UNIVERSITY OF CALICUT

THENHIPALAM, CALICUT UNIVERSITY P.O

DEGREE OF
BACHELOR OF COMPUTER APPLICATION
(B. C. A)

(CHOICE BASED CREDIT AND SEMESTER SYSTEM)

UNDER THE

FACULTY OF SCIENCE

SYLLABUS

FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2017 – 18 ONWARDS

BOARD OF STUDIES IN COMPUTER SCIENCE (UG)
THENHIPALAM, CALICUT UNIVERSITY P.O
KERALA, 673 635, INDIA

REGULATIONS

FOR DEGREE OF

BACHELOR COMPUTER APPLICATIONS

(B.C.A)

(CHOICE BASED CREDIT AND SEMESTER SYSTEM)

EFFECTIVE FROM THE ACADEMIC YEAR 2017-18

B.C.A. PROGRAMME OBJECTIVE

The basic objective of the program is to open a channel ofadmission for computing courses for students, who have done the10+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(CS), MSc(IT), MBA, etc., at this university 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 program include:

1. To attract young minds to the potentially rich & employable fieldof computer applications
2. To be a foundation graduate program which will act as a feedercourse for higher studies in the area of ComputerScience/Applications
3. To develop skills in software development so as to enable the BCAgraduates to take up self-employment in Indian & global softwaremarket.
4. To train & equip the students to meet the requirements of theSoftware industry in the country and outside.

PROGRAMME STRUCTURE

Duration: The duration of the BCA program shall be 6semesters distributed over a period of 3 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 BCA program includes four types of courses, viz., Common Courses (Code A), Core courses (Code B), Complementary courses (Code C) and Open course (Code D). The minimum number of courses required for completion of the BCA program is 36.

Credits: Each course shall have certain credits. For passing the BCA program the student shall be required to achieve a minimum of 120 credits of which 36 (14 for common English courses +8 for common languages other than English + 16 credits for General courses) credit shall be from common courses, a minimum of 3 credits for project and 2 credits for the open course. Minimum credits required for core, complementary and open courses put together are 82.

Attendance: A student shall be permitted to appear for thesemester examination, only if he/she secures not less than 75% attendance in each semester. Attendance shall be maintained by theconcerned Department. Condonation of shortage of attendance to a maximum of 9 days in a semester subject to a maximum of two times during the whole period of the BCA Programme may be granted by the University. Benefits of attendance may be granted to students who attend the approved activities of college/university with prior concurrence of the Head of the institution. Participation In such activities may be treated as presence in lieu of their absence on production of participation/attendance certificate in curricular/extracurricular activities. It should be limited 9 days in a semester. The condonation of shortage of attendance shall be granted according to the existing prescribed norms.

If a student registered in first semester of the BCA program is continuously absent from the classes for more than 14 working days at the beginning of the semester without informing the authorities the matter shall immediately be brought to the notice of the Registrar of the university. The names of such students shall be removed from the rolls.

Admission to repeat courses should be within the sanctioned strength. However if more candidates are there, the candidates who have suffered serious health problems, on production of a medicalcertificate issued by a physician not below the rank of a Civil Surgeonin Government service, may be permitted to repeat the course, with a written order issued by the Registrar, Calicut University (by considering his/her SGPA/CGPA and percentage of attendance). The number of such candidates should not exceed two.

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 regularclass hours. Such a benefit is applicable and limited to a maximum of8 courses in an academic year spreading over two semesters. No credit shall be assigned for such activities.

Project: Every student of the BCA program shall have to work on a project of not less than 3 credits under the supervision of a faculty member as per the curriculum.

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

ADMISSION

The admission to all programmes will be as per the rules and regulations of the University. The eligibility criteria for admission shall be as announced by the University 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 prescribedcourses 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 University/college websites.

Thereshall be a uniform calendar prepared by the University for the Registration, conduct /schedule of the courses, examinations and publication of results. The University shall ensure that the calendar is strictly followed.

There shall be provision for inter collegiate and inter universitytransfer in third and fifth semester within a period of two weeks from the date of commencement of the semester. For the inter-university or intra-university transfer of a student, he/she has a minimum of 20 credits in the credit bank a) in the same discipline and b) within Kerala.

Complementary changes at the time of college transfer are permitted in the third semester if all conditions are fulfilled. Complementarychanges will not be permitted in the fifth semester.

REGISTRATION

Each student shall register for the courses he/she proposes to takethrough 'on line', in consultation with the Faculty Adviser within two weeks from the commencement of each semester. The college shall send a list of students registered for each program in each Semester giving the details of courses registered, including repeat courses, to the university in the prescribed form within 45 days from the commencement of the semester.

A student shall be permitted to register for the examination also. If registration for examination is not possible owing to shortage of attendance beyond condonation limit, the student shall be permitted to move to the next semester. In such cases, a request from the student may be forwarded through the principal of the college to the University within two weeks of the commencement of that semester. An undertaking from the Principal may also be obtained stating that the students will be permitted to make up the shortage of attendance in that semester after completing 6 semesters.(Students shall make up the shortage of attendance in 'Repeat Semester' after completion of the program).

The 'Repeat Semester' shall be possible only once for the entire program and shall be done in the same college.

A student who registered for the course shall successfully complete the program within 6 years from the year of first registration. Ifnot, such candidate has to cancel the existing registration and join afresh as a new candidate.

The students who have attendance within the limit prescribed, but could not register for the examination have to apply for the token registration, within two weeks of the commencement of the next semester.

COURSEEVALUATION

Total marks for each core,complementary and elective course, including labcourses shall be 100 marks, project evaluation cum programme viva voce, shall be 150 marks and open course shall be 50 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

20% of the total marks in each course (i.e., 20 marks), including labare for internal examinations and for project evaluation cum programme viva voce, it shall be 30 marks.

