Hill, 1975.
2. A text book of Discrete Mathematics by H. K. Pathak and D.C.Agrawal, Shiksha Sahitya Prakashan, Meerut.
3. Seymour Lipschutz, M.Lipson, "Discrete Mathemataics" Tata McGraw Hill, 2005.
4. N. Deo, Graph Theory with Application to Engineering and Computer Sciences, Prentice Hall of India.
5. C.L. Liu, Elements of Discrete Mathematics. Mc Graw-Hill Book Co.

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BCA Scheme Effective for Students admitted in July 2018 or Later

Page 5



BCA-302: DATA STRUCTURE USING C

Max. Marks: 50

Min. Marks: 17

COURSE OBJECTIVES:

Course objectives are to

- Design and implement various basic and advanced data structures.
- Introduce various techniques for data representation.
- Develop application using data structures.
- Improve the problem solving skills by mapping problem operations to data structure operations

COURSE OUTCOMES:

On completion of the course students will be able to

1. choose appropriate data structure as applied to specified problem definition.
2. handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. apply concepts learned in various domains like DBMS, compiler construction etc.
4. use linear and non-linear data structures like stacks, queues, linked list etc.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Introduction to Data Structure & Linked List

Types of Data Structure, Arrays representation and address calculation, Strings, Recursion, ADT (Abstract Data type), Concept of Files, Operations with files, types of files.

Linked List as an ADT, Linked List Vs. Arrays, and Memory Allocation & De-allocation for a Linked List. Linked List operations, Types of Linked List, Implementation of Linked List. Application of Linked List- polynomial, sparse matrix.

UNIT- II

Stack & Queue

Stack as an ADT. Stack operation, Array Representation of Stack, Link Representation of Stack, Application of stack – Recursion, Polish Notation

The Queue as an ADT, Queue operation. Array Representation of Queue, Linked Representation of Queue, Circular Queue, Priority Queue. & De-queue, Application of Queues – Johnsons Algorithm. Simulation

UNIT- III

Tree

Basic trees concept, Binary tree representation, Binary tree operation, Binary tree traversal, Binary search tree implementation, Thread Binary tree, The Huffman Algorithm, Expression tree. Introduction to Multi-way search tree and its creation (AVL, B-tree, B+ tree)

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BCA Scheme Effective for Students admitted in July 2018 or Later

Page 6



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UNIT- IV

Sorting & Searching

Sorting Concept, Shell Sort, Radix sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort
List Search, Linear Index Search, Index Sequential Search

UNIT- V

Hashing and Graph

Hash table, Hashed List Search, Hashing Methods, Collision Resolution Techniques, Graph-its type and representation, Graph Traversal: Depth First Search, Breadth First Search, shortest path algorithm (Dijkstra's Algorithm)

TEXT BOOKS:

1. Data Structures A Pseudocode Approach with C, Richard F. Gilberg & Behrouz A. Forouzan, second edition, CENGAGE Learning.
2. Data Structures using C, Reema Thareja, Oxford University press.
3. Introduction to Data Structure and its Applications Jean-Paul Tremblay, P. G. Sorenson

REFERENCE BOOKS:

1. Data Structures Using C & C++, Rajesh K. Shukla, Wiley- India.
2. Data Structures Using C, ISRD Group, Second Edition, Tata McGraw-Hill
3. Data Structure Using C, Balagurusamy
4. C & Data Structures, Prof. P.S. Deshpande, Prof. O.G. Kakde, Dreamtech press.
5. Data Structures, Adapted by: GAV PAI, Schaum's Outlines

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BCA Scheme Effective for Students admitted in July 2018 or Later

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BCA-303: OBJECT ORIENTED PROGRAMMING USING C++

Max. Marks: 50

Min. Marks: 17

COURSE OBJECTIVES: To introduce the concept of object-oriented programming through C++ and to understand the difference between object oriented programming and procedural programming. Advanced C++ features such as operator overloading, inheritance, polymorphism, templates and exception handling are also introduced. The students will be exposed to usage of appropriate OOP design principles.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Develop an understanding about the basic OOP concepts like abstraction, encapsulation, inheritance and polymorphism and its application in solving real life problems.
2. Develop an understanding about modular programming, functions, and parameter passing within functions through programming.
3. Develop an understanding of the concepts of classes, objects, building and destroying the instances and functions to handle strings.
4. implement data encapsulation, polymorphism and operator overloading
5. implement Inheritance, templates and exception handling.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Introduction: OOP languages, characteristics of OOP languages, application of OOP, OOP paradigm. C++ concepts: object, class, data abstraction, data encapsulation, inheritance, and polymorphism.

Static and dynamic binding, message passing, benefits and disadvantage of OOP.

UNIT- II

C++ programming basics, Tokens, expressions and control structures.

Functions in C++: main () function, function prototyping, Call by Value, Call by Reference. Returning by Reference, Inline functions, default arguments, const arguments, variables and storage classes, function overloading, Friend functions, Virtual functions.

UNIT- III

Classes and Objects: Defining a Class, Defining Member Functions (Inside and outside class definition), Constructors and Destructors, Parameterized constructors, constructors with default arguments, copy constructor, dynamic constructor. Private member functions, arrays within the class, static data members and functions, arrays of objects, objects as function arguments, returning objects from functions. String handling functions.

BCA Scheme Effective for Students admitted in July 2018 or Later

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BCA-304: UNIX OPERATING SYSTEM

Max. Marks: 50

Min. Marks: 17

COURSE OBJECTIVES: To understand the fundamental design of Unix Operating System and to become familiar with the various commands used for file handling, general utility, filters, scheduling and system administration. The students will be familiarized with the shell programming.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Understand the basics of Unix operating system and its features and some general utility commands.
2. Learn about the command shell, create own commands by combining commands, use pipes and redirection, set and manipulate ownership and permissions of files and directories.
3. Extract information using simple and advanced filters, and shell process.
4. Learn communication and scheduling of jobs, Unix editor, and the shell script.
5. Understand UNIX system administration.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Unix operating system, background, philosophy, help facility, The file system, structure of file system, Basic Commands related to file system: pwd, cd, mkdir, rmdir, ls, cp, rm, mv, cat. General utility commands: banner, cal, date, who, who am i, echo, printf, bc, who, uname, tty, stty, passwd.

UNIT- II

Utilities: more, od, file, wc, cmp, comm, diff, tar commands. I/O redirection. The Bourne shell: sh preceding a command by its own combining commands, pattern matching, echo, pipes, tees. shell variables and shell scripts. Basic file attributes, chmod command.

UNIT- III

Simple filters: pr, head, tail, cut, paste, sort, uniq, nl commands. Advanced filters: grep, egrep, fgrep, tr, join, sed, awk, filtering. The process: shell process, parent and children process status, system processes, multiple jobs, foreground and background, wait commands, pre mature termination of process, job execution with low priority, multiple jobs in foreground, shell layers. timing processes.



BCA Scheme Effective for Students admitted in July 2018 or Later

Page 10

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UNIT- IV

Data encapsulation, Polymorphism, Operator overloading: overloading unary operators, overloading binary operators.

UNIT- V

Inheritance, reusability of code through inheritance, type of inheritance: Single inheritance, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, Abstract classes, constructors in derived classes, nesting of classes, Pointers, Virtual functions, Pure virtual functions, Templates and Exception handling.

Practical

Note: As per the syllabus and under guidance of respective faculty every student has to perform minimum 25 lab. exercises.

TEXT BOOK:

Object Oriented Programming with C++ by Balaguruswamy, TMH Publishing.

REFERENCE BOOKS:

1. Object Oriented Programming in C++, 3rd Edition, R. Lafore, Galigotia Publications Pvt Ltd.
2. The Complete Reference, 4th Edition, Herbert Schildt, TMH.
3. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
4. The C++ Programming Language, 3rd Edition, B.Stroustrup, Pearson Education.
5. OOP in C++, 3rd Edition, T.Gaddis, J.Walters and G.Muganda, Wiley DreamTech Press.
6. Computer Science, A Structured Programming Approach Using C++, B.A.Forouzan and R.F.Gilberg, Thomson

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UNIT-IV

Communication and scheduling, address all users, delay Execution of jobs-later, periodically
Introduction to vi editor, Programming with shell: system variable, profile, conditional
execution, script termination, Conditional and loop control statements, set and shift statements.

UNIT- V

System Administration: installing hardware and software, super user, security, user services,
management operation, files system, administration backups.

TEXT BOOKS

1. Sumitabha Das, "Unix : Concepts and Applications", Third Edition, 2006, Tata Mc-Graw-Hill

REFERENCE BOOKS:

1. ISRD Group, Basics of OS, UNIX and SHELL Programming, TMH (2006)
2. "A User Guide to Unix System", Thomas Rebecca yate, Second Edition, 2002, Tata Mc-Graw-Hill.
3. Stephen Prata "Advanced Unix -A programmer's Guide".

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BCA-305: ACCOUNTING AND FINANCIAL MANAGEMENT

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES: To introduce the concept of Accounting and financial management. The student shall be introduced with the accounting standards, book keeping and preparation of journal, ledger and trial balance and other accounting related statements. Students will be introduced with accounting through software.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Understand basics of accounting, conventions, develop conceptual framework and recording of transactions in the book of accounts
2. Record the transactions in bank reconciliation statement and record transactions through one journal.
3. Understand the meaning of depreciation and need for charging depreciation, preparing the final accounts, and company's financial statement as per the Company's act.
4. Conceptualize Ratios and its need in decision making, cash flow statement and its utility to business as a technique of financial analysis.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT-I

Introduction: Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in accounting, users of accounting information and limitations of Financial Accounting.

Conceptual Frame work: Accounting Concepts, Principles and Conventions, Accounting Standards concept, objectives, benefits, brief review of Accounting Standards in India, Accounting Policies, Accounting as a measurement discipline, valuation Principles, accounting estimates.

Recording of transactions: Journal, Ledger and Trial balance based on double entry book keeping.

UNIT-II

Subsidiary Books: Need, uses and types, Cash Book, Bank Reconciliation Statement.

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UNIT- III

Depreciation: Meaning, need & importance of depreciation, methods of charging depreciation. (WDV & SLM).

Preparation of final accounts: Preparation of Trading Account, Profit & Loss Account, and Balance Sheet of sole proprietary business.

Introduction to Company Final Accounts: Important provisions of Companies Act, 1956 in respect of preparation of Final Accounts. Understanding of final accounts of a Company.

UNIT- IV

Cash flow statement (as per accounting standard), Analysis of Financial Statement-Financial ratio.

UNIT- V

Computerized Accounting: Computers and Financial application, Accounting Software packages. An overview of computerized accounting system - Salient features and significance. Concept of grouping of accounts, Codification of accounts, Maintaining the hierarchy of ledger. Generating Accounting Reports.

Note: Practical's are to be conducted using any Accounting Software for UNIT V.

TEXT BOOK:

1. Fundamentals of Accounting & Financial Analysis: By Anil Chowdhry (Pearson Education)

REFERENCE BOOKS:

1. Financial Accounting: By Jane Reimers (Pearson Education)
2. Accounting Made Easy: By Rajesh Agarwal & R Srinivasan (Tata McGraw -Hill)
3. Financial Accounting for Management: By Amrish Gupta (Pearson Education)
4. Financial Accounting for Management: By Dr. S. N. Maheshwari (Vikas Publishing House)

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BCA -306: COMMUNICATION SKILLS

Max. Marks: 20

Min. Marks: 07

COURSE OBJECTIVES: The course aims to develop and enhance the communicative competence of the students. The focus is on the skills of writing, listening, and verbal communication. The students will be exposed to various forms of personal and professional communication that will be required in effective communication. Communication skills subject will help a student in developing confidence, smartness and outward skills.

