ST. THOMAS COLLEGE Autonomous

ST. THOMAS COLLEGE (AUTONOMOUS), THRISSUR

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BCA

SYLLABUS AND SCHEME
2020 ADMISSION ONWARDS

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Contents

VISION, MISSION & CORE VALUES

MOTTO:

"Veritas Vos Liberabit" (The Truth will set you Free).

VISION:

Transforming the Youth through Holistic Education towards an Enlightened Society.

MISSION:

- To Ensure Inclusion and Access of Quality Education.
- To Provide an Environment of Learning that enhances Dissemination of Knowledge.
- To Nurture Research and Innovation for the betterment of Life and Progress of the Nation.
- To Undertake Collaborative Partnerships for Facilitating Exposure and Sharing.
- To Impart Social and Environmental Sensitivity in Students through Extension and Outreach.
- To Equip Students with Life Skills in Facing Challenges and Responsibilities.
- To Help Students attain Moral, Spiritual and Emotional integrity.

CORE VALUES

- Faith in God
- Pursuit of Excellence
- Integrity
- Diversity
- Compassion

OUTCOME BASED EDUCATION

At the end of an Undergraduate Program at St. Thomas College (Autonomous), a student would have obtained the following:

PO1:	**Critical Thinking:** Ability to take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO2:	**Effective Communication:** Ability to speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media andtechnology.
PO3:	**Effective Citizenship:** Ability to demonstrate empathetic social concern and equity- centered national development, and the ability to act with an informed awarenessof issues and participate in civic life through volunteering.
PO4:	**Environment and Sustainability:** Ability to understand the issues of environmental contexts and sustainable development.
PO5:	**Ethical Living:** Ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibilityfor them.
PO6:	**Social Interaction:** Ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO7:	**Problem Solving and Analytical Skills:** Ability to think rationally, analyze situations and solve problems adequately.

COMPUTER SCIENCE & APPLICATIONS (BCA)

PROGRAM SPECIFIC OUTCOMES	
PSO1	Understand the basic principles of program development by identifying and formulating problems and integrate resources to decisions using the problem solving approach
PSO2	Understand data based reasoning through translation of data into abstract concepts using computing technology based tools and develop real life applications
PSO3	Understand and recognize different value system and the moral dimensions of software development and applications and their outcomes and acceptthe responsibility for them
PSO4	Design web applications by understanding the global perspective .and make meaning of the world by connecting people ideas, media and technology

PROGRAMMEOBJECTIVE

The basic objective of the Programme is to open a channel of admission for computing courses for students, who have done the 10+2 and are interested in taking computing/IT as a career. After acquiring the Bachelor's Degree (BCA) at University of Calicut, there is further educational opportunity to go for an MCA or other Master's Programme like MSc (Computer Science), MSc (IT), MBA, etc., at this college or at any other University/Institute. Also after completing the BCA Programme, a student should be able to get entry level job in the field of Information Technology or ITES or they can take up self-employment in Indian & global software market. The specific objectives of the Programmeinclude

1. To attract young minds to the potentially rich and employable field of computer applications.
2. To be a foundation graduate Programme this will act as a feeder course for higher studies in the area of ComputerScience/Applications.
3. To develop skills in software development so as to enable the BCA graduates to take up self-employment in Indian and global softwaremarket.
4. To train and equip the students to meet the requirements of the Software industry in the country andoutside.
5.

PROGRAMME STRUCTURE

Duration: The duration of the BCA Programme shall be six semesters distributed over a period of three academic years. The odd semesters (1, 3, 5) shall be from June to October and the even Semesters (2, 4, 6) shall be from November to March. Each semester shall have 90 working days inclusive of allexaminations.

Courses: The UG programme shall include five types of courses, viz; Common Courses (Code A), Core courses (Code B), Complementary courses (Code C), Open Course (Code D) and Audit courses (CodeE).

Grace Marks: Grace Marks may be awarded to a student for meritorious achievements in co-curricular activities (in Sports/Arts/ NSS/NCC/ Student Entrepreneurship) carried out besides the regular class hours. Such a benefit is applicable and limited to a maximum of 8 courses in an academic year spreading over two semesters. No credit shall be assigned for such activities. In addition, maximum of 6 marks per semester can be awarded to the students of UG Programmes, for participating in the College Fitness Education Programme(COFE).

Project: Every student of a UG degree programme shall have to work on a project of 2 credits under the supervision of a faculty member or shall write a theory course based on

Research Methodology as per the curriculum. College shall have the liberty to choose either of theabove.

Extension Activities: Compulsory social service (CSS) for a period of 15 days is essential for the successful completion of the BCA Programme.

ADMISSION

The admission to all programmes will be as per Rules and Regulations of the College. The eligibility criteria for admission shall be as announced by the College from time to time. Separate rank lists shall be drawn up for reserved seats as per the existing rules.

The admission to all programmes will be as per Rules and Regulations of the College. The eligibility criteria for admission shall be as announced by the College from time to time. Separate rank lists shall be drawn up for reserved seats as per the existing rules.

The college shall make available to all students admitted a **prospectus** listing all the courses offered in various departments during a particular semester. The information so provided shall contain title of the courses, the semester in which it is offered and credits forthe courses. Detailed syllabi shall be made available in the College websites.

There shall be a uniform **calendar** prepared by the College for the registration, conduct/schedule of the courses, examinations and publication of results. The Collegeshall ensure that the calendar is strictlyfollowed.

COURSE EVALUATION

Total marks for each core, elective course is 75 and lab courses shall be **100** marks and Industrial Visit & Project Evaluation cum Programme viva- voce shall be **100** marks and open course shall be **75** marks. The evaluation scheme for each course shall contain two parts (1) Internal evaluation (2) external evaluation. 20% weight shall be given to the internal evaluation. The remaining 80% weight shall be for the externalevaluation.

INTERNAL EVALUATION

Theinternalassessmentshallbebasedonapredeterminedtransparentsysteminvolvingwritten test, assignments, seminars and attendance in respect of theory courses and on test/record/viva/attendance in respect of lab courses. 20% of the total marks in each course are for internal examinations. The marks secured for internal assessment only need to be sent to University by the colleges concerned. Internal assessment of the project will be based on its content, method of presentation, final conclusion and orientation to researchaptitude.

EXTERNAL EVALUATION

There shall be External examinations for each course at the end of each semester. Practical examinations shall be conducted by the College at the end of second, fourth and sixth semesters. External evaluation of Project, Industrial Visit Report and Programme viva-voce shall be conducted along with the project evaluation at the end of the sixth semester. External evaluation carries 80% of marks, i.e., 60 marks, for each theory course.

The model of the question paper for external examination for theory courses of 2 Hours duration: The students can answer all the questions in Sections A and B. But there shall be Ceiling in each section.

1. **Section A**:Shortanswertypecarries2markseach-12questions**(Ceiling-20)**
2. **Section B:** Paragraph/ Problem type carries 5 marks each - 7 questions **(Ceiling -30)**
3. **Section C:** Essay type carries 10 marks (1 out of 2)- **(Ceiling -10)**

The external examination in theory courses is to be conducted with question papers set by external experts. The evaluation of the answer scripts shall be done by examiners based on a well-defined scheme of valuation and answer keys shall be provided by the University. The external examination in practical courses shall be conducted by two examiners, one internal and an external, appointed by the University. The project evaluation with Programme viva voce will be conducted by two examiners, one internal and an external (appointed by the College), at the end of the sixth semester. No practical examination will be conducted in odd semester. Practical examinations for BCA Programme shall be conducted in the even semesters 2, 4 and6.

The model of the question paper for external examination (lab courses) of 3 Hours duration shall be:

1. **Section A**: One marked question of 30 Marks from Programming Lab Part A is to be attempted (Design Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks Result: 10 Marks. **Total 30Marks**)

2. **Section B:** One marked question of 30 Marks from Programming Lab Part B is to be attempted (Design Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks Result: 10 Marks. **Total 30Marks**)

3. **Section C:**Lab viva voce **(Total 10Marks)**

4. **Section D:**Lab Record **(Total 10Marks)**

Number of students in one batch for practical examination must be limited to 14.

Project guidelines – Students must be encouraged to do projects in the latest tools or tools

appropriate for their topic. Department should conduct monthly evaluation of the project and give necessary instructions to the students as and when required. Number of students in a project group must be limited to4.

The scheme of evaluation for project cum Programme viva voce shall be

1. Relevance of the Topic, Statement of Objectives (**Total 15 Marks**)
2. Methodology (Reference/ Bibliography, Presentation, quality of Analysis/Use of Statistical Tools) (**Total 15Marks**)

3. Findings and recommendations (**Total 20Marks**)
4. Project cum Programme Viva Voce (**Total 20Marks)**
5. Report of Industrial visit **(Total 10Marks)**

Audit course: The students can attain only pass (Grade P) for these courses. At the end of each semester (up to fourth semester) there shall be examination conducted by the college from a pool of questions set by the College. The students can also attain the creditsthrough online courses like SWAYAM, MOOC etc The College shall send the list of passed students to the University at least before the commencement of fifth semester examination

EVALUATION AND GRADING

Evaluation (both internal and external) is carried out using Mark system. The Grade on the basis of total internal and external marks will be indicated for each course, for each semester and for the entire programme.

Indirect Grading System in 10-point scale is as below:

Ten Point Indirect Grading System

Percentage of Marks (Both Internal &External put together)	Grade	Interpretation	Grade point Average (G)	Range of grade points	Class
95 and above	O	Outstanding	10	9.5 -10	First Class with Distinction
85 to below 95	A+	Excellent	9	8.5 -9.49	
75 to below 85	A	Very good	8	7.5 -8.49	
65 to below 75	B+	Good	7	6.5 -7.49	First Class
55 to below 65	B	Satisfactory	6	5.5 -6.49	
45 to below 55	C	Average	5	4.5 -5.49	Second Class
35 to below	P	Pass	4	3.5 -4.49	Third

Example-1 SGPACalculation

Semester I Course Code	Course Name	Grade Obtained	Grade point (G)	Credit (C)	Credit point (CXG)
xxxxxxx	Xxxxxxx	A	8	4	32
xxxxxxx	Xxxxxxxxx	C	5	3	15
xxxxxxx	Xxxxxxxxx	A+	9	4	36
xxxxxxx	Xxxxxxxxx	B+	7	3	21
xxxxxxx	Xxxxxxxxx	P	4	3	12
xxxxxxx	Xxxxxxxxx	C	5	4	20

SGPA= Sum of the Credit points of all courses inasemester

Total Credits in

that semester SGPA=

(32+15+336+21+12+20)/21=136/

21

SGPA = 6.476

Percentage of marks of semester I = (SGPA/10) x 100 = 64.76 %

Note: The SGPA is corrected to three decimal points and the percentage of marks shall be approximated to two decimal points

Semester II Course Code	Course Name	Grade Obtained	Grade point (G)	Credit (C)	Credit point (CXG)
xxxxxxx	Xxxxxxx	A	8	4	32
xxxxxxx	Xxxxxxxxx	C	5	3	15
xxxxxxx	Xxxxxxxxx	A+	9	4	36
xxxxxxx	Xxxxxxxxx	B+	7	3	21
xxxxxx*	Xxxxxxxxx	F	0	3	0
xxxxxxx	Xxxxxxxxx	C	5	4	20

Note: In the event a candidate failing to secure **'P'** grade in any Course in a semester, consolidation of SGPA and CGPA will be made only after obtaining **'P'** grade in thefailed Course in the subsequentappearance

CGPA Calculation

Exampe

$$\text{CGPA} = \frac{\textit{Total Credit points obtained in six semesters}}{\textit{Total Credits acquired (120)}}$$

CGPA = 136 + 145 + 161 + 148 + 131 + 141 / 120 = 862/120

CGPA = 7.183

Total percentage of marks = (CGPA/10) * 100

Total % of marks = (7.183/10) * 100 = 71.83

$$\text{CGPA of Core Courses} = \frac{\textit{Total Credit points obtained for Core Courses}}{\textit{Total Credits acquired for CoreCourses}}$$

Similarly CGPA of Complementary courses, Open courses, English Common courses and Additional Language Common courses may be calculated and the respective percentage may be calculated. All these must be recorded in the Final GradeCard.

BACHELOR OF COMPUTER APPLICAIONS
PROGRAMME STRUCTURE

LEGEND	
Item	**Description**
C	Credits
E	External Component
I	Internal Component
L	Lecture Hours
P	Practical Hours
T	Total

SemesterI									
Course Code	**Course Name**	**C**	**Marks**			**Hrs/wk**			
			I	**E**	**T**	**L**	**P**	**T**	
A01	Common English	3	15	60	75	5	0	5	
A02	Common English	3	15	60	75	4	0	4	
A07	Languages other than English	4	20	80	100	4	0	4	
BCA1B01	Computer Fundamentals & HTML	3	15	60	75	2	2	4	
BCA1C01	Mathematical Foundation for Computer Applications	3	15	60	75	4	0	4	
BCA1C02	Discrete Mathematics	3	15	60	75	4	0	4	
Total			**19**			**475**	**23**	**2**	**25**

Semester II

No	Course Code	Course Name	C	Marks			Hrs/wk		
				I	E	T	L	P	T
07	A03	Common English	4	20	80	100	5	0	5
08	A04	Common English	4	20	80	100	4	0	4
09	A08	Literature in Languages other than English	4	20	80	100	4	0	4
10	BCA2B02	Problem Solving using C	3	15	60	75	2	2	4
11	BCA2B03	Programming Laboratory I: HTML and Programming in C	4	20	80	100	0	0	0
12	BCA2C03	Financial and Management Accounting	3	15	60	75	4	0	4
13	BCA2C04	Operations Research	3	15	60	75	4	0	4
Total			**25**			**625**	**23**	**2**	**25**

Semester III

No	Course Code	Course Name	C	Marks			Hrs/wk		
				I	E	T	L	P	T
14	A11	Python Programming	4	20	80	100	4	0	4
15	A12	Data Communication and Optical Fibres	4	20	80	100	4	0	4
16	BCA3B04	Data Structures using C	3	15	60	75	3	4	7
17	BCA3C05	Computer Oriented Numerical and Statistical Methods	3	15	60	75	5	0	5
18	BCA3C06	Theory of Computation	3	15	60	75	5	0	5
Total			**17**			**425**	**21**	**4**	**25**

Semester IV

No	Course Code	Course Name	Credit	Marks			Hrs/wk		
				I	E	T	L	P	T
19	A13	Microprocessors Architecture and Programming	4	20	80	100	4	0	4
20	A14	Sensors and Transducers	4	20	80	100	4	0	4
21	BCA4B05	Database Management System and RDBMS	3	15	60	75	3	4	7
22	BCA4B06	Programming Laboratory II: Data Structures and RDBMS	4	20	80	100	0	0	0
23	BCA4C07	E-Commerce	3	15	60	75	5	0	5
24	BCA4C08	Computer Graphics	3	15	60	75	5	0	5
Total			**21**			**525**	**21**	**4**	**25**

Semester V

No	Course Code	Course Name	Credit	Marks			Hrs/wk		
				I	E	T	L	P	T
25	BCA5B07	Computer Organization and Architecture	3	15	60	75	4	0	4
26	BCA5B08	Java Programming	3	15	60	75	3	3	6
27	BCA5B09	Web Programming Using PHP	3	15	60	75	3	3	6
28	BCA5B10	Principles of Software Engineering	3	15	60	75	4	0	4
29	XXX5DXX	Open Course	3	15	60	75	3	0	3
		Industrial Visit							
		Project Work	0				0	2	2
Total			**15**			**375**	**17**	**8**	**25**

List of Open Courses (XXX5DXX)		
No	**Course Code**	**Course Name**
29	BCA5D01	Introduction to Computers and Office Automation
29	BCA5D02	Web Designing
29	BCA5D03	Introduction to Problem Solving and C Programming
29	BCA5D04	Introduction to Data Analysis using spread sheet

Semester VI									
No	**Course Code**	**Course Name**	**Credit**	**Marks**			**Hrs/wk**		
				I	**E**	**T**	**L**	**P**	**T**
30	BCA6B11	Android Programming	3	15	60	75	4	3	7
31	BCA6B12	Operating Systems	3	15	60	75	4	3	7
32	BCA6B13	Computer Networks	3	15	60	75	5	0	5
33	BCA6B14	Programming Laboratory III: Java and PHP Programming	4	20	80	100	0	0	0
34	BCA6B15	Programming Laboratory IV: Android and Linux shell Programming	4	20	80	100	0	0	0
35	BCA6B16X	Elective Course	3	15	60	75	4	0	4
36	BCA6B17	Industrial Visit & Project Work (Industrial Visit- 1 Credit, Project Work- 2 Credit)	3	20	80	100	0	2	2
Total			**23**			**600**	**17**	**8**	**25**

List of Electives (BCA5B16X)		
No	**Course Code**	**Course Name**
35	BCA6B16A	System Software
35	BCA6B16B	Machine Learning
35	BCA6B16C	Software Testing and Quality Assurance
35	BCA6B16D	Technical Writing
35	BCS6B16E	Fundamentals of Life Skill Education

FIRST SEMESTER				
Course code	**BCA1B01**			
Name of the course	**Computer Fundamentals and HTML**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
04	**CORE**	**3**	**2**	**75**(Internal 15+ External 60)

Si.No	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand fundamentals of Computer.	5	U	C	P02,PO7	PSO1
CO2	Discuss the basics of computer organization.	10	U	C	P02,PO7	PSO1
CO3	Apply algorithm and draw flow charts for solving simple problems.	7	Ap	P	P02,PO7	PSO1
CO4	Analyze web page and identify its elements and attributes.	5	An	P	P02,PO7	PSO1
CO5	Identify importance of CSS in web page creation.	5	R	C	P02,PO7	PSO1

Prerequisites

- Background of the basic science at +2level

CourseOutline

Unit I [5 T]

Concepts of Hardware and Software: Computer Languages, Language Translators, Features of good language, Basics Computer Organization: Von Neumann Model, Input Unit, Output Unit, Storage Unit, Control Unit, Memory Hierarchy, Primary Storage, Cache Memory, Registers, Secondary Storage Devices, Basics of Hardware Components – SMPS, Motherboard, Add-on Cards, Ports, Memory, Adapters, Network cables, Basic Computer Configuration

Unit II [10 T]

Number Systems and Boolean Algebra – Decimal, Binary, Octal and Hexadecimal Numbers, Arithmetic involving Number Systems, Inter Conversions of Number Systems, 1's and 2's Complements, Complement Subtractions, Digital Codes – Binary Coded Decimal (BCD), ASCIICode,Unicode,GrayCode,Excess-3Code.BooleanAlgebra:BooleanOperations,Logic

Expressions, Postulates, Rules and Laws of Boolean Algebra, De Morgan's Theorem, Minterms,

Maxterms, SOP and POS form of Boolean Expressions for Gate Network, Simplification of Boolean Expressions using Boolean Algebra and Karnaugh Map Techniques (up to 4 variables)

Unit III [7 T]

Fundamentals of Problem Solving – The Problem Solving Aspect, Top-down Design, Definition Algorithm, Flowchart, Program - Properties of Flowcharts – Flowchart Symbols for Designing Application Programs, Sample Algorithms – Sum, Average, Finding Smallest Number, Checking Odd/Even Number, Prime Number, QuadraticEquation.

Unit IV [5T + 16L]

Basics of Web Design – www, W3C, Web Browser, Web Server, Web Hosting, Web Pages, DNS, URL, Introduction to HTML, XHTML, DHTML, HTTP.
Overview of HTML 5 – Basic Formatting Tags: heading, paragraph, break, underline, bold, italic, superscript, subscript, font and image, attributes: align, color, bgcolor, font face, border, size, navigation links using anchor tag: internal, external, mail and image, lists: ordered, unordered and definition, HTML media tags: audio andvideo.

Unit V [5T+16L]

Creating Simple Tables: row, col, heading, cell, border, spanning – Form Controls: Input types – text, password, text area, button, checkbox, radio button, select box, hidden controls, frames and frame sets
CSS: Introduction - Concept of CSS, Creating Style Sheet: inline and internal, CSS Properties, CSS Styling: Background, Text Format, Controlling Fonts - Working with Block Elements and Objects, CSS ID and Class

Text Books

1 Sinha. P.K, Computer Fundamentals, BPBPublications
2 Ram. B, Computer fundamentals, New Age International Pvt.LtdPublishers
3 Rajaraman V and Radhakrishnan, An introduction to Digital computer Design,PHI,
4 HTML 5 Blackbook, Dream Tech Press,2016Edition

Reference Books

1. Thomas L Floyd, Digital Fundamentals, Universal BookStall
2. Bartee T.C, Digital Computer Fundamentals, THM.

FIRST SEMESTER				
Course code	**BCA1C01**			
Name of the course	**MATHEMATICAL FOUNDATION OF COMPUTER APPLICATIONS**			
Course No	**Course Category (Core / Compli/ Elective)**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int + Ext)**
05	**COMPLEMENTARY**	**3**	**4**	**75** (Internal15+ External60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the basics of matrices, eigenvalues and their properties	12	U	P	PO7	PSO2
CO2	Apply the concept of matrices to solve the system of linear equations	12	Ap	P	PO7	PSO2
CO3	Compare the difference between the derivative at a point and derivative of a function.	14	U	C	PO7	PSO2
CO4	Identify definite integrals as anti-derivative.	12	R	P	PO1,PO7	PSO1
CO5	Develop knowledge of definite and indefinite integral and solving integrals by different methods.	14	Ap	P	PO7	PSO2

Prerequisites

- Basic mathematicalknowledge

CourseOutline

UNIT I (12T)

Linear Algebra and Vector Calculus: Matrices: Matrix definition, order of a matrix, types of matrices,

addition of matrices, multiplication of matrices, various kinds of matrices, transpose of a matrix.

UNIT II (12T)

Linear system of equations and solutions using Gauss elimination, Gauss Jordan, and Gauss Siedel methods.
Linear independence and rank , determinants, inverse, Eigen values. Vectors: Vectors in 2- and 3- space, dot and cross products.

UNIT III (14T)

Differentiation: Limits (definition only).Derivative at a point, Derivative of a Function, Differentiation from first principle, Differentiation of important functions, Product rule, Quotient rule, Differentiation of a function of a function (problembased)

UNIT IV (12T)

Integration: Integral as Anti-derivative, Indefinite integral &constant of integration, Fundamental theorems, Elementary Standard results.