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.

Components with percentage of marks of Internal Evaluation ofTheory Courses are:

Test paper (50%)   –   10 Marks

Attendance (25%)   –   5 Marks

Assignment/Seminar/Viva (25%)   –   5 Marks

Components with percentage of marks of Internal Evaluation of LabCourses are:

Test paper (50%)   –   10 Marks

Attendance (25%)   –   5 Marks

Assignment/Lab involvement (25%) –   5 Marks

Attendance of each course will be evaluated as below:

Above 90% attendance	–	5 Marks
85 to 89%	–	4 Marks
80 to 84%	–	3 Marks
76 to 79 %	–	2 Marks
75%	–	1 Marks

Internal evaluation for the project shall be generally based oncontent, method of presentation, final conclusion, and orientation toresearch aptitude. The split up shall be:

Punctuality	–	6 Marks
Use of Data	–	6 Marks
Scheme/Organization of Report	–	8 Marks
Viva-Voce	–	10Marks

(If a fraction appears in internal marks, nearest whole number is tobe taken)

To ensure transparency of the evaluation process, the internalassessment marks awarded to the students in each course in a semester shall be notified on the notice board at least one week before the commencement of external examination. There shall not be any chance for improvement for internal marks. The course teacher(s) shall maintain the academic record of each student registered for the course, which shall be forwarded to the University by the college Principal after obtaining the signature of both course teacher and HOD.

The marks secured for internal examination only need be sent touniversity, by the colleges concerned.

EXTERNAL EVALUATION:

There shall be University examinations for each course at the end of each semester.Practical examinations shall be conducted by the University at theend of second, fourth and sixth semester.

External project evaluation cum 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., 80 Marks, for each course.

External evaluation of even (2, 4 and 6) semesters will be conductedin centralized valuation camps immediately after the examination. Answer scripts of odd semester (1, 3 and 5) examination will be evaluated by home valuation. All question papers shall be set by the university.

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

1. **Section A:**10 compulsory short answer type questions of 1 Marks each (**Total 10 Marks**)

2. **Section B:**8 compulsory paragraph type questions of 2 Marks each (either a single question or can have subdivisions) (**Total 16 Marks**)

3. **Section C:**6 short essay type questions of 4 Marks each, to be attempted from a set of 9 questions – at least one question from each unit (either a single question or can have subdivisions) (**Total 24 Marks**)

4. **Section D:**3 long essay type questions of 10 Marks each, to be attempted from a set of 5 questions – at least one question from each unit (either a single question or can have subdivisions) (**Total 30 Marks**)

The external examination in theory courses is to be conducted withquestion 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 bytwo examiners, one internal and an external, appointed by the University.

The project evaluation with programme viva voce will be conductedby two examiners, one internal and an external (appointed by the University), at the end of the sixth semester.
No practical examination will be conducted in odd semester. Practical examinations for B.C.A program shall be conducted in the even semester 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 and Result: 10 Marks. **Total 30 Marks**)

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

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

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, Methodology (Reference/ Bibliography) (**Total 40 Marks**)
2. Presentation, Quality of Analysis/Use of Statistical tools, Findings and recommendations (**Total 40 Marks**)
3. Project cum Programme Viva Voce (**Total 40 Marks)**

REVALUATION:

In the new system of grading, revaluation is permissible. Theprevailing rules for revaluation are applicable.

Students can apply for photocopies of answer scripts of externalexaminations. Applications for photocopies/scrutiny/revaluation should be submitted within 10 days of publication of results. The fee for this shall be as decided by the university.

IMPROVEMENT COURSE

A maximum of two courses (Common, Core, Complementary or Open) can be improved in each semester. Improvement of a particular semester can be done only once. The student shall avail theimprovement chance in the succeeding year after the successful completion of the semester concerned. The internal marks already obtained will be carried forward to determine the grades/marks in the improvement examination. If the candidate fails to appear for the improvement examination after registration, or if there is no change in the results of the improvement examination appeared, the marks/grades obtained in the first appearance will be retained.

Improvement and supplementary examinations cannot be done simultaneously.

EVALUATION AND GRADING

Mark system is followed instead of direct grading for each question (for both internal and external examinations). For each course in the semester letter grade, grade point and % of marks are introduced in 7- point indirect grading system. The grading on the basis of a total internal and external mark will be indicated for each course and for each semester and for the entire program.

Indirect Grading System in 7 point scale is as below:

% of Marks	Grade	Interpretation	Grade point (G)	Range of Grade Points	Class
90 and above	A+	Outstanding	6	5.5 to 6	First class with distinction
80 to below 90	A	Excellent	5	4.5 to 5.49	
70 to below 80	B	Very Good	4	3.5 to 4.49	First class
60 to below 70	C	Good	3	2.5 to 3.49	
50 to below 60	D	Satisfactory	2	1.5 to 2.49	Second class
40 to below 50	E	Pass/Adequate	1	0.5 to 1.49	Pass
Below 40	F	Failure	0	0 to 0.49	Fail

An aggregate of 'E' grade with 40% marks (after external and internalput together) is required in each course for a pass and also for awarding a degree.

Appearance for Internal Assessment (IA) and End SemesterEvaluation (ESE-external)) are compulsory and no grade shall be awarded to a candidate if she/he is absent for IA/ESE or both. For a pass in each course 40% marks or E grade is necessary

A student who fails to secure a minimum grade for a pass in a courseis permitted to write the examination along with the next batch.

