

**ST. THOMAS' COLLEGE (AUTONOMOUS)**  
**THRISSUR, KERALA – 680001**

**Affiliated to University of Calicut**  
**Nationally recredited with 'A' Grade**



**CURRICULUM AND SYLLABUS**  
**FOR**  
**UNDERGRADUATE PROGRAMME IN**  
**COMPUTER SCIENCE & APPLICATIONS (BCA)**

**UNDER CHOICE BASED CREDIT AND SEMESTER SYSTEM**  
**(w.e.f. 2020 Admission onwards)**

# ST. THOMAS COLLEGE (AUTONOMOUS), THRISSUR

## OUTCOME BASED EDUCATION

### UG: Program Outcomes

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

<b>PO1:</b>	<b>Critical Thinking:</b> 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.
<b>PO2:</b>	<b>Effective Communication:</b> 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 and technology.
<b>PO3:</b>	<b>Effective Citizenship:</b> Ability to demonstrate empathetic social concern and equity-centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
<b>PO4:</b>	<b>Environment and Sustainability:</b> Ability to understand the issues of environmental contexts and sustainable development.
<b>PO5:</b>	<b>Ethical Living:</b> Ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
<b>PO6:</b>	<b>Social Interaction:</b> Ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.
<b>PO7:</b>	<b>Problem Solving and Analytical Skills:</b> Ability to think rationally, analyze situations and solve problems adequately.

## COMPUTER SCIENCE & APPLICATIONS (BCA)

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

### B.C.A PROGRAMME OBJECTIVE

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 Programme include

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 Computer Science/Applications.
3. To develop skills in software development so as to enable the BCA graduates to take up self-employment in Indian and global software market.
4. To train and equip the students to meet the requirements of the Software industry in the country and outside.

## 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 all examinations.

**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 (Code E).

**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 the above.

**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 admitted candidates shall subsequently undergo the prescribed courses of study in a college affiliated to the University for six semesters within a period of not less than three years; clear all the examinations prescribed and fulfill all such conditions as prescribed by the University from time to time.

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 for

the 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 College shall ensure that the calendar is strictly followed.

## **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 external evaluation.

## **INTERNAL EVALUATION**

The internal assessment shall be based on a predetermined transparent system involving written 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 research aptitude.

## **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:** Short answer type carries 2 marks each - 12 questions (**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 and 6.

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 30 Marks**)
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 30 Marks**)
3. **Section C:** Lab viva voce (**Total 10 Marks**)
4. **Section D:** Lab Record (**Total 10 Marks**)

*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 to 4.

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 15 Marks**)
3. Findings and recommendations (**Total 20 Marks**)
4. Project cum Programme Viva Voce (**Total 20 Marks**)

### 5. Report of Industrial visit (Total 10 Marks)

**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 credits through 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                      SGPA Calculation**

<b>Semester I Course Code</b>	<b>Course Name</b>	<b>Grade Obtained</b>	<b>Grade point (G)</b>	<b>Credit (C)</b>	<b>Credit point (CXG)</b>
xxxxxxx	Xxxxxxxx	A	8	4	32
xxxxxxx	Xxxxxxxxxx x	C	5	3	15
xxxxxxx	Xxxxxxxxxx x	A+	9	4	36
xxxxxxx	Xxxxxxxxxx x	B+	7	3	21
xxxxxxx	Xxxxxxxxxx	P	4	3	12
xxxxxxx	Xxxxxxxxxx	C	5	4	20

**SGPA =                      Sum of the Credit points of all courses in a semester**

**Total Credits in that semester**

**SGPA =                      (32+15+336+21+12+20)/21=1 3 6 / 2 1**

**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.

**Example: 2**

<b>Semester II Course Code</b>	<b>Course Name</b>	<b>Grade Obtained</b>	<b>Grade point (G)</b>	<b>Credit (C)</b>	<b>Credit point (CXG)</b>
xxxxxxx	Xxxxxxxx	A	8	4	32
xxxxxxx	Xxxxxxxxxx x	C	5	3	15
xxxxxxx	Xxxxxxxxxx x	A+	9	4	36
xxxxxxx	Xxxxxxxxxx x	B+	7	3	21
xxxxxx*	Xxxxxxxxxx	F	0	3	0
xxxxxxx	Xxxxxxxxxx	C	5	4	20

\*Failed course



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 the failed Course in the subsequent appearance.

### **CGPA Calculation**

#### **Example**

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

$$\text{CGPA} = 136 + 145 + 161 + 148 + 131 + 141 / 120 = 862/120$$

$$\text{CGPA} = 7.183$$

$$\text{Total percentage of marks} = (\text{CGPA}/10) * 100$$

$$\text{Total \% of marks} = (7.183/10) * 100 = 71.83$$

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

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 Grade Card.

## **BACHELOR OF COMPUTER APPLICATIONS PROGRAMME** **STRUCTURE**

<b>LEGEND</b>	
<b>Item</b>	<b>Description</b>
C	Credits
E	External Component
I	Internal Component
L	Lecture Hours
P	Practical Hours
T	Total

<b>Semester I</b>									
<b>No</b>	<b>Course Code</b>	<b>Course Name</b>	<b>C</b>	<b>Marks</b>			<b>Hrs/wk</b>		
				<b>I</b>	<b>E</b>	<b>T</b>	<b>L</b>	<b>P</b>	<b>T</b>
01	A01	Common English	3	15	60	75	5	0	5
02	A02	Common English	3	15	60	75	4	0	4
03	A07	Languages other than English	4	20	80	100	4	0	4
04	BCA1B01	Computer Fundamentals & HTML	3	15	60	75	2	2	4
05	BCA1C01	Mathematical Foundation for Computer Applications	3	15	60	75	4	0	4
06	BCA1C02	Discrete Mathematics	3	15	60	75	4	0	4
<b>Total</b>			<b>19</b>			<b>475</b>	<b>23</b>	<b>2</b>	<b>25</b>

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
<b>Total</b>			<b>23</b>			<b>600</b>	<b>17</b>	<b>8</b>	<b>25</b>

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

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

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 +2 level

### Course Outline

#### 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), ASCII Code, Unicode, Gray Code, Excess-3 Code. Boolean Algebra: Boolean Operations, 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, Quadratic Equation.

### **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 and video.

### **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, BPB Publications
- 2 Ram. B, Computer fundamentals, New Age International Pvt. Ltd Publishers
- 3 Rajaraman V and Radhakrishnan, An introduction to Digital computer Design, PHI,
- 4 HTML 5 Blackbook, Dream Tech Press,2016 Edition

### **Reference Books**

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



<b>FIRST SEMESTER</b>				
<b>Course code</b>	<b>BCA1C01</b>			
<b>Name of the course</b>	<b>MATHEMATICAL FOUNDATION OF COMPUTER APPLICATIONS</b>			
<b>Course No</b>	<b>Course Category (Core / Compli/ Elective)</b>	<b>Number of Credits</b>	<b>Number of hours of Lectures/week</b>	<b>Total marks (Int + Ext)</b>
<b>05</b>	<b>COMPLEMENTARY</b>	<b>3</b>	<b>4</b>	<b>75</b> (Internal 15+ External 60)

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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 mathematical knowledge

### Course Outline

#### 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 (problem based)

### **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, Elsevier Direct
- 2 Skills in Mathematics: Algebra, S.K.Goyal
- 3 Higher Engineering Mathematics, B S Grewal, Khanna Publisher
- 4 Higher Engineering Mathematics, Ramana, Tata McGraw Hill
- 5 Engineering Mathematics, P Kandasamy, S. Chand Group

<b>FIRST SEMESTER</b>				
<b>Course code</b>	<b>BCA1C02</b>			
<b>Name of the course</b>	<b>DISCRETE MATHEMATICS</b>			
<b>Course No</b>	<b>Course Category (Core / Compli/ Elective)</b>	<b>Number of Credits</b>	<b>Number of hours of Lectures/week</b>	<b>Total marks (Int + Ext)</b>
<b>06</b>	<b>COMPLEMENTORY</b>	<b>3</b>	<b>4</b>	<b>75</b> (Internal 15+ External 60)

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
CO1	Understand the concepts of set theory and mathematical logic.	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 mathematical knowledge

### Course Outline

#### 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, equivalence relation.

#### 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, Paths and Circuits, Euler's Formula, Eulerian graph, Hamiltonian graph, 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, McGraw Hill

### References:

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

<b>SECOND SEMESTER</b>				
<b>Course code</b>	<b>BCA2B02</b>			
<b>Name of the course</b>	<b>PROBLEM SOLVING USING C</b>			
<b>Course No</b>	<b>Course Category Core/Compli/ Elective</b>	<b>Number of Credits</b>	<b>Number of hours of Lectures/week</b>	<b>Total marks (Int+Ext)</b>
<b>10</b>	<b>CORE</b>	<b>3</b>	<b>4</b>	<b>75</b> (Internal 15+ External 60)

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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 user defined functions, structures and unions.	16	C	P	PO1,PO7	PSO1
CO5	Analyze the concept of pointers and file handling.	16	An	P	PO7	PSO1

### Prerequisites

- Knowledge of basic computer operations

### Course Outline

#### 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, 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 - 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 manipulation functions.