UNIT V (14T)

Methods of Integration, Integration through Partial Fractions, Integration by parts. Definite Integral: Evaluation by Substitution, Properties of definite integrals (Problem Based)

Textbooks

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley

References:

1 Higher Engineering Mathematics, John Bird, ElsevierDirect

2 Skills in Mathematics: Algebra,S.K.Goyal

3 Higher Engineering Mathematics, B S Grewal, KhannaPublisher

4 Higher Engineering Mathematics, Ramana, Tata McGrawHill

5 Engineering Mathematics, P Kandasamy, S. ChandGroup

FIRST SEMESTER				
Course code	**BCA1C02**			
Name of the course	**DISCRETE MATHEMATICS**			
Course No	**Course Category (Core / Compli/ Elective)**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int + Ext)**
06	**COMPLEMENTORY**	**3**	**4**	**75** (Internal15+ External60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the concepts ofset theory and mathematicallogic.	12	U	C	PO1	PSO1
CO2	Discuss about Boolean algebra and its properties.	12	U	C	PO1	PSO1
CO3	Distinguish various types of graphs and their properties.	14	U	C	PO1, PO2	PSO1, PSO2
CO4	Apply different algorithms to find the minimal spanning a graph.	14	Ap	P	PO2	PSO2
CO5	Represent a graph in its matrix form.	12	U	P	PO2	PSO2

Prerequisites

- Basic mathematicalknowledge

CourseOutline

UNIT I (12T)

Mathematical Logic: Propositions and logical operators, Truth tables, equivalence and implementation, Laws of logic, Quantifiers. Set theory: Introduction, concept of set of theory relation, types of relation, equivalencerelation.

UNIT II (12T)

Boolean Algebra and its properties, Algebra of propositions & examples, De-Morgan's Laws, Partial order relations, greatest lower bound , least upper bound, Algebra of electric circuits & its applications. Design of simple automatic control system

UNIT III (14T)

Graph: Simple and multigraph, Incidence and degree, Isomorphism, Sub graphs and Union of graphs,connectedness,Walks,PathsandCircuits,Euler'sFormula,Euleriangraph,Hamiltoniangraph, Chromatic Graphs, Planer Graphs, Travelling salesman problem, Complete, Regular and Bipartite graphs, Directed Graphs

UNIT IV (14T)

Trees: Properties of trees, pendant vertices. Centre of a tree, rooted and binary trees, spanning trees, spanning tree algorithms, fundamental circuits; spanning trees of a weighted graph: cutsets and cut-vertices; fundamental cutsets; connectivity and separativity; network. Flows; max-flow min-cut theorem.

UNIT V (12T)

Plan on graphs, dual graphs, Kuratowski's two graph, matrix representation of graphs, incidence matrix, directed graphs, digraphs, directed paths and connectedness. Euler digraphs

Textbooks

1. Discrete Mathematical Structures with applications to Computer Science, J.K. Tremblay and R.Manohar, McGrawHill

References:

- Elements of Discrete Mathematics, C. L. Liu, TMHEdition
- Discrete mathematical Structures, Kolman, Busby, Ross,Pearson
- Graph theory, Harry, F., AddisonWesley.
- Finite Mathematics, S. Lipchutz, Schaum Series,MGH.
- Graph Theory, Deo. N,PHI

SECOND SEMESTER				
Course code	**BCA2B02**			
Name of the course	**PROBLEM SOLVING USING C**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
10	**CORE**	**3**	**4**	**75** (Internal15+ External60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the basic fundamentals and structure of C programming	6	U	C	PO1	PSO1
CO2	Discuss concept of operators, library functions.	7	U	C	PO1	PSO1
CO3	Formulate conditional and iterative statements to write C programs.	15	C	C	PO1,PO7	PSO1
CO4	Conceive and Design the C programs that use arrays, strings, concept of modularization and userdefined functions, structures andunions.	16	C	P	PO1,PO7	PSO1
CO5	Analyze the concept of pointers and file handling.	16	An	P	PO7	PSO1

Prerequisites

- Knowledge of basic computeroperations

CourseOutline

Unit I [4T+2L]

Introduction to C Programming - Overview and Importance of C, C Program Structure, Sample programs.Familiarization of Integrated Development Environment - Invoking IDE, Opening a new window in IDE, Writing, Saving and Compiling a C program, making an Executable File.
Elements of C Language and Program Constructs: Character Set, C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable Declaration and Assignment of Values, Symbolic Constant Definition.

Unit II [5T+2L]

C Operators - Arithmetic operators, relational operators, and logical operators, assignment operators, increme and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation

expressions, precedence of arithmetic operators,
Type conversion in expressions, operator precedence and associativity, Mathematical Functions, I/O operations - Library functions.

Unit III [7T+8L]

Data input output functions - Simple C programs – Flow of Control - Decision making with IF statement, Simple IF statement, If-else statement, Nesting of If-else and else-if Ladder, Switch statement, Conditional operator, go to statement. Looping - While loop, Do-While, and For Loops, Nesting of loops, jumps in loop, skipping of loops.

Unit IV [7T + 9L]

Arrays and Strings - One dimensional array, two dimensional and multi-dimensional arrays, strings and string manipulationfunctions.
The Concept of modularization and User defined functions - Definition - Multifunction Program, prototypes, Passing arguments, calling functions, various categories of functions, Nesting of functions and recursion, functions and arrays, scope and lifetime of variables in functions, multi-file programs.
Structures & Union structure definition - giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within arrays, structures and functions, Unions, bitfields.

Unit V [7T +9 L]

Pointers - Understanding pointers, accessing the address of a variable, declaring and initializing pointers, accessing a variable through its pointer, pointer expressions, pointer and arrays, pointer and character string, pointers and functions, pointers and structures, pointer to pointer, dynamic memory allocation-malloc, calloc, free, realloc.
Files: Creating, Processing, Opening and Closing a data file, command line operations

Textbooks

1. Balaguruswami. E, Programming in ANSI C, Tata McGraw-Hill Education,2008

References

1. Brian W. Kernighan & Dennis M. Ritchie, The C Programming Language, Prentice Hall, 2nd Edition 1998
2. Yashavant P. Kenetkar, Let usC
3. ByranGotfried, Schaums Outline series Programming withC
4. Ashok N. Kamthane, Programming in C, Pearson, 2ndEdition

BCA2B03 - Programming Laboratory I: Lab Exam of 1st& 2nd Semester - HTML and Programming in C

Objective

SECOND SEMESTER				
Course code	**BCA2B03**			
Name of the course	**Programming Laboratory I: Lab Exam of 1st& 2nd Semester - HTML and Programming in C**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
11	**CORE**	**4**		**100** (Internal20+ External80)

- To make the students learn webdesigning
- To make the students learn programmingenvironments.
- To practice procedural programmingconcepts.
- To make the students equipped to solve mathematical or scientific problems usingC

Prerequisites

- Knowledge in operatingcomputer.
- Knowledge in Computerfundamentals.

CourseOutline:

Part A: HTML Labwork

List of Exercises:

1) Design a web page to display the information of Computer Science department of your college by using basic page tags. Display the information in the form of paragraphs/sentences. Also use effects to highlight the information like bold, italic orunderline.

2) (a) Create a webpage with HTML describing your department. Use paragraph and listtags.
(b) Apply various colors to suitably distinguish key words. Also apply font styling like italics,

underline and two other fonts to words you find appropriate. Also use header tags.

3) Use the above webpageto
   a) Create links on the words e.g. “Wi-Fi” and “LAN” to link them to Wikipediapages.
   b) Insert an image and create a link such that clicking on image takes user to otherpage.
   c) Change the background color of the page. At the bottom create a link to take user to the top of thepage.

4) Design a page to display the information in table format. Display the list of colleges offering B.Sc. Computer Science along with the details College Name, Address, Contact no. Address column will consist of sub columns as House Name, Post, City and pincode.
   (Purpose: - Introduction of table tags along with the sub columns and other supportive tags like caption, cell spacing, cell padding etc.)

5) Create a webpage to create a photo Album. When the user clicks on the Image and Video Link it should open the correspondingalbum.

6) Design web pages which display the product images and its information with it. The products are computer, printers and laptop. The information displayed of product should be configuration/ technical details, price etc.
   (Purpose: - Study image tag. Display image in tabular form along with the other text information.)

7) Design a page to display the B.Sc. Computer Science syllabus by using Listtag.
   (Purpose: - Introduce list tag to display data in ordered or unordered format as main, sub main, sub-sub main, etc by using nos. or special types of bullets.)

8) Create HTML pages using HyperLinks
   i. FileLink
   ii. Single PageLink

9) Create a hyperlink to show the information and syllabus of B.Sc. Computer Science. When click on the links each page should display the objective of respective course, Lesson plan, Course durationetc.
   (Purpose: - Introduce anchor tag to create links between pages. One can able to transfer the control to next page, previous page or to a specific page like Home page.)

10) Design an HTML page describing your University infrastructure. Use tables to provide layout to your HTMLpage.

11) Use and tags to provide a layout to the above HTML page instead of a table layout.

12) HTML pages withTables
   i. Use Tables to layout HTMLpages
   ii. Use and tags to provide a layout to the above page instead of table layout
   iii. Use Frames to divide the page contents into differentparts
   ivEmbed Audio and Video into your HTMLwebpage

13) Design a page to display the information in table format. Display the list of colleges offering Computer Science along with the details College Name, Address, Contact no.Address column will consist of sub columns as Post Office, City, District and Pincode.

(Purpose: - Introduction of table tags along with the sub columns and other supportive tags like caption, cell spacing, cell padding etc.)

14) Create an HTML page to show the use of NavigationFrame

15) Create an HTML page to show the use of FloatingFrame

16) Create an HTML page to show the use of InlineFrame

17) Design web pages to display the information about your college and UG Programmes offered in your college. Divide the page into three frames. The top frame should display the title of the college, left frame shout display the UG Programmes and the right frame display the details of selected programme like fees, syllabusetc.

(Purpose: - Study frame tag which allow to divide the screen into no of sections.)

18) Design web pages to accept the student information. Student should enter the details like first name, last name, middle name, city up to 25 characters, and address up to 50 characters. Show the combo box to select the qualification, option button for gender selection. Display the information accepted in a formattedform.

(Purpose: - Study form tag which allow to design the formatted screen to accept the information from the user.)

19) Design a website to show the use of the following inputcontrols

i. Checkbox,

ii. Radio button,

20) Design a website to show the use of the following inputcontrols

i. Selectbox,

ii. Hidden controls

21) Design CSS style sheet to define settings for heading, body, table andlinks.

(Purpose: - Study CSS style sheet facility. This allows setting the default settings for all the pages.)

22) Design a webpage to show the use of External StyleSheets

Part B: C Programming

Write programs to do the following

1. Find the sum of digits and reverse of anumber.
2. Find the distance between twopoints.
3. Find the factorial of anumber.
4. Find the N^{th}Fibonacci number usingrecursion.
5. Print the reverse of a string usingrecursion.
6. Solve the problem of Towers of Hanoi usingrecursion.
7. Find Sin(x) and Cos(x) in the range 0^o to 180^o (interval 30^o) usingfunctions.
8. Create a pyramid using„*".

9. Display the multiplication tables up to the numberN.
10. Find the number of words in asentence.
11. Perform matrix addition, subtraction, multiplication, inverse, and transpose using pointers and functions.
12. Replace a part of the string with anotherstring.
13. Find the power of a number using structure andunion.
14. Find the average of prime numbers in a group of N numbers usingfunction.
15. Find the sum of the series S = 1 + $(½)^2$ +$(1/3)^3$+..... to 0.0001%accuracy.
16. Display the rightmost digit in a floating pointnumber.
17. Create a pattern with the numberN.

e.g. N=39174 Pattern:

```
3 9 1 74
9 1 7 4
1 7 4
7 4
4
```

18. Display the short form of a string. E.g. Computer Science :CS
19. Currency conversion (any fourcurrencies)
20. Find the currency denomination of a givenamount.
21. Prepare sales bill using array ofstructures.
22. Addition and subtraction of complex numbers usingstructure.
23. Find the amstrong numbers within a givenrange.
24. Check for palindromestring/number.
25. Check for leapyear.
26. Find the number of special characters in a givenstring.
27. Store and read data from a textfile.
28. Write odd and even numbers into separate files.
29. Swapping of two numbers using call-by-referencemethod.
30. Copy the contents of one file into another one using command lineparameters.
31. Base conversion of numbers.
32. Calculate the percentage of marks obtained for N students appeared for examination in M

subjects using array ofstructures.

33. Display a table of the values of function y = exp(-x) for x varying from 0.0 to N in steps of 0.1
34. Design a Scientific Calculator and include as many functions aspossible.
35. Merge two numeric arrays in sortedorder.
36. Fill upper triangle with 1, lower triangle with -1 and diagonal elements with0.
37. Count the occurrence of different words in asentence.
38. Convert an input amount intowords.
39. Convert a time in 24 hour clock to a time in 12 hour clock usingstructure.
40. Change the date/time format usingstructure.

Include any 15 HTML programs and 20 C programs in the record book.

Note: All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation note book (roughrecord).

Objective

- To get a general introduction on accounting and its generalapplications.
- To get an understanding on various tools for financial statementanalysis.
- To get an understanding on accounting procedures upto the preparation of various financial statements.
- To get a general understanding of the important tools for managerial decisionmaking.

SECOND SEMESTER				
Course code	**BCA2C03**			
Name of the course	**Financial and Management Accounting**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
12	**COMPLEMENTORY**	**3**	**4**	**75** (Internal15+ External60)

Prerequisites

- Basic accountingknowledge.

CourseOutline

UNIT I (12T)

Principles of accounting - Some fundamentals concepts and conventions - Systems of accounting double entry principles - Advantages of Double entry system - personal, real, nominal accounts.

UNIT II (12T)

Cash book - forms of cash books - subdivisions of Journal - Ledgers - limitations of financial accounting - Trial balance - Final accounts - Trading P/L A/c - Balance sheet

UNIT III (12T)

Invitation to management accounting: Analysis and interpretation of trading accounts and financial statements - Horizontal Vertical analysis - Common size Balance sheet - common size income statement - comparative income and balance sheet - trend analysis.

UNIT IV (12T)

Marginal costing - Breakeven point - cost volume profit analysis - margin of safety

UNIT V (12T)

Standard costing - analysis of variance - material - labour - O/H - sales variables - Budget and Budgetary control - different types of budgets - master budget - sales budget - production budget - flexible budget - cash budget - advantages –preparation

Textbooks

1. Financial Management, Pandey I.M Vikas publishing house

References:

1. Elements of Accounting, Kellock.J,Heinmann
2. Advanced Accountancy, S.N Maheshwari, VikasPublishing
3. Cost and Management Accounting, A.Vinod, Calicut University Central Co-Operative Stores

SECOND SEMESTER				
Course code	**BCA2C04**			
Name of the course	**OPERATIONS RESEARCH**			
Course No	**Course Category (Core / Compli/ Elective)**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int + Ext)**
13	**COMPLEMENTORY**	**3**	**4**	**75** (Internal15+ External60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the concept of operation research, their advantages, applications and limitations.	12	U	F	PO1	PSO1, PSO2
CO2	Formulate a real-world problem into a mathematical problem and solve it by means oflinear programming.	14	C	P	PO2	PSO2
CO3	Solve specialized linear programming problem like the transportation and assignment problems.	12	Ap	M	PO2	PSO1, PSO2
CO4	Apply assignment algorithm to solve real world problems.	12	Ap	P	PO2	PSO1, PSO2
CO5	Identify the concepts of networks and different rules to construct a network.	14	R	M	PO1, PO2	PSO1, PSO2

Prerequisites

- Basic Mathematicalknowledge

CourseOutline

UNIT I (12T)

Operation research and LPP: Operation Research and Decision making, Advantages of O.R approach in

decision making, Application of O.R, uses and limitations of O.R.

UNIT II (14T)

LPP: Introduction, mathematical formulation the problem, canonical and standard forms of LPP. Simplex method, artificial variable technique - Big M and two phase method - problem of degeneracy concept of duality - dual simplexmethod.

UNIT III (12T)

Transportation model - North West corner rule, Least cost method, and Vogel's approximation method-loopsintransportationtable-Degeneracyintransportationtable-Transshipmentproblem.

UNIT IV (12T)

Assignment model: Mathematical formulation of the problem - assignment algorithm impossible algorithms - travelling salesman problem

UNIT V (14T)

Network Scheduling: Concept of network, basic components, PERT and CPM, Rules of network construction, maximal flow problem, project scheduling critical path calculations, advantages of network (PERT/CPM).

Sequencing models: processing n jobs through two machines, n jobs through three machines, two jobs through m machines.

Textbook

1.Operation Research, KantiSwarup, Gupta P.K Man Mohan, Sultan Chand & Sons

References:

1. Operation Research: An Introduction, Tahah. A, McMillan1982
2. Operations Research, Prof. K. Venogopal, Calicut University Central Co-OperativeStores

THIRD SEMESTER				
Course code	**A11**			
Name of the course	**PYTHON PROGRAMMING**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
14	**Common**	**4**	**4**	**100**(Internal 20+ External 80)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Remember mathematical preliminaries for sets, languages and proof techniques	10	R	C	PO1	PSO1
CO2	Understand model of computation formal languages and automata	10	U	F	PO1	PSO1
CO3	Apply regular grammars and their automata for applications	20	Ap	P	PO7	PSO1
CO4	Apply context free grammars and their automata for real applications	20	Ap	P	PO7	PSO1
CO5	Understand different Turing machine automata	20	U	F	PO1	PSO1

Prerequisites:

- Knowledge of Clanguage.

UNIT I [16T]

Introduction to python, features, IDLE, python interpreter, Writing and executing python scripts, comments, identifiers, keywords, variables, data type, operators, operator precedence and associativity, statements, expressions, user inputs, type function, eval function, print function.

UNIT II [16T]

Boolean expressions, Simple if statement, if-elif-else statement, compound boolean expressions, nesting,

multi way decisions. Loops: The while statement, range functions, the for statement, nested loops, break and continue statements, infinite loops.

UNIT III [16T]

Functions, built-in functions, mathematical functions, date time functions, random numbers, writing user defined functions, composition of functions, parameter and arguments, default parameters, function calls, return statement, using global variables, recursion.

UNIT IV [16T]

String and string operations, List- creating list, accessing, updating and deleting elements from a list, basic list operations. Tuple- creating and accessing tuples in python, basic tuple operations. Dictionary, built in methods to access, update and delete dictionary values. Set and basic operations on a set.

References:

1. E. Balaguruswamy, Introduction to Computing and Problem Solving UsingPython
2. Richard L. Halterman, Learning To Program WithPython
3. Martin C. Brown, Python: The CompleteReference.

THIRD SEMESTER				
Course code	**A12**			
Name of the course	**DATA COMMUNICATION AND OPTICAL FIBRES**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
15	**COMPLIMENTORY**	**4**	**4**	**100**(Internal 20+ External 80)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the protocols , standards of data communication and various transmissions	16	U	C	PO1	PSO2
CO2	Identify the types of multiplexing and its application such as telephone system, cellular system and mobile communications	16	U	C	PO1,PO4	PSO2
CO3	Discuss data link control, data link protocols, local area networks	16	U	C	PO1	PSO2
CO4	Analyze and identify integrated services digital network and subscriber access to ISDN.	16	An,U	C	PO4	PSO2
CO5	Understand optical fiber communication features of LASER diodes and LED	16	U	C	PO1	PSO2

CourseOutline

Unit I[16T]:

Introduction- Components, Networks, Protocols and standards, Basic Concepts: Line Configuration, Topology Transmission mode, analog and digital signals, Encoding and modulating- analog-to-digital conversion, digital to analog conversion, digital data transmission, DTE-DCE interface, modems, cable modems. Transmission media: guided media, unguided media, and transmission impairment- Attenuation, DistortionNoise

Unit II [16T]

Multiplexing: Many to one/ one to many, frequency division multiplexing, wave division multiplexing, TDM, multiplexing applications: the telephone system, Cellular System, Mobile Communication – Wireless Communication -GSM, Mobile Services, GSM system Architecture, Radio Interface in GSM,

Unit III[16T]

Data link Control: Line Discipline, flow control, error control, Data link Protocols: Asynchronous Protocols, synchronous protocols, character oriented protocols, bit – oriented protocols, link access procedures. Local Area Networks: Ethernet, token bus, token ring, FDDI, Comparison, Switching-circuit switching, packet switching, message switching, integrated services digital networks (ISDN): services, history, subscriber access toISDN.

Unit IV [16T]

Overview of Optical Fiber Communication - Introduction, historical development, general system, advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, fiber materials, Optical Sources And Detectors- Introduction, LED‟s, LASER diodes, Photo detectors. Ray theory, cylindrical fiber, single mode fiber, cutoff wave length, mode field diameter.

Text Book:

1. Behrouz A. Forouzan, Data Communication and Networking,TMH
2. Mobile Communications – Jochen H. Schiller , Second Edition,Pearson
3. Optical Fiber Communication – Gerd Keiser, 4th Ed., MGH,2008.

Reference Books:

1. William Stallings: Data & Computer Communications, 6/e, PearsonEducation.
2. William L. Schweber : Data Communication, McGrawHill.
3. Electronic Communication Systems - Kennedy and Davis,TMH
4. Optical Fiber Communications– – John M. Senior, Pearson Education. 3rdImpression,2007.
5. Fiber optic communication – Joseph C Palais: 4th Edition, PearsonEducation.

THIRD SEMESTER				
Course code	**BCA3B04**			
Name of the course	**DATA STRUCTURES USING C**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
16	**Core**	**3**	**7(3T+4L)**	**75**(Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the concept of dynamic memory management, data types, algorithm and Big O notations.	8 T +5 P	U	C	PO1	PSO1
CO2	Design and implement various data structure algorithms.	10 T + 12P	Ap	P	PO1, PO7	PSO3
CO3	Implement linear and nonlinear data structures.	10 T + 12P	Ap	P	PO1, PO7	PSO3
CO4	Develop application using data structure algorithms.	6 T +16 P	C	P	PO1, PO7	PSO3
CO5	Compute the complexity of various algorithms.	4T	E	P	PO1, PO7	PSO1

Prerequisites

- Knowledge in C Programming Language

CourseOutline

UNIT – I [8 T + 5P]

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space trade off, Big-O notation, Types of complexity .Strings: Introduction, strings, String operations, Pattern matching algorithms

UNIT – II [10 T + 14 P]

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, sparse matrix.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, , Applications of linked lists, Algorithm of insertion/deletion in Singly Linked List(SLL).