After the successful completion of a semester, Semester Grade PointAverage (SGPA) of a student in that semester is calculated using theformula given below. For the successful completion of a semester, a student should pass all courses. However, a student is permitted to move to the next semester irrespective of SGPA obtained.

The Semester Grade Point Average can be calculated as

$$SGPA \ = \frac{\text{Sum of the Credit Points of all courses in a semester}}{\text{Total Credits in that Semester}}$$

i.e.,

$$SGPA \ = \frac{C1 \ x \ G1 + C2 \ x \ G2 + C3 \ x \ G3 \ ....}{n}$$

where*G1*, *G2*, … are grade points of different courses; C1, C2, ... are credits of different courses of the same semester and *n* is the total credits in that semester.

The Cumulative Grade Point Average (CGPA) of the student iscalculated at the end of a program. The CGPA of a student determines the overall academic level of the student in a program and is the criterion for ranking the students. CGPA can be calculated by the following formula

The Cumulative Grade Point Average (CGPA) can be calculated as:

$$CGPA \ = \frac{\text{TOTAL CREDIT PONTS OBTAINED IN SIX SEMESTERS}}{\text{TOTAL CREDITS}}$$

GRADE CARDS

The University shall issue to the students grade/marks card (by online) on completion of each semester, which shall contain thefollowing information:

   i.   Name of University
  ii.   Name of college
 iii.   Title of Under-Graduate Programme
  iv.   Semester concerned
   v.   Name and Register Number of student
  vi.   Code number, Title and Credits of each course opted in the semester
 vii.   Internal marks, External marks, total marks, Grade point (G) and letter grade for each course in the semester
viii.   The total credits, total credit points and SGPA in the semester (corrected to two decimal places)
  ix.   Percentage of total marks

The final Grade/mark Card issued at the end of the final semestershall contain the details of all courses taken during the entire program including those taken over and above the prescribed minimum credits for obtaining the degree. However, for the compilation of CGPA only the best performed courses, if any, with maximum grade points alone shall be taken subject to the minimum credits requirements (120) for passing a specific degree. The final grade card shall show the percentage of marks, CGPA (corrected to two decimal places) and the overall letter grade of a student for the entire program. The final grade/mark card shall also include the grade points and letter grade of common courses, core courses, complementary courses and open courses, separately. This is to be done in a seven point indirect scale.

AWARD OF DEGREE

The successful completion of all the courses (common, core, complementary and open courses) prescribed for the BCA program with E grade (40 %) shall be the minimum requirement for the award of BCA degree.

GRIEVANCE REDRESSAL COMMITTEE

COLLEGE-LEVEL

The College shall form a Grievance Redressal Committee in eachdepartment comprising of course teacher and one senior teacher as members and the Head of the department as Chairman. This committee shall address all grievances relating to the internal assessment grades of the students. There shall be a College-Level Grievance Redressal Committee comprising of Student Advisor, two senior teachers and two staff council members (one shall be elected member) as members and principal as Chairman.

UNIVERSITY-LEVEL

The University shall form a Grievance Redressal Committee as perthe existing norms.

Bachelor of Computer Application (B.C.A)

Programme Structure

I Semester

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
1	XXXXA01	Common English Course I	20	80	100	5	0	5	4
2	XXXXA02	Common English Course II	20	80	100	4	0	4	3
3	XXXXA07	Additional Language Course I	20	80	100	4	0	4	4
4	BCA1B01	Computer Fundamentals & HTML	20	80	100	2	2	4	3
5	BCA1C01	Mathematical Foundation of Computer Applications	20	80	100	4	0	4	3
6	BCA1C02	Discrete Mathematics	20	80	100	4	0	4	3
Total 6 Courses					600	23	2	25	20

II Semester

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
7	XXXXA03	Common English Course III	20	80	100	5	0	5	4
8	XXXXA04	Common English Course IV	20	80	100	4	0	4	3
9	XXXXA08	Additional Language	20	80	100	4	0	4	4

		Course II							
10	BCA2B02	Problem Solving using C	20	80	100	2	2	4	3
11	BCA2B03	Programming Laboratory I: Lab Exam of 1st & 2nd Sem. HTML & Programming in C	20	80	100	0	0	0	2
12	BCA2C03	Financial & Management Accounting	20	80	100	4	0	4	3
13	BCA2C04	Operations Research	20	80	100	4	0	4	3
Total 7 Courses					**700**	**23**	**2**	**25**	**22**

III Semester

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
14	XXXXA11	General Course I-Basic Numerical Skills	20	80	100	4	0	4	4
15	XXXXA12	General Course II-General Informatics	20	80	100	4	0	4	4
16	BCA3B04	Data Structures Using C	20	80	100	3	4	7	4
17	BCA3C05	Computer Oriented Numerical &Statistical Methods	20	80	100	5	0	5	3
18	BCA3C06	Theory Of Computation	20	80	100	5	0	5	3
Total 5 Courses					**500**	**21**	**4**	**25**	**18**

IV Semester

Co	Course Code	Course Title	Marks	Contact Hours	Credit

			Internal	External	Total	Theory	Lab	Total	
19	XXXXA13	General Course III-Entrepreneurship Development	20	80	100	4	0	4	4
20	XXXXA14	General Course IV-Basics of Audio and Video	20	80	100	4	0	4	4
21	BCA4B05	Database Management System and RDBMS	20	80	100	3	4	7	4
22	BCA4B06	Programming Laboratory II: Lab Exam of 3rd& 4th Sem. Data Structures & RDBMS	20	80	100	0	0	0	2
23	BCA4C07	E-Commerce	20	80	100	5	0	5	3
24	BCA4C08	Computer Graphics	20	80	100	5	0	5	3
Total 6 Courses					**600**	**21**	**4**	**25**	**20**