The Concept of modularization and User defined functions - Definition - Multifunction Program, proto-types, 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, bit fields.

### **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 us C
3. ByranGotfried, Schaums Outline series Programming with C
4. Ashok N. Kamthane, Programming in C, Pearson, 2nd Edition

## BCA2B03 - Programming Laboratory I: Lab Exam of 1<sup>st</sup> & 2<sup>nd</sup> Semester - HTML and Programming in C

SECOND SEMESTER				
Course code	BCA2B03			
Name of the course	Programming Laboratory I: Lab Exam of 1 <sup>st</sup> & 2 <sup>nd</sup> 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 (Internal 20+ External 80)

### Objective

- To make the students learn web designing
- To make the students learn programming environments.
- To practice procedural programming concepts.
- To make the students equipped to solve mathematical or scientific problems using C

### Prerequisites

- Knowledge in operating computer.
- Knowledge in Computer fundamentals.

### Course Outline:

#### Part A: HTML lab work

#### 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 or underline.
- 2) (a) Create a webpage with HTML describing your department. Use paragraph and list tags.  
(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 webpage to
  - a) Create links on the words e.g. “Wi-Fi” and “LAN” to link them to Wikipedia pages.
  - b) Insert an image and create a link such that clicking on image takes user to other page.
  - c) Change the background color of the page. At the bottom create a link to take user to the top of the page.
- 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 pin code.  
*(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 corresponding album.
- 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 List tag.  
*(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 Hyper Links
  - i. File Link
  - ii. Single Page Link
- 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 duration etc.  
*(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 HTML page.
- 11) Use <span> and <div> tags to provide a layout to the above HTML page instead of a table layout.
- 12) HTML pages with Tables
  - i. Use Tables to layout HTML pages
  - ii. Use <span> and <div> tags to provide a layout to the above page instead of table layout
  - iii. Use Frames to divide the page contents into different parts



iv. Embed Audio and Video into your HTML webpage

- 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 Pin code.

*(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 Navigation Frame

- 15) Create an HTML page to show the use of Floating Frame

- 16) Create an HTML page to show the use of Inline Frame

- 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 should display the UG Programmes and the right frame display the details of selected programme like fees, syllabus etc.

*(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 formatted form.

*(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 input controls

i. Checkbox,

ii. Radio button,

- 20) Design a website to show the use of the following input controls

i. Select box,

ii. Hidden controls

- 21) Design CSS style sheet to define settings for heading, body, table and links.

*(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 Style Sheets

## **Part B: C Programming**

Write programs to do the following:

1. Find the sum of digits and reverse of a number.
2. Find the distance between two points.
3. Find the factorial of a number.
4. Find the N<sup>th</sup> Fibonacci number using recursion.
5. Print the reverse of a string using recursion.
6. Solve the problem of Towers of Hanoi using recursion.
7. Find Sin(x) and Cos(x) in the range 0° to 180° (interval 30°) using functions.
8. Create a pyramid using „\*“.
9. Display the multiplication tables up to the number N.
10. Find the number of words in a sentence.
11. Perform matrix addition, subtraction, multiplication, inverse, and transpose using pointers and functions.
12. Replace a part of the string with another string.
13. Find the power of a number using structure and union.
14. Find the average of prime numbers in a group of N numbers using function.
15. Find the sum of the series  $S = 1 + (\frac{1}{2})^2 + (\frac{1}{3})^3 + \dots$  to 0.0001% accuracy.
16. Display the rightmost digit in a floating point number.
17. Create a pattern with the number N.  
e.g. N = 39174      Pattern:      3 9 1 7 4  
   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 four currencies)
20. Find the currency denomination of a given amount.
21. Prepare sales bill using array of structures.
22. Addition and subtraction of complex numbers using structure.
23. Find the amstrong numbers within a given range.
24. Check for palindrome string/number.
25. Check for leap year.
26. Find the number of special characters in a given string.
27. Store and read data from a text file.
28. Write odd and even numbers into separate files.
29. Swapping of two numbers using call-by-reference method.
30. Copy the contents of one file into another one using command line parameters.
31. Base conversion of numbers.
32. Calculate the percentage of marks obtained for N students appeared for examination in M subjects using array of structures.
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 as possible.

35. Merge two numeric arrays in sorted order.
36. Fill upper triangle with 1, lower triangle with -1 and diagonal elements with 0.
37. Count the occurrence of different words in a sentence.
38. Convert an input amount into words.
39. Convert a time in 24 hour clock to a time in 12 hour clock using structure.
40. Change the date/time format using structure.

**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 (rough record).*

<b>SECOND SEMESTER</b>				
<b>Course code</b>	<b>BCA2C03</b>			
<b>Name of the course</b>	<b>Financial and Management Accounting</b>			
<b>Course No</b>	<b>Course Category Core/Compli/ Elective</b>	<b>Number of Credits</b>	<b>Number of hours of Lectures/week</b>	<b>Total marks (Int+Ext)</b>
<b>12</b>	<b>COMPLEMENTORY</b>	<b>3</b>	<b>4</b>	<b>75</b> (Internal 15+ External 60)

### Objective

- To get a general introduction on accounting and its general applications.
- To get an understanding on various tools for financial statement analysis.
- 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 decision making.

### Prerequisites

- Basic accounting knowledge.

### Course Outline

#### 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, Vikas Publishing
3. Cost and Management Accounting, A.Vinod, Calicut University Central Co-Operative Stores

<b>SECOND SEMESTER</b>				
<b>Course code</b>	<b>BCA2C04</b>			
<b>Name of the course</b>	<b>OPERATIONS RESEARCH</b>			
<b>Course No</b>	<b>Course Category (Core / Compli/ Elective)</b>	<b>Number of Credits</b>	<b>Number of hours of Lectures/week</b>	<b>Total marks (Int + Ext)</b>
<b>13</b>	<b>COMPLEMENTARY</b>	<b>3</b>	<b>4</b>	<b>75</b> (Internal 15+ External 60)

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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 of linear 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 Mathematical knowledge

### Course Outline

#### 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 simplex method.

## **UNIT III (12T)**

Transportation model - North West corner rule, Least cost method, and Vogel's approximation method - loops in transportation table - Degeneracy in transportation table - Transshipment problem.

## **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, Kanti Swarup, Gupta P.K Man Mohan, Sultan Chand & Sons

### **References:**

1. Operation Research: An Introduction, Tahah. A, McMillan 1982
2. Operations Research, Prof. K. Venogopal, Calicut University Central Co-Operative Stores

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(Internl 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 C language.

**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 Using Python
2. Richard L. Halterman, Learning To Program With Python
3. Martin C. Brown, Python: The Complete Reference.

<b>THIRD SEMESTER</b>				
<b>Course code</b>	<b>A12</b>			
<b>Name of the course</b>	<b>DATA COMMUNICATION AND OPTICAL FIBRES</b>			
<b>Course No</b>	<b>Course Category Core/Compli/ Elective</b>	<b>Number of Credits</b>	<b>Number of hours of Lectures/week</b>	<b>Total marks (Int+Ext)</b>
<b>15</b>	<b>COMPLIMENTARY</b>	<b>4</b>	<b>4</b>	<b>100</b> (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

## Course Outline

### 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, Distortion Noise.

## **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 to ISDN.

## **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, Pearson Education.
2. William L. Schweber : Data Communication, McGraw Hill.
3. Electronic Communication Systems - Kennedy and Davis, TMH
4. Optical Fiber Communications– – John M. Senior, Pearson Education. 3rd Impression,2007.
5. Fiber optic communication – Joseph C Palais: 4th Edition, Pearson Education.

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

### Course Outline

#### UNIT – I [8 T + 5 P]

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, New Delhi.
2. YedidyanLangsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, “Data Structures Using C”, Pearson Education., New Delhi.
3. Horowitz and Sahani, “Fundamentals of data Structures”, Galgotia Publication Pvt. Ltd., NewDelhi.