COURSE OUTCOMES

On completion of the course students will be able to

1. Understand the role of communication in personal & professional success. The student must be able to effectively communicate in written and oral communication and to become a good listener.
2. Develop interpersonal communication skills develop awareness of appropriate communication strategies.
3. Build up the confidence to appear for group discussion and interviews and present technical material orally with confidence and poise. Prepare and present talks effectively.
4. Build up effective written communication skills. Prepare and present written messages with a specific intent.
5. Negotiate and present technical material using audiovisual materials.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT-I

Fundamentals of Communication: Definitions, Need of communication, importance, forms of communication, process of communication, channels, barriers and strategies to overcome barriers of communication.
Listening: Definition, Importance, Benefits, barriers, approaches, be a better listener, exercises and cases.

UNIT-II

Advanced Communication: Art of communication, Key elements of Interpersonal Communication, Principles of Interpersonal Communication, tone of voice, facial expressions, gestures and body language, Communication and introduction with unknown person, Cell Phone/ Telephone Etiquettes: The Do's and Don'ts.

UNIT-III

Group Discussions: Definitions, importance, process, points to be borne in mind while participating, Dos and Don'ts.
Interviews: Types of Interviews, Points to be borne in mind as an interviewer or an interviewee, self introduction, commonly asked questions, Dos and Don'ts.

UNIT-IV

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Transactional Analysis: Transactional analysis, Johari Window, FIRO-B
Written Communication: Cover letter, Report writing, Documentation, business correspondence, preparation of manuals and project reports, Drafting emails, Minutes of meeting, Notices and Circulars, Resumes. Writing formal letters, Memos, Create a questionnaire.

UNIT-V

Negotiation Skill: Basic principles, Building understanding, process of negotiation, essentials of negotiations. Contemporary Communication Styles, Technology enabled communication: Power point presentation. Do's and Don'ts of Power point presentation. Other types of Multimedia presentation.

NOTE: Class Assignments: Making Resumes. Writing formal letters. Memo drafting emails, notices, Create a questionnaire, and meet new people they never met and know about them.

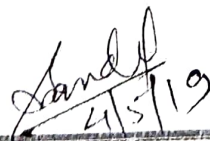
TEXT BOOKS :

1. Chaturvedi, P.D. and Chaturvedi Mukesh (2004), "Business Communication" Pearson Education, Singapore Pvt. Ltd.
2. Communication- KK Sinha
3. Organizational Behavior – Fred Luthans
4. Organizational Behavior – Stephen Robbins

REFERENCE BOOKS :

1. Business Communication by ICMR, Feb 2001.
2. Toropov Brandon (2000), "Last Minute Interview Tips", Jaico publishing House, Mumbai.
3. Heller Robert (1998), "Essential DK Managers: Communication Clearly", Dorling Kindersley, London.




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BCA-307: PRACTICAL (DATA STRUCTURE USING C)

Max. Marks: 25

Min. Marks: 09

1. Store records of 100 students using array.
2. Representation of upper triangular and lower triangular sparse matrix in linear array.
3. Push and pop operation on stack using array.
4. Insertion and deletion operation on queue using array.
5. Insertion and deletion operation on circular queue using array.
6. Program for Linear search.
7. Program for Binary search.
8. Program for exchanging the value of variables using pointers.
9. Linked List creation, insertion and deletion.
10. Count no. of elements in linked list.
11. Sort a Linked List.
12. Push and pop operation on stack using linked list.
13. Insertion and deletion operation on queue using linked list.
14. Insertion and deletion operation on circular queue using linked list.
15. Doubly Linked List creation, insertion and deletion.
16. Creation of Binary search tree.
17. Insertion and deletion of Binary search tree.
18. Traversal of Binary search tree (inorder, preorder, postorder)
19. Complete program for Binary search tree.
20. Representation of polynomial in Linked List.
21. Program for Bubble sort.
22. Program for selection sort.
23. Program for Quick sort

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BCA-308: PRACTICAL (OBJECT ORIENTED PROGRAMMING USING C++)

Max. Marks: 25

Min. Marks: 09

1. Write a program to illustrate the use of various stream classes of C++.
2. Write a program to find the largest, second largest and third largest in a given array.
3. Write a program to find the GCD and LCM of two no's.
4. Write a program to read a $n \times m$ matrix and find
 - a. The average of each row.
 - b. The average of each column.
 - c. The average of $m \times n$ matrix.
5. Write a program to print the boundary element of matrix.
6. Write a program to print the diagonal elements of matrix.
7. Write a program to illustrate the use of structure and union.
8. Write a function which accept object as a parameter and returns object.
9. Write a program to overload ++ operator to increment age of person by one month.
10. Write a program to overload + operator to concatenate two string.
11. Write a program to illustrate the use of scope resolution operator.
12. Write a program to find the square root using inline function.
13. Write a program to illustrate the use of friend function.
14. If a class D is derived from two base classes B1 and B2, then write these classes each containing zero argument constructors. Ensure while building an object of type D firstly the constructor of B2 should get called followed by that of B1. Also provide destructor in each.
15. Write a program to overload two operator > and - as follow.
Let t1, t2 and t3 be three object of time class.
If (t1>t2)
 t3=t1-t2;
else
 t3=t2-t1;
16. Create a class called Employee that includes three pieces of information as instance variables - a first name (type String), a last name (type String) and a monthly salary (double)
 - a. Create a constructor in above class to initialize the three instance variables. Provide a get method for each instance variable.
 - b. Create two employee objects and display each object's yearly salary.
 - c. Give each employee a 10% raise and display each Employee's yearly salary again.
17. Write C++ program to create five object of book, get information of book using getdata() function including name, price, publication and author. Write search() function to search a specified book, if book is available return the complete information of book and print the information of book using putdata() function.
18. Write an application to create a super class Employee with information first name & last name and methods getFirstName(), getLastName(). Derive the sub-class

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- ContractEmployee and RegularEmployee with the information about department, designation & method displayFullName() , getDepartment, getDesignation() to print the salary and to set department name & designation of the corresponding sub-class objects respectively.
19. Create an abstract class Shape which calculate the area and volume of 2-d and 3-d shapes with methods getArea and getVolume. Reuse this class to calculate the area and volume of square ,circle ,cube and sphere.
 20. Write a C++ program in which you are overloading all arithmetic operators.
 21. Write a program that accepts two values either integer or double. Design functions that understand the input, add them and provide the correct output.
 22. Create a base class that contains a function display(), displaying "I am in base" . Function with same name display() is in derived class ,displaying "I am in derive".
 23. Write a function template for finding the minimum value contained in an array.
 24. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to base class, a member function get_data() to initialize base class data members and another member functions display_area() to compute and display the area of figures. Mark the display_area() as a virtual function and redefine this function in the derived class to suit their requirements (Use pure virtual function)

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BCA- 309: PRACTICAL (UNIX OPERATING SYSTEM)

Max. Marks: 25

Min. Marks: 09

1. Demonstrate the following commands:

- a) ls
- b) pwd
- c) who, who am i
- d) cat
- e) mkdir, cd, rmdir
- f) cp, mv, rm
- g) chmod with its options
- h) cal, date, who, tty, lp, stty.

2. Basic Operations

- a) Connecting to the system
- b) Disconnecting from the system
- c) Text and graphic mode
- d) Changing your password
- e) Navigating through the file system
- f) Determining file type
- g) Looking at text files
- h) Finding help
- i) List the different types of file comparisons command.

3. Demonstrate following commands: -

- a) file
- b) less
- c) more

4. Demonstrate the following commands

- a) head
- b) tail
- c) wc
- d) cut
- e) paste
- f) sort

5. Demonstrate the following commands

- a) unique
- b) grep
- c) fgrep
- d) tee

6. List the different types of Mathematical and string operators in UNIX.

7. Demonstrate the mail command with an example.

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8. Write shell script to generate following output

a. Hello Everybody !!!
My Home directory is _____
Current date and time is _____

b. Use cut command to find date and time

Today's date is _____
Current time is _____

c. Use set command to find date and time

Today's date is _____
Current time is _____

9. Write shell script that accepts your name and displays the following result

Hi <your name>
Your host name is _____
Your shell's name is _____

10. Shell programming of bourne shell including if, for, while, case and shift statement.

- Write a shell script to find maximum of two numbers.
- Write a shell script to find maximum of three numbers.
- Write a shell script to find the sum of first N natural numbers.
- Write a shell script to read n numbers from the user and display its sum.
- Write a shell script sum.sh that takes an unspecified number of command line arguments (up to 9) of integers and finds their sum. Modify the code to add a number to the sum only if the number is greater than 10.
- Write a shell script to read 10 numbers from the user and to find the sum and Average of the numbers.
- Write a shell script for swapping two numbers (using only two variables).
- Write a shell script of make a calculator using case that accepts two numbers and an operator through command line and performs addition, subtraction, multiplication and division.
- Write a shell script that accepts file names as arguments (that are present in current directory only). Check if the file is available and is an ordinary file. Make the files executable for the user using chmod command.

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**BCA-401: COMPUTER ORIENTED NUMERICAL METHODS
(USING "C" LANGUAGE)**

Max.Marks:50

Min.Marks:17

COURSE OBJECTIVES: The course aims to provide conceptual understanding of various numerical methods and to develop the understanding of implementing numerical methods in programming language. The application of these numerical methods shall also be introduced.

COURSE OUTCOMES

On completion of the course students will be able to

1. Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Raphson method.
2. Understand the pitfalls of Gauss Elimination Method and Solve a Linear System of equation using Gauss Jordan and Gauss Seidel method.
3. Familiarize with finite precision computation.
4. Familiarize with numerical solutions of nonlinear equations in a single variable.
5. Implement numerical methods in programming language.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Numerical Computations, Computer Arithmetic: Floating Point Number Operations, Normalization and their consequences, Iterative Methods: Bisection Methods, False Position Methods, Newton Raphson Method, Secant Method, Graffes Root Squaring Method, Convergence of Solution

UNIT- II

Simultaneous Linear Equation: Solution of Simultaneous Linear Equation – Gauss Elimination Method, Gauss – Seidal Method, Gauss – Jordan Elimination Method, Triangularization Method & Pivoting Condensation, III Conditioned Equation & Refinement of solution
Curve Fitting: Curve Fitting Method, Least Curve Fitting, Non-Linear Curve Fitting

UNIT- III

Difference Operators and Interpolation: - Definition of Forward, Backward, Shifting, Divided Difference Central and Averaging Operators and their Relationships, Newton's Forward Interpolation Formula, Newton's backward Interpolation Formula, Newton's Divided Interpolation Formula, Lagrange's Interpolation Formula.

UNIT- IV

Numerical Differentiation: Numerical Differentiation using Newton's Forward interpolation Formula, Newton's Backward Interpolation Formula, Newton's divided Interpolation Formula
Numerical Integration: General Quadrature Formula, Newton-Cote's Formula, Trapezoidal Rule, Simpson's one Third Rule, Simpson's Three Eight Rule.

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UNIT-V

Numerical Solutions of Ordinary Differential Equations: Euler's Method, Euler's Modified Method, Taylor's Series Method, Picard's Method, Runge Kutta Second Order and Fourth order Method.

TEXT BOOK:

V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.