UNIT – III [10 T + 12 P]

Stack: primitive operation on stack, algorithms for push and pop. Representation of Stack as Linked List and array, Stacks applications: polish notation, recursion, tower of Hanoi.Introduction to queues: Primitive Operations on the Queues, Representation of Queues as Linked List and array, Circular queue, Deque-input restricted Deque and output restricted Deque, Priority queue, One–way list representation of priority Queue array representation of queue, Applications of queue: Algorithm on insertion and deletion in simple queue and circular queue.

UNIT – IV [10 T + 12 P]

Trees - Basic Terminology, representation, Binary Trees, Tree Representations using Array & Linked List, 3Basic operation on Binary tree: insertion, deletion and processing, Traversal of binary trees: In order, Pre-order & post-order, Algorithm of tree traversal with and without recursion, Binary Search Tree, Operation on Binary Search Tree, expression trees, implementation using pointers, applications, Heap Sort.

UNIT – V [10 T + 14 P]

Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, graph traversal- depth-first and breadth-first traversal of graphs, applications.Searching: sequential searching, binary searching, Hashing – linear hashing, hash functions, hash table searching; Sorting: Quick Sort, Exchange sort, Selection sort and Insertion sort.

Textbooks

1. Seymour Lipschutz, “Data Structures”, Tata McGraw- Hill Publishing Company Limited, Schaum’s Outlines, NewDelhi.
2. YedidyanLangsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, “Data Structures Using C”, Pearson Education., NewDelhi.
3. Horowitz and Sahani, “Fundamentals of data Structures”, Galgotia Publication Pvt. Ltd., NewDelhi.

Reference books

1. Applications", Mcgraw- Hill International Student Edition, NewYork.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint of Pearson Education), MexicoCity.
3. A.K.Sharma, Data Structures Using C, Pearson, Second edition,2011
4. Nair A.S., Makhalekshmi, Data Structures in C, PHI, Third edition2011
5. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education Asia, Delhi- 2002

6.K Loudon, "Mastering Algorithms with C", Shroff Publisher & Distributors Pvt.Ltd

THIRD SEMESTER				
Course code	**BCA3C05**			
Name of the course	**COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS**			
Course No	**Course Category (Core / Compli/ Elective)**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int + Ext)**
17	**COMPLEMENTARY**	**3**	**5**	**75** (Internal15+ External60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand basic knowledge of different number systems and their importance in reduction of errors.	8	U	C	PO1	PSO2
CO2	Illustrate basic concept of the derivation and use of methods of interpolation.	12	Ap	F	PO2	PSO1
CO3	Apply various statistical techniques such as measures of central tendency and dispersion.	20	Ap	P	PO1, PO2	PSO1, PSO2
CO4	Operate the concepts of correlation and regression in statistics in prediction.	20	Ap	P	PO1, PO2	PSO1, PSO2
CO5	Describe the basic knowledge of random variables and their properties.	20	R	C	PO1, PO2	PSO1, PSO2

Prerequisites

- Background of the basic Mathematics

CourseOutline

UNIT I (8T)

Floating Point Arithmetic - Errors, Significant digits and Numerical Instability, Roots of Algebraic Equations - Bisection Method - Method of False Position - Newton Raphson Method.

UNIT II (12T)

Interpolation and Approximation–Lagrange & Newton; Interpolations- Finite Difference Operators, Interpolating; Polynomials using finite differences, Simpson‟s 1/3rd rule ,Trapezoidal method.

UNIT III (20T)

Basics statistics: Measures of central tendencies - Mean, Median, Mode, Geometric mean and Harmonic mean. Measures of dispersion - Range, quartile deviation, Lorenz curve. Mean deviation and standard deviation.

UNIT IV (20T)

Curve fitting- Principles of least squares, fitting of straight lines. Correlation (Bivariate case only) Pearson‟s coefficient of correlation. Rank correlation and Regression analysis. Probability theory: Random experiment. Sample point, sample space, events, union, intersection and compliment of events.

UNIT V (20T)

Random variables and probability distribution, Discrete and continuous random variables- density function- distribution- density function.

Reference books

1 Numerical Methods in Engineering, Salvadori&Baron,PHI
2 Numerical Methods for Scientific and Engineering Computation, M.K. Jain, SRK, Iyengar, R.K. Jain, New AgeInternational
3 Introduction to Mathematical Statistics, Hogg R V Craig A T,Macmillan
4 Mathematical Statistics, Freund J E, Waple R E, Prentice Hall ofIndia.
5 Probability and Statistics for Engineers, Miller I Freund J E, Prentice Hall ofIndia.

THIRD SEMESTER				
Course code	**BCA3C06**			
Name of the course	**THEORY OF COMPUTATION**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
18	**Complementary**	**3**	**5**	**75**(Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Remember mathematical preliminaries for sets, languages and proof techniques	10	R	C	PO1	PSO1
CO2	Understand model of computation formal languages and automata	10	U	F	PO1	PSO1
CO3	Apply regular grammars and their automata for applications	20	Ap	P	PO7	PSO1
CO4	Apply context free grammars and their automata for real applications	20	Ap	P	PO7	PSO1
CO5	Understand different Turing machineautomata	20	U	F	PO1	PSO1

Prerequisites

- Basic knowledge in discrete structures and graph theory.

CourseOutline

UNIT I (10T)

Introduction to Mathematical preliminaries: Sets, Functions and Relations, graphs and trees, Strings and their Properties, Proof techniques: By induction, bycontradiction.

UNIT II (10T)

Formal languages: Definitions and examples, Chomsky classification of languages, Languages and their relation, Types of grammars, Languages andautomata.

UNIT III (20T)

Theory of Automata: Definition of automaton, description of a finite automaton, DFA, transition systems, properties of transition functions, acceptability of a string by a finite automaton, Non deterministic finite state machines: with epsilon moves and without epsilon moves, equivalence of DFA and NDFA, Mealy and Moore Models, minimization of finite automata. Regular sets and grammar: Regular expressions, Finite automata and regular expressions, closure properties of regular sets, Algebraic laws for regular expressions, regular sets and regulargrammars

UNIT IV (20T)

Context free languages: Context free languages and derivation trees, Ambiguity in context free grammars, Method of transformation of context free languages, normal forms for context free languages - Chomsky normal form and greibach normalform

UNIT V (20T)

Pushdown automata: Definition, Acceptance by PDA, Pushdown automata and Context-free languages, Parsing and Pushdown Automata. Turing Machines: Turing machine model, representation of Turing machines, universal Turing machine, non deterministic Turing machine, multitape Turing machine, Turing machine as accepters andtransducer.

Textbooks

1. Theory of Computer Science- Automata, Languages and Computation- K.L.P. Mishra, N Chandrasekaran,PHI
2. Theory of Computation, Sachin Agrawal, Vikas PublishingHouse

Reference books

1. Introduction to Automata Theory, Languages & Computations, J.E Hopcroft, R Motwani& J. D. Ullman
2. Elements of theory of Computation, Second edition, H.R. Lewis and C.H. Papadimitriou, Pearson education.
3. An Introduction to the Theory of Computer Science, Languages and Machines-Thomas A. Sudkamp, Third Edition, Pearson Education.
4. An Introduction to Formal languages and Automata- PeterLinz

FOURTH SEMESTER				
Course code	**A13**			
Name of the course	**Microprocessors Architecture and Programming**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
19	**Common**	**4**	**4**	**100** (Internal 20+ External 80)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the architecture of microprocessors	16	U	C	PO1	PSO2
CO2	Understand the basics of assembly language programming	16	U	C	PO1,PO4	PSO2
CO3	Understanding various methods of assembly language programming	16	An	C	PO1	PSO2
CO4	Analyze different architecture of microprocessors	16	U	C	PO4	PSO2

Prerequisites

- Basic knowledge ofComputer.

CourseOutline

Unit I [16 T]

General architecture of computer, Introduction to Microprocessor, Memory classification, Introduction to 8085,Microprocessor bus organizations ,data bus, address bus, control bus. Memory addressing, memory mapping. 8085 architecture in detail. General purpose registers and special purpose registers, flag register -8085 pins and signals.

Unit II [16 T]

Assembly language programming basics.Opcode, Mnemonics etc. 8085 instruction set ,Datatransfer,Arithmetic and Logic, Shifting and rotating, Branching/Jump, Program control. Addressing modes. Memory read and write cycle.Timing diagram. Instruction cycle , machine cycle and T- states.Types of I/O addressing. Simple programs.

Unit III [16 T]

Types of programming techniques looping, indexing (pointers),delay generation. Stack in 8085, call and return Instructions. Data transfer between stack and microprocessor. Subroutine and delay programs.Interrupts in 8085. Interrupt driven programs. Interfacing - Programmable peripheral devices - 8255A, 8254, 8237.

Unit IV [16 T]

Introduction to 8086/88 microprocessors – overview, 8086 internal architecture. The execution unit, BIU, Registers, Flags, Segmentation, physical address calculation, addressing modes.

Text Books:

1. Ramesh S. Gaonkar, Microprocessor Architecture Programming and Application with 8085, PrenticeHall
2. Doughles V Hall, Microprocessors and Interfacing: Programming and Hardware, Tata McGraw Hill

Reference Books:

1. Microprocessor and Microcomputer - Based system Design - M. Rafiquzzman - CRCpress
2. A.P Mathur, Introduction to Microprocessors, Tata McGraw-HillEducation
3. The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro,PentiumII,III,IVandCore2with64bitExtensions,BarryB.Brey,PrenticeHallPearson
4. Microprocessors PC Hardware and Interfacing –N.Mathivanan –PHI

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Explain resistance, inductance and capacitance transducers.	16	U	C	PO1	PSO2
CO2	Explain resistance, inductance and capacitance transducers.	16	U	C	PO1,PO4	PSO2

CO3	Perceive the concepts level transducers such as and flow transducers	16	U	C	PO1	PSO2
CO4	Explain Electromagnetic transducers, radiation sensors.	16	U	C	PO4	PSO2
CO5	Explain torque transducers and sound transducers.	16	U	C	PO1	PSO2

CourseOutline

Unit I [16 T]

Transducers: Definition, Principle of sensing & transduction, Classification, Characteristics of transducers. Basic requirement of transducers.

Resistance Transducer: Basic principle – Potentiometer –Loading effects, Resistance strain gauge– Types.
Inductance Transducer: - Basic principle – Linear variable differential transformer – RVDT-types. Capacitance Transducer: Basic principle- transducers using change in area of plates – distance between plates- variation of dielectric constants –Types

Unit II [16 T]

Thermal sensors: Resistance change type: RTD - materials, construction, types, working principle, Thermistor - materials, construction, types, working principle, Thermo emf sensors: Thermocouple – Principle and types, Radiation sensors: Principle and types.
Pressure Transducers: basic principle- different types of manometers-u tube manometer-well type manometers

Unit III [16 T]

Level transducer-continuous level measurement-discrete level measurement-mass – capacitive levelgauges
Flow Transducers: Bernoulli‟s principle and continuity, Orifice plate, nozzle plate, venture tube, Rotameter, anemometers, electromagnetic flow meter, impeller meter and turbid flow meter

Unit IV [16 T]

Hall effect transducers, Digital transducers, Piezo-electric sensors, eddy current transducers, tacho generators and stroboscope, Magnetostrictive transducers Radiation sensors: LDR, Photovoltaic cells, photodiodes, photo emissive cell types Force and Torque Transducers: Proving ring, hydraulic and pneumatic load cell, dynamometer and gyroscopes. Sound Transducers: Sound level meter, Microphone.

Text Books

1. D Patranabis, Sensors and Transducers, PHI, 2ndEdition.

2. E. A. Doebelin, Measurement Systems: Application and Design McGraw Hill, NewYork
3. A.K. Sawhney,- A course in Electrical & Electronic
Measurement and Instrumentation, DhanpatRai and
Company PrivateLimited.
4. Murthy D.V.S., ―Transducers and Instrumentation, 2nd Edition, Prentice
Hall of India Private Limited, New Delhi,2010.
5. S.Renganathan, ―Transducer Engineering, Allied Publishers,2005

FOURTH SEMESTER				
Course code	**BCA4B05**			
Name of the course	**Database Management System and RDBMS**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
21	**core**	**3**	**3T+4L**	**75**(Internal 15+ External 60)

Prerequisites

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the basic principles of database and database design	8T+2L	U	C	PO1	PSO2
CO2	Understand conceptual model of database and ER modeling .	10T +6L	U	C	PO1	PSO2
CO3	Understand relational database deign and normalization	10T+12L	U	C	PO1	PSO2
CO4	Create and populate RDBMS using SQL and database frameworks	10T+20L	C	P	PO7	PSO2
CO5	Create PL/SQL programs and transactions for real life database applications	10T+24L	C	P	PO1	PSO2

- Basic knowledge of computers, data structures andprogramming

CourseOutline

Unit I [8 T+ 2L]

Database System concepts and applications Introduction to databases, File Systems vs. DBMS, Advantages and Disadvantages of using DBMS Approach, Database administrators and user, Data Models, Schemas, and Instances, Types of Data Models, Three Schema Architecture and Data Independence, Database Languages and Interfaces.

Unit II [10 T+ 6L]

Entity-Relationship Model - Conceptual Data Models for Database Design Entity Relationship Models, Concept of Entity, Entity Sets, Relationship Sets, Attributes, Domains, Constraints, Keys, Strong and

Weak Entities, Concepts of EER.

Relational Data Model Relations, Domains and Attributes, Tuples, Keys. Integrity Rules, Relational Algebra and Operations, Relational Calculus and Domain Calculus, Relational Database Design using ER to RelationalMapping.

Unit III [10 T+12L]

Relational Database Design - Relational database design Anomalies in a Database, Normalization Theory, Functional Dependencies, First, Second and Third Normal Forms, Relations with more than one Candidate Key, Good and Bad Decompositions, Boyce Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth NormalForm.

Unit IV [10 T +20L]

SQL Concepts: Basics of SQL, DDL, DML, DCL, Tables – Create, Modify and Delete table structures, Rename and Drop tables, Defining constraints – Primary key, foreign key, unique, not null, check, INoperatorSelect Command, Logical Operators, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All. View - Creation, Renaming the column of a view, destroys view.

Unit V [10 T+24L]

Transaction Management and Concurrency Control - Transaction Properties (ACID), states, Commit, Rollback; Concurrency Control Lost update problems, Locks, two phaselocking.

Programming with SQL: Data types: Base and Composite, Attributes. Variables – Constants - Using set and select commands, Control Structures: IF, IF THEN ELSE, IF THEN ELSEIF, CASE. Loops: LOOP, EXIT, CONTINUE, WHILE, FOR, and FOREACH - Looping Through Arrays - Looping Through Query Results. Security: Locks: Table-level Lock, Row-level Lock, Deadlock, Advisory Lock. Cursors: Boud and Unbound Cursors, Declaration, Opening, Working with cursors: FETCH, MOVE, UPDATE/DELETE, CLOSE, Looping through a Cursor. Concept of Stored Procedures – Advantages and Disadvantages – Creation – Parameters Setting for Function- Alter – Drop – Grant and Revoke - Passing and Returning data to/from Stored Procedures - Using stored procedures within queries – Triggers: Creation, Modification, Deletion, Error Handling: Control Structures, Cursors, Functions,Triggers.

Textbooks:

1. Abraham Silberschatz, Henry F Korth, S.Sudharshan, Database System

Concepts, 6thEdition
2. W. Gilmore, Beginning PHP and PostgreSQL 8: From Novice to Professional,Goels Computer Hut (2007), ISBN: 9788181286000
3. PosgreSQL Official DocumentationOnline

Reference books:

1. Alex Krigel and Boris M.Trukhnov, SQL Bible, Wileypubs
2. Paul Nielsen, Microsoft SQL Server 2000 Bible, Wiley Dreamtech IndiaPubs.
3. CJ Date, Introduction to Database Systems, Addison Wesley.
4. Ramkrishnan, Database Management Systems, McGraw Hill

BCA4B06- Programming Laboratory II: Lab Exam of 3rd and 4th Semester - Data Structures and RDBMS

Course Number: *22*
Number of Credits: 4
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective

- To make the students equipped to solve mathematical or scientific problems usingC
- To learn how to implement various data structures.
- To provide opportunity to students to use data structures to solve real lifeproblems.

Prerequisites

- Knowledge in operatingcomputer.
- Theoretical knowledge in Datastructures.
- Knowledge inDatabase

CourseOutline

Part A: Data structure – LabQuestions

1. Sort a given list of strings
2. Reverse a string usingpointers.
3. Implement Pattern matching algorithm.
4. Search an element in the 2-dimensionalarray
5. Append 2 arrays
6. Merge two sorted array into one sortedarray.
7. Search an element in the array using iterative binarysearch.
8. Search an element in the array using recursive binarysearch.
9. Implement sparsematrix
10. Implement polynomial usingarrays
11. Implement singly linked list ofintegers.
12. Delete a given element from a singly linkedlist
13. Sort a singly linkedlist.
14. Delete an element from a singly linkedlist
15. Implement a doubly linked list ofintegers
16. Implement a circular linkedlist.
17. Implement polynomial using linkedlist
18. Addition of 2polynomials
19. Implement Stack usingarray
20. Implement Stack using linkedlist
21. Infix expression into its postfixexpression
22. Implement Queue usingarray
23. Implement Queue using linkedlist
24. Implement a binary search tree of characters.
25. Traverse a binary search tree non recursively inpreorder
26. Traverse a binary search tree non recursively ininorder
27. Traverse a binary search tree non recursively inpostorder
28. Traverse a binary search tree recursively inpreorder
29. Traverse a binary search tree recursivelyinorder
30. Traverse a binary search tree recursivelypostorder.
31. Delete an element from a binary searchtree.

32. Search an element in a binary searchtree
33. Implement linearsort
34. Implement bubblesort
35. Implement exchangesort
36. Implement selectionsort.
37. Implement insertionsort.
38. Implement quicksort.
39. Implement mergesort.
40. Implement heapsort

Part B: DBMS- Lab Questions

1. Create a table employee with fields (EmpID,EName, Salary, Department, Age). Insert some records. Write SQL queries using aggregate functionsfor

A. Display the total number ofemployees.

B. Display the age of the oldest employee of eachdepartment.

C. Display departments and the averagesalaries

D. Display the lowest salary in employeetable

E. Display the highest salary in salesdepartment;

2. A trading company wants to keep the data of their Order Processing Application using the followingrelations.

Customer_Master

Customer_Number	-	PrimaryKey
Customer_Name	-	Not NULL
Address	-	
Pincode	-	

Order_Master

Order_Number	-	PrimaryKey
Order_date	-	Not NULL
Customer_Number	-	Refers

Customer_master table Order_amount - Not NULL

Order_Detail

Line_Number	-	PrimaryKey
Order_Number	-	PrimaryKey
Item_No	-	Not NULL, Refers ITEMtable
Quantity	-	NotNULL

ITEM

Item_No	-	PrimaryKey
UnitPrice	-	Not NULL

SHIPMENT

Order_Number	-	PrimaryKey
Warehouse_No	-	Primary Key, Refers
Warehouse table Ship_Date IntegrityCheck	-	Not NULL with

WAREHOUSE

Warehouse_No	-	PrimaryKey
City	-	Not NULL

A. Create the above tables by properly specifying the primary keys and foreignkeys.
B. Enter at least five tuples for eachrelation.
C. Produce a listing: Cust_Name, No_of_orders, Avg_order_amount, where the middle column is the total number of orders by the customer and the last column is the average order amount for thatcustomer.
D. List the Order_Number for orders that were shipped from ***all*** the warehouses that the company has in a specificcity.
E. Demonstrate the deletion of an item from the ITEM table and demonstrate a method of handling the rows in the ORDER_ITEM table that contains this particularitem.

3. In this session you need to create database for an Employee management system of an ABC organization. The details about different tables are given below. According to that you can proceed further and create tables usingPostgreSQL/MySQL

Create the following tables with the specified constraints:

Department:

DepartmentNumber	-	Primary Key
DepartmentName NULLunique	-	Not
ManagerID employee table. Manager	-	Refers to EmployeeID of
DateofJoining	-	NotNULL.

Employee:

FirstName	-	Not NULL MiddleInitials
LastName	-	Not NULL
EmployeeID	-	PrimaryKey
DateofBirth	-	Not NULL Address
Gender	-	M orF

Salary - Range of
5000 to 25000 Date ofJoining
DepartmentNumber - Refers to Department Number of Departmenttable.

Department location:

DepartmentNumber - Refers to Department number of
department table. DepartmentLocation - NotNULL.
Department number & Department location are combined Primary Key

Project:

ProjectName -Not
NULL.ProjectNumber -
Primary Key.ProjectLocation -
NotNU
LL.
Departmentnumber -Refers to department number of Departmenttable.

Works-on:

EmployeeID - Not NULL refers to Employee ID of
Employee table. ProjectNumber - Not NULL refers to Project number of
Project table. Hours - NotNULL.

Employee ID & Project Number are combined primary key.

Dependent:

EmployeeID - Refer to employee table
Employee ID field DependentName - Gender - M
orF

DateofBirth - NotNULL
Relationship - NotNULL

Now enter a few sets of meaningful data and answer the following queries.