V Semester

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
25	BCA5B07	Java Programming	20	80	100	3	3	6	4
26	BCA5B08	Computer Organization And Architecture	20	80	100	5	0	5	4
27	BCA5B09	Web Programming Using PHP	20	80	100	3	3	6	4
28	BCA5B10	Principles of Software Engineering	20	80	100	4	0	4	4
29	XXX5DXX	Open Course(Other Streams)	10	40	50	2	0	2	2
		Project Work	0	0	0	0	2	2	0
Total 5 Courses					**450**	**17**	**8**	**25**	**18**

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
30	BCA6B11	Android programming	20	80	100	4	1	5	4
31	BCA6B12	Operating Systems	20	80	100	4	1	5	4
32	BCA6B13	Computer Networks	20	80	100	5	0	5	4
33	BCA6B14	Programming laboratory III- Java and Web Programming	20	80	100	0	0	0	2
34	BCA6B15	Programming Laboratory IV: Lab Exam of Android & Linux shell Programming	20	80	100	0	4	4	2
35	BCA6B16	Project and Viva Voce	30	120	150	0	2	2	3
36	BCA6B17x	Elective	20	80	100	4	0	4	3
Total 7 Courses					750	17	8	25	22

The table is titled **VI Semester**.

SEMESTER I

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
1	XXXXA01	Common English Course I	20	80	100	5	0	5	4
2	XXXXA02	Common English Course II	20	80	100	4	0	4	3
3	XXXXA07	Additional Language Course I	20	80	100	4	0	4	4
4	BCA1B01	Computer Fundamentals & HTML	20	80	100	2	2	4	3
5	BCA1C01	Mathematical Foundation of Computer Applications	20	80	100	4	0	4	3
6	BCA1C02	Discrete Mathematics	20	80	100	4	0	4	3
Total 6 Courses					600	23	2	25	20

SEMESTER I

BCA1B01 – COMPUTER FUNDAMENTALS& HTML

Course Number: 4
Contact Hours per Week: 4 (2T + 2P)
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives

- To equip the students with fundamentals of Computer
- To learn the basics of Computer organization
- To equip the students to write algorithm and draw flow chart for solving simple problems
- To learn the basics of Internet and webpage design

Prerequisites

- Background of the basic science at +2 level

Course Outline

Unit I[4 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 [9 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, DeMorgan'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 + 15 L]

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+15 L]

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

BCA1C01 -Mathematical Foundations for Computer Applications

Course Number: 5
Contact Hours: 4T
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives of the Course:

- To learn the basic principles of linear algebra and vectors.
- To learn the basic principles of differential and integral Calculus
- To learn the mathematical modeling using ordinary and partial differential equations

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 GaussSiedel methods.

Linear independence and rank, determinants, inverse, Eigen values. Vectors: Vectors in 2- and 3-space, dot and cross products

UNIT III (12T)

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 (12T)

Methods of Integration, Integration through Partial Functions, 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 Publishers

4. Higher Engineering Mathematics, Ramana, Tata McGraw Hill

5. Engineering Mathematics, P Kandasamy, S. Chand Group

BCA1C02 - Discrete Mathematics

Course Number: 6
Contact Hours: 4T
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives of the Course:

- To learn the mathematical logic & Boolean Algebra

Prerequisites:

- Basic Mathematical knowledge

Course Outline

UNIT I (12T)

Mathematical Logic: Propositions and logical operators, Truth tables, equivalence and implementation, Laws of logic, Quantifiers.
Settheory: 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 (12T)

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 (12T)

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. Eular digraphs

Textbooks

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

References:

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

II Semester

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
7	XXXXA03	Common English Course III	20	80	100	5	0	5	4
8	XXXXA04	Common English Course IV	20	80	100	4	0	4	3
9	XXXXA08	Additional Language Course II	20	80	100	4	0	4	4
10	BCA2B02	Problem Solving using C	20	80	100	2	2	4	3
11	BCA2B03	Programming Laboratory I: Lab Exam of 1st & 2nd Sem. HTML & Programming in C	20	80	100	0	0	0	2
12	BCA2C03	Financial & Management Accounting	20	80	100	4	0	4	3
13	BCA2C04	Operations Research	20	80	100	4	0	4	3
Total 7 Courses					**700**	**23**	**2**	**25**	**22**

SEMESTER II

BCA2B02 – Problem Solving Using C

Course Number: 10
Contact Hours per Week: 4 (2T + 2P)
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective

- To equip the students with fundamental principles of Problem Solving aspects.
- To learn the concept of programming
- To study C language
- To equip the students to write programs for solving simple computing problems

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, goto 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.

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: Programming in C & HTML

Course Number: 11
Contact Hours per Week: 0
Number of Credits: 2
Number of Contact Hours: 0.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective

- 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
- 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.
- Knowledge in Computer fundamentals.

Course Outline:

Part A: 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 Nth 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 $S = 1 + (½)^2 + (1/3)^3 + ...$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 armstrong 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.

Part B: HTML lab work

List of Exercises:

1) Design a web page to display the information of Computer Science department of your college by usingbasic page tags. Display the information in the form of paragraphs/sentences. Alsouse 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 durationetc.

   (Purpose: - Introduce anchor tag to create links between pages. One can able to transfer the control to next page, previous page or to a specific page like Home page.)

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

Include any 20 C programs and 15 HTML 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).