### **Reference books**

1. Applications”, McGraw- Hill International Student Edition, New York.

2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Addison- Wesley, (An Imprint of Pearson Education), Mexico City.
3. A.K.Sharma, Data Structures Using C, Pearson, Second edition, 2011
4. Nair A.S., Makhalekshmi, Data Structures in C, PHI, Third edition 2011
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 (Internal 15+ External 60)

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

### Course Outline

#### 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 complement 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 Age International
- 3 Introduction to Mathematical Statistics, Hogg R V Craig A T, Macmillan
- 4 Mathematical Statistics, Freund J E, Waple R E, Prentice Hall of India.
- 5 Probability and Statistics for Engineers, Miller I Freund J E, Prentice Hall of India.



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 machine automata	20	U	F	PO1	PSO1

### Prerequisites

Basic knowledge in discrete structures and graph theory.

### Course Outline

#### UNIT I (10T)

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

#### UNIT II (10T)

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

### **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 NFA, 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 regular grammars

### **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 normal form

### **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 and transducer.

### **Textbooks**

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

### **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- Peter Linz

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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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 of Computer.

## Course Outline

### 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 ,Data transfer,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, Prentice Hall
2. Doughles V Hall, Microprocessors and Interfacing: Programming and Hardware, Tata McGraw Hill

### **Reference Books:**

1. Microprocessor and Microcomputer - Based system Design - M. Rafiquzzman - CRC press
2. A.P Mathur, Introduction to Microprocessors, Tata McGraw-Hill Education
3. The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro, Pentium II, III, IV and Core 2 with 64 bit Extensions, Barry B. Brey, Prentice Hall Pearson
4. Microprocessors PC Hardware and Interfacing –N.Mathivanan – PHI

<b>FOURTH SEMESTER</b>				
<b>Course code</b>	<b>A14</b>			
<b>Name of the course</b>	<b>Sensors and Transducers</b>			
<b>Course No</b>	<b>Course Category Core/Compli/ Elective</b>	<b>Number of Credits</b>	<b>Number of hours of Lectures/week</b>	<b>Total marks (Int+Ext)</b>
<b>20</b>	<b>COMPLIMENTORY</b>	<b>4</b>	<b>4</b>	<b>100</b> (Internal 20+ External 80)

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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

## Course Outline

### 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 level gauges

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, tachogenerators 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, 2nd Edition.
2. E. A. Doebelin, Measurement Systems: Application and Design McGraw Hill, New York
3. A.K. Sawhney,- A course in Electrical & Electronic Measurement and Instrumentation, Dhanpat Rai and Company Private Limited.
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)

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 design 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

### Prerequisites

- Basic knowledge of computers, data structures and programming

### Course Outline

#### 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 Relational Mapping.

### **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 Normal Form.

### **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, IN operator

Select 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 phase locking.

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, 6<sup>th</sup> Edition
2. W. Gilmore, Beginning PHP and PostgreSQL 8: From Novice to Professional, Goels



Computer Hut (2007), ISBN: 9788181286000

3. PostgreSQL Official Documentation Online

**Reference books:**

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

## **BCA4B06- Programming Laboratory II: Lab Exam of 3<sup>rd</sup> and 4<sup>th</sup> 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 using C
- To learn how to implement various data structures.
- To provide opportunity to students to use data structures to solve real life problems.

### **Prerequisites**

- Knowledge in operating computer.
- Theoretical knowledge in Data structures.
- Knowledge in Database

### **Course Outline**

#### **Part A: Data structure – Lab Questions**

1. Sort a given list of strings
2. Reverse a string using pointers.
3. Implement Pattern matching algorithm.
4. Search an element in the 2-dimensional array
5. Append 2 arrays
6. Merge two sorted array into one sorted array.
7. Search an element in the array using iterative binary search.
8. Search an element in the array using recursive binary search.
9. Implement sparse matrix
10. Implement polynomial using arrays
11. Implement singly linked list of integers.
12. Delete a given element from a singly linked list
13. Sort a singly linked list.
14. Delete an element from a singly linked list
15. Implement a doubly linked list of integers
16. Implement a circular linked list.
17. Implement polynomial using linked list

18. Addition of 2 polynomials
19. Implement Stack using array
20. Implement Stack using linked list
21. Infix expression into its postfix expression
22. Implement Queue using array
23. Implement Queue using linked list
24. Implement a binary search tree of characters.
25. Traverse a binary search tree non recursively in preorder
26. Traverse a binary search tree non recursively in inorder
27. Traverse a binary search tree non recursively in postorder
28. Traverse a binary search tree recursively in preorder
29. Traverse a binary search tree recursively inorder
30. Traverse a binary search tree recursively postorder.
31. Delete an element from a binary search tree.
32. Search an element in a binary search tree
33. Implement linear sort
34. Implement bubble sort
35. Implement exchange sort
36. Implement selection sort.
37. Implement insertion sort.
38. Implement quick sort.
39. Implement merge sort.
40. Implement heap sort

## 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 functions for
  - A. Display the total number of employees.
  - B. Display the age of the oldest employee of each department.
  - C. Display departments and the average salaries
  - D. Display the lowest salary in employee table
  - E. Display the highest salary in sales department;
2. A trading company wants to keep the data of their Order Processing Application using the following relations.

### Customer\_Master

Customer_Number	-	Primary Key
Customer_Name	-	Not NULL
Address	-	
Pincode	-	

### Order\_Master

Order_Number	-	Primary Key
Order_date	-	Not NULL
Customer_Number	-	Refers Customer_master table
Order_amount	-	Not NULL

### Order\_Detail

Line_Number	-	Primary Key
Order_Number	-	Primary Key
Item_No	-	Not NULL, Refers ITEM table
Quantity	-	Not NULL

### ITEM

Item_No	-	Primary Key
UnitPrice	-	Not NULL

### SHIPMENT

Order_Number	-	Primary Key
Warehouse_No	-	Primary Key, Refers Warehouse table
Ship_Date	-	Not NULL with Integrity Check

### WAREHOUSE

Warehouse_No	-	Primary Key
City	-	Not NULL

- A. Create the above tables by properly specifying the primary keys and foreign keys.
  - B. Enter at least five tuples for each relation.
  - 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 that customer.
  - D. List the Order\_Number for orders that were shipped from *all* the warehouses that the company has in a specific city.
  - 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 particular item.
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 using PostgreSQL/MySQL

Create the following tables with the specified constraints:

**Department:**

Department Number	-	Primary Key
Department Name	-	Not NULL unique
Manager ID	-	Refers to EmployeeID of employee table.
Manager		
Date of Joining	-	Not NULL.

**Employee:**

First Name	-	Not NULL
Middle Initials		
Last Name	-	Not NULL
Employee ID	-	Primary Key
Date of Birth	-	Not NULL
Address		
Gender	-	M or F
Salary	-	Range of 5000 to 25000
Date of Joining		
Department Number	-	Refers to Department Number of Department table.

**Department location:**

Department Number	-	Refers to Department number of department table.
Department Location	-	Not NULL.
Department number & Department location are combined Primary Key		

**Project:**

Project Name	-	Not NULL.
Project Number	-	Primary Key.
Project Location	-	Not NULL.
Department number	-	Refers to department number of Department table.

**Works-on:**

Employee ID	-	Not NULL refers to Employee ID of Employee table.
Project Number	-	Not NULL refers to Project number of Project table.
Hours	-	Not NULL.
Employee ID & Project Number are combined primary key.		

**Dependent:**

Employee ID	-	Refer to employee table Employee ID field
Dependent Name	-	Gender - M or F

Date of Birth - Not NULL

Relationship - Not NULL

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

- A. List the department wise details of all the employees.
  - B. Find out all those departments that are located in more than one location.
  - C. Find the list of projects.
  - D. Find out the list of employees working on a project.
  - E. List the dependents of the employee whose employee id is 001
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 following tables:
- Book Records
  - Book details
  - Member details and
  - Book issue details

**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 be issued

**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 (use insert).
  - B. Insert appropriate description associated with each table and the column (use comment).
  - C. Display the structure of the tables.
  - D. Display the comments that you have inserted.
  - E. Using SELECT statement, write the queries for performing the following function:
    - a. Get the list of all books (No need to find number of copies).
    - b. Get the list of all members.
    - c. Get the Accession number of the books which are available in the library.
    - d. On return of a book by a member calculate the fine on that book.
    - e. List of books issued on 01-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 any time.
    - h. Get the list of members who have not returned the book.
    - i. Display member ID and the list of books that have been issued to him/her from time to time.
    - j. Find the number of copies of each book (A book accession number would be different but ISBN number would be the same).
    - k. Find the number of copies available of a book of given ISBN number.
    - 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 are entitled.
5. This session is based on Lab 2 where you have created a library management system. In this session you have different query specification.

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 than zero.
- 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 book name.
- 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 of cost.
- D. Get the list of books issued to each member.
- E. Write query to know the maximum and average price of the books.
- F. 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 books issued.