REFERENCE BOOKS:

I. S. S. Sastry, Introductory Methods of Numerical Analysis.

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BCA-402: SOFTWARE ENGINEERING

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES:

The course objectives are to :

- Acquire knowledge of basic Software Engineering methods and practices, and their appropriate application.
- Describe software engineering layered technology and Process frame work.
- Develop general understanding of software process models.
- Understand of software requirements and the SRS documents.
- Understand different software architectural styles.
- Understand implementation issues such as modularity and coding standards.
- Understanding of approaches to verification and validation and software testing approaches.
- Conceptualize quality issues and software evolution.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Gain basic knowledge and understanding of the analysis and design of complex systems.
2. Develop ability to apply software engineering principles and techniques.
3. Develop ability to develop, maintain and evaluate large-scale software systems.
4. Produce efficient, reliable, robust and cost-effective software solutions.
5. Manage time, processes and resources effectively
6. Apply software testing and quality assurance techniques at the module level, and understand these techniques at the system and organization level.
7. Understand common lifecycle processes
8. Prepare technical documentations and make presentations on various aspects of a software development project.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

System concepts and Information system environment:

The system concept, characteristics of system, elements of system, The System Development Life Cycle, various information gathering tools, feasibility study, tools of system analysis, various methods of process design, form design methodologies.

UNIT- II

Software Process, Product and Project:

The Product: Software. Software Myths, The process: Software Engineering, A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Component-Based Development, Fourth Generation Techniques, Software process and Project Metrics, Software measurement

UNIT- III

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Software Project Planning and Design:

Software Project Planning: Project planning objectives, Decomposition Techniques, Cost Estimation, Empirical estimation models, The Make/Buy Decision..

Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure design methodology.

UNIT- IV

Software Quality Assurance and Testing:

Software Quality Assurance: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Reliability, Mistake Proofing for Software, Testing Strategies: A strategic approach of software testing, White Box Testing, Black Box testing Techniques, strategic issues, unit testing, integration testing, validation testing, system testing, the art of debugging.

UNIT- V

Advanced Topics:

MIS & DSS: Introduction to MIS, long range planning, development and implementation of an MIS, applications of MIS in manufacturing sector and in-service sector, Decision Support System concepts, types of DSS.

TEXT BOOKS

1. R. S. Pressman, "Software Engineering – A practitioner's approach", 6th ed., McGraw Hill Int. Ed., 2002.

REFERENCE BOOKS

1. Pankaj Jalote "Software Engg" Narosa Publications.
2. Jan Sommerville: Software Engineering 6/e (Addison-Wesley)
3. Richard Fairley: Software Engineering Concepts (TMH)
4. Elis Awad. "System Analysis & Design", Galgotia publications
5. W.S. Jawadekar: Management Information Systems, TMH Publication, India
6. Hoffer " Modern System Analysis & Design" 3e, Pearson Edition

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BCA-403: DATABASE MANAGEMENT SYSTEM

Max. Marks: 50

Min. Marks: 17

COURSE OBJECTIVES: The objective of the course is to present an introduction to database management systems with an emphasis on how to organize, maintain and retrieve information from a DBMS efficiently. Practical's related to DBMS shall be carried in SQL and PL/SQL and will help the students to develop projects related to databases.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Develop a broad understanding of database concepts, database management system, major DBMS components and their function.
2. Design a model as per application's data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model.
3. List and explain the fundamental concepts of a relational database system and manipulate a database using SQL.
4. Develop Programming capability using PL/SQL including stored procedures, stored functions, cursors, packages.
5. Improve the database design by normalization.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT-I

Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages: -DDL, DML, DCL, TCL, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal: - external, conceptual & internal levels. Database System architecture, level of abstraction, Database users and DBA, Classification of Database Management Systems, Components of database system, Traditional File Systems vs. Modern Database Systems, Introduction and applications of DBMS, Data Independence

UNIT-II

Entity relationship model as a tool of conceptual design: entities & entities set, relationship, relationship set & relationship types, attributes, role, participation and mapping constraints, keys, strong and weak entities, Advance ER Model Features: generalization, specialization & aggregation, reducing ER diagram to tables, Roles, Participation.

UNIT-III

Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity, extension and intention, relational algebra: select, project, Cartesian product, Evaluation of SQL., Between clause, Distinct Clause, Order by

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Clause, Group by Clause, SQL Functions, Sub queries, Handling null value, Aggregate Functions, set operations, Different types of Joins, View

UNIT-IV

PL/SQL Programming using Oracle, Oracle Data types, Looping and Decision Making, Working with Stored Procedure, Trigger, Cursor.

Relational Database design, Features of good relational database design, Codd's Rule, Integrity Constraints.

UNIT-V

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF & BCNF normal forms, multivalued dependency, join dependency, 4NF, 5NF.

TEXT BOOK-

Database System Concepts by Henry Korth and A. Silberschatz.

REFERENCE BOOKS-

1. An Introduction to Database System by Bipin Desai
2. Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh, Kalyani Publication
3. Database Management System by SeemaKedar, Technical Publication

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BCA- 404: PROGRAMMING WITH JAVA

Min Marks: 17

Max Marks: 50

COURSE OBJECTIVES: The subject introduces the fundamental concepts of Java programming. The students will be familiarized with the features of Java like platform independence, robustness etc. The course covers the concepts of class, objects, constructors, super class, overloading, overriding, packages and interfaces. The topic of database connectivity will be helpful to develop complete software solutions in Java.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Develop an understanding of the features of Java programming language and its application.
2. Implement the control structures in Java using programs.
3. Understand the concepts of classes and objects, access modifiers, constructors and destructors, inheritance, overloading and overriding by implementing programs.
4. Understand about the packages and interfaces, exception handling, threading in Java, and Java I/O package by implementing through programs.
5. Handle strings in Java, various utility classes through Java util package, and database connectivity by programs.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I

Java features like Platform independent, architecture neutral, robust etc, Java Virtual machine concept, Introduction to class in java and methods, Primitive data types, operators, reserved words, local variables, examples and exercises.

UNIT II

Control statements: selection statements, Iteration statements, jump statements. String class, StringBuffer class, Math library, Arrays.

UNIT III

Definitions and naming conventions classes and class members, instance fields and methods access modifiers: public, private, protected, final, static, abstract, volatile and transient; initialization by constructor, Initialization by Default constructor, Multiple Definition of constructors, creation of objects, access modifiers, Inheritance, Super class, Sub class, Method overloading, Method overriding.

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UNIT IV

Packages and Interfaces: defining package, finding packages and CLASSPATH. Access protection, importing packages, Exception Handling: fundamentals, exception types, try, catch and finally, throw, throws, creating own exception, exception by overriding, Thread, Multithreading example, synchronization, Java IO package, InputStream, OutputStream. File handling

UNIT V

String Handling in java, Special string operators, String handling methods, Classes of java lang package, Java. util package and classes: Calendar, Date, ArrayList, Vector class, Taking input from user by Scanner class. Database connectivity: Types of driver, connecting database, crating table and running queries for insert, delete, update and selecting data and showing them to user. Examples and Exercises.

Practical Note: As per the syllabus and under guidance of respective faculty every student has to perform minimum 25 lab. exercises covering all units with equal weightage.

TEXT BOOK

1. Complete Reference (Java 2) – Herbert Schildt - Tata McGraw Hill, New Delhi.
2. Programming with Java E. Balaguruswamy Tata McGraw Hill, New Delhi, 2nd edition 2002.

REFERENCE BOOKS:

1. Joseph O'Neil. Teach yourself java, Tata McGraw Hill, New Delhi, 2001.
2. Java script: Don Gosselin, Thomson Learning (Vikas Publication)
3. Java in a Nut Shell – Flanagan – Orielly Publication

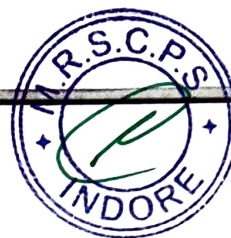
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BCA-405: ENVIRONMENTAL AWARENESS AND GREEN COMPUTING

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES:

The course objectives are to :

- Study the concepts related to Environmental Awareness, Green IT, Green devices and hardware.
- Manage the green IT and various laws, standards, protocols along with outlook of green IT.
- Understand the concept of green IT and relate it to sustainable development.
- Apply the green computing practices to save energy.
- Discuss how the choice of hardware and software can facilitate a more sustainable operation
- Use methods and tools to measure energy consumption

COURSE OUTCOMES:

On completion of the course students will be able to understand

1. Green IT with its different dimensions and Strategies.
2. Green devices and hardware along with its green software methodologies.
3. Various green enterprise activities, functions and their role with IT.
4. The concepts of how to manage the green IT with necessary components.
5. Various laws, standards and protocols for regulating green IT.
6. Identify the various key sustainability and green IT trends.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT - I

Study of Environment and ecology & Environmental Pollution:

Definition and Importance, Public participation and Public awareness., Air, water, noise, heat and nuclear pollution- Definition, Causes, effect and prevention of pollution, Disaster management – Flood, Earthquake, cyclones and landslides.

UNIT - II

Environment and social problems& Role of mankind in conserving natural resources:

Sustainable development- Introduction, Energy problems of cities, solar energy, biogas and wind energy. Water conservation – rain-water harvesting, Food resources – World food problem, Energy resources – increasing demand for energy, Role of information technology in protecting environment & health.

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UNIT III

Fundamentals of Green IT

Green IT Fundamentals: Business, IT, and the Environment –Green computing: carbon foot
Print -Measuring. Details, reasons to bother, Plan for the Future, Cost Savings: Hardware,
Power

UNIT IV

Green Assets and Power Problems

Green Assets: Buildings, Data Centers, Networks, and Devices, Green Information Systems :
Design and Development Models, Monitoring Power Usage, Servers, Low-Cost Options,
Reducing Power Use, Data De-Duplication, Low-Power Computers and peripheral devices.

UNIT V

Green Supply Chain & Green PC

Paper Reduction, Green Supply Chain, Reduce PCs and Servers, Shared Services, Hardware
Costs. Cooling. Green Grid Framework, Virtualizing of IT systems, Materials recycling, Best
ways for Green PC, Green Data center Case Studies

Reference Books

1. Text Book for Environmental Studies – University Grants Commission, New Delhi &
Bharati Vidyapeeth institute of Environment Education and Research, Pune
2. Woody Leonhard, Katherrine Murray, “Green Home Computing for Dummies”,
August2009, ISBN: 978-0-470-46745-9
3. Alvin Galea, Michael Schaefer, Mike Ebbers, “Green Data-Center: Steps for the Journey”



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BCA-406: ENTREPRENEURSHIP

Max. Marks: 20

Min. Marks: 07

COURSE OBJECTIVES:

The course objectives are to:

- Understand basic concepts in the area of entrepreneurship,
- Understand the role and importance of entrepreneurship for economic development,
- Develop personal creativity and entrepreneurial spirit by adopting of the key steps in the elaboration of business idea,
- Understand the stages of the entrepreneurial process and the resources needed for the successful development of entrepreneurial ventures.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Define basic terms, interpret their own business plan.
2. Identify the elements of success of entrepreneurial ventures.
3. Evaluate the effectiveness of different entrepreneurial strategies.
4. Consider the legal and financial conditions for starting a business venture.
5. Specify the basic performance indicators of entrepreneurial activity.
explain the importance of marketing and management in small businesses venture.
6. Analyze the business environment in order to identify business opportunities.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT-I

Concepts of Entrepreneurship Development Evolution of the concept of Entrepreneurship Entrepreneur Vs. Intrapreneur, Entrepreneur Vs. Entrepreneurship, Entrepreneur Vs. Manager, Attributes and Characteristics of a successful Entrepreneur, Role of Entrepreneur in Indian economy and developing economies with reference to Self-Employment Development, Entrepreneurial Culture, Women Entrepreneurs.

UNIT-II

Creating Entrepreneurial Venture, Business Planning Process, Environmental Analysis - Scanning and Scanning, Identifying problems and opportunities, Sources of Business Idea, Idea Generation- role of creativity & innovation and business research.

UNIT-III

Technical, Financial, Marketing, Personnel and Management Feasibility, Estimating financing funds requirement - Schemes offered by various commercial banks and financial institutions, Venture Capital Funding.

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UNIT-IV

Managerial roles and functions in a small business. Designing and redesigning, business processes, location, layout, operations planning & control.