A. List the department wise details of all theemployees.
B. Find out all those departments that are located in more than onelocation.
C. Find the list ofprojects.
D. Find out the list of employees working on aproject.
E. List the dependents of the employee whose employee id is001

4. These sessions is similar to the previous one, but in this session, assume that you are developing a prototype database of the College library management system, for that you need to create the followingtables:

- BookRecords
- Bookdetails
- Member details
- Book issuedetails

Book Records:
Accession Number
ISBN Number

Books:

ISBN Number
Author
Publisher
Price

Members:

Member ID
Member Name
Maximum Number of books that can be issued
Maximum Number of days for which book can beissued

Book Issue:

Member ID
Accession Number
Issue Date
Return Date

You must create constraints, including referential integrity constraints, as appropriate. Please note accession number is unique for each book. A book, which has no return date, can be considered as issued book. Enter suitable data into the tables. Now answer the following

A. Insert data in all the three tables (useinsert).
B. Insert appropriate description associated with each table and the column (use comment).
C. Display the structure of thetables.
D. Display the comments that you haveinserted.

Using SELECT statement, write the queries for performing the followingfunction

a. Get the list of all books (No need to find number ofcopies).
b. Get the list of allmembers.
c. Get the Accession number of the books which are available in thelibrary.
d. On return of a book by a member calculate the fine on thatbook.
e. List of books issued on01-Jan-2005.
f. Get the list of all books having price greater than Rs.500/-
g. Get the list of members who did not have any book issued at anytime.
h. Get the list of members who have not returned thebook.
i. Display member ID and the list of books that have been issued to him/her from

time totime.

j. Find the number of copies of each book (A book accession number would be different but ISBN number would be thesame).

k. Find the number of copies available of a book of given ISBNnumber.

Column name	**Type**	**size**
Customer ID	Character	10

l. Get the member ID and name of the members to whom no more books can be issued, because they have already got as many books issued as the number for which they areentitled.

This session is based on Lab 2 where you have created a library management system. In this session you have different queryspecification

You must create appropriate forms, reports, graphs, views and data filtering, use of multilevel report, etc. to answer these queries.

A. Get the list of ISBN-Number, Book name, available copies of the books of which available copies are greater thanzero.
B. Get the list of ISBN-Number, Book name, Total copies, available copies of the book of which available copies are greater than zero. List should be displayed in alphabetical order of bookname.
C. Get the list of ISBN number, Book name, Author, total copies, cost (cost is price total copies). List should be displayed in descending order ofcost.
D. Get the list of books issued to eachmember.
E. Write query to know the maximum and average price of the books.

B. Get the list of all existing members and the number of days for which a member is allowed to keep the book. Also find out the members who have got the maximum number of booksissued Get the list of member codes of those members who have more than two books issued.
C. Find the details of the books presently issued to amember.
D. Create the history of issue of a book having a typical accessionnumber.
E. To set the width of the book name to35.

5. Create the following table and perform the necessary tasks defined below one by one. You must use the query tools/ SQL/ Reports/ Forms/ Graphs/Views/ using client/server wherever needed.

Name	Character	25
Area	Character	3
Phone	Numeric	7

6) Create the following table named customer

Insert the appropriate data into table and do the following.

- Update Phone numbers of all customers to have a prefix as your city STDCode
- Print the entire customertable
- List the names of those customers who have e as second letter in theirnames.
- FindouttheCustomerbelongingtoarea„abc"
- Delete record where area isNULL.
- Display all records in increasing order ofname.
- Create a table temp from customer having customer-id, name, and area fieldsonly
- Display area and number of records within each area (use GROUP byclause)
- Displayallthoserecordsfromcustomertablewherenamestartswithaorareais„abc".
- Displayallrecordsofthosewherenamestartswith„a"andphoneexchangeis55.

6. Answer the following queries using Library system as created earlier. You must create a view to know member name and name of the book issued to them, use any inbuilt function and operators like IN, ANY,ALL,EXISTS.

a. List the records of members who have not been issued any book using EXISTSoperator.
b. List the members who have got issued at least one book (use IN / ANYoperator).
c. List the books which have maximum Price using ALLoperator.
d. Display Book Name, Member Name, and Issue date of Book. Create a view of this query of the currently issuedbooks.

7. Create a table of Employee (emp_number, name, dept_number, salary) and Department (dept_ number, dept_name). Insert some records in the tables through appropriate forms having integrity checks. Add some records in employee table where department value is not present in department table. Now answer the followingquery:

a. Display all records from employee table where department is not found in department table.
b. Display records from employee table in a report format with proper headings. This report must also contain those records where department number does not match with any value of department table.
c. Display those employee records who have salary less than the salary of person whose

emp_number=A100.

d. Create another table: SalesData (RegionCode, City, SalespersonCode,SalesQty).
e. Display records where salesperson has achieved sales more than average sales of all sales persons of all theregions.

8. Create the followingtables:

Order party: (Order number, Order date, customer code) Order: Order number, Item code, Quantity
The key to the second table is order-number + item-code Create a form for data entry to both the tables.

9. Create a table shop with fields Item_ID, Item_Name, Price, and Quantity. Write a procedure 'sales' to update the quantity by accepting Item_ID and Quantity as argument. Write PostgreSQL block to invoke theprocedure

10. Implement student informationsystem

11. SQL scripts to display various reports like Result of an Examination, Salary Report, Sales Report, Sales reports grouped on Sales person or item,etc

12. Write simple PostgreSQL anonymous blocks for displaying whole numbers from 1 to 100, odd numbers from 1 to 100, even numbers from 1 to 100, positive whole numbers up to a given number, odd numbers from 1 to a given number, even numbers from 2 to a given number, Fibonacci numbers up to 100, Strange numbers up to 1000, factorials of the numbers from 1 to 10,etc.

13. Create a table product with the fields(Product_code primary key, Product_Name, Category, Quantity, Price). Insert some records Write the queries to perform thefollowing.

a. Display the records in the descending order ofProduct_Name
b. Display Product_Code, Product_Name with price between 20 and50
c. DisplaytheProduct_Nameandpriceofcategoriesbathsoap,paste,washingpowder
d. Display the product details whose Quantity less than 100 and greater than 500
e. Display product names starts with's'
f. Display the products which not belongs to the category'paste'
g. Display the product names whose second letter is 'a' and belongs to the Category 'washingpowder'

Field Name	**Type**	**Width**
RegNo	Character	10
Name	Character	20
Paper1	Numeric	3
Paper2	Numeric	3

Paper3	Numeric	3
Paper4	Numeric	3
Paper5	Numeric	3
Total	Numeric	3
Result	Character	6
Grade	Character	1

Field Name	Type	Width
EmpNo	Character	10
Name	Character	20
Basic	Numeric	6

14. Create a STUDENT table with following fields

Enter the RegNo, Name and Marks in 5 Papers of at least 10 students. Write a SQL program to process the records to update the table with values for the fields Total (Paper1+Paper2+Paper3+Paper4+Paper5), Result („Passed‟ if total is greater than or equal to 50% of the total; „Failed‟ otherwise), and Grade („A‟ if mark obtained is greater than orequalto90%ofthetotalmark,„B‟ifmarkobtainedisgreaterthanorequalto75%ofthe totalmark,„C‟ifmarkobtainedisgreaterthanorequalto60%ofthetotalmark,„D‟if markobtainedisgreaterthanorequalto50%ofthetotalmark,and„F‟ifmarkobtainedis less than 50% of the total mark). Display a report in descending order of the total mark, showing the data entered into the table along with the total marks, result andgrade.

16.An examination has been conducted to a class of 10 students and 4 scores of each student have been provided in the data along with their reg_no, name, total and avg_score. Assign null values to the fields total and average. Write Postgresql block to do thefollowing

Find the total and average of each student. Update the table with the calculated values Assign a letter grade to each student based on the average Score as

avg_score between 90and100 - A
avg_score75-89 - B
avg_score60-74 -C
avg_score50-59 – D
avg_scorebelow50-Failed

1. Prepare a salary report of the employees showing the details suchas:

EmpNo, Name, Basic Pay, DA, Gross Salary, PF, Net Salary, Annual Salary and Tax For this purpose, create a table named SALARIES having the following structure.

Enter the records of at least 10 employees. Use the following information for calculating the details for the report:

DA is fixed as the 40% of the basic pay
PF is fixed as 10% of the basic pay.
Gross Salary is (Basic Pay + DA).
Net Salary is (Gross Salary – PF)
Annual Salary is (12*Net salary)

Tax is calculated using the following rules:

If annual salary is less than 100000, No Tax
If annual salary is greater than 100000 but less than or equal to 150000, then the tax is 10% of the excess over100000.
If annual salary is greater than 150000 but less than or equal to 250000, then the tax is 20% of the excess over150000.
If annual salary is greater than 250000, then the tax is 30% of the excess over 250000

16.Generate a Hospital information system that can generate the followingreports:

- Patients who belongs to in-patientcategory
- Patients who belongs to out-patientcategory

Forthispurpose,createatablenamedHOSPITALhavingthefollowingstructure

Field Name	Type	Width
PatientID	character	10
Name	character	20
Age	numeric	3
Doctor	character	20
PatientType	character	15
ConsultCharge	numeric	6
BloodTestCharge	numeric	6
XrayCharge	numeric	6
OtherCharges	numeric	6
TotalAmount	numeric	6

Enter the records of at least 10 patients. Write a SQL program to display the report in the ascending order of patient name.

15. Using the Hospital table created in Lab 16, generate a Hospital information system that can generate the followingreports:

- Patients undergone bloodtest.
- Patients who have takenX-Rays

16. Design a Hotel Bill calculating system that generates hotel bills for thecustomers.

17. Design an Electricity Bill Report generating system that generates electricity bills details of customers for amonth.
18. Generate a Library Information System that generates report of the books available in the library.
19. Programs involving multipletables.
20. Create a table named Elec_Bill (Cust_No, Cust_Name, Units_Consumed, Bill_Amt). Set bill_amt as null. Write a PostgreSQL function to calculate the Bill_Amt by accepting Cust_No and Units_Consumed. Write a PostgreSQL block to update the calculated amount by invoking thefunction.
21. Create two tables Book (BookID, BookName, Author, Publisher) and Book_Del (Date_of_Del, BookID,BookName)

    Create and application to generate a trigger before deleting a record from book table. The trigger procedure should insert the deleted BookID and BookName along with current date to the table Book_Del.

Include any 20 Data structure Lab questions and 15 DBMS Lab questions in the record book.

Note: All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation note book (roughrecord).

FOURTH SEMESTER				
Course code	**BCA4C07**			
Name of the course	**E-Commerce**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
23	**Core**	**3**	**3T+4L**	**75**(Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand basics of electronic commerce framework.	15	U	C	PO2, PO6	PSO1
CO2	Understand the various models of E-Commerce	15	U	F	PO2,PO6	PSO2
CO3	Understand the basics of networks and E-marketing	15	U	C	PPO2,PO6	PSO2
CO4	Understanding the security, legal and ethical issues in E-Commerce	15	U	C	PO2,PO6	PSO3
CO5	Analysing the e-payment systems and designing the payment system	15	An	P	PO6,PO7	PSO3

Prerequisites

- Basic knowledge ofCommerce.

CourseOutline

UNIT I (15T)

History of E-commerce and Indian Business Context : E-Commerce, Emergence of the Internet, Emergence of the WWW,Advantages of E-Commerce, Transition to E-Commerce in India, The Internet and India, E-transition Challenges for IndianCorporates.

UNIT II (15T)

Business Models for E-commerce: Business Model, E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

UNIT III (15T)

Enabling Technologies of the World Wide Web: World Wide Web, Internet Client-Server Applications, Networks and Internets, Software Agents, Internet Standards and Specifications, ISP.e- Marketing: Traditional Marketing, Identifying Web Presence Goals, Online Marketing, E-advertising, E-branding

UNIT IV (15T)

e-Security : Information system Security, Security on the Internet, E-business Risk Management Issues, Information Security Environment in India. Legal and Ethical Issues: Cyber stalking,Privacy is at Risk in the Internet Age, Phishing, Application Fraud, Skimming, Copyright, Internet Gambling, Threats to Children.

UNIT V (15T)

e-Payment Systems: Main Concerns in Internet Banking, Digital Payment Requirements, Digital Token-based e-payment Systems, Classification of New Payment Systems, Properties of Electronic Cash, Cheque Payment Systems on the Internet, Risk and e-Payment Systems, Designing e-payment Systems, DigitalSignature.

References:

1. E-Commerce - An Indian Perspective, P.T.Joseph, S.J.,PHI
2. E-Commerce Strategy, Technologies and Applications, David Whiteley, TataMc-Graw-Hill
3. Frontiers of Electronic Commerce, Ravi Kalakota, Andrew B.Whinston, Pearson Education Asia
4. E – Commerce, Jeffery F. Rayport, Bernard J.Jaworski,TMCH
5. E-Commerce - A Managerial Perspective, P.T. Joseph,PHI

FOURTH SEMESTER				
Course code	**BCA4C08**			
Name of the course	**COMPUTER GRAPHICS**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
24	**Complementary**	**3**	**5**	**75(Internal 15+ External 60)**

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CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand core concepts of computer graphics, including display and input.	10	U	C	PO1	PSO1
CO2	Interpret the mathematical foundation of the concepts of computer graphics.	12	U	C	PO1	PSO1
CO3	Implement various algorithms to scan, convert the basic geometrical primitives, transformations.	20	Ap	P	PO7	PSO1
CO4	Define the fundamentals of clipping and algorithms used for clipping.	17	U	P	PO1	PSO1
CO5	Analyze image manipulation usingGIMP	18	An	P	PO1	PSO1

Prerequisites

- Basic knowledge in Mathematics and Computerfundamentals

CourseOutline

UNIT I (10T)

Introduction to computer graphics definition, Application, Pixel, Frame Buffer, Raster and Random Scan Display, Display Devices CRT, Color CRT Monitors, basics of LCD and LED Monitors

UNIT II (12T)

Scan Conversion of Line, DDA Algorithm of Line Drawing, Scan Conversion of Circles-Bresenham‟s Circle Generating algorithm, Polygon Filling, Scan Line Polygon Filling Algorithm

UNIT III (20T)

Two-Dimensional Transformation, Translation, Rotation, Scaling, HomogeneousCoordinates, Reflection, Shear

UNIT IV (17T)

Window to Viewport Transformation, Clipping, Line Clipping, Cohen Sutherland Line Clipping, Polygon Clipping, Sutherland and Gray Hodgman Polygon Clipping Algorithm.

UNIT V (18T)

Color Models and Color Applications Light and Color, Different color models, RGB, CMY, YIQ. Introduction to GIMP, Image Manipulation Using GIMP.

Reference books

1. Donald Hearn and M Pauline Baker, Computer Graphics, PHI, NewDelhi.
2. Zhigang Xiang and Roy Plasock, Computer Graphics, Schaum‟sOutlines.
3. Deborah Morley, Understanding Computer Today And Tomorrow, IntroductoryEdition.

FIFTH SEMESTER				
Course code	**BCA5B07**			
Name of the course	**Computer Organization and Architecture**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
25	**Complementary**	**3**	**4**	**75**(Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the concept of logic gates, combinational circuits and sequential circuits.	12	U	C	PO1	PSO1
CO2	Interpret the functional architecture of computer system.	13	U	C	PO1	PSO1
CO3	Analyze the functions ofeach element in memoryhierarchy.	13	An	C	PO7	PSO1
CO4	Identify and compare different methods for computer I/O.	13	U	C	PO1	PSO1
CO5	Evaluate the impact of memory element on computer performance/cost.	13	E	P	PO7	PSO4

Prerequisites

- Boolean algebra

CourseOutline

Unit I [12 T]

Digital Logic - Positive and negative logic, logic gates ,NOT gate, OR gate, AND gate, XOR and X-NOR gates, Universal gates- NAND gate, NOR gate,. Combinational circuits- Half adder, half subtractor, full adder, full subtractor, ripple carry adders, look-ahead carry adders, decoders, BCD to 7-segment decoder, encoders, multiplexers anddemultiplexers.

Unit II [13 T]

Sequential Logic Circuits: Edge triggering, Pulse triggering ,SR latch, SR flip flop, JK flip flop,

Master Slave JK flip flop, D flip flop, T flip flop. Shift register: serial in - serial out, serial in parallel out, parallel in - serial out, parallel in-parallel out configurations. counters (asynchronous & synchronous),up/downcounter,decadecounter,modNcounter,Ringcounter,Johnson‟scounter

Unit III [13 T]

Basic Computer Organization and Design: Instruction Codes , Computer Registers, Computer Instructions, Instruction types, Timing and Control, Instruction Cycle, Memory reference Instructions, Register reference instructions, Input, Output and Interrupt Design of Basic Computer, Design of Accumulator logic

Unit IV [13 T]

Micro programmed Control: Control Memory, Address sequencing, Micro program Example, Design of control unit. Processor Organization: general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, programcontrol

Unit V [13 T]

Memory Organization: Memory mapping, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, Input-Output Organization: Peripheral devices, I/O interface, Modes of Transfer-asynchronous and synchronous, Priority Interrupt, Strobe Control, Handshaking. Direct Memory Access, Input-Output Processor, Serial Communication. I/O Controllers

Textbooks:

1. Thomas L Floyd, Digital Fundamentals, Universal Book Stall (Unit I andII)
2. M. Morris Mano, *Computer System Architecture*PHI (Unit III –V)

References:

1. Rajaraman V &Radhakrishnan, An Introduction to Digital Computer Design, PHI.
2. William Stallings, *Computer Organization and Architecture*,PHI.
3. Malvino& Leach, Digital Principles & Applications,TMH
4. Jain R.P. , Modern Digital Electronics,TMH
5. Malvino, Digital Computer Electronics,TMH
6. Bartee T.C., Digital Computer Fundamentals,THM
7. William H. Gothmann, Digital Electronics: An Introduction to Theory and Practice,PHI

FIFTH SEMESTER				
Course code	**BCA5B08**			
Name of the course	**JAVA PROGRAMMING**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
26	**CORE**	**3**	**6**	**75**(Internal 15+ External 60)

Prerequisites

- Knowledge in OOP &Programming

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the object oriented programming concepts	14	U	C	PO1	PSO1
CO2	Formulate Java programs using class and objects that may include basic data types, operators, tokens and control flow constructs	17	C	P	PO7	PSO1
CO3	Understand and develop exception handling ,multithreaded applications with synchronizations and I/O	22	U,C	P	PO1,PO7	PSO1
CO4	Conceive the idea of JDBC architecture and Connectivity	22	U	C	PO1	PSO1
CO5	Design GUI based applications and develop applets for web applications	21	C	P	PO7	PSO1

CourseOutline

Unit I [9 T + 5L]

Introduction to OOPS, Characteristics of OOPS, Object oriented languages, comparison between procedural and object oriented programming, basic principles of Object Orientation-class, object, abstraction, encapsulation, inheritance, polymorphism, modularity, and message passing. Features of object orientation - attributes, state, identity, operation,behaviour.

Unit II [9 T + 8L]

Introduction to Java: History, Versioning, The Java Virtual Machine, Byte code, Writing simple java program, Language Components: Primitive Data Types, Comments, Keywords, literals, The break Statement, The continue Statement, Operators – Casts and Conversions, Arrays. Introduction to classes and methods, constructors, Passing Objects to Methods, Method Overloading, Static and final, The this Reference, finalize, inner and nested classes. Inheriting class, extends, member access and inheritance, super keyword, Object class. Dynamic method dispatch, method overriding, abstract class, interface, packages, importstatement.

Unit III [10 T + 12 L]

Exceptions, I/O and Threads Input and Output in Java: The File Class, Standard Streams, Keyboard Input, File I/O Using Byte Streams, Character Streams, File I/O Using Character Streams - Buffered Streams, File I/O Using a Buffered Stream, Keyboard Input Using a Buffered Stream, Writing Text Files. Threads: Threads vs. Processes, Creating Threads by Extending Thread, Creating Threads by Implementing Runnable, Advantages of Using Threads, Daemon Threads, Thread States, Thread Problems, Synchronization. Exceptions: Exception Handling, The Exception Hierarchy, throws statement, throw statement, Developing user defined Exception Classes- The finallyBlock.

Unit IV [10 T + 12 L]

Database Connectivity & Applets: Introduction to JDBC : The JDBC Connectivity Model, Database Programming, Connecting to the Database, Creating a SQL Query, Executing SQL Queries, Gettingthe Results, Updating Database Data, Executing SQL Update/Delete, The Statement Interface, The ResultSet Interface, ResultSetMetaData. Introduction to GUI ApplicationsApplets - Types of Applet, Applet Skeleton, Update method, repaint Methods, Html Applet tag and passing parameter to applet.

Unit V [10 T + 11 L]

Events and GUI Applications: Event Handling: The Delegation Event Model, Event Classes, Event Listener Interfaces, Adapter Classes. Java Desktop Applications, Introduction to the AWT, Overview of the AWT, Structure of the AWT, The AWT hierarchy, Containers, Components, Canvas, Frame Working with: Color, Font, FontMetrics, Simple Graphics- Point, line, Rectangle, Polygon, Controls - Button, , Checkbox, Choice, , Label, List, Scroll bar, TextArea, TextField, Layout Manager, MenuBar, Menu, MenuItem , CheckboxMenuItem.

Text Books

1. Herbert Scheldt, Java The Complete Reference, 8th Edition, Tata McGraw-Hill Edition,

ISBN: 9781259002465

References

1. E Balaguruswamy, Programming in Java: A Primer, 4th Edition, Tata McGraw Hill Education Private Limited, ISBN:007014169X.
2. Kathy Sierra, Head First Java, 2nd Edition, Shroff Publishers and Distributors Pvt Ltd, ISBN: 8173666024.
3. David Flanagan, Jim Farley, William Crawford and Kris Magnusson, Java Enterprise in a Nutshell: A Desktop Quick Reference, 3rd Edition, O'Reilly Media, ISBN:0596101422

FIFTH SEMESTER				
Course code	**BCA5B09**			
Name of the course	**Web Programming Using PHP**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
27	**CORE**	**3**	**3**	**75** (Internal15+ External60)

Remarks:-HTMLportioncoveredinComputerFundamentalsandHTMLpaperis trimmed. Emphasis is given for HTML5.