BCA2C03-Financial & Management Accounting

Course Number: 12
Contact Hours: 4T
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives

- To get a general introduction on accounting and its general application.
- To get a general understanding on various tools for financialstatement analysis.
- To get a general understanding on accounting procedures up tothe preparation of various financial statements.
  To get a general understanding of the importanttoolsformanagerial 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 UniversityCentral Co-Operative Stores

BCA2C04: Operations Research

Course Number: 13
Contact Hours: 4T
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives of the Course:

- To get a general introduction in solving linear programming problems.
- To get a general understanding of network analysis technique.
- To get a general understanding of different mathematical models.

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 (12T)

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, 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 (12T)

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.

Textbooks

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

References:

1. Operation Research: An Introduction, Tahah. A, McMillan 1982

III Semester

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
14	XXXXA11	General Course I-Basic Numerical Skills	20	80	100	4	0	4	4
15	XXXXA12	General Course II-General Informatics	20	80	100	4	0	4	4
16	BCA3B04	Data Structures Using C	20	80	100	3	4	7	4
17	BCA3C05	Computer Oriented Numerical & Statistical Methods	20	80	100	5	0	5	3
18	BCA3C06	Theory Of Computation	20	80	100	5	0	5	3
Total 5 Courses					500	21	4	25	18

BCA3B04 – Data Structures Using C

Course Number: 16
Contact Hours per Week: 7 (3T + 4P)
Number of Credits: 4
Number of Contact Hours: 105 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective

- To introduce the concept of data structures
- To make the students aware of various data structures
- To equip the students implement fundamental data structures

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.

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.

Introduction to queues: Primitive Operations on the Queues, Circular queue, Priority queue, Representation of Queues as Linked List and array, 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, Basic 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.

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.

BCA3C05- Computer Oriented Numerical & Statistical Methods

Course Number: 17
Contact Hours per week: 5T
Number of Credits: 3
Number of Contact Hours: 75 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives of the Course:

- To learn the floating point arithmetic
- To learn how to solve linear equations
- To learn the numerical differentiation and integration
- To learn basics of statistics,probability theory

Prerequisites:

- Background of the basic Mathematics

Course Outline

UNIT I (7T)

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

UNIT II (17T)

InterpolationandApproximation–Lagrange&Newton; Interpolations- Finite Difference Operators, Interpolating; Polynomials using finite differences, Simpson's $1/3^{rd}$ rule ,Trapezoidal method.

UNIT III (17T)

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 (17T)

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

UNIT V (17T)

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

References:

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 ofIndia.

5. Probability and Statistics for *Engineers*, Miller I Freund J E,Prentice Hall of India.

BCA3C06 –Theory of Computation

Course Number: 18
Contact Hours per week: 5T
Number of Credits: 4
Number of Contact Hours: 75 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To get a general introduction to Theory of computer science
- To get a general understanding on different languages,grammar,automata

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, Recursive and Recursively enumerable sets, 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 NDFA, Mealy and Moore Models, minimization of finite automata. Regular sets and grammar: Regular expressions, Finite automata and regular expressions, closure properties of regular sets, Algebraic laws for regular expressions, regular sets and regular grammars

UNIT IV (17T)

Context free languages: Context free languages and derivation trees, Ambiguity in context free grammars, Simplification of context free languages, normal forms for context free languages.

UNIT V (18T)

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, languages accepted by Turing machine.

References:

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

5. Theory of Computer Science- Automata, Languages and Computation- K.L.P. Mishra, N Chandrasekaran, PHI

			IV Semester							
				Marks			**Contact Hours**			
Course No	**Course Code**	**Course Title**	**Internal**	**External**	**Total**	**Theory**	**Lab**	**Total**	**Credit**
19	XXXXA13	General Course III-Entrepreneurship Development	20	80	100	4	0	4	4
20	XXXXA14	General Course IV-Basics of Audio and Video	20	80	100	4	0	4	4
21	BCA4B05	Database Management System and RDBMS	20	80	100	3	4	7	4
22	BCA4B06	Programming Laboratory II: Lab Exam of 3rd& 4th Sem. Data Structures & RDBMS	20	80	100	0	0	0	2
23	BCA4C07	E-Commerce	20	80	100	5	0	5	3
24	BCA4C08	Computer Graphics	20	80	100	5	0	5	3
Total 6 Courses					**600**	**21**	**4**	**25**	**20**

BCA4B05-Database Management System& RDBMS

Course Number: 21
Contact Hours per week: 3T+ 4L
Number of Credits: 4
Number of Contact Hours: 105 Hrs.
Course Evaluation: *Internal –* **20 Marks + External – 80 Marks**

Objectives:

- To learn the basic principles of database and database design
- To learn the basics of RDBMS
- To learn the concepts of database manipulation SQL
- To study PL/SQL language

Prerequisites:

- Basic knowledge of the functional units computer of computers and their functioning along with basic programming knowledge

Course Outline

Unit I [8 T+3L]

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 [8 T+4L]

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+10L]

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

CoddNormal 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+22L]

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: Bound and Unbound Cursors, Declaration, Opening, Working with cursors: FETCH, MOVE, UPDATE/DELETE, CLOSE, Looping through a Cursor. Concept of Stored Procedures – Advantages and Disadvantages – Creation – Parameters Setting for Function- Alter – Drop – Grant and Revoke - Passing and Returning data to/from Stored Procedures - Using stored procedures within queries – Triggers: Creation, Modification, Deletion, Error Handling: Control Structures, Cursors, Functions, Triggers.

Textbooks:

1. Abraham Silberschatz, Henry F Korth, S.Sudharshan, Database System Concepts, 6thEdition
2. W. Gilmore, Beginning PHP and PostgreSQL 8: From Novice to Professional, Goels Computer Hut (2007), ISBN: 9788181286000
3. PosgreSQL Official Documentation Online

References:

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: Data Structures &RDBMS

Course Number: 22
Contact Hours per Week: 0P
Number of Credits: 2
Number of Contact Hours: 0 hours
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 C Programming.