UNIT- V

Role of Central Government and State Government in promoting Entrepreneurship – Introduction to various incentives, subsidies and grants. Role of following agencies in the Entrepreneurship Development - District Industries Centres (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB), MSME.

Text Books:

1. R.V. Badi, N. V. Badi, Entrepreneurship, 2nd edition, Vrinda publications.

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**BCA-407: PRACTICAL ((COMPUTER ORIENTED NUMERICAL METHODS)
(USING "C" LANGUAGE))**

Max. Marks :25

Min. Marks: 09

Problems/ Programs related to iterative method

- Zeros of a single transcendental equation.
- Zeros of polynomials using bisection.
- false Position.
- convergence of solution.

Problems/ Programs related to

- Simultaneous liner equation using Gauss Elimination Method.
- Solution of Simultaneous liner equation Gauss Elimination Method.
- Solution related to pivoting.
- Ill Conditioned equations and refinement of solution.
- Gauss - Seidal iterative method

Problems/ Programs related to

- Numerical differentiation and integration.
- Solution of Differential equations: Runge- Kutta method

Problems/ Programs related to

- Interpolation and Approximation: Polynomial interpolation.
- Newton
- Lagrange.
- Approximation of function by Taylor series.

UNIT I:

1. Write a program to convert floating point number into normalized floating point number
2. Write a program to add two floating point number and convert into normalized floating point number.
3. Write a program to subtract floating point number and convert into normalized floating point number.
4. Write a program to multiply two floating point number and convert into normalized floating point number.
5. Write a program to divide two floating point number and convert into normalized floating point number.
6. Write a program to solve real root of the equation using Bisection Method.
7. Write a program to solve real root of the equation using Regular Falsi Position Method
8. Write a program to solve real root of the equation using Secants Method
9. Write a program to solve real root of the equation using Newton Raphson's Method.

UNIT II:

10. Write a program to solve simultaneous liner equation using Gauss Elimination Method
11. Write a program to solve simultaneous liner equation using Gauss Elimination Method with pivoting.
12. Write a program to solve simultaneous liner equation using Gauss Jordan's Method
13. Write a program to solve simultaneous liner equation using Jacobi's Method.
14. Write a program to solve simultaneous liner equation using Gauss Seidal Method.

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15. Write a program for linear and non linear curve fitting:
- Straight line
 - Second Degree Parabola
 - Exponential Curve
 - Geometric Curve

UNIT III:

- Write a program for Newton's Forward Difference Formula.
- Write a program for Newton's Backward Difference Formula.
- Write a program for Newton's Divided Difference Formula.
- Write a program for Lagrange's Interpolation Formula.

UNIT IV & UNIT V

- Write a program for evaluation of integral by Trapezoidal's Rule.
- Write a program for evaluation of integral by Simpson's 1/3 Rule.
- Write a program for evaluation of integral by Simpson's 3/8 Rule.
- Write a program for Euler's Method.
- Write a program for Runga Kutta Second Order Method.
- Write a program for Runga Kutta Fourth Order Method.

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BCA-408: PRACTICAL (DATABASE MANAGEMENT SYSTEM)

Max. Marks :25

Min. Marks: 09

1. Create the following Databases.

Salesmen

SNUM	SNAME	CITY	COMMISSION
1001	Piyush	London	12 %
1002	Sejal	Surat	13 %
1004	Miti	London	11 %
1007	Rajesh	Baroda	15 %
1003	Anand	New Delhi	10 %

Customers

CNUM	CNAME	CITY	RATING	SNUM
2001	Harsh	London	100	1001
2002	Gita	Rome	200	1003
2003	Lalit	Surat	200	1002
2004	Govind	Bombay	300	1002
2006	Chirag	London	100	1001
2008	Chinmay	Surat	300	1007
2007	Pratik	Rome	100	1004

Orders

ONUM	AMOUNT	ODATE	CNUM	SNUM
3001	18.69	10/03/97	2008	1007
3003	767.19	10/03/97	2001	1001
3002	1900.10	10/03/97	2007	1004
3005	5160.45	10/03/97	2003	1002
3006	1098.16	10/03/97	2008	1007
3009	1713.23	10/04/97	2002	1003
3007	75.75	10/04/97	2004	1002
3008	4723.00	10/05/97	2006	1001
3010	1309.95	10/06/97	2004	1002
3011	9891.88	10/06/97	2006	1001

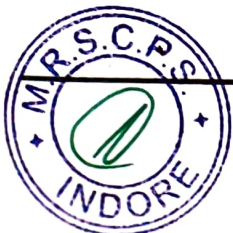
Practical List - 1

Solve the following queries using above databases and where clause range searching and pattern matching.

1. Produce the order no, amount and date of all orders.
2. Give all the information about all the customers with salesman number 1001.
3. Display the following information in the order of city, sname, snum and commission.
4. List of rating followed by the name of each customer in Surat.
5. List of snum of all salesmen with orders in order table without any duplicates.
6. List of all orders for more than Rs. 1000.

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7. List of names and cities of all salesmen in London with commission above 10%.
8. List all customers excluding those with rating \leq 100 unless they are located in Rome.
9. List all orders for more than Rs. 1000 except the orders of snum \leq 1006 of 10/03/97.
10. List all orders taken on October 3rd or 4th or 6th, 1997.
11. List all customers whose names begins with a letter 'C'.
12. List all customers whose names begins with letter 'A' to 'G'.
13. List all orders with zero or NULL amount.

Practical List - 2

Solve the following queries using above databases and group by clause.

1. Find out the largest orders of salesman 1002 and 1007.
2. Count all orders of October 3, 1997.
3. Calculate the total amount ordered.
4. Calculate the average amount ordered.
5. Count the no. of salesmen currently having orders.
6. Find the largest order taken by each salesman on each date.
7. Find the largest order taken by each salesman on 10/03/1997.
8. Find out the no. of different non NULL cities in the Customer table.
9. Find out each customer's smallest order.
10. Find out the first customer in alphabetical order whose name begins with 'G'.
11. Count the no. of salesmen registering orders for each day.

Practical List - 3

Solve the following queries using above databases and formatted output and order by clause.

1. List all salesmen with their % of commission.
2. Display the no. of orders for each day in the descending order of the no. of orders in the following format. FOR dd-mon-yy, there are __ Orders.
3. Assume each salesperson has a 12% commission. Write a query on the order table that will produce the order number, salesman no and the amount of commission for that order.
4. Find the highest rating in each city in the form : For the city (city), the highest rating is:(rating)
5. List all in descending order of rating.
6. Calculate the total of orders for each day and place the result in descending order.

Practical List - 4

Solve the following queries using above databases and join.

1. Show the name of all customers with their salesman's name.
2. List all customers and salesmen who shared a same city.
3. List all orders with the names of their customer and salesman.
4. List all orders by the customers not located in the same city as their salesman.
5. List all customers serviced by salespeople with commission above 12%.
6. Calculate the amount of the salesman commission on each order by a customer with rating above 100.
7. Find all pairs of customers having the same rating with out duplication.
8. Company policy is to assign each salesperson three customers, one at each of the three ratings. Display all possible combination of such three customers.
9. List all customers located in cities where salesman Sejal has customers.
10. List all pairs of customers served by a single salesman with the salesman's name and no.
11. List all salesmen who are living in the same city with out duplicate rows.
12. List all pairs of orders by a given customer with customer name.



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13. Produce the name and city of all the customers with the same rating as Harsh.
14. Extract all orders of Miti.
15. Extract all orders of Baroda's salesmen.
16. Find all orders of the salesman who services 'Harsh'.
17. List all orders that are greater than the average of October 4, 1997.
18. Find the average commission of salesmen in London

Practical List - 5

Solve the following queries using above databases and join and subquery.

1. Find all orders attributed to salesmen in 'London' using both the subquery and join method.
2. List the commission of all salesmen serving customers in 'London'.
3. Find all customers whose cnum is 1000 above than the snum of Sejal.
4. Count the no. of customers with the rating above than the average of Surat'.
5. List all orders of the customer 'Chirag'.
6. Produce the name and rating of all customers who have above average orders.
7. Select the total amount in orders for each salesman for whom this total is greater than the amount of the largest order in the table.
8. Find all customers with orders on 3rd Oct., 1997 using correlated subquery.
9. List the name and number of all salesmen who has more than one customer.
10. Find all orders with amount atleast equal to the average amounts for their customers.
11. Calculate the total amount ordered on each day eliminating those days where the total amount was not atleast Rs. 2000 above the maximum amount of that day.
12. Using correlated subquery, find the name and number of all customers with rating equal to maximum for their city.
13. Select the name and number of all salesmen who have customers in their cities who they do not service.
14. Find the number of all the salesmen having multiple customers using EXIST.
15. Find the name, number and city of all the salesmen having multiple customers using EXIST.
16. Find the name and number of all the salesmen who serve only one customer.
17. Find all salesmen with more than one current order.
18. Display the customer information if and only if one or more of the customers in are located in 'Surat'.
19. Find all salesmen who have customers with more than one current order.
20. Find all salesmen who have customers with rating > 300 using EXIST and using join.
21. List all salesmen with customers located in their cities who are not assigned to them.
22. write a query to extract from the customers table every customer assigned to a salesman who currently has atleast one other customer with orders in the order table.
23. Find all salesmen with customers located in their cities using ANY and IN.
24. Find all salesmen for whom there are customers that follow them in alphabetical order.
25. Find all customers having rating greater than any customer in 'Rome'.
26. List all orders that has amount grater than atleast one of the orders from 6th October, 1997
27. Find all orders with amounts smaller than any amount for a customer in 'London'.
28. Find all the customers who have greater rating than every customer in 'Rome'.
29. Select all customers whose rating doesn't match with any rating of customer of 'Surat'.
30. List all customers whose ratings are equal to or greater than ANY of 'Sejal'.
31. Find all salesmen who have no customers located in their city using ANY and ALL.
32. List all orders for amount greater than any for the customers in London.
33. Find all salesmen and customers located in London.
34. Find out which salesman produce largest and smallest orders on each date.

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35. Find out which salesman produce largest and smallest orders on each date in the order of order number

36. List salesman no, salesman name, customer name & commission of salesman who have customers in their cities as well as those who don't have in which case the customer name should indicate 'NO MATCH'.

Practical List - 6

Solve the following queries using above databases and table from another table and set operation.

1. Create a union of two queries that shows the names, cities and ratings of all customers. Those with rating of ≥ 200 should display 'HIGH RATING' and those with < 200 should display 'LOW RATING'.

2. Produce the name and number of each salesman and each customer with more than one current order in the alphabetical order of names.

3. Create union of three queries. First select snum of all salesman in Surat, second, the cnum of all customers in 'Surat' and third, the onum of all orders of 3rd Oct. Retain duplicates between the last two queries, but remove the duplicates between either of them and the first.

4. Insert a row into salesmen table with the values snum is 1005, salesman name is Rakesh, city is unknown and commission is 14%.

5. Insert a row in to customer table with values London, Pratik and 2005 for the columns city, name and number.

6. Create another table London staff having same structure as salesmen table.

7. Insert all the rows of salesmen table with city London in to London staff table.

8. Create another table Day totals with two attributes date and total and insert rows into this table from order table.

9. Create a duplicate of the salesmen table with a name Multi cust. Now delete all the rows from the salesmen table.

10. Get back all the rows of salesmen table from its duplicate table.

Practical List - 7

Solve the following queries using above databases and delete and update.

1. Remove all orders from customer Chirag from the orders table.

2. Set the ratings of all the customers of Piyush to 400.

3. Increase the rating of all customers in Rome by 100.

4. Salesman Sejal has left the company. Assign her customers to Miti.

5. Salesman Miti has resigned. Reassign her number to a new salesman Gopal whose city is Bombay and commission is 10%.

6. Double the commission of all salesmen of London.

7. Set ratings for all customers in London to NULL.

8. Suppose we have a table called SalesManager with the same definition as Salesmen table. Company decides to promote salesmen having total order more than 5000 to SalesManager. Fill up the SalesManager table.