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand basic structure of the Internet	9	U	C	P02,PO7	PSO1
CO2	Analyze a web page and identify its elements and attributes.	9	An	C	PO7	PSO1
CO3	Illustrate relationship between the client side and the server side scripts.	10	U	C	P02,PO7	PSO1
CO4	Describe the general concepts of PHP scripting language for the development of internet websites.	10	R	P	P02	PSO1
CO5	Apply the basic functions of MySQL database program.	10	Ap	P	P02,PO7	PSO1

Prerequisites

- Knowledge in OOP &Programming

CourseOutline
Unit I [9 T + 9L]

Introduction web-documents: Static, Dynamic, Active - Web programming: client side and server side scripting. HTML 5: Document Structure, Elements, Attributes, Types of Elements and Attributes, Basic HTML Data types. Using HTML5 form elements: datalist, keygen, output, progress, meter. File uploading using forms - Frameset and frames. CSS: External CSS, CSS3 Syntax, Selector: Universal, Class, ID. Working with Lists and Tables, CSS ID and Class – Navigation Bar - Image Gallery – ImageOpacity

Unit II [9 T + 9L]

Javascript: Introduction, Client side programming, script tag, comments, variables. Including JavaScript in HTML: head, body, external.Data types. Operators: Arithmetic, Assignment, Relational, Logical. Conditional Statements, Loops, break and continue. Output functions: write, writeln, popup boxes: prompt, alert, confirm. Functions: Built-in Global Functions: alert(), prompt(), confirm(), isNan(), Number(), parseInt(). User Defined Functions, Calling Functions with Timer, Events Familiarization: onLoad, onClick, onBlur, onSubmit, onChange, Document Object Model (Concept). Objects: String, Array,Date.

Unit III [10 T + 10 L]

PHP: Introduction, Server side programming, Role of Web Server software, Including PHP Script in HTML: head, body, external. Comments, Data types, variables and scope, echo and print. Operators: Arithmetic, Assignment,Relational,Logical.ConditionalStatements,Loops,breakandcontinue.UserDefinedFunctions.

Unit IV [10 T + 10 L]

Working with PHP: Passing information between pages, HTTP GET and POST method, Cookie, Session. String functions: strlen, strops, strstr, strcmp, substr, str_replace, string case, Array constructs: array(),list() and foreach().Header().

Unit V [10 T + 10 L]

PHP &PostgreSQL: Features of PostgreSQL, data types, PostgreSQL commands – CREATE DATABASE, CREATE TABLE, DESCRIBE TABLE (\d table_nameor usingusinginformation_schema), SELECT, SELECT INTO, CREATE AS, DELETE, UPDATE, INSERT. PHP - PostgreSQL Integration: Establishing Database Connection (pg_connect(), pg_connection_status(), pg_dbname()), Getting Error String (pg_last_error()), Closing database Connection (pg_close()), Executing SQL statements (pg_query(), pg_execute()), Retrieving Data (pg_fetch_row(), pg_fetch_array(), pg_fetch_all(), pg_fetch_assoc(), pg_fetch_object(), pg_num_rows(), pg_num_fields() pg_affected_rows(), pg_num_rows(), pg_free_result()), Insertion and Deletion of data using PHP, Displaying data from PostrgreSQL database in webpage. Introduction to AJAX - Implementation of AJAX in PHP - Simple example for partial pageupdate.

Textbook

1. HTML 5 Blackbook, Dreamtech Press, ISBN 9879351199076, 2016Edition.
2. W. Gilmore, *Beginning PHP and PostgreSQL 8: From Novice to Professional* , Goels Computer Hut (2007), ISBN:9788181286000

Reference

1. HTML 5 Blackbook, Dreamtech Press, ISBN 987-93-5119-907-6, 2016Edition.
2. Jon Duckett, *Beginning Web Programming with HTML,XHTML, CSS*,Wrox.
3. Jim Converse & Joyce Park, *PHP & MySQL Bible*,Wiley.
4. PosgreSQL Official DocumentationOnline

FIFTH SEMESTER				
Course code	**BCA5B10**			
Name of the course	**PRINCIPLES OF SOFTWARE ENGINEERING**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
28	**core**	**3**	**4**	**75**(Internal 15+ External 60)

	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand and demonstrate basic knowledge in software engineering.	13	U	C	PO1	PSO1
CO2	Understand basic software engineering process models	13	U	C	PO1	PSO1
CO3	Design & develop the software projects.	14	Ap	P	PO6	PSO4
CO4	Identify risks, manage the change to assure quality in software projects	11	U	C	PO1	PSO1
CO5	Apply testing principles on software project and understand the maintenance concepts.	13	Ap	p	PO6	PSO4

Prerequisites

- Knowledge inProgramming

Course Outline

UNIT I [13T]

Software and Software Engineering: Overview of Software Engineering, Practice & Myths; Software Process; Generic process model- Framework Activity, Task Set, Process Patterns, Process Improvement; SDLC , Prescriptive process model- Waterfall Model, Spiral Model, Incremental Process Model, Evolutionary Process Model; Specialized Process Models: Component Based Development, the Formal MethodsModels;

Scrum, DSDM, FDD, LSD, Agile Modeling, Agile Unified Process.

UNIT II [13T]

Requirements Engineering- Establishing the Groundwork- Eliciting Requirements - Developing use cases - Building the requirements model - Negotiating, validating Requirements - Requirements Analysis-Requirements Modeling Strategies.

UNIT III [14T]

MODELING WITH UML: Concepts and Diagrams - Use Case Diagrams - Class Diagrams - Interaction Diagrams - State chart Diagrams – Activity Diagrams - Package Diagrams - Component Diagrams - Deployment Diagrams -Diagram Organization- Diagram Extensions. Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity,
Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements.

UNIT IV [11T]

Structured coding Techniques-Coding Styles - Standards and Guidelines-Documentation Guidelines-Modern Programming Language Features: Type checking-User defined data types-Data Abstraction Exception Handling - Concurrency Mechanism.

UNIT V [13T]

TESTING: Software Quality- Software Quality Dilemma- Achieving Software Quality- Testing: Strategic Approach to software Testing- Strategic Issues - Testing: Strategies for Conventional Software, Object oriented software, Web Apps-Validating Testing- System Testing- Art of Debugging.

MAINTENANCE: Software Maintenance-Software Supportability- Reengineering - Business Process Reengineering- Software Reengineering- Reverse Engineering - Restructuring- Forward Engineering-

Economics ofReengineering

Textbooks

1. Roger S, *"Software Engineering – A Practitioner's Approach",* seventh edition, Pressman, 2010.
2. Pearson Education, *"Software Engineering by Ian Sommerville",* 9th edition,2010.
3. Roff: UML: A Beginner"s GuideTMH

Reference books

1. Hans Van Vliet, "Software Engineering: Principles and Practices",2008.
2. Richard Fairley, "Software Engineering Concepts",2008.
3. RohitKhurana, Software Engineering: Principles and Practices, 2nd Edition, Vikas Publishing House Pvt Ltd.
4. PankajJalote, An Integrated Approach to Software Engineering, 3rd Edition, Narosa PublishingHouse.
5. Alhir, learning UML,SPD/O"Reily

OPEN COURSES

(XXX5DXX)

FIFTH SEMESTER				
Course code	**BCA5D02**			
Name of the course	**Web Designing**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
29	**OPEN COURSE**	**3**	**3**	**75**(Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the current technologies in internet.	12	U	C	P02,PO7	PSO1
CO2	Learn the language of the web: HTML and CSS.	12	U	C	P02	PSO1
CO3	Analyze a web page and identify its elements and attributes.	12	An	P	P02,PO7	PSO1
CO4	To learn the basics of JavaScript programming	12	U	P	P02,PO7	PSO1

Prerequisites

- Basic knowledge in Computer &Internet.

Course Outline

Unit I [12T]

HTML: Introduction - history of html, sgml - structure of html document, web page layout, html tags and types - font type, paragraph formatting, meta data, blockquote, hyperlinks, linking, comments,whitespace,horizontalruler,images,orderedandunorderedlists,frames,tables,forms

Unit II [12T]

DHTML: Introduction, DHTML technologies, elements of DHTML, document object model events - window events, form events, keyboard events, mouse events, style sheets, properties used in style sheets - background properties, positioning properties.

Unit III [12T]

Javascript: Introduction and advantages of javascript, java script syntax, writing javascript in html, javascript operators, arrays and expressions, programming constructs - for .. in loop, while loop - dialog boxes and prompts - alert, prompt, confirm methods - functions - built-in functions and user defined functions, scope of variables, handling events, using event handlers and event methods, form object, properties, methods, form element‟s properties andmethods.

Unit IV [12T]

HTML Editor: Introduction, advantages, creating, opening, saving a web page, building forms, formatting and aligning text and paragraph, adding lists, styles and themes, linking pages, working with images, frames.

Reference:

H. M. Dietel, *Internet and World Wide Web*,Pearson

BCA5D03 - Introduction to Problem Solving and C Programming

Course Number: 29
Contact Hours per Week: Number of
Credits: 3
Number of Contact Hours: 48 Hrs.
Course Evaluation: Internal – 15 Marks + External – 60 Marks

Objective

- To introduce fundamental principles of Problem Solvingaspects.
- To learn the concept ofprogramming.
- To learn Clanguage.

Prerequisites

- Background of the basic science at +2level

CourseOutline

Unit I [12T]

Introduction: The problem solving aspect, Top-down design, Implementation of algorithms, Program verification, efficiency of algorithms. Introduction to C Programming, overview and importance of C, C Program Structure and Simple programs, Creation and Compilation of C Programs under Linux and WindowsPlatforms.

Unit II [12T]

Elements of C Language and Program constructs, Character Set, C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable declaration and assignment of values, Symbolic constant definition. C-Operators, Arithmetic operators, relational operators, and logical operators, assignment operators, increment and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, Type conversion in expressions, operator precedence and associativity, Mathematical Functions, I/O operations.

Unit III[12T]

Decision making, Branching and Looping, Decision making with IF statement, Simple IF statement, If.. .else statement, Nesting of If..else and else...if Ladder, Switch statement, Conditional operator, Go-to statement. Looping: While loop, Do-While, and For Loops, Nesting of loops, jumps in loop, skipping ofloops.

Unit IV [12T]

Array & Strings - One dimensional array, two dimensional array and multidimensional array, strings and string manipulation functions. Structures & Union structure definition , giving values to members,

structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within arrays, structures and functions, Unions,CSC-fields.

References:

1. Balaguruswami, *Programming in ANSIC*
2. Brian W. Kernighan & Dennis M. Ritchie, *The C ProgrammingLanguage*
3. Yashvant P. Kanetkar, *Let UsC*
4. ByranGotfried, *Programming with C*, Schaums OutlineSeries

BCA5D04 - Introduction to Data Analysis using Spread sheet

Course Number: 29

Contact Hours per Week: 3T **Number of Credits:** 3

Number of Contact Hours: 48 Hrs.

Course Evaluation: Internal – 15 Marks + External – 60 Marks

Objective

- To introduce the importance of softwaretools.
- To learn the Analysis using Spreadsheets.

Prerequisites

- Background of the Basic Scince and statistics at +2level

CourseOutline

Unit I [12T]

Introduction to MS Excel and Understanding Basic Working with it: Quick review on MS Excel Options, Ribbon, Sheets , Difference between Excel 2003, 2007, 2010 and 2013- Saving Excel File as PDF, CSV and Older versions - Using Excel Shortcuts - Copy, Cut, Paste, Hide, Unhide, and Link the Data in Rows, Columns and Sheet Using Paste Special Options - Formatting Cells, Rows, Columns and Sheets - Protecting & Unprotecting Cells, Rows, Columns and Sheets with or without Password-PageLayoutandPrinterProperties-InsertingPicturesandotherobjectsinWorksheets

Unit II [12T]

Introduction to Pivot table: Use multiple pivot tables and pivot charts to create dashboard, Connect multiple slicers to the pivot tables.

Unit III [12T]

Pivot table applications in analytics: filter the data shown in the pivot in different ways to achieve subsets of the data, Use calculated fields on top of the pivot table to calculate profitability and find anomalies.

Unit IV [12T]

Formulae and Function: Use formulas to aggregate the data as an alternative to pivot tables for moreflexiblereportinglayouts.Usageofmultipletablesinasinglepivot,introductiontodatatable

Text Books:

1. Winston, *Microsoft Excel 2013: Data Analysis and Business Modeling*, Prentice Hall India Learning Private Limited (2013), ISBN: 9788120349605

References:

1. John Walken bach, Microsoft Excel 2013 Bible, Wiley(23 April 2013), ISBN: 9788126541720.
   Paul McFedries, Excel 2013 Formulas and Function 1st Edition, Pearson India (2014), ISBN: ISBN:9789332524026

BCA5D01-Introduction to Computers and Office Automation

Course Number: 29
Contact Hours per Week: 3 Number of Credits: 3
Number of Contact Hours: 48 Hrs.
Course Evaluation: Internal – 15 Marks + External – 60 Marks

Objective

- To learn Office Automation.

Prerequisites

- Basic knowledge in Computer &Internet.

Course Outline

Unit I [12T]

Introduction to Computers: Types of Computers - DeskTop, Laptop, Notebook and Netbook. Hardware: CPU, Input / Output Devices, Storage Devices – System - Software - Operating Systems, Programming Languages, Application Software - Networks - LAN, WAN - Client - Server.

Unit II [12T]

Documentation Using a Word Processor (OpenOffice Writer / M.S. Word) - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, SpellingandGrammarTool,DocumentDictionary,PageFormatting,Bookmark,AdvanceFeatures
Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

Unit III [12T]

Electronic Spread Sheet (Open Office Calc/MS-Excel) - Introduction to Spread Sheet, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advanced features – Pivot table & Pivot Chart, Linking andConsolidation.

Unit IV [12T}

Presentation using (OpenOffice Impress/MS-Power Point): Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, 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.

References:

1. Michael Miller, *Absolute Beginner's Guide to Computer Basics*, PrenticeHall.
2. Russell A. Stultz, *Learn Microsoft Office*, BPBPublication.
3. H.M.Deitel, P. J. Deitel, et al., *Internet & World Wide Web - How to program*, Prentice Hall.

SIXTH SEMESTER				
Course code	**BCA6B11**			
Name of the course	**Android Programming**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
30	**core**	**3**	**5 (4T + 1L)**	**75(Internal 15+ External 60)**

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Interpret android programming environment.	13T+3L	U	C	PO1	PSO1
CO2	Describe android resources such as string, layout resources.	13T+3L	U	C	PO1	PSO1
CO3	Compare the user interface controls in android.	13T+3L	U	P	PO1	PSO1
CO4	Specify the activities and code behind the working of an android application and requirement of database.	13T+3L	U	C	PO1	PSO1
CO5	Implement the android developing environment And develop a simple android application using database.	12T+4L	C	p	PO7	PSO4

Prerequisites

- Knowledge in OO & JavaProgramming.

CourseOutline
Unit I [13T+3L]

Introducing the android computing platform, History of android, an- droid softwarestack, Developing end user application using Android SDK, Android java packages,Setting up the development environment, Installing android development tools(ADT), Fundamental components, Android virtual devices, Running on realdevice, Structure of android application, Application life cycle.

Unit II [13T+3L]

Understanding android resources - String resources, Layout resources, Resourcereference syntax, Defining own resource IDs - Enumerating key android resources,string arrays, plurals, Colour resources, dimension resources, image resources,Understanding content providers - Android built in providers, exploring databaseson emulator, architecture of content providers, structure of android content URIs,reading data using URIs, using android cursor, working with where clause,inserting updates and deletes, implementing content, Understanding intents basicsof intents, available intents, exploring intent composition, Rules for ResolvingIntents to Their Components, ACTION PICK, GET CONTENT, pending intents

Unit III [13T+3L]

User interfaces development in android - building UI completely in code, UI usingXML, UI in XML with code, Android's common controls - Text controls, buttoncontrols, checkbox control, radio button controls, image view, date and timecontrols, map view control, understanding adapters, adapter views, list view, gridview, spinner control, gallery control, styles and themes, Understanding layoutmanagers - linear layout manager, table layout manager, relative layout manager,frame layout manager, grid layoutmanager.

Unit IV [13T+3L]

Android menus - creating menus, working with menu groups, responding tomenu items, icon menu, sub menu, context menu, dynamic menus, loading menuthrough XML, popup menus, Fragments in Android structure of fragment,fragment life cycle, fragment transaction and back stack, fragment manager, saving fragment state, persistence of fragments, communications with fragments,startActivity() and setTargetFragment(), using dialogs in android, dialogfragments, workingwith toast, Implementing action bar - tabbed navigation action bar activity, implementing base activity classes, tabbed action bar and tabbedlistener, debug text view layout, action bar and menu interaction, list navigationaction bar activity, spinner adapter, list listener, list action bar,

Unit V [12T+4L]

Persisting data - Files, saving state and preferences - saving application data,creating, saving and retrieving shared preferences, preference framework andpreference activity, preference layout in XML, native preference controls,preference fragments, preference activity, persisting the application state, includingstatic files as resources, Working with file system, SQLLite - SQLLitetypes,database manipulation using SQLLite, SQL and database centric data model for Android, Android database classes.

References:

1. SatyaKomatineni& Dave MacLean,*Pro Android 4*,Apress.
2. Retomeier, *Professional Android 4 Application Development*,Wrox.
3. ZigurdMednieks, Laird Dornin, G. Blake Meike, *Programming Android*,O'Reilly

SIXTH SEMESTER				
Course code	**BCA6B12**			
Name of the course	**Operating Systems**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
31	**Core**	**3**	**5 (4T + 1L)**	**75(Internal 15+ External 60)**

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understand the process management policies and scheduling of processes by CPU	12T+4L	U	C	PO1	PSO1
CO2	Describe the important computer system resources and the role of operating system in their management policies and algorithms	13T+3L	U	C	PO1	PSO1
CO3	Identify use and evaluate the storage management policies with respect to different storage management technologies	13T+3L	U	P	PO1	PSO1
CO4	Understand objectives & functions of Operating Systems.	13T+3L	U	C	PO1	PSO1
CO5	Understand Shell Programming concepts	13T+3L	C	p	PO7	PSO4

Prerequisites

- Knowledge in Datastructures.

Course Outline

Unit I [12T + 4P]

Operating System - Objectives and functions - The Evolution of Operating Systems: Serial Processing, Simple batch Systems, Multi Programmed batch Systems, Time Sharing Systems, Parallel Systems, Distributed Systems, Real time systems. Definition of Process, Process States, Process Control Block, Operations on Process, Process Communication, Communication in Client server System, Basic concepts of threads, Concurrency, Principles of Concurrency, Mutual exclusion, Semaphores, Messages, Dead lock: Prevention, Detection,Avoidance.

Unit II [13 T + 3P]

Linux Shell Programming: Introduction – Shells available in Unix: Bourne shell (sh), C shell (csh), TC shell (tcsh), Korn shell (ksh), Bourne Again SHell (bash). Bash: special characters – getting help – man pages – Linux Directory Layout – Command for Navigating the Linux Filesystems: pwd, cd, ls, file, cat, cp, mv, mkdir, rmdir, whereis – Piping and Redirection - Informational Commands: ps, w, id, free – clear, echo, more. File permissions – Setting Permissions – Making a file executable. Creating shell programs: comments, variables, operators (arithmetic, relational, logical) – single and double quotes - read – echo – test - conditional commands, iterative commands – break – continue - evaluating expressions using expr, bc – strings – grep –arrays.

Unit III [13T + 3P]

CPU Scheduling: Scheduling Criteria, Scheduling algorithms: FCFS, SJF, Priority, RR, Multilevel, Feedback Queue - Process synchronization, The Critical Section Problem, Synchronization Hardware, Classical Problems of Synchronization: Reader Writer, Dining Philosopher. File and DatabaseSystem,FileSystem,Functionsoforganization,AllocationandFreeSpaceManagement.

Unit IV [13T + 3P]

Memory Management, Address Binding, Logical Vs Physical Address Space, Dynamic Loading, Dynamic Linking and Shared Libraries, Overlays, Swapping, Contiguous Memory allocation, Paging, Segmentation, Virtual memory, Demand Paging, Page Replacement,Thrashing.

Unit V [13 T + 3 P]

Protection and security: policy and mechanism, authentication, authorization. Mobile OS:Concepts, history, features, architecture, future scope. Case studies: Android, UNIX kernel and Microsoft Windows NT (concepts only).

Text Books

1. Silberschatz, Galvin and Gagne, Operating System Concepts, John Willey & Sons
2. William Stallings, Operating Systems, Internals and Design Principles, PHI
3. Mendel Cooper, Advanced Bash-Scripting Guide, Available at http://www.tldp.org/LDP/abs/abs-guide.pdf

References:

4. Nutt G.J, Operating Systems: A Modern Perspective, Addison Wesley

SIXTH SEMESTER				
Course code	**BCA6B13**			
Name of the course	**Computer Networks**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
32	**CORE**	**3**	**3**	**75**(Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	To learn about basics of Computer Networks.	16	U	C	PO2	PSO1
CO2	To learn various Protocols used in Communication.	16	U	C	PO6	PSO1
CO3	Describe the functions of data link layer and explain the protocols.	16	R	C	PO2	PSO1
CO4	To learn TransportLayer services and itsprotocols	16	U	C	PO2	PSO1
CO5	To have a general idea on Network Administration.	16	U	C	PO6	PSO1

Prerequisites

- Knowledge in datastructure.
- Knowledge in OperatingSystem.

Course Outline:

Unit I [16 T]

Introduction to Computer networks, Topology, categories of networks, Internetwork, Internet, Network Models, Layered model, OSI and TCP/IP models, Physical layer, Switching - Circuit switching, Packet Switching and Message Switching, DTE - DCE Interface, EIA - 232 interface,modems.

Unit II [16T]

Data link layer, Error detection and correction, Types of errors, Single CSC error and Burst error, Vertical redundancy check (VRC), longitudinal redundancy Check (LRC), Cyclic Redundancy Check(CRC), Error correction - Single CSC error correction, Hamming code Data compression -

Huffman code, data link control, Line discipline, Flow control, Error control, Multiple Access, Random Access, ALOHA, pure ALOHA and slotted ALOHA, CSMA/CD and SCMA/CA, Polling, Wired LANs, Ethernet - IEEE standards, Wireless LANs.

Unit III [16T]

Network layer, Networking and Internetworking devices - Repeaters, Bridges, Routers, Gateways, Logical addressing - IPv4 & IPv6 addresses, Network Address Translation(NAT), Internet protocols, internetworking, Datagram, Transition from IPv4 to IPv6, Address Mapping-Error reporting and multicasting - Delivery, Forwarding and Routing algorithms, Distance Vector Routing, Link StateRouting.