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 tothem, use any inbuilt function and operators like IN, ANY, ALL,EXISTS.

a. List the records of members who have not been issued any book using EXISTS operator.
b. List the members who have got issued at least one book (use IN / ANY operator).
c. List the books which have maximum Price using ALL operator.
d. 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 fair 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).

BCA4C07- E-Commerce

Course Number: 23
Contact Hours per week: 5T
Number of Credits: 3
Number of Contact Hours: 75 Hrs.
Course Evaluation: *Internal –* 20 Marks + External – 80 Marks

Objectives:

- To get a general introduction Electronic Commerce framework .To get a general understanding on various electronic payment system.
- To get a general understanding on Internal information systems. To get a general understanding on the new age of Information.

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: Cyberstalking,

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

BCA4C08- Computer Graphics

Course Number: 24
Contact Hours: 5T
Number of Credits: 3
Number of Contact Hours: 75 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To learn basics of Computer Graphics

Prerequisites:

- Basic knowledge in Mathematics and Computer

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

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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.

References:

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.

			Marks			Contact Hours			
V Semester									
Course No	Course Code	Course Title	Internal	External	Total	Theory	Lab	Total	Credit
25	BCA5B07	Java Programming	20	80	100	3	3	6	4
26	BCA5B08	Computer Organization And Architecture	20	80	100	5	0	5	4
27	BCA5B09	Web Programming Using PHP	20	80	100	3	3	6	4
28	BCA5B10	Principles of Software Engineering	20	80	100	4	0	4	4
29	XXX5DXX	Open Course(Other Streams)	10	40	50	2	0	2	2

		Project Work	0	0	0	0	2	2	0
Total 5 Courses					450	17	8	25	18

BCA5B07|Java Programming

Course Number:25
Contact Hours per Week:6 (3T + 3P)
Number of Credits:4
Number of Contact Hours:90 Hrs.
Course Evaluation: Internal: 20 Marks + External: 80 Marks

Objectives

- To review on concept of OOP.
- To learn Java Programming Environments.
- To practice programming in Java.
- To learn GUI Application development in JAVA.

Prerequisites

- Knowledge in OOP & Programming

Course Outline

Unit I [8 T + 4 P]

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 [10 T + 8 P]

Introduction to Java: History, Versioning, The Java Virtual Machine, Byte code, Writing simple java program, Language Components: Primitive Data Types, Comments, Keywords, literals, The if Statement, The switch Statement, The for Statement, The while and do while Statements, 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 + 10 P]

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 + 10 P]

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 + 10 P]

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.

BCA5B08|Computer Organization & Architecture

Course Number:26
Contact Hours per Week:5T
Number of Credits:4
Number of Contact Hours:75 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives

- To learn logic gates, combinational circuits and sequential circuits
- To learn basics of computer organization and architecture

Prerequisites

- Boolean algebra

Course Outline

Unit I [14 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 [15 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 [15 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 [15 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 [16 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

BCA5B09|Web Programming using PHP

Course Number:27
Contact Hours per Week:6 (3T + 3P)
Number of Credits:4
Number of Contact Hours:90 Hrs.
Course Evaluation: Internal: 20 Marks + External: 80 Marks

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

Objectives

- To review on concept of OOP.
- To learn Java Programming Environments.
- To practice programming in Java.
- To learn GUI Application development in JAVA.

Prerequisites

- Knowledge in OOP & Programming

Course Outline

Unit I [8 T + 8 P]

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 [8 T + 9 P]

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 P]

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 [8 T + 9 P]

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

Unit V [10 T + 10 P]

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 PostrgreSQL 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. PosgreSQL Official Documentation Onlin

BCA5B10|Principles of Software Engineering

Course Number: 28
Contact Hours: 4T
Number of Credits: 4
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To learn engineering practices in Software Development.

Prerequisites:

- Basic programming knowledge

Course Outline

UNIT I (12 hours)

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,Spriral 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 (12 hours)

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

UNIT III (12 hours)

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 (12 hours)

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 (12 hours)

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

TEXT BOOKS

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

REFERENCES

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

VI Semester

Course No	Course Code	Course Title	Marks			Contact Hours			Credit
			Internal	External	Total	Theory	Lab	Total	
30	BCA6B11	Android programming	20	80	100	4	1	5	4
31	BCA6B12	Operating Systems	20	80	100	4	1	5	4
32	BCA6B13	Computer Networks	20	80	100	5	0	5	4
33	BCA6B14	Programming laboratory III- Java and Web Programming	20	80	100	0	0	0	2
34	BCA6B15	Programming Laboratory IV: Lab Exam of Android & Linux shell Programming	20	80	100	0	4	4	2
35	BCA6B16	Project and Viva Voce	30	120	150	0	2	2	3
36	BCAB617x	Elective	20	80	100	4	0	4	3
Total 7 Courses					750	16	9	25	22

BCA6B11|Android Programming

Course Number: **30**
Contact Hours per Week: **5 (4T + 1P)**
Number of Credits: **4**
Number of Contact Hours: **75 Hrs.**
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To have a review on concept of Android programming.
- To learn Android Programming Environments.
- To practice programming in Android.
- To learn GUI Application development in Android platform with XML

Prerequisites:

- Knowledge in OOP & Java Programming.

Course Outline

Unit I [12T+3L]

Introducing the android computing platform, History of android, an- droid 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 [12T+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 databaseson emulator, architecture of content providers, structure of android content URIs,reading data using URIs, using android cursor, working with where clause,inserting updates and deletes, implementing content, Understanding intents basicsof intents, available intents, exploring intent composition, Rules for ResolvingIntents to Their Components, ACTION PICK, GET CONTENT, pending intents

Unit III [12T+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 [12T+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 navigation action bar activity, action bar and search view, action bar and fragments.