- G. Get the list of member codes of those members who have more than two books issued.
- H. Find the details of the books presently issued to a member.
- I. Create the history of issue of a book having a typical accession number.
- J. To set the width of the book name to 35.
6. 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.
1. Create the following table named customer

Column name	Type	size
Customer ID	Character	10
Name	Character	25
Area	Character	3
Phone	Numeric	7

Insert the appropriate data into table and do the following.

- Update Phone numbers of all customers to have a prefix as your city STD Code
  - Print the entire customer table
  - List the names of those customers who have e as second letter in their names.
  - Find out the Customer belonging to area „abc“
  - Delete record where area is NULL.
  - Display all records in increasing order of name.
  - Create a table temp from customer having customer-id, name, and area fields only
  - Display area and number of records within each area (use GROUP by clause)
  - Display all those records from customer table where name starts with a or area is „abc“.
  - Display all records of those where name starts with „a“ and phone exchange is 55.
7. 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.
- List the records of members who have not been issued any book using EXISTS operator.
  - List the members who have got issued at least one book (use IN / ANY operator).
  - List the books which have maximum Price using ALL operator.
  - Display Book Name, Member Name, and Issue date of Book. Create a view of this query of the currently issued books.



8. 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 following query:
  - 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 the regions.
9. Create the following tables:

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.
10. 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 the procedure
11. Implement student information system
12. SQL scripts to display various reports like Result of an Examination, Salary Report, Sales Report, Sales reports grouped on Sales person or item, etc
13. 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.
14. Create a table product with the fields(Product\_code primary key, Product\_Name, Category, Quantity, Price). Insert some records Write the queries to perform the following.
  - a. Display the records in the descending order of Product\_Name
  - b. Display Product\_Code, Product\_Name with price between 20 and 50
  - c. Display the Product\_Name and price of categories bath soap, paste, washing powder
  - 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 'washing powder'

15. Create a STUDENT table with following fields:

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

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 or equal to 90% of the total mark, „B“ if mark obtained is greater than or equal to 75% of the total mark, „C“ if mark obtained is greater than or equal to 60% of the total mark, „D“ if mark obtained is greater than or equal to 50% of the total mark, and „F“ if mark obtained is 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 and grade.

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 the following

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 90 and 100	-	A
avg_score 75 -89	-	B

avg_score 60- 74	-	C
avg_score 50 -59	-	D
avg_score below 50	-	Failed

17. Prepare a salary report of the employees showing the details such as:

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.

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

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 over 100000.

If annual salary is greater than 150000 but less than or equal to 250000, then the tax is 20% of the excess over 150000.

If annual salary is greater than 250000, then the tax is 30% of the excess over 250000.

18. Generate a Hospital information system that can generate the following reports:

- Patients who belongs to in-patient category
- Patients who belongs to out-patient category

For this purpose, create a table named HOSPITAL having the following structure.

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.

19. Using the Hospital table created in Lab 16, generate a Hospital information system that can generate the following reports:
  - Patients undergone blood test.
  - Patients who have taken X-Rays
20. Design a Hotel Bill calculating system that generates hotel bills for the customers.
21. Design an Electricity Bill Report generating system that generates electricity bills details of customers for a month.
22. Generate a Library Information System that generates report of the books available in the library.
23. Programs involving multiple tables.
24. 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 the function.
25. 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 (rough record).*

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 of Commerce.

### Course Outline

#### 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 Indian Corporates.

## **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, Digital Signature.

### **References:**

1. E-Commerce - An Indian Perspective, P.T.Joseph, S.J., PHI
2. E-Commerce Strategy, Technologies and Applications, David Whiteley, Tata Mc-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)

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 using GIMP	18	An	P	PO1	PSO1

### Prerequisites

- Basic knowledge in Mathematics and Computer fundamentals

### Course Outline

#### 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, Homogeneous Coordinates, 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, New Delhi.
2. Zhigang Xiang and Roy Plasock, Computer Graphics, Schaum's Outlines.
3. Deborah Morley, Understanding Computer Today And Tomorrow, Introductory Edition.



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 of each element in memory hierarchy.	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

### Course Outline

#### 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 and demultiplexers.

#### 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/down counter, decade counter, mod N counter, Ring counter, Johnson's counter

### **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, program control

### **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 and II)
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)

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

### Prerequisites

- Knowledge in OOP & Programming

## Course Outline

### 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, import statement.

### 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 finally Block.

### 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, Getting the Results, Updating Database Data, Executing SQL Update/Delete, The Statement Interface, The ResultSet Interface, ResultSetMetaData. Introduction to GUI Applications

Applets - 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 , Checkbox MenuItem.

### **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 (Internal 15+ External 60)

**Remarks:- HTML portion covered in Computer Fundamentals and HTML paper is trimmed. Emphasis is given for HTML 5.**

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

## Course Outline

### 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 – Image Opacity.

## 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. Conditional Statements, Loops, break and continue. User Defined Functions.

## Unit IV [10 T + 10 L]

Working with PHP: Passing information between pages, HTTP GET and POST method, Cookie, Session. String functions: strlen, strpos, 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\_name or using usinginformation\_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 PostgreSQL database in webpage. Introduction to AJAX - Implementation of AJAX in PHP - Simple example for partial page update.

## Textbook

1. HTML 5 Blackbook, Dreamtech Press, ISBN 9879351199076, 2016 Edition.
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, 2016 Edition.
2. Jon Duckett, *Beginning Web Programming with HTML,XHTML, CSS*, Wrox.
3. Jim Converse & Joyce Park, *PHP & MySQL Bible*, Wiley.
4. PostgreSQL Official Documentation Online

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 in Programming

### 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 Methods Models;

Agile development-Agile Process; Extreme Programming; Other Agile Process Models – ASD,



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 of Reengineering

### **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 Guide TMH

### **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 Publishing House.
5. Alhir, learning UML, SPD/O'Reily

**Open Courses (XXX5DXX)**

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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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, white space, horizontal ruler, images, ordered and unordered lists, 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 and methods.

### **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:**

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

## **BCA5D03 - Introduction to Problem Solving and C Programming**

**Course Number: 29**

**Contact Hours per Week: 3 T**

**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 Solving aspects.
- To learn the concept of programming.
- To learn C language.

### **Prerequisites**

- Background of the basic science at +2 level

### **Course Outline**

#### **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 Windows Platforms.

#### **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 of loops.

#### **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 ANSI C*
2. Brian W. Kernighan & Dennis M. Ritchie, *The C Programming Language*
3. Yashvant P. Kanetkar, *Let Us C*
4. ByranGotfried, *Programming with C*, Schaums Outline Series

## **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 software tools.
- To learn the Analysis using Spread sheets.

### **Prerequisites**

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

### **Course Outline**

#### **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 - Page Layout and Printer Properties - Inserting Pictures and other objects in Worksheets

#### **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 more flexible reporting layouts. Usage of multiple tables in a single pivot, introduction to data table.

**Text Books:**

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

**References:**

1. John Walkenbach, *Microsoft Excel 2013 Bible*, Wiley (23 April 2013), ISBN: 9788126541720.
2. 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 T**

**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, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advance Features - 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 and Consolidation.

#### **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*, Prentice Hall.
2. Russell A. Stultz, *Learn Microsoft Office*, BPB Publication.
3. H.M.Deitel, P. J. Deitel, et al., *Internet & World Wide Web - How to program*, Prentice Hall.

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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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 & Java Programming.

## Course Outline

### Unit I [13T+3L]

Introducing the android computing platform, History of android, android software stack, 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 real device, Structure of android application, Application life cycle.

### Unit II [13T+3L]

Understanding android resources - String resources, Layout resources, Resource reference 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 databases on 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 basics of intents, available intents, exploring intent composition, Rules for Resolving Intents to Their Components, ACTION PICK, GET CONTENT, pending intents

### Unit III [13T+3L]

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

### Unit IV [13T+3L]

Android menus - creating menus, working with menu groups, responding to menu items, icon menu, sub menu, context menu, dynamic menus, loading menu through 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, dialog fragments, working with toast, Implementing action bar - tabbed navigation action bar activity, implementing base activity classes, tabbed action bar and tabbed listener, debug text view layout, action bar and menu interaction, list navigation action bar activity, spinner adapter, list listener, list action bar,

standard navigationaction bar activity, action bar and search view, action bar and fragments.

### 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, SQLite - SQLite types,database manipulation using SQLite, SQL and database centric data model for Android, Android database classes.

### References:

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

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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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 Data structures.

## 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 Database System, File System, Functions of organization, Allocation and Free Space Management.

### 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



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

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 Transport Layer services and its protocols	16	U	C	PO2	PSO1
CO5	To have a general idea on Network Administration.	16	U	C	PO6	PSO1

### Prerequisites

- Knowledge in data structure.
- Knowledge in Operating System.