Unit IV [16 T]

Transport layer, Process-to-process Delivery: UDP, TCP and SCTP, Congestion control and Quality of Service, Application Layer, Domain Name Systems-Remote Login-Email FTP, WWW, HTTP, Introductory concepts on Network management:SNMP.

Unit V [16T]

Cryptography and Network Security: Introduction – Goals of Security – Attacks - Services and Techniques. Basics of Cryptography: Plain Text - Cipher Text – Encryption – Decryption. Confidentiality: Basics of Symmetric Key Ciphers - Traditional Symmetric Key Ciphers: Substitution, Transposition, Stream & Lock, Modern – Components of Modern Block Cipher – DES - Modern Stream Cipher. Basics of Asymmetric Key Ciphers – RSA Cryptosystem. Integrity: Message – Message Digest – Hash Function. Authentication: MAC. Digital Signature : Analogy withManualSignature–Process–SigningtheDigest–Services–RSADigitalSignatureScheme.

Textbook:

1. Behurouz A Forozan, *Introduction to Data Communications & Networking*,TMH

References:

1. Andrew S. Tanenbaum, Computer Networks,PHI
2. William Stallings, Data and Computer Communications, VIIth Edition, PearsonEducation
3. William Stallings, Cryptography and Network Security, Principles and Practices, Prentice Hall ofIndia.

Steven Graham and Steve Shah, Linux Administration: A Beginners Guide, Third Edition,

BCA6B14 -Programming Laboratory III: Lab Exam of Vth Semester
Java and PHP Programming

Course Number: *33* ***Contact Hours per Week:*** *0* ***Number of Credits:*** *4*

Number of Contact Hours: 0 Hrs.

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective

- To practice Javaprogramming.
- To practice client side and server sidescripting.
- To practice PHPProgramming.
- To practice developing dynamicwebsites.
- To practice how to interact with databases throughPHP.

Prerequisites

- Theoretical knowledge in Javaprogramming.
- Theoretical knowledge of PHPProgramming.

Course Outline

Part A: Java Programming

1. Write a program to find the distance between twopoints.
2. Write a program to find the sum, difference, product, quotient and remainder of two numbers passed as command lineargument.
3. Write java program to display Fibonacci series up to alimit.
4. Write java program to display armstrong numbers within arange.
5. Given the sides of a triangle, write a program to check whether the triangle is equilateral, isosceles or scalene and find itsarea.
6. Read an array of 10 or more numbers and write a program to findthe
   a) Smallest element in the array
   b) Largest element in thearray
   c) Second largest element in thearray
7. Write a program to perform baseconversion
   a) Integer tobinary
   b) Integer to Octal
   c) Integer toHexadecimal
8. Write a program to verify De Morgan‟sLaw
9. Write a program to merge twoarrays.
10. Write a program to find the trace and transpose of amatrix.
11. Write java program to find the sum of the digits and reverse of a given number using class and objects.
12. Write a program to sort a set of n numbers using a class.

13. Createaclass„Account"torepresentabankaccount.Writeaprogramtodepositand withdraw amounts from the account.
14. Using class and objects, Write a java program to find the sum of two complex numbers (Hint: Use object as parameter tofunction).
15. Create a class Time with hh, mm, ss as data members. Write a java program to find the sum of two time intervals (Hint: Use object as parameter tofunction).
16. Write a program to count and display total number of objects created to a class (Hint: static members).
17. Write a java program to find the volume of cube, rectangular box, cylinder using function overloading.
18. Create a class student with methods to read and display the student details. Create a derived class result with methods to read marks of 5 subjects. Write a java program to display the total and grade of students, creating objects of classresult.
19. Create a class Employee with ID, Name Designation and Dept. Create a child class salary with Basic, HRA, DA and Allowance. Write a program to compute the net salary assuming that HRA is 1250, DA, Allowance are 110% and 35% of the Basicsalary.
20. Write a program to demonstrate inheritance hierarchy by using class a base class shape and 'TwoDim'and'ThreeDim'assubclasses.Createclasses„square"and'triangle'derivedfrom TwoDim and 'sphere and 'cube' derived from ThreeDim. A reference variable of shape is used to determine area of variousshapes.
21. Write a program to demonstrate the order in which constructors are invoked in multilevel inheritance.
22. Create an abstract class shape with two data members and an abstract method area. Create two child classes rectangle and triangle. Write a program to display the area of theshapes.
23. Create an interface calculator having methods to perform basic arithmetic operation. Write a program to implement the interface to perform operation on integer and floatvalues.
24. Create a class factorial with a method that accept a number and return its factorial in a package P1. Using the factorial class, write a program to find the factorial of anumber.
25. Write a multi thread java program for displaying odd numbers and even numbers up to a limit (Hint : Implement thread using Runnableinterface).
26. Write a multi thread java program for displaying numbers ascending and descending order (Hint: create thread by inheriting Threadclass).
27. Write a program to handle arithmeticexception.
28. Create a user defined exception „MinBalExp" to be invoked when the read number is lessthan a pre-setvalue.
29. Create a user defined exception „OddValExp" to be invoked when the read number is an odd number.

Write a program to copy a file to another. Pass the file names as command linearguments

30. Write a program to track keyboard events on anapplet.
31. Write an applet to display a rectangle with specified coordinate and colour passed as parameter from the HTMLfile.
32. Create an AWT application to add, remove items in a listbox.
33. Create an AWT application to select gender using radiobuttons.

34. Design a window to accept the qualifications of a user usingcheckboxes.
35. Create an applet for a displaying smilingface.
36. Write a program to display ip address of thesystem.
37. Write a program to implement echo server (A server that echo the messages the client sends).
38. Create a database table employee (id, name, design, dept). Write a program to list the employees usingJDBC.
39. Write a program to insert a new employee record to the abovetable.

Part B:PHPProgramming

1. Design a website of an educational institution using framesets and links. A sample design is as shown below.

Top Frame	
Menu frame	**Details frame**

2. Design a webpage that illustrates the use of the following form controls: (i) input controls: single-line text, password, multi-line text. (ii) buttons: submit andreset.
3. Design a webpage that illustrates the use of the following form controls: (i) input controls: check box, radio button, select box (ii) buttons: submit andreset.
4. Design a webpage that illustrates the use of the following form controls: (i) input controls: datalist, multi-select box, grouped select box (ii) buttons: submit andreset.
5. Design a webpage that illustrates the use of field sets andlegends.
6. Design a web page to demonstrate Border colors using internalCSS.
7. Design a web page to demonstrate Text alignment usingCSS.
8. Design a web page to demonstrate inlineCSS.
9. Design a webpage to invert the behavior of the <h1> to <h6> tags using externalCSS.
10. Design a webpage for a simple image gallery.

JavaScript

11. Write a javascript program to perform find the area and circumference of acircle.
1. Write a javascript program to check whether a given number is perfect, abundant or deficient. Use alert box to display theoutput.
2. Write a javascript program to check whether the given sides can form a triangle. If yes, find the type (isosceles, equilateral and scalene) and area of the triangle. Use prompt dialogue box to accept thesides.
3. Write a javascript program to display the nth prime number. Value of n should be accepted from the user. Validate the value entered by the user: Only positive numbers except 0 are to beaccepted.
4. Write a JavaScript program to find all years in which 1st January is a Sunday between a given range (eg:- between 2010 and 2017).Use

5. Design a webpage to illustrate imagerollover.
6. Design a JavaScript program to illustrate the following events: onLoad, onClick, onBlur,onSubmit,onChange.
7. Design a JavaScript program to display the multiplication table of a no accepted from the user.
8. Design a form that accepts two integers. Provide 4 buttons for Add, Subtract, Multiply, Divide. Add JavaScript program to add, subtract, multiply and divide the given numbers when these buttons are clicked. Use output element to display theresults.
9. Write a JavaScript program to create a table after accepting row and column numbers from the user. Contents of each cell should be corresponding row-column number (e.g. Row-0 Column-0).
10. Write a JavaScript program to store different colors in an array and change the background color of the page using this arrayelements
11. Write a JavaScript program to create clock with a timingevent.
12. Write a JavaScript program for form validation for question numbers 2, 3 and4.
13. Design a webpage to demonstrate the use of **progress** HTMLelement.

PHP

14. Write a PHP program to check whether the given number is Armstrong ornot.
15. Write a PHP program to check whether a given number is perfect, abundant ordeficient.
16. Display the Fibonacci series up to a givennumber.
17. Create a php program to display the bio data of a person by reading the personal details using an HTMLpage.
18. Create a login page usingdatabase.
19. Create a mysql table student with fields roll no, name, mark, grade. Insert records in the table. Write a PHP program to display the mark list of a student by accepting the register no of thestudent.
20. Write a php application to generate the pay slip of an employee by accepting name, basic salaryanddesignation.Thenetsalarywillbecalculatedbasedonthefollowingconditions.

Designation	conveyance allowance	extra allowance
Manager	1000	500
Supervisor	750	200
Clerk	500	100
Peon	250	

HRA – 25 %

Income tax

Gross<=200	0
2500 <gross<=4000	3%
4000<gross<=5000	5%
Gross>5000	8%

Gross= basic + HRA + conveyance + extra Net = gross – income tax

12. Create a table “product” with fieldsitemcode, itemname, unitprice. Write php program to insert 5 records into the table and display it in a table format.
13. Write a php program for delete and update operation on account table. The account table contain fields such as accountno, name andamount.
14. Write an HTML page to display a list of fruits in a list box. Write php program to display the names of the fruits which are selected by theuser.
15. Write php program to store current date/time in a cookie and display the „last visited on„ date time on the web page upon reopening of the samepage.
16. Design a PHP page to implement a login screen using sessions. Login details are to be verified from the server side with values stored in adatabase.
17. Write a php program to create an array and store 10 names in the array. Do the following operations.
    a. Display the contents using for eachstatement.
    b. Display the array in a sortedorder.
    c. Display the array without the duplicateelements
    d. Remove the last element anddisplay
    e. Display the array in reverseorder
    f. Search an element in the givenarray.
18. Design a PHP page to illustrate the use of **keygen**HTMLelement.
19. Design a PHP page to illustrate the use of **meter** HTML element – accept five cities and the temperature of those cities and display the resultgraphically.

20. Design a PHP page to illustrate the use of file upload – uploading files of a type with a specified size to thewebserver.

Include any 20 Java Programming Lab questions and 20 PHP Programming Lab questions in the record book.

Android versions eclipse, studio etc. may be used for doing the lab works

Note: All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation note book (roughrecord).

BCA6B15 -Programming Laboratory IV: Lab Exam of Android and Linux Shell Programming

Course Number: 34 Contact Hours per Week: 0 Number of Credits:4

Number of Contact Hours: 0 Hrs.

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective

- To practice Androidprogramming.
- To practice user interfaceapplications.
- To develop mobileapplication.
- To practice shellprogramming

Prerequisites:

- Theoretical knowledge in Androidprogramming.
- Theoretical knowledge of ShellProgramming.

Course Outline:

Part A: Android Programming

1. Programs to understand basic arithmeticoperations
2. Programs to understand basic logicoperations
3. Programs to understand loops and controlstatements
4. Programs to understand GUI inandroid
5. Android application for adding twonumbers
6. Develop simple user interface to displaymessage
7. Create two menu items-opening a file-saving afile
8. Inserting values into Spinner control using Text view andButton.
9. Implementation of backgroundimage
10. Starting another activity from your own activity usingintent
11. Create a new activity that services ACTION-PICK for contact data which display each of the contact in the contact database and lets the user to select one before closing and returning the selected contacts URL to the callingactivities
12. Create Android application to linkify a text view to display web and E-mail address as hyperlinks.When clicked they will open the browser and E-mail address respectively
13. Implementation of arrayadapter
14. Create an alert dialogs used to display a message and offer two button options to continue. Clicking either button will close the dialog after executing the attached clicklistener
15. Get data from Text view control and insert into database using SQLite. Another activity shows inserted

data in a List Viewcontrol

16. Load menu item by parsing XMLdata.
17. Program to implement simplecalculator
18. Program to Get IP Address
19. Program to Home and Lock Screen Widget (TemperatureWidget)
20. Create a new contact usingintent
21. A Button control shows Date picker and Text view control displays selecteddate.
22. Insert data into Spinner and delete selected item usingSQLite.
23. Program to create simple loginscreen.
24. Create an Android application to display the map of your locality. Use ACTION_VIEW intent by passing latitude and longitude asparameters.
25. Create an Android application to convert a voice into text (using Google Speech to Text service)
26. Create an Android application to populate a list view by getting names & numbers from a SQLite databasetable.
27. Display the saved contacts available in the android phone in a listview using content providers
28. Create an image grid. Images should be placed under the resourcessection.
29. Create an android app with three tabs. First tab should contain two Edit text and that should accept age and name. In the second tab you need another 3 edit texts that accept education address and phone number. After these information is proved, when the third tab is open it should display all the provided informationneatly.
30. Create a custom toast with an Image and aTextView.
31. Apply a Custom List style to a ListView. ListView should have at least 10Items.
32. Determine the acceleration of your android device along all three axes using accelerometer? (i.e.x,y,z).
33. Capture an Image from the primary camera of an android device and save that picture into the internalstorage.
34. Create an app to list files under a given folder name in anEditText
35. Fetch data from an arbitrary URL given in an EditText and display it in aTextView
36. Create an SQLite database named student. Accept student details from the MainActivity and save it in the table called student. Display the calculated result in the second activity when a button on the MainActivity isclicked.
37. Create an android app to switch the wifi on and off also illustrate the use of permission in android?
38. Create a spinner that takes data from the String.xmlfile.
39. Create a simple android application that opens the default messaging application available in the android device?
40. Create an app to display message in the notification bar?

art B: ShellProgramming

1. Write a script to find area of acircle
2. Write a shell script to find given number is even orodd

3. Write a shell script to make a menu driven calculator usingcase
4. Write a shell script to find the greatest of threenumbers
5. Write a shell script to compute mean and standard deviation of threenumbers
6. Write a shell script to find sum of all digits from a givennumber
7. Write a shell script to find reverse of anumber
8. Write a shell script to find prime numbers upto a givennumber
9. Write a shell script to find n fibonaccinumbers
10. Write a shell script to check whether a given number is Amstrong ornot
11. Write a shell script to reverse a string and check whether a given string is palindrom ornot
12. Write a shell script to count no of line,words and characters of a inputfile
13. Code for Write a shell program to convert all the contents into the uppercase in a particular file in Unix
14. Write a script to find the value of one number raised to the power of another. Two numbers are entered through thekeyboard.
15. Write a shell script find the factorial of a givennumber
16. An employee Basic salary is input through keyboard where da is 40% of basic salary and hra is 20% of basic salary. Write a program to calculate grosssalary
17. Write a shell script to find the average of the number entered as command linearguments
18. Code for Shell script which whenever gets executed displays the message â€œGood Morning/Good afternoon /Good Evening â€œdepending on the time it getexecuted"
19. Write a shell script to Display Banner, calander of givenyear
20. Code for a program to display current date and time, number of users , terminal name, login date and time
21. Write a shell script which uses all the file testoperators
22. Write a shell script to copy the contents of file to another. Input file names through command line. The copy should not be allowed if second fileexists.
23. Write a shell script to find number of vowels, consonants, numbers in a givenstring.
24. Code for Shell script to perform operations like display, list, make directory and copy, rename, delete
25. Write a shell script to compare two files and remove one of them if they aresame

Include any 15 Android Programming Lab questions and 15 Shell Programming Lab questions in the record book.

Note: All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. All students should have a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entering the lab. He/She may also note down the i/p and o/p that he gives for program verification in the observation note book (roughrecord).

BCA6B17-Industrial Visit and Project Work

Course Number: *36*

Contact Hours per Week: 4 (0T + 2L in V Sem + 2L in VI Sem)

Number of Credits: *2*

Number of Contact Hours: 64 Hrs.

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective

To provide practical knowledge on software development process

Prerequisites

Basic programming and system development knowledge

CourseOutline

The objective of the B.Sc. Computer Science final project work is to develop a quality software solution by following the software engineering principles and practices. During the development of the project the students should involve in all the stages of the software development life cycle (SDLC). The main objective of this project course is to provide learners a platform to demonstrate their practical and theoretical skills gained during five semesters of study in B.Sc. Computer ScienceProgramme.

During project development students are expected to define a project problem, do requirements analysis, systems design, software development, apply testing strategies and do documentation with an overall emphasis on the development of a robust, efficient and reliable software systems. The project development process has to be consistent and should follow standard. For example database tables designed in the system should match with the E-R Diagram. SRS documents to be created as per IEEE standards.

Students are encouraged to work on a project preferably on a live software project sponsored by industry or any research organization. Topics selected should be complex and large enough to justify as a B.Sc. Computer Science final semester project. The courses studied by the students during the B.Sc. ComputerScience

Programme provide them the comprehensive background knowledge on diverse subject areas in computer science such as computer programming, data structure, DBMS, Computer Organization, Software Engineering,

Computer Networks, etc., which will be helping students in doing project work. Students can also undertake group project to learn how to work in groups. However, the maximum number of students in a group must be limited to 4.

For internal evaluation, the progress of the student shall be systematically assessed through *two or three stages of evaluation at periodic intervals*.

A bonafied project report shall be submitted in hard bound complete in all aspects

Industrial Visit:

Contact Hours per Week: *NIL*
Number of Credits: 1
Number of Contact Hours: NIL
Course Evaluation: External – 10 Marks

Guide Lines:

• Minimum one day visit to National research Institutes, Laboratories, places of scientific Importance or SoftwareCompanies.

OR

• One week Industrial Training / internship at any software firms/ ResearchLabs

• The Industrial visit should be done in fifth or sixthsemester.

• A 10 – 20 page Industrial visit / Training report have to be submitted with certificate from industry / institute, sufficient photos and analysis along with Project for evaluation in the sixth semester.

Electives

BCA6B16A -System Software

Contact Hours per Week: 4T Number of Credits: 3
Number of Contact Hours: 64 Hrs.
Course Evaluation: Internal – 15 Marks + External – 60 Marks

Objective

- To build fundamental knowledge in systemsoftware.
- To learn functions of various systemsoftware.
- To learn specifically learn compilation process of aprogram.

Prerequisites

- Basic knowledge inProgramming.

Course Outline:

Unit I [12T]

System software: General concept, Assemblers, loaders, linkers, macros, compilers, interpreters, operating system, Design of assemblers.

Unit II [13T]

Macros and macro processors, Macro definitions and instructions, Macro calls, Features of Macros, Design of Macro processors.

Unit III [13T]

Loading, linking and relocating Loader schemes- Binders, linking loaders, overlays, dynamic binders- Dynamic loading and dynamic linking – Relocatability of programs.

Unit IV [13T]

Compilers - Phases of a compiler - Lexical, Syntax, Intermediate code generation, Optimization, Code generation, Symbol table and error correcting routines – Passes of a compiler.

Unit V [13T]

Case studies of lexical and syntax analyzers: LEX and YAAC.

References:

1. D.M. Dhamdhere, *Systems Programming and OperatingSystems*
2. John J Donovan, Systemsprogramming
3. Jim Welsh and R M Mckeag, Structured System Programming, PrenticeHall.
4. Principal of Compiler Design, Alfred Aho V and Jeffrey D Ullman,Addison- Wesley Publications.
5. L Lbech, SystemSoftware

SIXTH SEMESTER				
Course code	**BCA6B16B**			
Name of the course	**MACHINE LEARNING**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
35	**Elective**	**3**	**4**	**75** (Internal 15+ External 60)

CourseOutline

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Remember mathematical preliminaries for sets, languages and proof techniques	10	R	C	PO1	PSO1
CO2	Understand model of computation formal languages and automata	10	U	F	PO1	PSO1
CO3	Apply regular grammars and their automata for applications	20	Ap	P	PO7	PSO1
CO4	Apply context free grammars and their automata for real applications	20	Ap	P	PO7	PSO1
CO5	Understand different Turing machine automata	20	U	F	PO1	PSO1

Unit I [12 T]

Basics of Linear Algebra foML : Classes of spaces (vector , metric , normed , inner product), Pythagorean Theorem, Type of matrices, Matrix operations, Eigenvector, Fundamental Theorem of Linear Algebra.

Unit II [13 T]

Foundations of Probability for ML : Probability Theory (Random Variables, Distributions, Mean and Variance, Bayes Rule), Basic Techniques (Naive Bayes, Nearest Neighbor Estimators, K- Means), Density Estimation (Limit Theorems, Parzen Windows, Exponential Families, Estimation, Sampling).

Unit III [13 T]

Introduction to Machine Learning : Applications, Issues in Machine Learning, Designing a Learning system - Supervised Learning - Unsupervised Learning, Vapnik-Chervonenkis Dimension

– Probably Approximately Correct (PAC) Learning- Learning Multiple Classes, Bayesian Decision theory- Classification, Discriminant Functions, Association rules.

Unit IV [13 T]

Dimensionality Reduction : Subset Selection-Principal Component Analysis-Linear Discriminant Analysis, Clustering- K-means Clustering- Expectation maximization Algorithm- Hierarchical Clustering,

Unit V [13 T]

Parametric and Non-Parametric methods for classification and regression : Parametric methods-MaximumLikelihoodEstimation-Baye"sEstimator-ParametricClassification,Regression ,Non-Parametric methods- Kernel Estimator- K-nearest neighbour estimator, Decision Trees-Univariate Trees-Classification trees, Regression trees, Rules extraction from Trees

References

1. EthemAlpaydın, Introduction to Machine Learning, Second edition, MIT Press,2010.
2. Alex Smola and S.V.N. Vishwanathan ,Introduction to Machine Learning, Second Edition, Cambridge UniversityPress
3. Jason Brownlee, Basics of Linear Algebra for Machine Learning, First Edition, Machine Learning Mastery,2018
4. Bishop. C M, Pattern Recognition and Machine Learning. Springer,2006.
5. Duda, R O, Hart P E and Stork D G. Pattern Classification. Wiley-Interscience, 2nd Edition, 2000.
6. Hastie T, Tibshirani R and Friedman J, The Elements of Statistical Learning: Data Mining, Inference and Prediction. Springer, 2nd Edition,2009.
7. Mitchell T, Machine Learning. McGraw Hill,1997.
8. Mohssen Mohammed, Muhammad Badruddin Khan ,EihabBashier Mohammed Bashier, Machine Learning Algorithms and applications, CRC Press, FirstEdition,2017

SIXTH SEMESTER				
Course code	**BCA6B16c**			
Name of the course	**Software testing & Quality Assurance**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
35	**Elective**	**3**	**4**	**75** (Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.	12	U	C	PO1	PSO1
CO2	Implement various test processes for quality improvement	12	U	C	PO1	PSO1
CO3	Design test planning and test process	12	Ap	C	PO1	PSO1
CO4	Apply the software testing techniques in commercial environment	12	U	C	PO1	PSO1
CO5	Use practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques	12	E	P	PO7	PSO4

CourseOutline

UNIT I (12T)

Phases of Software project - Quality Assurance, Quality control - Testing, Verification and Validation - Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing - Structural Testing Challenges in White-BoxTesting.