9. Assume that we have a table called smcity. Store the information of all salesmen with the customers in their home cities into smcity.

10. Create a table Bonus that contains datewise maximum amount of order for all salesmen.

11. Create a table Mltcust containing the salesmen with more than one customer.

12. Since Delhi office has closed. Remove all customers assigned to salesmen in New Delhi.

13. Delete all salesmen who have at least one customer with a rating of 100 from salesmen table.

14. Delete all salesmen who don't have any customer with a rating of 100 from salesmen table.

15. Delete the salesmen who produce the lowest order for each day.

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16. Delete the salesmen who produce the lowest order for each day unless he has a commission $> 12\%$.
17. Increase the commission of all salesmen by 2% who have been assigned at least two customers.
18. Find the smallest order for each day. Reduce the commission of all salesmen by 2% who produce this order.
19. Delete all customers with no current orders.
20. Double the rating of all customers having more than one current order.
21. Write a command to find out the orders by date.

Practical List - 8

Solve the following queries using above databases and alter table and table constraints..

1. How the onum field is forced to be an unique?
2. Create an index to permit each salesman to find out his orders by date quickly.
3. Write a command to enforce that each salesman is to have only one customer of a given rating.
4. Write a command to add the item-name column to the order table.
5. Create a copy of your order table. Drop the original order table.
6. Write a command to create the order table so that all onum values as well as all combinations of cnum and snum are different from one another and so that NULL values are excluded from the date field.
7. Write a command to create the salesmen table so that the default commission is 10% with no NULLs permitted, snum is the primary key and all names contain alphabeticals only.
8. Write a command to create the order table making sure that the onum is greater than cnum and cnum is greater than the snum. Allow NULL in any of these fields.
9. Give the commands to create our sample tables (salesmen, customer, orders) with all the necessary constraints like PRIMARY KEY, NOT NULL, UNIQUE, FOREIGN KEY.

Practical List - 9

Solve the following queries using above databases and view.

1. Create a view called Bigorders which stores all orders larger than Rs. 4000.
2. Create a view Ratecount that gives the count of no. of customers at each rating.
3. Create a view that shows all the customers who have the highest ratings.
4. Create a view that shows all the number of salesmen in each city.
5. Create a view that shows the average and total orders for each salesmen after his name and number.
6. Create a view that shows all the salesmen with multiple customers.
7. Create a view that shows all the salesmen with multiple customers with rating > 200 .
8. Create a view to keep track of the total no of customers ordering, no of salesmen taking orders, the no of orders, the average amount ordered, and the total amount ordered for each day.
9. Create a view Showname that shows for each order the order no, amount, salesman name and the customer name.
10. List all orders of salesman 'Rajesh' using Showname View along with his commission.
11. Create a view Maxsales to store the name and number of salesman, along with the date who have the highest order on any given date.
12. Using above view, find out the name and number of salesman who have the highest order at least two times. Store the result in another view.
13. create a view Same city that shows the no and name and city of the customers along with the city of the salesman serving them.



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14. Create a view Commission of salesmen table to include only snum and commission field so that through this view someone can enter or change the commission but only to values between 10% and 20%.
15. Assume that the CURDATE is a constant representing current date.
Give a command to create orders table with CURDATE as a defaultodate.
16. List all salesmen in London who had atleast one customer located there as well.
17. List all salesmen in London who didn't have any customer there.
18. Develop an input form in SQL Forms to enter the students marks in order to prepare marksheet of student result.
19. Develop an application to maintain payroll of employees in an organization. Use SQL Forms for data entry

Practical List - 10

Solve the following using PL/SQL Block , cursors , Procedure , Function , Trigger

1. Write a PL/SQL block to display whether the given number is odd or even.
2. Write a PL/SQL block to display LJIET 10 times using for loop
3. Write a PL/SQL block using cursor to update salary of a given programmer by 25%.
4. Write a PL/SQL block to display addition of all the numbers in the given range
5. Write a PL/SQL block to display the detail about given employee from EMP table
6. Write a PL/SQL block to find the salary of a given employee and raise his salary by 20%.
7. Write a PL/SQL procedure to print the following output.

* * *
* *
*

8. Create a cursor emp_cur, fetch record from emp table and check whether sal > 10000 then update Grade = 'A' else if sal = > 5000 and sal <= 10000 then update Grade = 'B'
9. Write a PL/SQL procedure to find the table structure of a given number
10. Write a function on programmer table to calculate number of female programmer
11. Write a function on programmer table to return total number of programmers having knowledge of specified language
12. Write a function on programmer table to return age of specified person.
13. Write a function on software table to calculate selling cost of all software of a specified person
14. Write a function on studies table to return course fee of a specified course.
15. Write a function on studies and programmer table to return number of months required to overcome the course fee he/she has studied
16. Write a PL/SQL block with cursor , showing the use of SQL%FOUND attribute
17. Write a PL/SQL block with cursor , showing the use of SQL% ROWCOUNT attribute
18. Write a PL/SQL block with cursor , showing the use of SQL% ISOPEN attribute
19. Create trigger on Supplier Detail on update or insert of Sname to convert Sname into capital letter
20. Create trigger on Supplier Detail on update or insert of Scity to convert first letter of scity into capital letter.

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Rajendra

BCA - 409: PRACTICAL (PROGRAMMING WITH JAVA)

Max Marks: 25

Min. Marks: 09

1. WAP to print hello world
2. WAP to demonstrate use of operators like +, -, *, / with integer and string
3. WAP to find largest of three numbers (using ternary operator).
4. WAP to calculate area of a circle.
5. WAP to find largest of two numbers (using if)
6. WAP to find largest of two numbers (using ternary operator).
7. WAP to find largest of three numbers (using if).
8. WAP to generate Fibonacci series.
9. WAP to find factorial of a number.
10. WAP to use for loop to print pattern like
1
1 2
1 2 3
1 2 3 4
11. WAP to print pattern like this
1
2 3
4 5 6
7 8 9 10
12. WAP to print prime number series using while loop.
13. WAP to reverse digit of a number.
14. WAP to sum digit of a number.
15. WAP to print Pythagoras triplet between 1 to n.
16. WAP to generate random number.
17. WAP to calculate sum of digits of two different numbers. Find the maximum of the sum.
Use only one loop for the process.
18. WAP to create an array of characters and reverse all of them.
19. WAP to find sum of array elements.
20. WAP to find out the number of vowels and consonants in a sequence of character string.
21. WAP to print maximum element from the array
22. WAP to find out second maximum and second minimum from the list.
23. WAP for linear search.
24. WAP for binary search.
25. WAP to perform bubble sort on array.
26. WAP to perform insertion sort on array.
27. WAP to search a string within another string.
28. WAP to reverse the string.
29. WAP to reverse each word in a sentence
30. WAP to replace each small letter with the help of capital letter after every white space
31. WAP to accept a sentence and break it into an array of strings at each white space
32. WAP to demonstrate function overloading in a class.

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Gaurav

Sanku

Pratik

33. WAP to demonstrate function overloading in parent and child class.
34. WAP to demonstrate function overriding.
35. WAP to find factorial of a number using recursion.
36. WAP to initialize variable by constructor chaining.
37. WAP to show use of final class.
38. WAP to show use of abstract class with the help of inheritance.
39. WAP to show use of static class and static method.
40. WAP to initialize private member of parent class by super keyword.
41. WAP to initialize private member of parent class by child class.
42. WAP to show overriding of static method.
43. WAP to create calculator method sum, subtract, divide and multiply for abstract class and inheritance.
44. WAP to create a static method which will return object of the class.
45. WAP to create an interface shape which will have different overloaded method for calculating area and child class implement all of them.
46. WAP to create an interface interest and child class must override two methods one for simple interest and another for compound.
47. WAP in which user will create own exception for any number which is less than 0 and greater than 100.
48. WAP in which user will enter his name and an exception will be thrown if length of name is less than 7 or greater than 18.
49. WAP to multiply two matrices and if c1 is not equal to r2 than exception must be thrown stating error message.
50. WAP in which one thread will print even number and another thread will print odd number. After every 5 even numbers, 5 odd numbers will be printed and after 5 odd numbers, 5 even numbers will be printed.
51. WAP in which one thread will take user input and another thread will perform the whether given number is prime or not.
52. WAP in which one thread will take input from user to generate the number and another number will generate the Fibonacci series. After series is printed till limit, user will be ask again for input or exit
53. WAP which demonstrate synchronized block and methods
54. WAP which will take user input like his id, name, address and phone number after that all these detail will be saved on file.
55. WAP which will take user id from the user, search the file for details and then print the details.
56. WAP which will take user name and count the number of users having same name.

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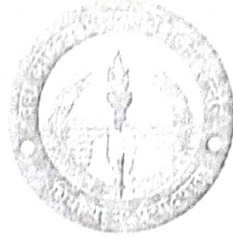
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DEVI AHILYA VISWAVIDYALAYA, INDORE, (M. P.)



SEMESTER WISE SCHEME
AND
SYLLABUS

FOR

BACHELOR OF COMPUTER APPLICATIONS (B. C. A.)

2018-19 ACADEMIC YEAR ONWARDS

Dr. Manoj K. Jaiswal



BCA Third Year Semester Scheme: 2018-19 and Onwards

BCA – V Semester Examination Scheme

Course	Theory Max. Marks		Practical Max Marks	Max. Marks	Min Marks
	Internal	External			
BCA – 501 Linear Algebra and Geometry	10	40	-----	50	04+13
BCA – 502 Computer Networks	10	40	-----	50	04+13
BCA – 503 Introduction to Cloud Computing	-----	50	-----	50	17
BCA – 504 Introduction to Data Science	-----	50	-----	50	17
BCA – 505 Human Values and Professional Ethics	10	40	-----	50	04+13
BCA – 506 Information Technology Trends	10	40	-----	50	04+13
BCA – 507 Network and Cloud Computing Lab	-----	-----	25	25	09
BCA – 508 Practical on Data Science using R	-----	-----	25	25	09
Total Marks	40	260	50	-----	-----
Grand Total	-----	-----	-----	350	-----

Note: The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/ analytical/ theoretical questions.



BCA – 501: Linear Algebra and Geometry

Max. Marks: 40

Min Marks: 13

Course Objectives: To introduce the concept of Linear Algebra & Geometry which build strong foundation of students in many areas of Computer Science including graphics, image processing, Cryptography, machine learning, computer vision, Optimization, graph algorithm, quantum computation, information retrieval and web-search. Analytical Geometry is very important for computer graphics, computer games, game designing, animation and cartography.

Course Outcomes: It is expected that after completion of the course, students will able to

- 1) Vector Space and Linear Maps which help in the image processing.
- 2) Concept of Eigen Vectors and Eigen Values and that have many important applications in computer vision and machine learning.
- 3) Group Theory which plays a vital role in applications of Cryptography.
- 4) Parabolic and ellipsoidal surfaces which helps in computer graphics.
- 5) Cone and cylindrical surfaces which helps in cartography and animation.

Unit I

Groups. Definition, Order of an element. Subgroups; Definition, Necessary and Sufficient Condition. Coset Decomposition. Right and Left Cosets, Lagrange's Theorem. Definitions and Basics of Normal Subgroups, Quotient Group, Homomorphism and Isomorphism of groups, Kernel of Homomorphism.

Unit II

Vector Spaces. Vector space, Subspace and Quotient Space, Linearly Dependent and Independent Vectors. Linear Maps. Definition and properties. Homomorphism and Isomorphism of Vector spaces, Kernel of a Linear Map.