### 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 State Routing.

## 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 with Manual Signature – Process – Signing the Digest – Services – RSA Digital Signature Scheme.

### Textbook:

1. Behrouz 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, Pearson Education
3. William Stallings, *Cryptography and Network Security, Principles and Practices*, Prentice Hall of India.
4. Steven Graham and Steve Shah, *Linux Administration: A Beginners Guide*, Third Edition,

## **BCA6B14 -Programming Laboratory III: Lab Exam of V<sup>th</sup> 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 Java programming.
- To practice client side and server side scripting.
- To practice PHP Programming.
- To practice developing dynamic websites.
- To practice how to interact with databases through PHP.

### **Prerequisites**

- Theoretical knowledge in Java programming.
- Theoretical knowledge of PHP Programming.

### **Course Outline**

#### **Part A: Java Programming**

1. Write a program to find the distance between two points.
2. Write a program to find the sum, difference, product, quotient and remainder of two numbers passed as command line argument.
3. Write java program to display Fibonacci series up to a limit.
4. Write java program to display armstrong numbers within a range.
5. Given the sides of a triangle, write a program to check whether the triangle is equilateral, isosceles or scalene and find its area.
6. Read an array of 10 or more numbers and write a program to find the
  - a) Smallest element in the array
  - b) Largest element in the array
  - c) Second largest element in the array
7. Write a program to perform base conversion
  - a) Integer to binary
  - b) Integer to Octal
  - c) Integer to Hexadecimal
8. Write a program to verify De Morgan's Law
9. Write a program to merge two arrays.

10. Write a program to find the trace and transpose of a matrix.
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. Create a class „Account“ to represent a bank account. Write a program to deposit and 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 to function).
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 to function).
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 class result.
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 Basic salary.
20. Write a program to demonstrate inheritance hierarchy by using class a base class shape and 'TwoDim' and 'ThreeDim' as sub classes. Create classes „square“ and 'triangle' derived from TwoDim and 'sphere and 'cube' derived from ThreeDim. A reference variable of shape is used to determine area of various shapes.
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 the shapes.
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 float values.
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 a number.
25. Write a multi thread java program for displaying odd numbers and even numbers up to a limit (Hint : Implement thread using Runnable interface).
26. Write a multi thread java program for displaying numbers ascending and descending order (Hint: create thread by inheriting Thread class).
27. Write a program to handle arithmetic exception.
28. Create a user defined exception „MinBalExp“ to be invoked when the read number is less than a pre-set value.
29. Create a user defined exception „OddValExp“ to be invoked when the read number is an odd number.
30. Write a program to copy a file to another. Pass the file names as command line arguments.

31. Write a program to track keyboard events on an applet.
32. Write an applet to display a rectangle with specified coordinate and colour passed as parameter from the HTML file.
33. Create an AWT application to add, remove items in a list box.
34. Create an AWT application to select gender using radio buttons.
35. Design a window to accept the qualifications of a user using checkboxes.
36. Create an applet for a displaying smiling face.
37. Write a program to display ip address of the system.
38. Write a program to implement echo server (A server that echo the messages the client sends).
39. Create a database table employee (id, name, design, dept). Write a program to list the employees using JDBC.
40. Write a program to insert a new employee record to the above table.

## Part B: PHP Programming

### HTML and CSS

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 and reset.
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 and reset.
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 and reset.
5. Design a webpage that illustrates the use of field sets and legends.
6. Design a web page to demonstrate Border colors using internal CSS.
7. Design a web page to demonstrate Text alignment using CSS.
8. Design a web page to demonstrate inline CSS.
9. Design a webpage to invert the behavior of the <h1> to <h6> tags using external CSS.
10. Design a webpage for a simple image gallery.

### JavaScript

11. Write a javascript program to perform find the area and circumference of a circle.

12. Write a javascript program to check whether a given number is perfect, abundant or deficient. Use alert box to display the output.
13. 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 the sides.
14. 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 be accepted.
15. 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
16. Design a webpage to illustrate image rollover.
17. Design a JavaScript program to illustrate the following events: onLoad, onClick, onBlur, onSubmit, onChange.
18. Design a JavaScript program to display the multiplication table of a no accepted from the user.
19. 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 the results.
20. 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).
21. Write a JavaScript program to store different colors in an array and change the background color of the page using this array elements
22. Write a JavaScript program to create clock with a timing event.
23. Write a JavaScript program for form validation for question numbers 2, 3 and 4.
24. Design a webpage to demonstrate the use of **progress** HTML element.

## PHP

25. Write a PHP program to check whether the given number is Armstrong or not.
26. Write a PHP program to check whether a given number is perfect, abundant or deficient.
27. Display the Fibonacci series up to a given number.
28. Create a php program to display the bio data of a person by reading the personal details using an HTML page.
29. Create a login page using database.
30. 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 the student.
31. Write a php application to generate the pay slip of an employee by accepting name, basic salary and designation. The net salary will be calculated based on the following conditions.

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

HRA – 25 %

Income tax

Gross $\leq$ 200	0
2500 < gross $\leq$ 4000	3%
4000 < gross $\leq$ 5000	5%
Gross > 5000	8%

Gross = basic + HRA + conveyance + extra

Net = gross – income tax

32. Create a table “product” with fields itemcode, itemname, unitprice. Write php program to insert 5 records into the table and display it in a table format.
33. Write a php program for delete and update operation on account table. The account table contain fields such as accountno, name and amount.
34. 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 the user.
35. 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 same page.
36. 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 a database.
37. 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 each statement.
  - b. Display the array in a sorted order.
  - c. Display the array without the duplicate elements
  - d. Remove the last element and display
  - e. Display the array in reverse order
  - f. Search an element in the given array.
38. Design a PHP page to illustrate the use of **keygen** HTML element.

39. Design a PHP page to illustrate the use of **meter** HTML element – accept five cities and the temperature of those cities and display the result graphically.
40. Design a PHP page to illustrate the use of file upload – uploading files of a type with a specified size to the webserver.

**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 (rough record).*



## **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 Android programming.
- To practice user interface applications.
- To develop mobile application.
- To practice shell programming

### **Prerequisites:**

- Theoretical knowledge in Android programming.
- Theoretical knowledge of Shell Programming.

### **Course Outline:**

#### **Part A: Android Programming**

1. Programs to understand basic arithmetic operations
2. Programs to understand basic logic operations
3. Programs to understand loops and control statements
4. Programs to understand GUI in android
5. Android application for adding two numbers
6. Develop simple user interface to display message
7. Create two menu items-opening a file-saving a file
8. Inserting values into Spinner control using Text view and Button.
9. Implementation of background image
10. Starting another activity from your own activity using intent
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 calling activities
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 array adapter
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 click listener

15. Get data from Text view control and insert into database using SQLite. Another activity shows inserted data in a List View control
16. Load menu item by parsing XML data.
17. Program to implement simple calculator
18. Program to Get IP Address
19. Program to Home and Lock Screen Widget (Temperature Widget)
20. Create a new contact using intent
21. A Button control shows Date picker and Text view control displays selected date.
22. Insert data into Spinner and delete selected item using SQLite.
23. Program to create simple login screen.
24. Create an Android application to display the map of your locality. Use ACTION\_VIEW intent by passing latitude and longitude as parameters.
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 database table.
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 resources section.
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 information neatly.
30. Create a custom toast with an Image and a TextView.
31. Apply a Custom List style to a ListView. ListView should have at least 10 Items.
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 internal storage.
34. Create an app to list files under a given folder name in an EditText
35. Fetch data from an arbitrary URL given in an EditText and display it in a TextView
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 is clicked.
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.xml file.
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?

## Part B: Shell Programming

1. Write a script to find area of a circle
2. Write a shell script to find given number is even or odd
3. Write a shell script to make a menu driven calculator using case
4. Write a shell script to find the greatest of three numbers
5. Write a shell script to compute mean and standard deviation of three numbers
6. Write a shell script to find sum of all digits from a given number
7. Write a shell script to find reverse of a number
8. Write a shell script to find prime numbers upto a given number
9. Write a shell script to find n fibonacci numbers
10. Write a shell script to check whether a given number is Armstrong or not
11. Write a shell script to reverse a string and check whether a given string is palindrom or not
12. Write a shell script to count no of line, words and characters of a input file
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 the keyboard.
15. Write a shell script find the factorial of a given number
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 gross salary
17. Write a shell script to find the average of the number entered as command line arguments
18. Code for Shell script which whenever gets executed displays the message "Good Morning/Good afternoon /Good Evening "depending on the time it get executed"
19. Write a shell script to Display Banner, calander of given year
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 test operators
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 file exists.
23. Write a shell script to find number of vowels, consonants, numbers in a given string.
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 are same

**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 (rough record).*

## 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

### Course Outline

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 Science Programme.