Unit V [12T+3L]

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

References:

1. Pro Android 4, SatyaKomatineni& Dave MacLean, Apress.
2. Professional Android 4 Application Development, Retomeier, Wrox.
3. Programming Android, ZigurdMednieks, Laird Dornin, G. BlakeMeike, and Masumi Nakamura, O'Reilly.

BCA6B12| Operating Systems

Course Number: 31
Contact Hours per Week: 5 (4T + 1P)
Number of Credits: 4
Number of Contact Hours: 75 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives

- To learn objectives & functions of Operating Systems.
- To understand processes and its life cycle.
- To learn and understand various Memory and Scheduling Algorithms.
- To have an overall idea about the latest developments in Operating Systems

Prerequisites

- Knowledge in Data structures.

Course Outline

Unit I [12T + 3P]

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 [12T + 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 [12T + 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 [12T + 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 [12T + 3P]

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

BCA6B14| Computer Networks

Course Number: 32
Contact Hours per Week: 5 (5T + 0P)
Number of Credits: 4
Number of Contact Hours: 75 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives

- To learn about transmissions in Computer Networks.
- To learn various Protocols used in Communication.
- To have a general idea on Network Administration.

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

Course Outline:

Unit I [15 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, X.21 modems.

Unit II [15 T]

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 - IEEE - 802.11,basics of Bluetooth,wifi,wimax and mobile networks (2G,3G,4G)

Unit III [15 T]

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 [15 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 [15T]

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

References:

1. Andrew S. Tanenbaum, Computer Networks, PHI
2. William Stallings, Data and Computer Communications, VIIth Edition, 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, Dreamtech,2003.

BCA6B14| Programming Laboratory III: Lab Exam of Java & PHP Programming

Course Number: 33
Contact Hours per Week: 0
Number of Credits: 2
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 & 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 <=200	0
2500 < gross <=4000	3%
4000< gross <=5000	5%
Gross >5000	8%

Gross= basic + HRA + conveyance + extra

Net = gross – income tax

32. Create a table "product" with fieldsitemcode, itemname, unitprice. Write php program to insert 5 records into the table and display it in a table format.
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.

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: Android & Linux shell Programming

Course Number: 34
Contact Hours per Week: 4 (0T + 4P)
Number of Credits: 2
Number of Contact Hours: 64 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 Amstrong 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 â€œGood Morning/Good afternoon /Good Evening â€œdepending 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.

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).

BCA6B16| Project Work

Course Number: 35
Contact Hours per Week: 4 (0T + 2P in V Sem + 2 P in VI Sem)
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 30 Marks + External – 120 Marks

Objective

- To provide practical knowledge on software development process

Prerequisites

- Basic programming and system development knowledge

Course Outline

The objective of the BCA 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 BCA 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 BCA final semester project. The courses studied by the students during the BCA 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 bonafide project report shall be submitted in hard bound complete in all aspects.

ELECTIVES

BCA6B17a|Microprocessor and Applications

Course Number: 36
Contact Hours: 4T
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To understand internals of Microprocessor.
- To learn architecture of 8086 Microprocessor
- To learn instruction set of 8086 Microprocessor
- To learn how to program a Microprocessor

Prerequisites:

- Basic knowledge of Computer

Course Outline

UNIT I (12T)

16-Bit Microprocessor: 8086 Architecture, Pin Configuration, 8086 Minimum and Maximum mode configurations

UNIT II (12T)

Addressing modes, 8086 Instruction set (Data transfer, Arithmetic, Branch, Processor control & String instruction), 8086 interrupts.

UNIT III (12T)

Assembler Directives: Data Definition And Storage Allocation, Program Organization, Alignment, Program End value, Returning Attribute, Procedure Definition, Macro Definition, Data Control, Branch Displacement, Header File Inclusion-Target Machine Code Generation Control Directives.

UNIT IV (12T)

Peripherals and Interfacing: Interfacing output displays (8212), interfacing input keyboards, key Debounce, Programmable communication interface (8251A), programmable peripheral interface

(8255), Programmable DMA Controller (8257), Programmable interrupt controller (8259), Programmable interval timer (8253).

UNIT V (12T)

Advanced Microprocessors: Introduction to 80186, 80286, 80386, 80486 and Pentium processors, General introduction to BIOS and DOS interrupts.

References:

1. The Intel Microprocessor 8086/8088. 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing, Barry.B.Brey,Prentice Hall of India Pvt.Ltd.
2. Microprocessor X86 programming, K.R. Venugopal, Raj Kumar,BPB publications
3. IBM PC Assembly Language & Programming, Abel P, Parson Education Asia 2001
4. Fundamentals of Microprocessors and Microcomputers, B Ram, DhanpatRai Publications Pvt. Ltd., New Delhi
5. Microprocessors and Microcomputer Based System Designing,
6. MohamadRafiquzzaman, Universal Bookstall, New Delhi
7. Microcomputer Systems: The 8086/8088 Family. Architecture, Programming & Designing, Yu. Cheng Liu, Glenn A Gibson,Prentice Hall of India Pvt. Ltd., New Delhi
8. Advanced Microprocessor and Peripherals, Ray A.K., Bhurchandi.K.M, Tata McGraw-Hill, 2002.