Unit III

Matrix Representation of a Linear Map. Rank and Nullity of Linear Map. Fundamental Theorem of Vector Space Homomorphism. Eigen Values and Eigen vector of Matrix, Cayley Hamilton Theorem: Proof and Applications.

Unit IV

Parabolic, definition and description. Elliptical and Hyperbolic paraboloid, Parabolic of revolution. Tangent planes and Normal to a parabolic. The Ellipsoid, Tangent & Normal plane to it, director sphere of an ellipsoid, conjugate diameters and diametrical planes to ellipsoid, locus of chords.

Unit V

The definition and description, finding equation of Cone, standard equation, condition of



Cone of conicoid, right circular Cone. The Cylinder definition, equation, right circular Cylinder, enveloping cylinder to a conicoid.

Text Books:

- (1) Linear Algebra by I. N Herstein, Wiley Publisher.
- (2) Analytical Geometry of Three Dimensions by P. K. Jain, New Age International Publisher.

Reference Books:

- (1) Linear Algebra Schaum's Series by Seymour Lipschutz & Mark Lipson, Mc-Graw Hill Publisher.
- (2) Linear Algebra by S. N. Goel, Kedarnath Ramnath Publication, Meerut.
- (3) Linear Algebra by Kenneth Hoffman and Ray Kunze, Prentice Hall of India Pvt. Ltd. New Delhi.
- (4) Solid Geometry by M.L. Khanna, S.P Nigam, S.S. Gangwar, Jai Prakash Nath Publication Meerut.
- (5) Solid Geometry by P.N. Chatterjee, Ram-Prasad & Sons Publisher Bhopal.
- (6) Coordinate Geometry of Three Dimensions by D.C Agrawal Shree Sai Prakashan Meerut.

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BCA – 502: Computer Networks

Max. Marks: 40

Min Marks: 13

Course Objectives: The course objective is to provides a general idea of data communications, networking, protocols, standards and networking model.

Course Outcomes: It is expected that after completion of the course, students will 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.
- 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 subnetting and routing mechanisms.
- 7) Get familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Unit I

Data communications and networking for Today's Enterprise, A communication model, Data Communications, Networking, and the Internet. Network model, need for a protocol architecture, The TCP/IP protocol architecture, The OSI model, Addressing, Data transmission: Concept and terminology, Analog and digital signals, Transmission impairment, Channel capacity.

Unit II

Digital transmission: Digital-to-digital conversion, Analog-to-digital conversion, Transmission mode, Analog transmission, Digital-to-analog conversion, Analog-to-digital conversion.

Unit III

Bandwidth utilization: Frequency division multiplexing, Wavelength division multiplexing, Synchronous and statistical time-division multiplexing, switching: Circuit switching Packet switching, Types of errors, framing (character and bit stuffing), error detection & correction method.

Unit IV

Data Link Layer protocols, LAN Protocol Architecture, Bridges, Emergence of High — Speed LANs, Ethernet, Token Bus, Token Ring, Wireless LAN Technology (Wi-Fi), Routing in switched network: Routing in packet switched networks,

Unit V

Internet and transport protocols: Principles of internetworking IPv4 & IPv6, Connection-oriented transport protocol mechanism, TCP and UDP, Network security: Encryption and authentication, Internet applications: Email, World Wide Web, And HTTP.



Text Books:

- (1) Data Communications and Networking, Behrouz A. Forouzan, McGraw-Hill, 4th Ed.,
- (2) A. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI

Reference Books:

- 1) Computer Networking: James F. Kurose & Keith W. Rose, Pearson Education, Third Edition, 2005.
- 2) Communication Networks: Fundamentals Concepts and Key Architecture : Alberto Leon-Garcia and Indra Widjaja, Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-040223-3.
- 3) Data and Network Communication: Michael A. Miller, Delmar Thomson Learning inc ISBN 0-07-668-1100-X.
- 4) Introduction to Computer Networks: Douglas E. Comer, Prentice-Hall. Alberto Leon-Garcia and Indra Widjaja, Communication Networks – Fundamentals
- 5) Concepts and Key Architecture, ~~Tata~~ McGraw-Hill Publishing Company Limited, ISBN

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CS – 503: Introduction to Cloud Computing

Max. Marks: 50

Min Marks: 17

Course Objectives: The course objective is to provide comprehensive knowledge of the Cloud Computing fundamental issues, technologies, applications and implementations including security aspects.

Course Outcomes: It is expected that after completion of the course, students will able to

- 1) Understand the core issues of cloud computing such as security, privacy, and interoperability.
- 2) Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

Unit I

Introduction to cloud computing, History, Importance of cloud computing in the current era, characteristics of cloud computing, what cloud computing really is and isn't, pros and cons of cloud computing, technologies in cloud computing, migrating into cloud.

Unit II

Types of clouds, cloud infrastructure, cloud application architecture, working of cloud computing, trends in cloud computing, cloud service models, cloud deployment models, cloud computing and services pros and cons.

Unit III

Cloud computing technology, cloud life cycle model, role of cloud modelling and architecture, cloud system architecture, virtualization, types of virtualization, importance and limitations of various types of virtualization, virtualization in cloud computing.

Unit IV

Data storage, introduction to enterprise data storage, data storage management, file system, cloud data stores, cloud storage characteristics, applications utilizing cloud storage.

Unit V

Introduction to web services, cloud service deployment tools, management/ administrative services, risk management in cloud computing, introduction to apache hadoop.

Text Books:

- (1) Cloud Computing: A practical approach for learning and implementation, 1st edition. Pearson. A. Srinivasan, J. Suresh.

Reference Books:

- (1) Cloud Computing Bible. Barrie Sosinsky. Wiley-India, 2010
- (2) Cloud Computing: Principles and Paradigms. Editors: Rajkumar Buyya, Y. Y. Cui, and S. S. Choudhury. Springer, 2011



- 3) Cloud Computing: Principles, Systems and Applications. Editors: Nikos Antonopoulos, Lee Gillam. Springer, 2012
- 4) Cloud Security - A Comprehensive Guide to Secure Cloud Computing. Ronald L. Krutz, Russell Dean Vines. Wiley-India, 2010

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CS – 504: Introduction to Data Science

Max. Marks: 50

Min Marks: 17

Course Objectives: The objective of the course is introducing and teach idea of Data Science and enable students to apply Data Science in real world. This course will help learning from data, in order to gain useful predictions and business decisions.

Learning Outcomes: It is expected that after completion of the course, students will able to

- 1) Learn the fundamentals of Data Science
- 2) Work with R to analyze structured and unstructured data.
- 3) Develop the ability to build and assess data-based models.
- 4) Predict outcomes with supervised and unsupervised machine learning techniques.

Unit I

Introduction: What is Data Science? The Data Science Process, Different Types of Data: Quantitative, Categorical. Graphical Summaries of Data: Pie Chart, Bar Graph, Pareto Chart, Histogram. Measuring the Center of Quantitative Data: Mean, Median, Mode. Measuring the Variability of Quantitative Data: Range, Standard Deviation, and Variance.

Unit II

Overview of R. R data types: Vectors, Matrices, Factors, Lists, Data Frames, reading and writing data, Control structures, functions, scoping rules, dates and times

Unit III

Introduction to Data Cleansing, Missing and Repeated Values, Feature Engineering, Outliers and Errors, Finding Outliers. Cleaning Data with R.

Unit IV

Machine Learning: Definition and overview, Regression, Simple Linear Regression, Multiple Regression, Assessing Performance, Ridge Regression, Feature Selection & Lasso, Nearest Neighbors & Kernel Regression

Unit V

Machine Learning: Classification, Linear Classifiers & Logistic Regression, Learning Linear Classifiers, Overfitting & Regularization in Logistic Regression, Decision Trees, Handling Missing Data, Boosting.

Text Books:

- 1) Allan G. Bluman. Elementary Statistics: A Step By Step Approach, 10th Edition. McGraw-Hill, 2017.
- 2) Paul Tector. R Cookbook, First Edition. O'ReillyMedia, 2011.
- 3) Tom I. Mitchell. Machine Learning, First Edition. McGraw Hill, 1997



BCA – 505: Human Values and Professional Ethics

Max. Marks: 40

Min Marks: 13

Course Objectives: The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "virtuous" in individual, social and professional context.

Course Outcomes: It is expected that after completion of the course, students will able to

- 1) Understand ethical philosophies, principles, models that directly and indirectly affect business.
- 2) Learn the importance of the ethics and moral values.

Unit I

Human Values; Types, Features and Classification Sources of Value System Values across Cultures.

Unit II

Morality Norms, Beliefs, Attitude Moral Norms, Moral Values Moral Standards

Unit III

Professional Ethics; Nature, Characteristics and Needs Ethics V/s Morals and Values Ethico-Moral Action Ethical Codes, Ethical Practices

Unit IV

Nature and Dimensions of Attitude Components of Attitude Attitude Formation Functions of Attitude Changing Attitude

Unit V

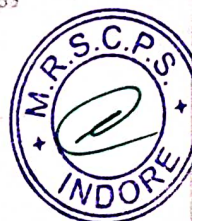
Moral Values and Character-Building Character; Meaning, Important Components of Character Character Development.

Text Books:

- 1) Beteille Andre (1991), Society and Politics in India, Athlone Press, Latest edition
- 2) Chakraborty S. K. (1999), Values and Ethics for Organizations, oxford university press, Latest edition
- 3) Fernando, A.C. (2009), Business Ethics - An Indian Perspective, Pearson Education, India, Latest edition

Reference Books:

- 1) Charles D. Fleddermann (2012). "Engineering Ethics". Pearson Education / Prentice Hall. New Jersey. (Indian Reprint). Latest edition
- 2) Boatright John R (2012). "Ethics and the Conduct of Business", Pearson Education. New Delhi. Latest edition
- 3) Crane. Andrew and Matten Dirk (2015). Business ethics. Oxford University Press. India. Latest edition



CS – 506: Information Technology Trends

Max. Marks: 40

Min Marks: 13

Course Objectives: To make aware student the changes in technologies, applications and systems around us.

Course Outcomes: It is expected that after completion of the course, students will able to

- 1) Get knowledge about modern communication systems.
- 2) Be familiarized with concept of Mobile Commerce and Geographic Information System.
- 3) Understand the concept of data warehouse, data mining and Big Data.
- 4) Understand the use of Artificial Intelligence and IoT in current context.

Unit I

Introduction and basic concepts of modern communication and telephony technology: CDMA, WLL, GSM, VOIP, Bluetooth, Wi-Fi, Communication Technology: 2G, 3G, 4G, 5G. Communication over Radio, Microwave systems, Communication satellites, Radar, Fiber optics, ISDN – their properties, Geographic Information System (GIS): Components of a GIS – Hardware, Software, Data, People, Methods, Working and application of GIS.

Unit II

Information Security - Introduction, Malicious Programs, Cryptography, Digital Signature, Firewall, Users Identification and Authentication, Security Awareness and policies, Application areas requiring security. Mobile Commerce: Introduction, Growth, Success stories of Mobile commerce, Technologies for mobile commerce, M-Commerce in India. Digital Marketing

Unit III

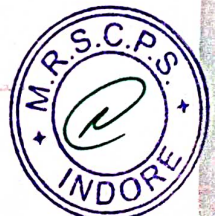
Data Warehouse and Data Marts: Introduction, Advantages of data warehouse, Data warehouse components, Data warehouse architecture and schemas. Big Data Concept, Data Mining: Introduction, Evolution of data mining, Data mining – verification versus discovery, Advantages of data mining, Technologies used in data mining.