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. Computer Science

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 Software Companies.

#### **OR**

- One week Industrial Training / internship at any software firms/ Research Labs
- The Industrial visit should be done in fifth or sixth semester.
- 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

**Course Number: 35**

**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 system software.
- To learn functions of various system software.
- To learn specifically learn compilation process of a program.

#### Prerequisites

- Basic knowledge in Programming.

#### 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 YACC.

**References:**

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



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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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

## Course Outline

### Unit I [12 T]

**Basics of Linear Algebra for ML :** 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-Maximum Likelihood Estimation- Baye"s Estimator-Parametric Classification, Regression ,Non-Parametric methods- Kernel Estimator- K-nearest neighbour estimator, Decision Trees- Univariate Trees-Classification trees, Regression trees, Rules extraction from Trees

## References

1. Ethem Alpaydm, Introduction to Machine Learning, Second edition, MIT Press, 2010.
2. Alex Smola and S.V.N. Vishwanathan ,Introduction to Machine Learning, Second Edition, Cambridge University Press
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 ,Eihab Bashier Mohammed Bashier, Machine Learning Algorithms and applications, CRC Press, First Edition,2017

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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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

## Course Outline

### 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-Box Testing.

## **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, Srinivasan Desikan & Gopalswamy, Ramesh, Pearson Education.
2. Effective Methods of Software Testing, William E. Perry, Wiley
3. Software Testing, Renu Rajani and Pradeep Oak, TMH
4. Software Testing Tools, K. V. K. K. Prasad, Dreamtech Press
5. Introducing Software Testing, Louise Tamres, Pearson Education



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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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

## Course Outline

### 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 to Communication.

## **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-Magazines – Social Networks.

## **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 Education India.
2. Phillip A. Laplante, Technical Writing: A Practical Guide for Engineers and Scientists (What Every Engineer Should Know), CRC Press.

## **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.

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

<b>CO</b>	<b>CO Statement</b>	<b>Hrs</b>	<b>Cognitive Level (CL)</b>	<b>Knowledge Category (KC)</b>	<b>PO</b>	<b>PSO</b>
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.

### Unit II [13 T]



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, group discussion

### **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 guidance centre and sources, making a career decision, preparing a resume and tips

### **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, emotional intelligence,

### **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 assertive behaviour.

### **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](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: 2 Hr**

**Maximum: 60 Marks**

**Section A - Short Answer type Questions**

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

1. What is hyperlink?
2. What is SMPS?
3. What is WWW?
4. What is CSS Box Model?
5. What is problem solving?
6. What is cache memory?
7. What is CSS stands for?
8. What is the use of count in flowchart?
9. What is machine language?
10. What are the advantages of CSS?
11. What is BCD?
12. Define system software?

**SectionB- Short Essaytype Questions**

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

13. Describe the structure of HTML document.
14. In how many ways can a CSS be integrated as a webpage?
15. State DeMorgan's Theorem.
16. Write an algorithm to find a number is prime or not.
17. Explain the ways of integer representation in computer.
18. Explain K-Map and its significance.
19. State and verify Distributive law in Boolean algebra.

**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 various units.
21. Explain HTML basic tags with example.

**PATTERN OF QUESTION PAPER ( BCA CORE)**

SEMESTER: I

BCA1B01: COMPUTER FUNDAMENTALS & HTML

Contact Hours per Week :BCA1B01

Number of Credits : 3

Number of Contact Hours: 48Hrs

Course Evaluation : External 60 Marks + Internal 15 Marks

Duration of Exam : 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:
Expected Marks >>>>										
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: 2 Hr**

**Maximum: 60 Marks**

**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 integral of  $\sqrt{x}$
3. Find the integral of  $\frac{1}{x}$
4. Find the integral of  $\tan x$
5. Find the integral of  $x^{3/2}$
6. Define diagonal matrix. Give an example.
7. Define upper triangular matrix. Give an example.
8. Define symmetric matrix with an example.
9. Define derivative of a function.
10. Find the derivative of  $f(x) = x^2$  at  $x = -2$
11. Find the derivative of  $\frac{x}{\sin x}$
12. Find the derivative of  $\tan x \log x$

**Section B- Short Essay Type Questions**

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

13. Solve  $3x - 4y + 5z = -6$ ,  $x + y - 2z = -1$ ,  $2x + 3y + z = 5$  using Gauss elimination method.
14. Verify  $A(B + C) = AB + AC$  where  $A = \begin{bmatrix} 1 & -2 & 7 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 \\ 4 \\ 8 \end{bmatrix}$ ,  $C = \begin{bmatrix} 4 \\ 7 \\ -6 \end{bmatrix}$
15. Find the inverse of  $A = \begin{bmatrix} 1 & 4 & 9 \\ 5 & -4 & 6 \\ 0 & 2 & 7 \end{bmatrix}$
16. Find the integral of  $x^2 \log x$
17. Find the integral of  $\frac{x^2}{\tan(3x^3)}$
18. Find  $A^2 + 5A - 9I$  if  $A = \begin{bmatrix} 4 & 6 \\ 2 & -3 \end{bmatrix}$

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

**PART D (Essay Questions)**

*Answer any one* [1×10 = 10]

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

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

**PATTERN OF QUESTION PAPER( BCA COMPLEMENTARY)**

SEMESTER: 1

BCA1C01: MATHEMATICAL FOUNDATIONS OF COMPUTER APPLICATIONS

Contact Hours per Week : 4

Number of Credits : 3

Number of Contact Hours: 64

Course Evaluation : External 60 Marks + Internal 15 Marks

Duration of Exam : 2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Section s or Parts	Mar k	Questio n Numbe rs	MODULE :1	MODULE :2	MODULE :3	MODULE :4	MODULE :5	MODUL E:	MODUL E:	MODUL E:
			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			
Total Marks >>>>			16	20	13	10	20			

**FIRST SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019**  
**(UG-CBCSS)**

**Complementary Course**  
**BCA1C02: Discrete Mathematics**

**Time: 2 Hrs**

**Maximum: 60 Marks**

**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 and OR.
23. Give an example of a relation which is reflexive, transitive but not symmetric.
24. What is a cycle? Give an example.
25. Define dual of a graph.
26. What is bipartite graph? Give an example.
27. Define simple proposition and compound proposition.
28. What is a complete graph? Draw  $K_4$ .
29. Define equivalence relation.
30. Construct the truth table of  $P \uparrow Q$ .
31. What is planar graph? Is  $K_4$  planar?
32. Define regular graph using an example.
33. Define quantifiers. Give an example

**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-1 edges.
36. Define Boolean algebra. Give an example.
37. Write Kruskal's algorithm for finding minimal spanning tree.
38. If  $x + y = x + z$  and  $x \cdot y = x \cdot z$  then prove that  $y = z$ .
39. Explain weakly connected and strongly connected digraphs.
40. Define adjacency matrix and incidence matrix of a simple undirected graph.



**Section C - Essay type Questions**  
(Answer any one, correct answer carries 10 marks)

41. State and prove Euler's theorem
42. Write Prim's algorithm for finding spanning tree and explain it with example.

**PATTERN OF QUESTION PAPER( BCA COMPLEMENTARY)**

SEMESTER: 1  
BCA1C02: DISCRETE MATHEMATICS

Contact Hours per Week : 4  
Number of Credits : 3  
Number of Contact Hours: 64  
Course Evaluation : External 60 Marks + Internal 15 Marks  
Duration of Exam : 2hr

Module Blue Print For Question Paper Setting / Scrutiny										
Maximum Mark: 60										
Question Paper			Syllabus							
Section s or Parts	Mar k	Questio n Numbe rs	MODULE :1	MODULE :2	MODULE :3	MODULE :4	MODULE :5	MODUL E:	MODUL E:	MODUL E:
			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				
Total Marks >>>>			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: 2 Hours

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? Give examples
4. What is a register variable?
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 its pointer?
8. What is a conditional operator? Explain with example.
9. What is a structure?
10. Differentiate between actual and formal parameters with example
11. What is meant by Recursion?
12. What do you mean by bit fields?

**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 using pointer
14. What are pointer arrays? How pointer arrays are defined? Illustrate with example.
15. Describe operator precedence and associativity.
16. What is a function? What are its advantages?
17. Explain the jumping statements in C with examples
18. Which are the file handling functions?
19. Describe the Tokens in C

**SECTION C – Essay type questions**

(Answer any one question. Correct answer carries 10 marks)

20. Explain the different looping statements in C with examples
21. Write a program to print prime numbers in a group of n numbers using function.