BCA6B17b|Multimedia Systems

Course Number: 36
Contact Hours: 4T
Number of Credits: 4
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objective:

- To get a general introduction and basic skills on Multimedia techniques and tools

Prerequisites:

- Basic knowledge of +2 level Mathematics

Course Outline

UNIT I (12T)

Multimedia Definition, Use Of Multimedia, Delivering Multimedia, Text: About Fonts and Faces, Using Text in Multimedia, Computers and Text, Font Editing and Design Tools, Hypermedia and Hypertext.

UNIT II (12T)

Images: Plan Approach, Organize Tools, Configure Computer Workspace, Making Still Images, Colour, Image File Formats. Sound: The Power of Sound, Digital Audio, Midi Audio, Midi vs. Digital Audio, Multimedia System Sounds, Audio File Formats –Vaughan's Law of Multimedia Minimums, Adding Sound to Multimedia Project.

UNIT III (12T)

Animation: The Power of Motion, Principles of Animation, Animation by Computer, Making Animations that Work. Video: Using Video, Working with Video and Displays, Digital Video Containers, Obtaining Video Clips, Shooting and Editing Video.

UNIT IV (12T)

Making Multimedia: The Stage of Multimedia Project, The Intangible Needs, The Hardware Needs, The Software Needs, An Authoring Systems' Needs. Multimedia Production Team

UNIT V (12T)

Planning and Costing: The Process of Making Multimedia, Scheduling, Estimating, RFPs and Bid Proposals. Designing and Producing, Content and Talent: Acquiring Content, Ownership of Content Created for Project, Acquiring Talent

References:

1. Multimedia: Making It Work,Tay Vaughan
2. Multimedia Computing, Communication & Applications, RalfSteinmetz&KlaraNahrstedt, Pearson Education

BCA6B17c|Software testing & Quality Assurance

Course Number: 36
Contact Hours: 4T
Number of Credits: 4
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To get a general introduction and basic skills on software testingand quality assurance techniques and tools

Prerequisites:

- Basic knowledge of Software Engineering

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.

References:

1. Software Testing Principles and Practices, SrinivasanDesikan&Gopalswamy, Ramesh, Pearson Education.

2. Effective Methods of Software Testing, William E. Perry, Wiley

3. Software Testing, RenuRajani and Pradeep Oak, TMH

4. Software Testing Tools, K. V. K. K. Prasad, Dreamtech Press

5. Introducing Software Testing, LauiseTamres, Pearson Education

BCA6B17d|System Software

Course Number: 36
Contact Hours: 4T
Number of Credits: 4
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To build fundamental knowledge in system software
- To learn functions of various system software
- To 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 (12T)

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

UNIT III (12T)

Loading, Linking and Relocating Loader Schemes-Binders, Linking loaders, overlays, dynamic binders- Dynamic loading and dynamic linking- Relocatability of programs

UNIT IV (12T)

Compilers-Phases of Compiler-Lexical syntax,intermediate code generation, optimization, code generation, symbol table and error correcting routines- Passes of a compiler.

UNIT V (12T)

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

BCA6B17e| Technical Writing

Course Number: 36
Contact Hours per Week: 4 (4T + 0P)
Number of Credits: 3
Number of Contact Hours: 60 Hrs.
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives

- Acquire the skills and knowledge for professional technical communication, web content writing, soft skill development and search engine optimization.

Prerequisites

- Basic communication skills in English.

Course Outline

Unit I [12 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 [12 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 [12 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 [12 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.

OPEN COURSES

BCS5D01| Introduction to Computers & Office Automation

Course Number: 29
Contact Hours: 2T
Number of Credits: 2
Number of Contact Hours: 30 Hrs.
Course Evaluation: Internal – 10 Marks + External – 40 Marks

Objectives:

- To get a general introduction to office automation packages To get a general introduction to Internet

Prerequisites:

- Basic knowledge Computers and Internet

Course Outline

UNIT I (6T)

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 (8T)

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 (8T)

Electronic Spread Sheet(OpenOfficeCalc/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 (8T)

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

BCS5D02 | Introduction to Web Designing

Course Number: 29
Contact Hours: 2T
Number of Credits: 2
Number of Contact Hours: 30 Hrs.
Course Evaluation: Internal – 10 Marks + External – 40 Marks

Objectives:

- To get a general introduction to Internet
- To achieve basic Web designing skills

Prerequisites:

- Basic knowledge Computers and Internet

Course Outline

UNIT I (7T)

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 (7T)

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 (8T)

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 (8T)

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

References:

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

BCS5D03 | Introduction to Problem Solving and C Programming

Course Number: 29
Contact Hours: 2T
Number of Credits: 2
Number of Contact Hours: 30 Hrs.
Course Evaluation: Internal – 10 Marks + External – 40 Marks

Objectives:

- To introduce fundamental principles of Problem Solving aspects.
- To learn the concept of programming.
- To learn C language.

Prerequisites:

- None

Course Outline

UNIT I (7T)

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 (7T)

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 (8T)

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 (8T)

Array & Strings - One dimensional array, two dimensional array and multi-dimensional 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, bit-fields.

References:

1. Programming in ANSI C, E. Balaguruswami.
2. The C Programming Language, Brian W. Kernighan & Dennis M.Ritchie.
3. Let us C, Yashvant P. Kanetkar.
4. Programming with C, ByranGotfried, Schaums Outline series.

BCS5D04| Introduction to Data Analysis using Spread sheet

Course Number: 29
Contact Hours per Week: 2 (2T + 0P)
Number of Credits: 2
Number of Contact Hours: 30 Hrs.
Course Evaluation: Internal – 10 Marks + External – 40 Marks

Objective

- To introduce the importance of software tools.
- To learn the Analysisusing Spread sheets.

Prerequisites

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

Course Outline

Unit I [8 T]

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 [7 T]

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

Unit III [8 T]

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 [7 T]

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.