UNIT II (12T)

Black-Box Testing: What is Black, Box Testing?, Why Black, Box Testing?, When to do Black,

Box Testing?, How to do Black, Box Testing?, Challenges in White Box Testing, Integration Testing: Integration Testing as Type of Testing, Integration Testing as a phase of Testing, Scenario Testing, Defect Bash.

UNIT III (12T)

System and Acceptance Testing: system Testing Overview, Why System testing is done? Functional versus Non, functional Testing, Functional testing, Non, functional Testing, Acceptance Testing, Summary of Testing Phases.

UNIT IV (12T)

Performance Testing: Factors governing Performance Testing, Methodology of Performance Testing, tools for Performance Testing, Process for Performance Testing, Challenges.

Regression Testing: What is Regression Testing? Types of Regression Testing, When to do Regression Testing, How to do Regression Testing, Best Practices in Regression Testing.

UNIT V (12T)

Test Planning, Management, Execution and Reporting: Test Planning, Test Management, Test Process, Test Reporting, Best Practices. Test Metrics and Measurements: Project Metrics, Progress Metrics, Productivity Metrics, Release Metrics

REFERENCE BOOKS

1. Software Testing Principles and Practices, SrinivasanDesikan&Gopalswamy, Ramesh, PearsonEducation.
2. Effective Methods of Software Testing, William E. Perry, Wiley
3. Software Testing, RenuRajani and Pradeep Oak, TMH
4. Software Testing Tools, K. V. K. K. Prasad, Dreamtech Press
5. Introducing Software Testing, LauiseTamres, PearsonEducation

SIXTH SEMESTER				
Course code	**BCA6B16d**			
Name of the course	**Technical Writing**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
35	**Elective**	**3**	**4**	**75** (Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understanding the basics and types of Technical Communication	13	U	C	PO2	PSO2, PSO4
CO2	Understanding the Constituents of Technical Written Communication	13	U	C	PO2	PSO2, PSO4
CO3	Analysing the forms of Technical Communication	12	An	F	PO2	PSO2, PSO4
CO4	Understanding the types of reports	13	U	F	PO2	PSO2, PSO4
CO5	Designing and presenting the content	13	C	P	PO2	PSO2, PSO4

CourseOutline

Unit I [13 T]

Basics of Technical Communication: Technical Communication - features; Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communication; the flow of Communication: Downward, Upward, Lateral or Horizontal (Peer group); Barriers toCommunication

Unit II [13 T]

Constituents of Technical Written Communication: Word formation, Prefix and Suffix; Synonyms and Antonyms; Homophones; One Word Substitution; Technical Terms; Paragraph Development: Techniques and Methods -Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation- various steps.

Unit III [12 T]

Forms of Technical Communication - Business Letters: Sales and Credit letters; Letter of Enquiry; Letter of Quotation, Order, Claim and Adjustment Letters; Memos, Notices, Circulars; Job application and Resumes.

Unit IV [13 T]

Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts;Types; Writing of Proposal; Significance, Technical Paper, Project, Dissertation and Thesis Writing. E- Media: E-mail – E-Newsletter – Blogging – E-Magzines – SocialNetworks.

Unit V [13 T]

Soft Skills: Presentation Strategies - Preparing a Presentation – Body Language – Voice Dynamics – Handling Questions.

Text Books

1. Professional Communication: For GautamBuddh Technical University &Mahamaya Technical University, Pearson EducationIndia.
2. Phillip A. Laplante, Technical Writing: A Practical Guide for Engineers and Scientists (What Every Engineer Should Know), CRCPress.

References

1. Gerald J. Alred ,Charles T. Brusaw, Walter E. Oliu, Handbook of Technical Writing, Tenth Edition.

2. Gary Blake and Robert W. Bly, The Elements of Technical Writing, New York: Macmillan Publishers.
3. Hackos, JoAnn T., Managing Your Documentation Projects. Wiley,1994.

SIXTH SEMESTER				
Course code	**BCA6B16E**			
Name of the course	**Fundamentals of Life Skill Education**			
Course No	**Course Category Core/Compli/ Elective**	**Number of Credits**	**Number of hours of Lectures/week**	**Total marks (Int+Ext)**
35	**Elective**	**3**	**4**	**75** (Internal 15+ External 60)

CO	CO Statement	Hrs	Cognitive Level (CL)	Knowledge Category (KC)	PO	PSO
CO1	Understanding the importance of life skill education	13	U	C	PO2	PSO2
CO2	Understanding the importance and types of communication skills	13	U	C,F	PO2	PSO2
CO3	Analysing the steps in selecting a career	12	An	P	PO3, PO7	PSO2
CO4	Analysing the self	13	An	P	PO3	PSO2
CO5	Learning the management of stress and strain	13	Ap	P	PO3	PSO2

Course Outline

Unit I [13 T]

Introduction to life skill education, definition, components, pillars of learning, need for life skill training, approaches - critical thinking skills/decision making skills, interpersonal/communication skills, criteria for using life skills.

Communication skills, communication, definition , components- sender, message, channel , receiver, feedback, types of communication, effective interpersonal communication, barriers, communication noise, listening, ways to improve interpersonal communication, effective public speaking interview, groupdiscussion

Unit III [13 T]

Career planning, career planning steps, choosing a career, career development, career guidance and career guidance centre, need and importance of career guidance, career guidancecentre and sources, making a career decision, preparing a resume andtips

Unit IV [12 T]

Self management, self esteem, definitions, practice self acceptance, practice self acceptance characteristics of people with high self-esteem, low self esteem, characteristics and causes, self- esteem building, self awareness importance, develop self awareness, self control, developing self control, emotional intelligence or emotional quotient, emotional quotient , two aspects of emotional intelligence, five domains of emotional eq or ei, social intelligence, coping with emotions, emotionalintelligence,

Unit V [13 T]

Stress and strain: concept of stress, meaning and definition of stress, types of stress, major symptoms of stress, manage everyday stress. strain-mental strain, causes of strain, conflict, conflict resolution, understanding conflict in relationships, emotional awareness, managing and resolving conflict, stages of healthy conflict resolution, styles of conflict resolution, styles of dealing with conflict, developing positive thinking, positive and negative self-talk, better self-talk, impacts , assertiveness, behaviour , importance of assertivebehaviour.

Text Books

1. ShaliniVerma, Development of Life Skills and Professional Practice ,Vikas Publishing House; First edition (2014

References:

1. Dr. K. RavikanthRao and Dr. P. Dinakar, Life Skills Education, Neelkamal; First edition (2016)
2. http://www.universityofcalicut.info/SDE/opencourses/Life_skill_education.pdf

MODEL QUESTION PAPERS

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CCSS)

Core Course

BCA1B01: Computer Fundamentals & HTML

Time:2Hr **Maximum: 60Marks**

Section A - Short Answer type Questions

(Answer All , Each Correct Answer Carries A Maximum Of 2 Marks. Ceiling 20 Marks)

1. What ishyperlink?
2. What isSMPS?
3. What isWWW?
4. What is CSS BoxModel?
5. What is problemsolving?
6. What is cachememory?
7. What is CSS standsfor?
8. What is the use of count inflowchart?
9. What is machinelanguage?
10. What are the advantages ofCSS?
11. What isBCD?
12. Define systemsoftware?

SectionB- Short Essaytype Questions

(Answer All, Each Correct Answer Carries A Maximum Of 5 Marks. Ceiling 30 Marks)

13. Describe the structure of HTMLdocument.
14. In how many ways can a CSS be integrated as awebpage?
15. State DeMorgan'sTheorem.
16. Write an algorithm to find a number is prime or not.
17. Explain the ways of integer representation incomputer.
18. Explain K-Map and itssignificance.
19. State and verify Distributive law in Booleanalgebra.

Section C - Essay type Questions

(Answer any one, correct answer carries 10 marks)

20. Draw a block diagram and illustrate the basic organization of a computer system and explain the functions of variousunits.
21. Explain HTML basic tags withexample.

PATTERN OF QUESTION PAPER (BCA CORE)

SEMESTER: I

BCA1B01: COMPUTER FUNDAMENTALS & HTML

Contact Hours per Week :BCA1B01
NumberofCredits 3
Number of Contact Hours: 48Hr
CourseEvaluation : External 60 Marks + Internal 15 Marks
DurationofExam : 2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	**MODULE:I**	**MODULE:II**	**MODULE:III**	**MODULE:IV**	**MODULE:V**	**MODULE:**	**MODULE:**	**MODULE:**
			Hour: 4	Hour:5	Hour:3	Hour:2	Hour:2	Hour:	Hour:	Hour:
			Marks:15	Marks:19	Marks:13	Marks:19	Marks:13	Marks:	Marks:	Marks:
ExpectedMarks >>>>										
A	2	1.				2				
		2.	2							
		3.				2				
		4.					2			
		5.			2					
		6.	2							
		7.					2			
		8.			2					
		9.	2							
		10.					2			
		11.		2						
		12.	2							
B	5	13.				5				
		14.					5			
		15.		5						
		16.			5					
		17.			5					
		18.		5						
		19.			5					
C	10	20.	10			10				
		21.								
Total Marks >>>>			18	12	19	19	11			

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CBCSS)

Complementary Course

BCA1C01: Mathematical Foundations of Computer Applications

Time:2Hr **Maximum: 60Marks**

Section A - Short Answer Type Questions

(Answer All , Each Correct Answer Carries A Maximum Of 2 Marks. Ceiling 20 Marks)

1. State fundamental theorem of calculus part 2
2. Find the integralof$\sqrt{x}$
3. Find the integral of $\frac{1}{s}$
4. Find the integraloftanx
5. Find the integral of$x^{3/2}$
6. Define diagonal matrix. Give anexample.
7. Define upper triangular matrix. Give anexample.
8. Define symmetric matrix with anexample.
9. Define derivative of a function.
10. Find the derivative of $f(x) = x^2$at x =−2
11. Find the derivative of$\frac{s}{\cos s}$
12. Find the derivative oftanxlogx

Section B- Short Essay Type Questions

(Answer All, Each Correct Answer Carries A Maximum Of 5 Marks. Ceiling 30 Marks)

13. Solve3x−4y+5z=−6,x+y−2z=−1,2x+3y+z=5usingGausseliminationmethod.
14. VerifyA(B+C)=AB+ACwhereA=$\begin{bmatrix}1 & -2 & 7\end{bmatrix}$, B = $\begin{bmatrix}0\\4\\8\end{bmatrix}$, C = $\begin{bmatrix}4\\7\\-6\end{bmatrix}$
15. FindtheinverseofA=$\begin{bmatrix}1 & 4 & 9\\5 & -4 & 6\\0 & 2 & 7\end{bmatrix}$
16. Find the integralofx^{2}logx
17. Find theintegralof $\frac{s^2}{\tan(3s^3)}$
18. FindA^2+5A−9IifA=$\begin{bmatrix}4 & 6\end{bmatrix}$

$$2 \quad -3$$

19. Find the derivative of $x^2 \log(2x^3)$

PART D (Essay Questions)

Answer any one [1×10 = 10]

20. Find the eigenvalues and eigenvectors of $A = \begin{bmatrix} 2 & 0 & 0 \\ 1 & 1 & 2 \\ 0 & -1 & 4 \end{bmatrix}$

21. Evaluate integral $\int_1^5 \frac{ds}{90+19s+s^2}$

PATTERN OF QUESTION PAPER(BCA COMPLEMENTARY)

SEMESTER: 1

BCA1C01: MATHEMATICAL FOUNDATIONS OF COMPUTER APPLICATIONS

Contact Hours per Week : 4

NumberofCredits 3

Number of Contact Hours: 64

CourseEvaluation : External 60 Marks + Internal 15 Marks

DurationofExam : 2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE :1	MODULE :2	MODULE :3	MODULE :4	MODULE :5	MODULE:	MODULE:	MODULE:
			Hour:12	Hour:12	Hour:14	Hour:14	Hour:12	Hour:	Hour:	Hour:
			Marks:15	Marks:15	Marks:18	Marks:15	Marks:16	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	22.				2				
		23.				2				
		24.				2				
		25.				2				
		26.				2				
		27.	2							
		28.	2							
		29.	2							
		30.			2					
		31.			2					
		32.			2					
		33.			2					
B	5	34.		5						
		35.	5							
		36.		5						
		37.					5			
		38.					5			
		39.	5							
		40.			5					
C	10	41.		10						
		42.					10			
TotalMarks >>>>			**16**	**20**	**13**	**10**	**20**			

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CBCSS)

Complementary Course

BCA1C02: Discrete Mathematics

Time:2Hrs **Maximum: 60Marks**

Section A - Short Answer Type Questions

(Answer All, Each Correct Answer Carries a Maximum Of 2 Marks. Ceiling 20 Marks)

22. Define connectives. Draw truth tables for AND andOR.
23. Give an example of a relation which is reflexive, transitive but notsymmetric.
24. What is a cycle? Give anexample.
25. Define dual of agraph.
26. What is bipartite graph? Give anexample.
27. Define simple proposition and compoundproposition.
28. What is a complete graph? DrawK_4.
29. Define equivalence relation.
30. Construct the truth table of P ↑Q.
31. What is planar graph? Is K_4planar?
32. Define regular graph using an example.
33. Define quantifiers. Give anexample

Section B- Short Essay Type Questions

(Answer All, Each Correct Answer Carries A Maximum Of 5 Marks. Ceiling 30 Marks)

34.Prove$\overline{(a + b)} = \bar{a} \cdot \bar{b}$.

35. Prove that a tree with n vertices has n-1edges.
36. Define Boolean algebra. Give anexample.
37. Write Kruskal's algorithm for finding minimal spanningtree.
38. Ifx+y= x+zandx·y=x·zthenprovethaty=z.
39. Explain weakly connected and strongly connecteddigraphs.
40. Define adjacency matrix and incidence matrix of a simple undirectedgraph.

Section C - Essay type Questions

(Answer any one, correct answer carries 10 marks)

35. State and prove Euler'stheorem

36. Write Prim's algorithm for finding spanning tree and explain it withexample.

PATTERN OF QUESTION PAPER(BCA COMPLEMENTARY)

SEMESTER: 1
BCA1C02: DISCRETE MATHEMATICS

Contact Hours per Week : 4
NumberofCredits 3
Number of Contact Hours: 64
CourseEvaluation : External 60 Marks + Internal 15 Marks
DurationofExam : 2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE :1	MODULE :2	MODULE :3	MODULE :4	MODULE :5	MODULE:	MODULE:	MODULE:
			Hour:12	Hour:12	Hour:14	Hour:14	Hour:12	Hour:	Hour:	Hour:
			Marks:15	Marks:15	Marks:18	Marks:18	Marks:13	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	43.	2							
		44.	2							
		45.			2					
		46.					2			
		47.			2					
		48.	2							
		49.			2					
		50.	2							
		51.	2							
		52.			2					
		53.			2					
		54.	2							
B	5	55.		5						
		56.				5				
		57.		5						
		58.				5				
		59.		5						
		60.					5			
		61.					5			
C	10	62.			10					
		63.				10				
TotalMarks >>>>			**12**	**15**	**20**	**20**	**12**			

Name…….
Reg.No……..

SECOND SEMESTER BCA DEGREE EXAMINATION APRIL 2020

(CBCSS-UG)

Core Course – COMPUTER SCIENCE: BCA2B02 – PROBLEM SOLVING USING C

Time:2Hours Maximum: 60 Marks

Section A – Short Answer type questions

(Answer all questions. Each correct answer carries a maximum of 2 marks. Ceiling 20 marks)

1. How will you define a symbolic constant?
2. Differentiate between the constants „A‟ and “A”
3. What is an identifier? Giveexamples
4. What is a registervariable?
5. What is the purpose of return ()statement?
6. How will you read a string using scanf()function?
7. What is a pointer? How will you access a variable through itspointer?
8. What is a conditional operator? Explain with example.
9. What is astructure?
10. Differentiate between actual and formal parameters withexample
11. What is meant byRecursion?
12. What do you meant by bitfields?

Section B – Short Essay type questions

(Answer all questions. Each correct answer carries a maximum of 5 marks. Ceiling 30 marks)

13. Write a program to find the length of a string usingpointer
14. What are pointer arrays? How pointer arrays are defined? Illustrate withexample.
15. Describe operator precedence and associativity.
16. What is a function? What are itsadvantages?
17. Explain the jumping statements in C withexamples
18. Which are the file handlingfunctions?
19. Describe the Tokens inC

SECTION C – Essay type questions

(Answer any one question. Correct answer carries l0 marks)

20.Explain the different looping statements in C withexamples

21.Write a program to print prime numbers in a group of n numbers usingfunction

PATTERN OF QUESTION PAPER(BCA COMPLEMENTARY)
SEMESTER:II

BCA2B02 – PROBLEM SOLVING USING C

Contact Hours per Week : 4
NumberofCredits 3
Number of Contact Hours: 64
CourseEvaluation : External 60 Marks + Internal 15 Marks
DurationofExam : 2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	**MODULE :I**	**MODULE: II**	**MODULE:II III**	**MODULE:II V**	**MODULE: V**	**MODULE:**	**MODULE:**	**MODULE:**
			Hour: 3	Hour:2	Hour:3	Hour:4	Hour:4	Hour:	Hour:	Hour:
			Marks:	Marks:	Marks:	Marks:	Marks:	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	64.	2							
		65.	2							
		66.	2							
		67.				2				
		68.	2							
		69.		2						
		70.					2			
		71.		2						
		72.				2				
		73.				2				
		74.					2			
		75.					2			
B	5	76.					5			
		77.					5			
		78.		5						
		79.				5				
		80.			5					
		81.					5			
		82.	5							
C	10	83.			10					
		84.				10				
TotalMarks >>>>			13	9	15	21	21			

SECOND SEMESTER BCA DEGREE EXAMINATION APRIL 2020

(CBCSS-UG)

Complementary Course : BCA2C03 – FINANCIAL AND MANAGEMENT ACOUNTING

Time:2Hours Maximum: 60 Marks

Section A – Short Answer type questions

(Answer all questions. Each correct answer carries a maximum of 2 marks. Ceiling 20 marks)

1.DefineAccounting
2.Distinguish between book keeping andaccounting
3.List out the main objectives ofaccounting.
4.Write the compound journal entry :
On first June2017-

Wages paid : 5000
Commission paid: 2000
Rent paid: 3000
5.What is CVPanalysis?
6.Write about the process ofjournalizing.
7.What isBudget?
8.List out the Accountingconcepts.
9.List out subsidiary books ofaccounting.
10.What is marginalcosting?
11.List out the difference between fixed budget and flexible budget.
12.What is budgetarycontrol?

Section B – Short Essay type questions

(Answer all questions. Each correct answer carries a maximum of 5 marks. Ceiling 30 marks)

13.Find P/V ratio and BEP for the following data
Sales :1,00,000
Variable cost : 60,000
Fixedcost :30,000
14.What is margin of safety? Write itsimportance.
15.What is BEP? Why should it becalculated?
16.Selling price/unit Rs.150; variable cost/unit Rs 90; fixed cost Rs6,00,000.
(a) What will be the selling price per unit if the break even point is8,000.
(b) Compute the sales required to earn a profit of Rs 2,20,000.

17.From the following calculate Material Cost Variance, Material price variance, material usagevariance:-

Material	Standard unit	price	Actual Unit	price
A	1010	1.0	1080	1.2
B	410	1.5	380	1.8
C	350	2.0	380	1.9

18.Record the following transactions in the journal of Vincy

2015 January	1	Vincy commenced business with cash Rs 50,000
"	3	Paid into Bank Rs 30,000
"	5	Purchased from Ram on credit Rs 1,500
"	7	Sold goods on credit to John Rs 750
"	12	Purchased machinery from Voltas Ltd Rs 2500
"	20	Bought goods from Nithin for cash Rs 1200
"	22	Paid cash to Ram Rs 1500
"	31	Paid rent Rs 2500

19.Elaborate the advantages of Marginalcosting.

SECTION C – Essay type questions

(Answer any one question. Correct answer carries l0 marks)

20.Fromthefollowingtrialbalance,prepareTradingandprofitandlossaccountfortheyear ended 31st March 2016

Item	Debit	Credit
Stock	5250	
Sales		11800
Sundry Exp	667	
Commission		211
Insurance	380	
Carriage Inwards	300	
Furniture	6670	
Printing andstationary	481	
Carriage Outwards	200	
Creditors		1780
Capital		27998
Bills Payable		541
Plant andMachinery	15000	

Returns outwards		1380
Cash in Hand	895	
Salaries	750	
Debtors	1905	
Discount	328	
Bills Receivable	2730	
Wages	1589	
Returns Inwards	1659	
Bank Overdraft		4000
Purchases	8679	
Petty Cash in Hand	47	
Bad Debts	180	

21.Withthefollowingdatafora60%activity,prepareaflexiblebudgetforaproductionat 80%activity.