**PATTERN OF QUESTION PAPER( BCA COMPLEMENTARY)**  
**SEMESTER:II**

**BCA2B02 – PROBLEM SOLVING USING C**

Contact Hours per Week : 4  
 Number of Credits : 3  
 Number of Contact Hours: 64  
 Course Evaluation : External 60 Marks + Internal 15 Marks  
 Duration of Exam : 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:I IV	MODULE: V	MODUL E:	MODUL E:	MODUL E:
			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				
Total Marks >>>>			13	9	15	21	21			

(Model Question Paper)

Name.....  
 Reg. No.....

**SECOND SEMESTER BCA DEGREE EXAMINATION APRIL 2020**  
(CBCSS-UG)

Complementary Course : BCA2C03 – FINANCIAL AND MANAGEMENT ACCOUNTING

Time: 2 Hours

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. Define Accounting
2. Distinguish between book keeping and accounting
3. List out the main objectives of accounting.
4. Write the compound journal entry :  
    On first June 2017-  
        Wages paid : 5000  
        Commission paid: 2000  
        Rent paid: 3000
5. What is CVP analysis?
6. Write about the process of journalizing.
7. What is Budget?
8. List out the Accounting concepts.
9. List out subsidiary books of accounting.
10. What is marginal costing?
11. List out the difference between fixed budget and flexible budget .
12. What is budgetary control?

**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  
    Fixed cost : 30,000
14. What is margin of safety? Write its importance.
15. What is BEP? Why should it be calculated?
16. Selling price/unit Rs.150; variable cost/unit Rs 90; fixed cost Rs 6,00,000.  
    (a) What will be the selling price per unit if the break even point is 8,000.  
    (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 usage variance:-

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 Marginal costing.

### SECTION C – Essay type questions

(Answer any one question. Correct answer carries 10 marks)

20. From the following trial balance, prepare Trading and profit and loss account for the year ended 31<sup>st</sup> March 2016

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

Plant and Machinery	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. With the following data for a 60% activity, prepare a flexible budget for a production at 80% activity.

Production at 60% activity –600 units

Materials: 100 per unit

Labour : 40 per unit

Expenses: 10 per unit

**THIRD SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019**  
**(UG-CCSS)**  
**Common Course**  
**XXXXA11: PYTHON PROGRAMMING**

**Time: 2.5 Hr**

**Maximum: 80 Marks**

**Section A - Short Answer Type Questions**

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

22. Define type function
23. Name 5 features of python
24. How we can create an identifier in python?
25. Write the python code to create list
26. What are different conditional statement syntax in python
27. Write an example for nested loop
28. What is IDLE?
29. Write four expression code for python
30. Explain the main function of python
31. Explain any four string operations
32. Give syntax and code to delete elements from list?
33. Name any six tuple operations
34. Write an example to update dictionary values
35. What are sets.
36. What is data frame

**Section B- Short Essay Type Questions**

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

37. With example code explain writing and executing python scripts.
  38. Explain different data types available in python
  39. What are range functions.
  40. Distinguish between break and continue with code.
  41. What are basic list operations.
  42. How we can create and access tuples in python write with example data.
  43. Explain dictionary functions.
-



44. Write about a recursion method use factorial as example

**Section C - Essay Type Questions**

*(Answer any two, correct answer carries 10 marks)*

- 45. Explain different type of operators in python and precedence with example.
  - 46. What are the syntax for looping statements in python language? Explain with code.
  - 47. Discuss different types of function with syntax and example
  - 48. Explain the function with different type parameters, their call and return statements.
-

**PATTERN OF QUESTION PAPER( BSc CORE)**

SEMESTER: III

CODE: PYTHOM PROGRAMMING

Contact Hours per Week :

Number of Credits :

Number of Contact Hours:

Course Evaluation : External 80 Marks + Internal 20 Marks Duration of Exam : 2.5 hr

**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 >>>>										
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				
		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					
Total Marks >>>>										

**THIRD SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019**  
**(UG-CBCSS)**

**XXXXA12– Data Communication and Optical Fibers**

**Time: 2.5 Hrs**

**Maximum: 80 Marks**

**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 digital transmission
2. Describe NIC and its Classification.
3. Explain Line configuration
4. Write note on cable modem.
5. Describe telephone system
6. Write note on GSM.
7. Define Radio interface.
8. Identify the term multiplexing..
9. Explain packet switching
10. Specify single mode fiber.
11. Write note on Optical sources.
12. Explain working principle of LED.
13. Define cutoff wavelength.
14. Illustrate Photo detectors.
15. Differentiate Optical sources and detectors.

**Section B- Short Essay Type Questions**

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

16. Specify digital data transmission.
  17. Differentiate guided media and unguided media.
  18. Specify different types of multiplexing.
  19. Illustrate system architecture of GSM.
  20. Explain advantages and disadvantages of optical fiber communication?
  21. Analyze LASER Diodes.
  22. Explain Ray Theory.
  23. Compare Asynchronous Protocols and synchronous protocols.
-

### **Section C - Essay Type Questions**

*(Answer any two, correct answer carries 10 marks)*

24. Explain components of Network in detail.
  25. Describe Mobile Communication
    - a. GSM
    - b. Mobile services
  26. Identify different types of Switching.
  27. 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

Number of Credits :4

Number of Contact Hours:64

Course Evaluation : External 80 Marks + Internal 20 Marks

Duration of Exam : 2.5 hr

**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							
		3.	2							
		4.	2							
		5.		2						
		6.		2						
		7.		2						
		8.		2						
		9.			2					
		10.				2				
		11.				2				
		12.				2				
		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					
Total Marks >>>>			28	28	27	27				

**MODEL EXAMINATION PAPER**  
**THIRD SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019**  
**(UG-CBCSS)**  
**Core Course**

**BCA3B04 : DATA STRUCTURES USING C**

**Time: 2 Hr**

**Maximum: 60 Marks**

**Section A - Short Answer Type Questions**

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

1. Define an algorithm.
2. Define string.
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 queue empty.
4. Define circular linked list.
5. Write short notes on Big-oh notations.
6. Illustrate binary search tree with example.
7. What is the time complexity of linear search?
8. Define hash table.
9. What you mean by a level in a tree?
10. How many nodes in a full binary tree with  $n$  leaves?
11. List out various string operations..
12. How many undirected graphs (not necessarily connected) can be constructed out of a given set  $V = \{V_1, V_2, \dots, V_n\}$  of  $n$  vertices ?

**Section B- Short Essay Type Questions**

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

13. What is an Abstract Data Type?
  14. Evaluate the time complexity of binary search
  15. What is a sparse matrix?
  16. Explain various stack operation?
  17. What are pointer arrays?
  18. Explain header linkedlist.
-

19. Compare the complexity of breadth first search and depth first search.

**Section C - Essay Type Questions**

*(Answer any one, correct answer carries 10 marks)*

20. What is a stack data structure? Explain the algorithms of array and linked list implementation of stack using example.

21. Analyze various tree traversal algorithms with and without recursion.

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**PATTERN OF QUESTION PAPER ( BCA CORE)**

SEMESTER: III

BCA3B04: DATA STRUCTURE USING C

Contact Hours per Week :3T

Number of Credits : 3

Number of Contact Hours: 48Hrs

Course Evaluation : External 60 Marks + Internal 15 Marks

Duration of Exam : 2hr

**Module Blue Print For Question Paper Setting / Scrutiny**

Maximum Mark: 60

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							
		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					
		21.				10				
Total Marks >>>>>			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: 2 Hrs**

**Maximum: 60 Marks**

**PART A**

**(Short Answer Questions, each question carries 2 marks)**

**[Ceiling 20]**

1. Define blunders.
2. Define absolute error and percentage error.
3. Define random experiment. Give an example.
4. Define significant digits. Find the number of significant digits in 122.1020043.
5. Define central difference operator and backward difference.
6. Find the solution of  $x^2 - 7 = 0$  using regula falsi method in 5 steps.
7. Find the solution of  $x^4 - 6 = 0$  using Newton Raphson method in 5 steps.
8. Find the harmonic mean of 15,7,2,1,6.
9. Define sample space. Give an example.
10. Explain the axiomatic definition of probability.
11. Define range using an example.
12. Derive the relationship between shift operator and forward difference operator.