Unit IV

Artificial Intelligence and Expert System: Concept of Artificial Intelligence and Expert System, Building of Expert System, Merits and Demerits of Expert System, Application of Expert System, Application of Artificial Intelligence

Unit V

Introduction to IoT Defining IoT. Characteristics of IoT. Physical design of IoT. Logical design of IoT, Functional blocks of IoT, Home automation, Industry applications, Surveillance and other IoT applications. Introduction to Virtual Reality: definition, Applications of VR, Smart Systems, Embedded systems.



Text Books:

- 1) Fundamentals of Information Technology by Alex Leon & M. Leon, Vikas Publications, New Delhi.
- 2) Frontiers of Electronic Commerce by Ravi Kalakota, Andrew B. Whinston, Addison Wesley Longman Publication.
- 3) E-Commerce: An Indian Perspective (Second Edition) by S.J.P. T. Joseph, Prentice-hall Of India Pvt Ltd.
- 4) Security in Computing (Third Edition) by C.P.Pfleeger, S.L. Pfleeger, D.N. Shah, S.Ware, Prentice Hall 2002.
- 5) Mobile Communications, Joschen Schiller, Pearson Education.
- 6) Recent Magazines of Computers and Communication.
- 7) Cloud Computing PHI by Rao M.N.
- 8) Internet of Things McGrawHill by Raj Kamal

Reference Books:

- 1) Introduction to Information Technology - ITL Education Solutions Ltd., Seventh Impression, Pearson Education, 2008.
- 2) Data Mining Techniques - Arun K Pujari, University Press.
- 3) Enterprise Resource Planning 1/e - Alexis Leon, International edition-Tata McGraw Hill publication.
- 4) Concepts in computing - Kenneth Hoganson, First Indian Edition, Jones & Bartlett Publishers, Inc., 2010.
- 5) Artificial Intelligence - Elaine Rich, Kevin Knight, 2nd edition, McGraw Hill, 1991.
- 6) Computer Networks - Andrew S. Tanenbaum, 4th Edition, Pearson Education.



BCA – 507: Network and Cloud Computing Lab

Max. Marks: 25

Min Marks: 9

- 1) Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.
- 2) Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Connectors etc., Preparing straight and cross cables.
- 3) Study of various LAN topologies and their creation using network devices, cables and computers.
- 4) How to make a network cabling connection.
- 5) How to Create a Local Area Network (LAN).
- 6) Network Protocol - Types of Network Protocols.
- 7) Network maintenance Troubleshooting.
- 8) Steps for installing Proxy Server on Windows.
- 9) Procedure to create a network (LAN).
- 10) Trouble shooting tools in Data Communication.
- 11) Procedure to share hardware resources (printer) over network.
- 12) Implementation of file and printer sharing.
- 13) Network Cable Connectors Types and Specifications.
- 14) Case study on IEEE Standards 802.3, 802.4 and 802.5.
- 15) Case Study on DNS, TELNET, FTP
- 16) Virtualization in cloud using any freeware Tool.
- 17) Installing Operating System on virtual computer.
- 18) Using existing cloud services like SAAS, PAAS, IAAS, Cloud Storage.



BCA – 508: Practical on Data Science using R

Max. Marks: 25

Min Marks: 9

- 1) Write a R program to take input from the user (name and age) and display the values. Also print the version of R installation.
- 2) Write a R program to get the details of the objects in memory.
- 3) Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.
- 4) Write a R program to create a vector which contains 10 random integer values between -50 and +50.
- 5) Write a R program to get the first 10 Fibonacci numbers.
- 6) Load the built in warpbreaks data set . Find out, in a single command, which columns of warpbreaks are either numeric or integer.
- 7)
 - a. Load the `state` datasets.
 - b. Convert the `state.x77` dataset to a dataframe.
 - c. Rename the `Life_Exp` variable to `Life_Exp`, and `HS_Grad` to `HS_Grad`
- 8) Suppose we wanted to enter all the variables in a first-order linear regression model with Life Expectancy as the dependent variable. Fit this model.
- 9) Suppose we wanted to remove the `Income`, `Illiteracy`, and `Area` variables from the model in Exercise 2. Use the `update` function to fit this model.
- 10) Let's assume that we have settled on a model that has `HS_Grad` and `Murder` as predictors. Fit this model.
- 11) Write a R program to create a Data Frames which contain details of 5 employees and display summary of the data
- 12) Write a R program to create the system's idea of the current date with and without time.
- 13) To prepare data for analysis in R
- 14) To find missing data in R?
- 15) To exclude missing data in R?
- 16) To remove rows with 0 in R?
- 17) Create a list of 80% of the rows in the original dataset to use for training.
- 18) Select 20% of the data for validation.
- 19) Use the remaining 80% of data to train and test the models.
- 20) Find the dimensions of the "iris" dataset.
- 21) Find the type of each attribute in your dataset.
- 22) Take a look at the first 5 rows of your dataset.
- 23) Display the summary of the "iris" dataset.
- 24) What happens to missing values in a histogram? What happens to missing values in a bar chart? Why is there a difference?



BCA – 601: Operations Research

Max. Marks: 40

Min Marks: 13

Course Objectives: To analyze different situations in the industrial/ business scenario involving limited resources and finding the optimal solution within constraints.

Course Outcomes: It is expected that after completion of the course, students will able to

- 1) Identify and develop operational research models from the verbal description of the real system.
- 2) Analyze the different operation research models that are needed to solve optimization problems.
- 3) Understand the mathematical tools that are needed to solve business problems.
- 4) Formulate and solve the problems as networks and graphs.
- 5) Use CPM and PERT techniques to plan, schedule and control project activities.
- 6) Apply analytical skills and problem-solving tools to the analysis of the operations problems.

Unit I

Introduction to Operations Research: Origin and Development of OR, nature of OR, characteristics of OR, Meaning, Scope of Operations Research and Decision making, Advantages and Limitations of OR, Application of OR, Phases of OR, OR Models.

Unit II

Linear Programming: Meaning of Linear Programming, Mathematical Formulation of Linear Programming Problems, Graphical Solution, Simplex Method, Dual Simplex, Advantages and limitations of LPP.

Unit III

Transportation Problems: Mathematical Model and Formulation, Initial Basic Feasible Solution, North West Corner Method, Least Cost Method, Vogel's Approximation Method, Optimal Solution (Minimization And Maximization) using Modified Distribution Method, Degeneracy in Transportation Problem.

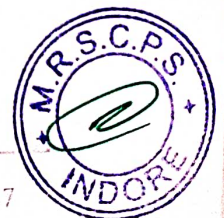
Unit IV

Assignment Problems:

Definition of Assignment Problem, comparison with Transportation Problem, formulation and solution of Assignment Problem using Hungarian Method (Minimization and Maximization), Travelling Salesman Problem.

Unit V

Sequencing and Scheduling: Johnson's Algorithm for processing n jobs through 2 machines, Algorithm for processing n jobs through 3 or more machines, Processing 2 jobs through n machines.



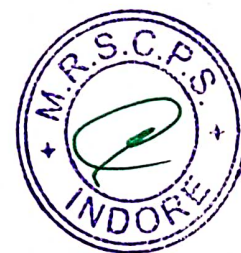
Text Books:

- 1) Gillet B.E., Introduction to Operation Research, Computer Oriented Algorithmic Approach, Tata McGraw Hill publishing Co. Ltd., New Delhi.
- 2) P.K.Gupta & D.S. Hira, Operations Research, S. Chand & Co.

References Books:

- 1) Taha H.A., Operations Research: AN Introduction, Mc Millian Co., New York.
- 2) N.S. Kambo, Mathematical Programming Techniques, Affiliated East West Press Pvt. Ltd., New Delhi, 1984.
- 3) R. Pannesarivam, Operations Resaerch, Prentic Hall of India Pvt. Ltd., New Delhi, 2004.
- 4) S.D. Sharma, Operations Research, Kedar Nath & Co. Meerut.
- 5) Gupta, Kanti Swaroop, Gupta P.K. and Manmohan, Operations Research, Sultan Chand and Sons, New Delhi.

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BCA – 602: Internet and Web Technology Using PHP

Max. Marks: 50

Min Marks: 17

Course Objectives: The course objective is to understand the principles of creating an effective web page using HTML, CSS and the concepts on web designing and development using PHP and MySQL.

Course Outcomes: It is expected that after completion of the course, students will be able to

- 1) Develop an understanding about the basic concepts of web page design using HTML and CSS.
- 2) Develop an understanding about the web site development using PHP.
- 3) Create powerful and dynamic web applications using PHP and MySQL.
- 4) Build a simple, yet functional web application using PHP/MySQL.

Unit I

Web Technology: Introduction to WWW, web browsers, web servers, HTTP, URL.

HTML: Introduction, Objective, HTML Command Tags: Text, List, Table, creation of links, inserting graphics, forms.

Cascading style sheets: Introduction to CSS

Unit II

A Brief History of PHP, PHP Characteristics, Installing and Configuring PHP on Windows, PHP Language Basics: Lexical Structure, Data Types, Variables, Expressions and Operators, Decision Statements, Flow Control Statements, Embedding PHP in Web Pages.

Strings: String Constants, Printing Strings, Accessing Individual Characters, String Handling Functions: length, Word count, string position, reverse, replace.

Maths: max, min, sqrt, sin, cos, tan, sinh, cosh, tanh, abs, count, ceil, round, floor, log, log10, pow() functions.

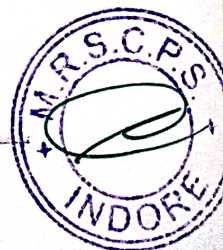
Arrays: Indexed Arrays, Associative Arrays, Identifying Elements of an Array. Storing Data in Arrays, Multidimensional Arrays, extracting multiple values, converting between arrays and variables, Traversing Arrays.

Unit III

Session: Session handling, creating session, storing values in session, accessing values from session, destroying session. Cookies: creating cookies, setting values, accessing cookies values, session cookie, persistent cookie, redirecting page.

Functions: Calling a Function, Defining a Function, Variable Scope, Function Parameters, Return Values, Variable Functions.

Object Oriented Programming Concepts: Classes, Objects, Member Functions, Encapsulations, Inheritance, and Polymorphism. (only basic definitions of these topics).



Unit IV

Form Handling in PHP: Setting Up Web Pages to Communicate with PHP, Handling Text Fields, Text Areas, Check box, Radio button, Submit, Reset, Button, Image Button, Select Box, input type email, password, date and url.

File Handling: Working with files: File Open and Read, File Create and Write, Reading and writing Character in file, reading entire file, Rename and Delete File, File Uploading.

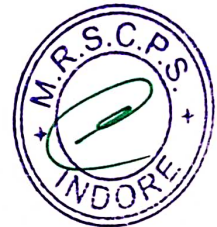
Unit V

Database Access: Using PHP to access a database. Introduction to MySQL, connectivity with MySQL.

Creating form and saving data of form to MySQL. Performing CRUD operation using PHP and MySQL.

Text Books:

- 1) Programming PHP by Rasmus Lerdorf and Kevin Tatroe, O'Reilly Publications
- 2) Beginning PHP5 by Wrox Publication
- 3) Mastering PHP : BPB Publication
- 4) PHP 5.1 for beginners by Evan Bayross and Sharman Shah, SPD Publications
- 5) PHP 5.2 The Complete Reference by Steven Holzner, Mc Graw Hill Edition 2008.



CS – 603: Computer Graphics & Multimedia

Max. Marks: 50

Min Marks: 17

Course Objectives: The objective of the course is to provide comprehensive introduction about computer graphics system, design algorithms, two-dimensional transformations, techniques of clipping, three-dimensional graphics and three-dimensional transformations.

Course Outcome: It is expected that after completion of the course, students will able to

- 1) Learn the basic concepts of computer graphics.
- 2) Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
- 3) Create 2D animations using tools.
- 4) Create 3D graphical scenes using open graphics library suits.
- 5) Implement image manipulation and enhancement.
- 6) Learn fundamentals of animation and its related technologies.