Production at 60% activity –600 units
Materials: 100 perunit

Labour : 40 per unit

Expenses: 10 per u

THIRD SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CCSS)

Common Course

XXXXA11: PYTHON PROGRAMMING

Time:2.5Hr **Maximum: 80 Marks**

Section A - Short Answer Type Questions

(Answer All , each correct answer carries a maximum of 2 marks. Ceiling 25 marks)

1. Define typefunction
2. Name 5 features ofpython
3. How we can create an identifier inpython?
4. Write the python code to createlist
5. What are different conditional statement syntax inpython
6. Write an example for nestedloop
7. What isIDLE?
8. Write four expression code forpython
9. Explain the main function ofpython
10. Explain any four stringoperations
11. Give syntax and code to delete elements fromlist?
12. Name any six tupleoperations
13. Write an example to update dictionaryvalues
14. What aresets.
15. What is dataframe

Section B- Short Essay Type Questions

(Answer all questions, each correct answer carries a maximum of 5 marks. Ceiling 35 marks)

16. With example code explain writing and executing pythonscripts.
17. Explain different data types available inpython
18. What are rangefunctions.
19. Distinguish between break and continue withcode.
20. What are basic listoperations.
21. How we can create and access tuples in python write with exampledata. Explain dictionaryfunctions
22. Write about a recursion method use factorial asexample

Section C - Essay Type Questions

(Answer any two, correct answer carries 10 marks)

1. Explain different type of operators in python and precedence withexample.
2. What are the syntax for looping statements in python language? Explain withcode.
3. Discuss different types of function with syntax andexample
4. Explain the function with different type parameters, their call and returnstatements.

PATTERN OF QUESTION PAPER(BSc CORE)

SEMESTER: III

CODE: PYTHOM PROGRAMMING

Contact Hours per Week
NumberofCredits
Number of ContactHours
CourseEvaluation : External 80 Marks + Internal20Marks DurationofExam : 2.5hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 80										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE:1	MODULE:2	MODULE:3	MODULE:4	MODULE:	MODULE:	MODULE:	MODULE:
			Hour:	Hour:	Hour:	Hour:	Hour:	Hour:	Hour:	Hour:
			Marks:	Marks:	Marks:	Marks:	Marks:	Marks:	Marks:	Marks:
Expected Marks >>>>										
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		13.				2				
		14.				2				
		15.				2				
B	5	16.	5							
		17.	5							
		18.		5						
		19.		5						
		20.				5				
		21.				5				
		22.				5				
		23.			5					
C	10	24.	10							
		25.		10						
		26.			10					
		27.			10					
TotalMarks >>>>										

THIRD SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CBCSS)

XXXXA12– Data Communication and Optical Fibers

Time:2.5Hrs **Maximum: 80Marks**

Section A - Short Answer Type Questions

(Answer all questions. Each correct answer carries a maximum of 2 marks. Ceiling 35 marks)

1. Differentiate analog and digitaltransmission
2. Describe NIC and itsClassification.
3. Explain Lineconfiguration
4. Write note on cable modem.
5. Describe telephonesystem
6. Write note onGSM.
7. Define Radiointerface.
8. Identify the termmultiplexing..
9. Explain packetswitching
10. Specify single modefiber.
11. Write note on Opticalsources.
12. Explain working principle ofLED.
13. Define cutoffwavelength.
14. Illustrate Photodetectors.
15. Differentiate Optical sources anddetectors.

Section B- Short Essay Type Questions

(Answer all questions. Each correct answer carries a maximum of 5 marks. Ceiling 35 marks)

1. Specify digital datatransmission.
2. Differentiate guided media and unguidedmedia.
3. Specify different types ofmultiplexing.
4. Illustrate system architecture ofGSM.
5. Explain advantages and disadvantages of optical fibercommunication?
6. Analyze LASERDiodes.
7. Explain RayTheory.
8. Compare Asynchronous Protocols and synchronousprotocols

Section C - Essay Type Questions

(Answer any two, correct answer carries 10 marks)

1. Explain components of Network indetail.
2. Describe MobileCommunication
    a. GSM
    b. Mobileservices

3. Identify different types ofSwitching.
4. Illustrate the term Integrated services digital networks(ISDN).

PATTERN OF QUESTION PAPER(BCA COMMON)

SEMESTER:III

COMMON COURSE

XXXXA12– Data Communication and Optical Fibers

Contact Hours per Week :4
NumberofCredits :4
Number of Contact Hours:64
CourseEvaluation : External 80 Marks + Internal20Marks DurationofExam : 2.5hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 80										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE:1	MODULE:2	MODULE:3	MODULE:4	MODULE:	MODULE:	MODULE:	MODULE:
			Hour:16	Hour:16	Hour:16	Hour:16	Hour:	Hour:	Hour:	Hour:
			Marks:27	Marks:27	Marks:27	Marks:29	Marks:	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	1.	2							
		2.	2							
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		15.				2				
B	5	16.	5							
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		21.				5				
		22.				5				
		23.			5					
C	10	24.	10							
		25.		10						
		26.			10					
		27.			10					
TotalMarks >>>>			28	28	27	27				

MODEL EXAMINATION PAPER

THIRD SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CBCSS)

CoreCourse

BCA3B04 : DATA STRUCTURES USING C

Time:2Hr **Maximum: 60Marks**

Section A - Short Answer Type Questions

(Answer All, Each Correct Answer Carries a Maximum Of 2 Marks. Ceiling 20 Marks)

1. Define analgorithm.
2. Definestring.
3. Suppose a circular queue of capacity (n – 1) elements is implemented with an array of n elements. Assume that the insertion and deletion operation are carried out using REAR and FRONT as array index variables, respectively. Initially, REAR = FRONT = 0. Write down the conditions to detect queue full and queueempty.
4. Define circular linkedlist.
5. Write short notes on Big-ohnotations.
6. Illustrate binary search tree withexample.
7. What is the time complexity of linearsearch?
8. Define hashtable.
9. What you mean by a level in atree?
10. How many nodes in a full binary tree with nleaves?
11. List out various string operations..
12. How many undirected graphs (not necessarily connected) can be constructed out of a given set V= {V 1, V 2,…V n} of n vertices?

Section B- Short Essay Type Questions

(Answer All , each correct answer carries a maximum of 5 marks. Ceiling 30 marks)

1. What is an Abstract DataType?
2. Evaluate the time complexity of binarysearch
3. What is a sparsematrix?
4. Explain various stackoperation?
5. What are pointerarrays?
6. Explain headerlinked list
7. Compare the complexity of breadth first search and depth firstsearch.

Section C - Essay Type Questions

(Answer any one, correct answer carries 10 marks)

8. What is a stack data structure? Explain the algorithms of array and linked list implementation of stack usingexample.
9. Analyze various tree traversal algorithms with and withoutrecursion

PATTERN OF QUESTION PAPER (BCA CORE)

SEMESTER: III

BCA3B04: DATA STRUCTURE USING C

Contact Hours per Week :3T

NumberofCredits 3

Number of Contact Hours: 48Hrs

CourseEvaluation : External 60 Marks + Internal 15 Marks

DurationofExam :2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	**MODULE:I**	**MODULE:II**	**MODULE:III**	**MODULE:IV**	**MODULE:V**	**MODULE:**	**MODULE:**	**MODULE:**
			Hour: 8	Hour:10	Hour:10	Hour:10	Hour:10	Hour:	Hour:	Hour:
			Marks:13	Marks:17	Marks:17	Marks:17	Marks:15	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	1.	2							
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		12.					2			
B	5	13.	5							
		14.					5			
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		16.			5					
		17.		5						
		18.		5						
		19.					5			
C	10	20.			10					
		21.				10				
TotalMarks >>>>			13	17	17	16	16			

MODEL EXAMINATION PAPER

THIRD SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CBCSS)

Complementary Course

BCA3C05: Computer Oriented Numerical & Statistical Methods

Time:2Hrs **Maximum: 60Marks**

PART A

(Short Answer Questions, each question carries 2 marks)

[Ceiling 20]

1. Define blunders.
2. Define absolute error and percentageerror.
3. Define random experiment. Give anexample.
4. Define significant digits. Find the number of significant digits in122.1020043.
5. Define central difference operator and backwarddifference.
6. Find the solution of $x^2 - 7 = 0$ using regula falsi method in 5 steps.
7. Findthesolutionof$x^4 - 6 = 0$usingNewtonRaphsonmethodin5steps.
8. Find the harmonic mean of15,7,2,1,6.
9. Define sample space. Give anexample.
10. Explain the axiomatic definition ofprobability.
11. Define range using anexample.
12. Derive the relationship between shift operator and forward differenceoperator.

PART B

(Paragraph Questions, each question carries 5 marks)

[Ceiling 30]

1. Define discrete and continuous random variables with anexample.
2. Explain scatter diagram technique for finding correlation using suitableexample.
3. Find mode of the followingdata

Class	10-15	15-20	20-25	25-30	30-35	35-40
F	10	7	5	14	9	11

4. Find the geometric mean of the followingdata

Class	1-5	5-9	9-13	13-17	17-21	21-25
F	8	6	10	7	11	9

5.What do you mean by probability distribution? Explain using an example. Also explain distributivefunction.

6.Find y when x=2 form the followingdata

X	1	3	4	6
Y	1	8	16	64

7.Find mean deviation about mean of the followingdata

Class	0-5	5-10	10-15	15-20	20-25
F	6	9	15	13	8

PART C (Essay Questions)

Answeranyone

[1×

10 =10]

13. Find the value of y when x= 11 and x= 21 from the table using Newton interpolation formula.

X	10	12	14	16	18	20	22
Y	0.17364	0.20791	.24192	.27563	.30901	.34202	.37460

14. Find the two regression lines for the followingdata.

X	67	74	68	65	63	79	62
Y	110	135	112	105	107	140	102

PATTERN OF QUESTION PAPER (BCA COMPLEMENTARY)

SEMESTER: 1

BCA3C05: COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS

Contact Hours per Week : 5

NumberofCredits 3

Number ofContactHours 75

CourseEvaluation : External 60 Marks + Internal 15 Marks

DurationofExam :2hr

Module Blue Print For Question Paper Setting / Scrutiny

Maximum Mark: 60

Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE:1	MODULE:2	MODULE:3	MODULE:4	MODULE:5	MODULE:	MODULE:	MODULE:
			Hour:7	Hour:17	Hour:17	Hour:17	Hour:17	Hour:	Hour:	Hour:
			Marks:9	Marks:19	Marks:19	Marks:19	Marks:12	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	1.	2							
		2.	2							
		3.					2			
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B	5	13.					5			
		14.				5				
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		16.			5					
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		18.		5						
		19.			5					
C	10	20.		10						
		21.				10				
TotalMarks >>>>			**10**	**19**	**19**	**19**	**12**			

MODEL EXAMINATION PAPER

FIFTH SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019
(UG-CBCSS)
OpenCourse
BCS5D02: INTRODUCTION TO WEB DESIGNING

Time:2Hr **Maximum: 60Marks**

Section A - Short Answer Type Questions

(Answer All, Each Correct Answer Carries a Maximum Of 2 Marks. Ceiling 20 Marks)

1. Explain variable declaration inHTML.
2. How to insert an image into HTMLDocument?
3. What ismetadata?
4. Write notes on ordered and unorderedlist.
5. How do you insert hyperlink in an HTMLDocument?
6. What isDHTML?
7. Explain window events inDHTML.
8. List out the keywords inDHTML.
9. Explain the positioningproperties.
10. Write notes on stylesheet.
11. Discuss advantage of HTMLEditor.
12. How to add list in HTMLpage.

Section B- Short Essay Type Questions

(Answer All , each correct answer carries a maximum of 5 marks. Ceiling 30 marks)

1. Explain structure of HTML Document and web pagelayout.
2. Discuss frames and forms inHTML.
3. Describe Document ObjectModel.
4. Briefly describe events inDHTML.
5. Explain formatting aligning text andparagraph.
6. Discuss programming concepts inJavaScript.
7. Explain operators inJavaScript.

Section C - Essay Type Questions

(Answer any one, correct answer carries 10 marks)

1. Write note on built-in function and user defined function inJavaScript,
    a. Write a program to show alertmessage.
2. What is HTMLEditor?
    a. Creation of HTMLEditor.
    b. Opening and saving a webpage.
    c. Building forms in HTMLEditor.
    d. Linking with web page HTMLEditor.

PATTERN OF QUESTION PAPER (BCA Open Course)
SEMESTER: V
BCS5D02: INTRODUCTION TO WEB DESIGNING

Contact Hours per Week :3T

NumberofCredits 3

Number of Contact Hours: 48 Hrs

CourseEvaluation : External 60 Marks + Internal 15 Marks

DurationofExam :2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE:1	MODULE:2	MODULE:3	MODULE:	MODULE:	MODULE:	MODULE:	MODULE:
			Hour:12 T	Hour:12 T	Hour:12T	Hour:12T	Hour:	Hour:	Hour:	Hour:
			Marks:20	Marks:20	Marks:20	Marks:19	Marks:	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	1.	2							
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C	10	20.				10				
		21.			10					
TotalMarks >>>>			20	20	20	19				

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, OCTOBER 2018

(UG-CBCSS)

CoreCourse

BCA5B11 - Computer Organization & Architecture

Time:2Hrs **Maximum: 60Marks**

Section A - Short Answer Type Questions

(Answer all questions. Each correct answer carries a maximum of 2 marks. Ceiling 20 marks)

1. List different logic gates?
2. Definecounters?
3. List the four stage of an instructioncycle.
4. What is fulladder?
5. Discuss about addresssequencing?
6. Define set associativecache?
7. What isinterrupt?
8. Discuss about sequential logiccircuits.
9. Illustrate various memory referenceinstructions?
10. What is virtual memory? Give its merits anddemerits.
11. Draw and explain memoryhierarchy.
12. Compare SR flip flop and JK flipflop?

Section B- Short Essay Type Questions

(Answer all questions. Each correct answer carries a maximum of 5 marks. Ceiling 30 marks)

1. Differentiate between combinational and sequential circuit with the help of adiagram.
2. Write a short note on a) Hardwired control b) Micro programmedcontrol.
3. Outline the properties of universalgates.
4. Differentiate between strobe control and handshaking.
5. Illustrate accumulator logic with neatdiagram?
6. Write the Instruction format and explain Instruction cycle withflowchart?
7. Analyze the memory hierarchy in terms of speed, size and cost

and explain the need of memoryhierarchy.

Section C - Essay Type Questions

(Answer any one, correct answer carries 10 marks)

13. What is Flip-Flops? Discuss various types of flip flops along with diagrams and truth tables.
14. Explain processor organization with neatdiagram

PATTERN OF QUESTION PAPER (BCA CORE)
SEMESTER: V
BCA3B04: COMPUTER ORGANIZATION AND ARCHITECTURE

Contact Hours per Week :4T

NumberofCredits 3
Number of Contact Hours: :64Hrs
CourseEvaluation : External 60 Marks + Internal 15 Marks
DurationofExam :2hr

Module Blue Print For Question Paper Setting / Scrutiny

Maximum Mark: 60

Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	**MODULE:I**	**MODULE:II**	**MODULE:III**	**MODULE:IV**	**MODULE:V**	**MODULE:**	**MODULE:**	**MODULE:**
			Hour: 12	Hour:13	Hour:13	Hour:13	Hour:13	Hour:	Hour:	Hour:
			Marks:14	Marks:16	Marks:16	Marks:17	Marks:16	Marks:	Marks:	Marks:
Expected Marks >>>>										
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C	10	20.		10						
		21.				10				
TotalMarks >>>>			14	16	16	17	16			

MODEL EXAMINATION PAPER

SIXTH SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CBCSS)

Elective Course

BCA6B16A: SYSTEM SOFTWARE

Time:2Hrs **Maximum: 60Marks**

PART A

(Short Answer Questions, each question carries 2 marks)

[Ceiling 20]

1. Define loader.
2. What do you meant by macrocall?
3. Define macro processors.
4. How does a programmer decide to use macro calls or procedurecalls?
5. Write a program to swap two variables bymacro.
6. What you mean byoverlays?
7. Definebinders.
8. What is acompiler?
9. List the phases ofcompilers.
10. Explain error correctingroutines.
11. What do you mean by passes ofcompilers?
12. DefineYACC.

PART B

(Paragraph Questions, each question carries 5 marks)

13. What is acompiler?
14. What isassembler?
15. What is interpreter? Explain withexamples?
16. What do you mean by re-locatability ofprograms?
17. Explain Intermediate codegeneration.
18. What is symbol table? By whom is the symbol tablecreated?
19. Compare Lex and Yaccgenerators.
20. Differentiate between lexical and syntaxanalysis.
21. How does Lex and Yacc worktogether

PART C (Essay Questions)

Answeranyone **[1×10 =10]**

22. Differentiate between dynamic loading and dynamiclinking.
23. Explain macro and macroprocessors

PATTERN OF QUESTION PAPER (BCA ELECTIVE)
SEMESTER: V
BCA6B16A -SYSTEM SOFTWARE

Contact Hours per Week :4T
NumberofCredits 3
Number of Contact
Hours: :64Hrs
CourseEvaluation : External 60
Marks + Internal 15 Marks DurationofExam :2hr

Module Blue Print For Question Paper Setting / Scrutiny

Maximum Mark: 60

Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	**MODULE:I**	**MODULE:II**	**MODULE:III**	**MODULE:IV**	**MODULE:V**	**MODULE:**	**MODULE:**	**MODULE:**
			Hour: 12	Hour:13	Hour:13	Hour:13	Hour:13	Hour:	Hour:	Hour:
			Marks:17	Marks:18	Marks:19	Marks:18	Marks:17	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	1.	2							
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B	5	13.	5							
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C	10	22.			10					
		23.		10						
TotalMarks >>>>			17	18	19	18	17			

MODEL EXAMINATION PAPER

SIXTH SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CBCSS)

Elective Course

BCA6B16C: Software Testing & Quality Assurance

Time:2Hrs **Maximum: 60Marks**

Section A - Short Answer Type Questions

(Answer All, Each Correct Answer Carries a Maximum Of 2 Marks. Ceiling 20 Marks)

1. Define Positive and Negativetesting
2. What do you meant bystub
3. Define Integration testing
4. Define deskchecking
5. Differentiate between alpha and beta testing
6. What is formalinspection?
7. List the methodologies for regression testing
8. What are the tools for performancetesting
9. What is regressiontesting
10. Explain verification and validation
11. Define processmodel
12. What is a test caseexplain

Section B- Short Essay Type Questions

(Answer All , each correct answer carries a maximum of 5 marks. Ceiling 30 marks)

1. What is black box testing? How to doit?
2. What is acceptance testing? What are the criteria foracceptance
3. What are the factors governing performancetesting
4. What are the best practices in regressiontesting
5. What is scenariotesting?
6. What is Deploymenttesting?
7. Write note on ProjectMetrics

Section C - Essay Type Questions

(Answer any one, correct answer carries 10 marks)

1. Illustrate test defectmatrics
2. Explain any two life cyclemodels

PATTERN OF QUESTION PAPER(BCA COMPLEMENTARY)
SEMESTER: 1
BCA6B16C: SOFTWARE TESTING AND QUALITY ASSURANCE

Contact Hours per Week : 4
NumberofCredits 3
Number of Contact Hours: 64
CourseEvaluation : External 60
Marks + Internal 15 Marks DurationofExam :2hr

Module Blue Print For Question Paper Setting / Scrutiny

Maximum Mark: 60

Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE:1	MODULE:2	MODULE:3	MODULE:4	MODULE:5	MODULE:	MODULE:	MODULE:
			Hour:12	Hour:12	Hour:12	Hour:12	Hour:12	Hour:	Hour:	Hour:
			Marks:16	Marks:16	Marks:16	Marks:16	Marks:15	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	1.		2						
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		12.	2							
B	5	13.		5						
		14.			5					
		15.				5				
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		18.			5					
		19.					5			
C	10	20.					10			
		21.	10							
TotalMarks >>>>			**20**	**16**	**12**	**16**	**15**			

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019

(UG-CCSS)

Common Course

XXXXA11: PYTHON PROGRAMMING

Time:2.5Hr **Maximum: 80 Marks**

Section A - Short Answer Type Questions

(Answer All , each correct answer carries a maximum of 2 marks. Ceiling 25 marks)

1. Define type function
2. Name 5 features ofpython
3. How we can create an identifier inpython?
4. Write the python code to createlist
5. What are different conditional statement syntax inpython
6. Write an example for nestedloop
7. What isIDLE?
8. Write four expression code forpython
9. Explain the main function ofpython
10. Explain any four stringoperations
11. Give syntax and code to delete elements fromlist?
12. Name any six tupleoperations
13. Write an example to update dictionaryvalues
14. What aresets.
15. What is dataframe

Section B- Short Essay Type Questions

(Answer all , each correct answer carries a maximum of 5 marks. Ceiling 35 marks)

1. With example code explain writing and executing pythonscripts.
2. Explain different data types available inpython
3. What are rangefunctions?
4. Distinguish between break and continue withcode.
5. What are basic listoperations?
6. How we can create and access tuples in python write with exampledata.
7. Explain dictionaryfunctions.
8. Write about a recursion method use factorial asexample

Section C - Essay Type Questions

(Answer any two, correct answer carries 10 marks)

1. Explain different type of operators in python and precedence withexample.
2. What are the syntax for looping statements in python language? Explain withcode.
3. Discuss different types of function with syntax andexample
4. Explain the function with different type parameters, their call and returnstatements.

PATTERN OF QUESTION PAPER(BCA COMMON)

SEMESTER:

XXXXA11: PYTHON PROGRAMMING

Contact Hours per Week :4

Number of Contact Hours:64

Number of Credits :4

Course Evaluation : External 80 Marks + Internal 20 Marks DurationofExam : 2.5hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 80										
Question Paper			Syllabus							
Sections or Parts	Mark	Question Numbers	MODULE:1	MODULE:2	MODULE:3	MODULE:4	MODULE:	MODULE:	MODULE:	MODULE:
			Hour:16	Hour:16	Hour:16	Hour:16	Hour:	Hour:	Hour:	Hour:
			Marks:27	Marks:27	Marks:27	Marks:29	Marks:	Marks:	Marks:	Marks:
Expected Marks >>>>										
A	2	28.	2							
		29.	2							
		30.	2							
		31.	2							
		32.		2						
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		39.				2				
		40.				2				
		41.				2				
		42.				2				
B	5	43.	5							
		44.	5							
		45.		5						
		46.		5						
		47.				5				
		48.				5				
		49.				5				
		50.			5					
C	10	51.	10							
		52.		10						
		53.			10					
		54.			10					
TotalMarks >>>>			28	28	27	27				