**PART B**

**(Paragraph Questions, each question carries 5 marks)**

**[Ceiling 30]**

13. Define discrete and continuous random variables with an example.
14. Explain scatter diagram technique for finding correlation using suitable example.
15. Find mode of the following data

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

16. Find the geometric mean of the following data

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

---

17. What do you mean by probability distribution? Explain using an example. Also explain distributive function.

18. Find y when x=2 form the following data

X	1	3	4	6
Y	1	8	16	64

19. Find mean deviation about mean of the following data

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

### PART C (Essay Questions)

*Answer any one*

[1×10 = 10]

20. 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	.17364	.20791	.24192	.27563	.30901	.34202	.37460

21. Find the two regression lines for the following data.

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

Number of Credits : 3

Number of Contact Hours : 75

Course Evaluation : External 60 Marks + Internal 15 Marks

Duration of Exam : 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			
		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						
		21.				10				
Total Marks		>>>>	10	19	19	19	12			

**MODEL EXAMINATION PAPER**  
**FIFTH SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019**  
**(UG-CBCSS)**  
**Open Course**  
**BCS5D02: INTRODUCTION TO WEB DESIGNING**

**Time: 2 Hr**

**Maximum: 60 Marks**

**Section A - Short Answer Type Questions**

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

1. Explain variable declaration in HTML.
2. How to insert an image into HTML Document?
3. What is metadata?
4. Write notes on ordered and unordered list.
5. How do you insert hyperlink in an HTML Document?
6. What is DHTML?
7. Explain window events in DHTML.
8. List out the keywords in DHTML.
9. Explain the positioning properties.
10. Write notes on style sheet.
11. Discuss advantage of HTML Editor.
12. How to add list in HTML page.

**Section B- Short Essay Type Questions**

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

13. Explain structure of HTML Document and web page layout.
  14. Discuss frames and forms in HTML.
  15. Describe Document Object Model.
  16. Briefly describe events in DHTML.
  17. Explain formatting aligning text and paragraph.
  18. Discuss programming concepts in JavaScript.
  19. Explain operators in JavaScript.
-

### **Section C - Essay Type Questions**

*(Answer any one, correct answer carries 10 marks)*

20. Write note on built-in function and user defined function in JavaScript,

- a. Write a program to show alert message.

21. What is HTML Editor?

- a. Creation of HTML Editor.
  - b. Opening and saving a web page.
  - c. Building forms in HTML Editor.
  - d. Linking with web page HTML Editor.
-

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

Contact Hours per Week :3T  
 Number of Credits :3  
 Number of Contact Hours: 48 Hrs  
 Course Evaluation : External 60 Marks + Internal 15 Marks  
 Duration of Exam : 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							
		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				
		21.			10					
Total Marks		>>>>>	20	20	20	19				

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, OCTOBER 2018**  
**(UG-CBCSS)**  
**Core Course**  
**BCA5B11 - Computer Organization & Architecture**

**Time: 2 Hrs**

**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. List different logic gates?
2. Define counters?
3. List the four stage of an instruction cycle.
4. What is full adder?
5. Discuss about address sequencing?
6. Define set associative cache?
7. What is interrupt?
8. Discuss about sequential logic circuits.
9. Illustrate various memory reference instructions?
10. What is virtual memory? Give its merits and demerits.
11. Draw and explain memory hierarchy.
12. Compare SR flip flop and JK flip flop?

**Section B- Short Essay Type Questions**

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

13. Differentiate between combinational and sequential circuit with the help of a diagram.
14. Write a short note on a) Hardwired control b) Micro programmed control.
15. Outline the properties of universal gates.
16. Differentiate between strobe control and hand shaking.
17. Illustrate accumulator logic with neat diagram?
18. Write the Instruction format and explain Instruction cycle with flowchart?
19. Analyze the memory hierarchy in terms of speed, size and cost and explain the need of memory hierarchy.

**Section C - Essay Type Questions**

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*(Answer any one, correct answer carries 10 marks)*

20. What is Flip-Flops? Discuss various types of flip flops along with diagrams and truth tables.
  21. Explain processor organization with neat diagram.
-



**PATTERN OF QUESTION PAPER ( BCA CORE)**

SEMESTER: V

BCA3B04: COMPUTER ORGANIZATION AND ARCHITECTURE

Contact Hours per Week :4T

Number of Credits : 3

Number of Contact Hours: :64Hrs

Course Evaluation : External 60 Marks + Internal 15 Marks

Duration of Exam : 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		>>>>								
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						
		21.				10				
Total Marks		>>>>	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: 2 Hrs**

**Maximum: 60 Marks**

**PART A**

**(Short Answer Questions, each question carries 2 marks)**

**[Ceiling 20]**

1. Define loader.
2. What do you mean by macro call?
3. Define macro processors.
4. How does a programmer decide to use macro calls or procedure calls?
5. Write a program to swap two variables by macro.
6. What do you mean by overlays?
7. Define binders.
8. What is a compiler?
9. List the phases of compilers.
10. Explain error correcting routines.
11. What do you mean by passes of compilers?
12. Define YACC.

**PART B**

**(Paragraph Questions, each question carries 5 marks)**

**[Ceiling 30]**

13. What is a compiler?
14. What is assembler?
15. What is interpreter? Explain with examples?
16. What do you mean by re-locatability of programs?
17. Explain Intermediate code generation.
18. What is symbol table? By whom is the symbol table created?
19. Compare Lex and Yacc generators.
20. Differentiate between lexical and syntax analysis.
21. How does Lex and Yacc work together?

**PART C (Essay Questions)**

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*Answer any one*

**[1×10 = 10]**

22. Differentiate between dynamic loading and dynamic linking.
  23. Explain macro and macro processors
-

**PATTERN OF QUESTION PAPER ( BCA ELECTIVE)**

SEMESTER: V

BCA6B16A -SYSTEM SOFTWARE

Contact Hours per Week :4T

Number of Credits : 3

Number of Contact Hours: :64Hrs

Course Evaluation : External 60 Marks + Internal 15 Marks

Duration of Exam : 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							
		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			
		20.					5			
		21.					5			
C	10	22.			10					
		23.		10						
Total Marks >>>>			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: 2 Hrs**

**Maximum: 60 Marks**

**Section A - Short Answer Type Questions**

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

1. Define Positive and Negative testing
2. What do you mean by stub
3. Define Integration testing
4. Define desk checking
5. Differentiate between alpha and beta testing
6. What is formal inspection?
7. List the methodologies for regression testing
8. What are the tools for performance testing
9. What is regression testing
10. Explain verification and validation
11. Define process model
12. What is a test case explain

**Section B- Short Essay Type Questions**

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

13. What is black box testing? How to do it?
  14. What is acceptance testing? What are the criteria for acceptance
  15. What are the factors governing performance testing
  16. What are the best practices in regression testing
  17. What is scenario testing?
  18. What is Deployment testing?
  19. Write note on Project Metrics
-

**Section C - Essay Type Questions**  
*(Answer any one, correct answer carries 10 marks)*

- 20. Illustrate test defect matrices
  - 21. Explain any two life cycle models
-

**PATTERN OF QUESTION PAPER( BCA COMPLEMENTARY)**

SEMESTER: 1

BCA6B16C: SOFTWARE TESTING AND QUALITY ASSURANCE

Contact Hours per Week : 4

Number of Credits : 3

Number of Contact Hours: 64

Course Evaluation : External 60 Marks + Internal 15 Marks

Duration of Exam : 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						
		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			
		21.	10							
Total Marks >>>>			20	16	12	16	15			

**FIRST SEMESTER B.C.A. DEGREE EXAMINATION, OCTOBER 2019**  
**(UG-CCSS)**

**Common Course**  
**XXXXA11: PYTHON PROGRAMMING**

**Time: 2.5 Hr**

**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 of python
3. How we can create an identifier in python?
4. Write the python code to create list
5. What are different conditional statement syntax in python
6. Write an example for nested loop
7. What is IDLE?
8. Write four expression code for python
9. Explain the main function of python
10. Explain any four string operations
11. Give syntax and code to delete elements from list?
12. Name any six tuple operations
13. Write an example to update dictionary values
14. What are sets.
15. What is data frame

**Section B- Short Essay Type Questions**

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

16. With example code explain writing and executing python scripts.
  17. Explain different data types available in python
  18. What are range functions?
  19. Distinguish between break and continue with code.
  20. What are basic list operations?
  21. How we can create and access tuples in python write with example data.
  22. Explain dictionary functions.
  23. Write about a recursion method use factorial as example
-



### **Section C - Essay Type Questions**

*(Answer any two, correct answer carries 10 marks)*

24. Explain different type of operators in python and precedence with example.
  25. What are the syntax for looping statements in python language? Explain with code.
  26. Discuss different types of function with syntax and example
  27. Explain the function with different type parameters, their call and return statements.
-

# PATTERN OF QUESTION PAPER( BCA COMMON)

SEMESTER:

XXXXA11: PYTHON PROGRAMMING

Contact Hours per Week :4

Number of Credits :4

Number of Contact Hours:64

Course Evaluation : External 80 Marks + Internal 20 Marks

Duration of Exam : 2.5 hr

## 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						
		33.		2						
		34.		2						
		35.		2						
		36.			2					
		37.				2				
		38.				2				
		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					
Total Marks		>>>>	28	28	27	27				

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