Unit I

Computer Graphics: Introduction. Application of Computer Graphics, Display Devices: Refresh Cathode -Ray Tubes, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Flat Panel Displays. Video cards/display cards. Input Devices: Mouse, Trackball, Space ball, Data Glove, Joystick, Light pen, Scanner, Digital Camera, Touch Panels, Voice Systems. Hardcopy Devices: Printers and Plotters.

Unit II

Graphics Primitives: Line Generation Algorithms: DDA algorithm, Bresenham's algorithm. Circle Generation Algorithms: Midpoint Circle algorithm, Bresenham's circle generation algorithm. Displaying Lines, characters and polygon. Polygon filling Algorithms: Scan Line Polygon fill algorithm, Inside - Outside Tests, Boundary-Fill algorithm, Flood - Fill algorithm. Fundamentals of Aliasing, Antialiasing Technique.

Unit III

Clipping: Clipping operations. Point clipping. Line clipping: Cohen Sutherland Algorithm, Liang Barsky Algorithm, Nicholl-Lee-Nicholl Algorithm. Polygon clipping: Sutherland-Hodgeman Algorithm, Weiler Atherton Algorithm. Text clipping, Exterior clipping.

Unit IV

Two Dimensional: Two Dimensional Transformations: Translation, Scaling, Rotation, Reflection, Shear, Homogenous coordinate system, Composite transformations, Raster method of transformation. Two- Dimensional Viewing: Window to Viewport coordinates transformation.

Unit V

Multimedia: Introduction, Multimedia applications, Multimedia data and File formats, Multimedia tools, Advancements in the technology in Computer graphics and Multimedia.

Text Books:

- 1) Donald Hearn and M. Pauline Baker, *Computer Graphics: C Version*, Second Edition, Prentice Hall of India.
- 2) Tor Vaughan, *Multimedia, Fundamentals of a New Art*, Second Edition, Tata McGraw-Hill, New Delhi, India.



Reference Books:

- 1) David F. Rogers, *Procedural Elements for Computer Graphics*, Tata Mc-Graw-Hill Publishing Company Ltd., New Delhi, 2001.
- 2) James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, *Computer Graphics: Principles and Practice in C*, Second Edition, Addison-Wesley Professional.
- 3) Zhigang Xiang, Roy A. Plastrock, *Schaum's outline of Theory and Problems of Computer Graphics*, Second Edition, Tata McGraw-Hill Professional, New Delhi.

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BCA – 604: Principles and Practices of Management

Max.Marks:40

Min.Marks:13

Course Objectives: The course aims to help the students to be aware of the primary functions & responsibilities of managers, and understand the environment of an organization.

Course Outcomes: It is expected that after completion of the course, students will able to

- 1) Understand the concepts related to business.
- 2) Understand the roles, skills and functions of management.
- 3) Understand the complexities associated with the management of resources in the organization.

Unit I

The Nature of Management: Definition and role of management, Functions of Manager, Scientific Management, Human Relations school of Management, Contingency Theory of Management.

Unit II

Planning: Nature and Purpose of Planning, Components of Planning, objective of Business Management by Objectives.

Unit III

Organizing: Nature of Purpose of Organizing, Departmentation, Span of management, Delegation of Authority, Line and Staff Relationships. Staffing: Nature of staffing, problems faced in staffing, process of staffing.

Unit IV

Directing Process: Principles of Direction, Problems in Human Relation, Strategies for Establishing Healthy Human Relations.

Unit V

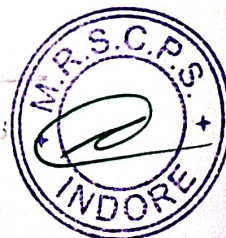
Control: Meaning and Process of Control, Control Techniques.

Text Book:

- 1) "Principles of Management", Harold Koontz, O'Donnel and Heinz Wehrich, New York: McGraw Hill Book Co

Reference Books:

- 1) "Management", Stoner, Freeman and Gilbert Jr., PHI, 6th Ed.
- 2) "Organization and Management Concepts", R.D. Agarwal, New Delhi, Tata McGraw Hill, 1995.
- 3) "Management", Robbins and Coulter, PHI, 8th Ed.
- 4) "A. - Fundamentals of Management: Essential Concepts and Applications", Robbins P. L. and Daemen, David L. Herstein, Education, 5th Ed.



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BCA – 605: PROJECT

Min.Marks:33

Max. Marks: 60

The students are expected to work on a project in their final year. The student can formulate a project problem with the help of her/his Guide and submit the project proposal of the same. If approved, the student can commence working on it and complete it. The Project comprises of 25 marks, of which Project Demonstration & Report is evaluated for 20 marks and the Viva-Voce is for 15 marks by the external examiner.

Project Report Guidelines

I Introduction

- Project Introduction
- Existing System with limitations
- Proposed System with aim and objectives
- Preliminary investigation
- Feasibility study
- Software/ hardware Requirements

II System Analysis

- Functional and non-functional requirements
- System Flowcharts
- Data Flow Diagram
- E-R Diagrams

III System Design

- Architectural design
- File / Database Design
- Normalization
- User Interface Design

IV Coding

VI System Testing

- Testing techniques and Testing strategies used
- Testing Plan used
- Test reports for Unit Test Cases and System Test Cases

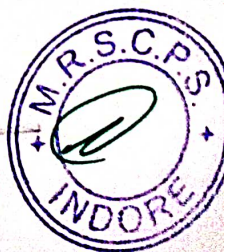
VIII Conclusions

Bibliography

Appendices (if any)

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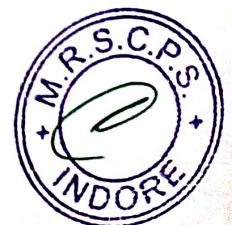
BCA – 606: Computer Graphics & Multimedia (LAB)

Max. Marks: 25

Min Marks: 09

- 1) Write a program to implement DDA algorithm
- 2) Write a program to implement Bresenham algorithm
- 3) Write a program to implement circle generating algorithm
- 4) Write a program to implement ellipse generating algorithm
- 5) Write a program to implement scaling on polygon.
- 6) Write a program to implement transferring on polygon.
- 7) Write a program to implement rotation on polygon.
- 8) Write a program to implement reflection on polygon.
- 9) Write a Program to implement set of Basic Transformations on Polygon i.e. translation, Rotation and Scaling.
- 10) Write a program to implement set of Composite Transformations on Polygon i.e Reflection, Shear (x & Y), rotation about an arbitrary point.
- 11) Write a program to implement Line Clipping Algorithm using Cohen Sutherland Algorithm.
- 12) Write a program to implement Line Clipping Algorithm using Liang Barsky Algorithm.
- 13) Write a program to Implement Polygon Clipping Algorithm using Sutherland Hodgman
- 14) Algorithm
- 15) Determine the sequence of basic transformations that are equivalent to the x-direction and y- direction shearing matrix.
- 16) Show that transformation matrix for a reflection about the line $y=x$, is equivalent to a reflection relative to the x axis followed by a counter clockwise rotation of 90 degrees.
- 17) Modify the Liang-Barsky line clipping algorithm to polygon clipping.
- 18) Write a routine to clip an ellipse against a rectangular window.
- 19) Write a routine to implement exterior clipping on any part of a defined picture using any specified window.
- 20) Modify the BRESENHAM algorithm so that it will produce a dashed-line pattern. Dash length should be independent of slope.
- 21) Write a procedure to scan the interior of a specified ellipse into a solid color.
- 22) Modify the 4-connected boundary fill algorithm to avoid excess stacking.
- 23) Write the Scan line filling algorithm

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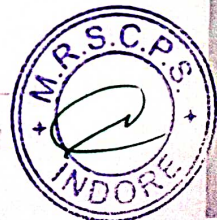


BCA – 607: Practical on Internet and Web Technology Using PHP

Max. Marks: 25

Min. Marks: 09

- 1) Write down html code to design navigation menu for home, about us, contact us, registration and login page. Link all of them too.
- 2) Write down html code to list unordered list of items and link each item to another page which will show detail about them.
- 3) Write down html code to design 4 sections using div tags. Each section will show image, link, ordered list and an image which is a link to another html page respectively.
- 4) Write down html code to design 5 sections using table tags.
- 5) Write down html code to design a registration form like facebook.com using div.
- 6) Write down html code to design registration form in four steps.
- 7) Write down html code to design login form like Gmail.
- 8) Write down html code to design a bill. The bill should contain date of invoice, different items, quantity, price of single item and total price.
- 9) WAP to print hello world using php .
- 10) WAP to print Character, Boolean, Integer and Floating values using single variable.
- 11) WAP to reverse a string using strrev function
- 12) WAP to demonstrate strlen, strstr, strpos, stripos, stristr functions.
- 13) WAP to search a string within string.
- 14) WAP to sum of all digits of number.
- 15) WAP to print pattern like
1
1 2
1 2 3
1 2 3 4
- 16) WAP to print pattern like
*
*
* *
* * *
- 17) WAP to demonstrate sin, cos, tan, sinh, cosh, tanh, sqrt, abs, pow, max and min functions.
- 18) WAP to create an array of character and reverse the characters in array.
- 19) WAP to create an array of item price and print maximum price.
- 20) WAP to create array of strings and calculate length of each string.
- 21) WAP to break a string using explode function with following comma, white space and dollar symbol. After breaking store all in an array.
- 22) WAP for matrix multiplication.
- 23) WAP for storing and displaying student roll no and marks in associative array.
- 24) WAP to create a multi-dimensional array. In the array row index will be integer and column index will be string. For example \$a[0]['id'], \$a[0]['name'], \$a[0]['dob'], \$a[1]['id'], \$a[1]['name'], \$a[1]['dob'] and so on.



- 25) WAP to create user defined function to print hello world.
- 26) WAP to create user defined function to reverse the string.
- 27) WAP to create user defined function to swap value of two variables.
- 28) WAP to create a function to find out maximum of four numbers.
- 29) WAP to create class to show use of class.
- 30) WAP to create class, in which one function will set variable like name, id and salary. Another function will be called to show all these details.
- 31) WAP to create a class which will have function for area. The second class will inherit it and override the function area.
- 32) WAP print maximum of three numbers accepted from user.
- 33) WAP to print average of 5 numbers. Input will be taken from the user using form tag.
- 34) WAP to take username, address, phone number and date of birth from user and then print them all on html page using PHP code in page design using html.
- 35) WAP to accept the name of user from html form and check its length. If the length is less than 7 or greater than 14, redirect it to same page and print the error message; if name is within given length take page to another page and print welcome message.
- 36) WAP to create session using set some value in session like name and print the name on another page using session.
- 37) WAP to store username in session, take input from user, redirect to another page and print username from session.
- 38) WAP to take username and password. Check it in database. If record is found, then user will redirect to home page and on home page all details will be displayed. Following options should be there – edit profile, change password, logout, user session to store user name and check them on each page. If session expires, user will be directed to another page.
- 39) WAP to create cookie to store a name.
- 40) WAP to access cookie data and display them.
- 41) WAP to create “keep me signed in” as in gmail and yahoo.
- 42) WAP to create session cookie.
- 43) WAP to create persistent cookie.
- 44) WAP to create a file and store user details entered by user with the help of form.
- 45) WAP to print information of the file. The file name will be given by the user.
- 46) WAP to copy contents of one file to another file.
- 47) WAP to connect MySQL database using PDO and MySQLI connection object.
- 48) WAP to create login with MySQL database. User will enter username and password. Write SQL command which will take username and password and check with database table. If record is found all details of user will be displayed.
- 49) WAP to create signup form and store all user information in database. Check that no duplicate username will be stored.
- 50) WAP to display all user data store in database table.
- 51) WAP to edit user record by selecting a user from list of all users.
- 52) WAP to delete user record by selecting a user from list of all users.

