DEPARTMENT OF
COMPUTER SCIENCE

CURRICULUM AND SYLLABUS FOR
BACHELOR OF COMPUTER APPLICATION
(with effect from 2015 admissions)

St Berchmans College
Founded 1922
AUTONOMOUS | College with Potential for Excellence | Reaccredited by NAAC with A Grade
Affiliated to Mahatma Gandhi University, Kottayam, Kerala
Changanassery, Kottayam, Kerala, India-686101

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The revised syllabus for BCA Programme provides a strong foundation to pursue postgraduate programme in computer science / applications. The knowledge acquired by the students may also equip them to meet the industrial need, and get placed.

Course Objectives

The BCA Programme is designed with the following specific objectives.

- To attract young minds to the potentially rich & employable field of computer applications.
- To be a foundation graduate programme which will act as a feeder course for higher studies in the area of Computer Science/Applications.
- To develop skills in software development so as to enable the BCA graduates to take up self-employment in Indian & global software market.
- To Train & Equip the students to meet the requirement of the Industrial standards

BOARD OF STUDIES IN COMPUTER SCIENCE

1. Dr. Gladston Raj S (Chairman),Associate Professor
   Department of Computer Science, Government College, Nedumangad

2. Dr. Binu P Chacko, Associate Professor
   Prajyothi Nikethan College, Pudukkad, Thrissur

3. Mr. M.C Jose, Associate Professor
   Department of Statistics, SBCollege, Changanacherry

4. Mrs. Ashalakshmi R, Head of the Department
   Department of Computer Science, SB College, Changanacherry

5. Ms. Bobby Joseph, Faculty
   Department of Computer Science, SB College, Changanacherry

6. Ms. Shy Mary Abraham, Faculty
   Department of Computer Science, SB College, Changanacherry

7. Ms. Dhanya C Nair, Faculty
   Department of Computer Science, SB College, Changanacherry

8. Mr. Alex Joseph , Faculty
   Department of Computer Science, SB College, Changanacherry

9. Ms. Merin Joseph, Faculty
   Department of Computer Science, SB College, Changanacherry

10. Ms. Smitha Krishnan, Faculty
    Department of Computer Science, SB College, Changanacherry

REGULATIONS FOR UNDERGRADUATE PROGRAMMES IN COMPUTER APPLICATION UNDER CREDIT SEMESTER SYSTEM (SB-CSS-UG) 2015

1. SHORT TITLE

1.1 These Regulations shall be called St. Berchmans College (Autonomous) Regulations (2015) governing undergraduate programme in Computer Application under the Credit Semester System.

1.2 These Regulations shall come into force with effect from the academic year 2015 - 2016 onwards.

2. SCOPE

2.1 The regulation provided herein shall apply to undergraduate programme in Computer Application conducted by St. Berchmans College (Autonomous) with effect from the academic year 2015 - 2016.

3. DEFINITIONS

3.1 'University' means Mahatma Gandhi University, Kottayam, Kerala.

3.2 'College' means St. Berchmans College (Autonomous).

3.3 There shall be an Academic Committee nominated by the Principal to look after the matters relating to the SB-CSS-UG system.

3.4 'Academic Council' means the Committee consisting of members as provided under section 107 of the Autonomy Ordinance, Government of Kerala.

3.5 'Parent Department' means the Department of Computer Science.

3.6 'Department Council' means the body of all teachers of the Department of Computer Science.

3.7 'Faculty Mentor' is a teacher nominated by a Department Council to coordinate the continuous evaluation and other academic activities of the undergraduate programme in Computer Application.

3.8 'Programme' means a three year programme of study and examinations.

3.9 'Duration of Programme' means the period of time required for the conduct of the programme. The duration of undergraduate programme in Computer Application shall be six (6) semesters.

3.10 'Semester' means a term consisting of a minimum of 450 contact hours distributed over 90 working days, inclusive of examination days, within 18 five-day academic weeks.

3.11 'Course' means a segment of subject matter to be covered in a semester. Each Course is to be designed under lectures/tutorials/laboratory work/ seminar/ project/ practical/ assignments/evaluation etc., to meet effective teaching and learning needs.

3.12 ‘Course Teacher’ means the teacher who is taking classes on the course.

3.13 ‘Core Course’ means a course that the student admitted to undergraduate programme in Computer Application must successfully complete to receive the Degree and which cannot be substituted by any other course.

3.14 ‘Complementary Course’ means a course which would enrich the study of core courses.

3.15 ‘Common Course I’ means a course that comes under the category of courses for English.

3.16 ‘Open Course’ means a course outside the field specialization of the student, which can be opted by a student.

3.17 ‘Elective Course’ means a course, which can be substituted, by equivalent course from the same subject and the number of courses required to complete the programme shall be decided by the respective Board of Studies.

3.18 ‘Extra credit course’ means a course opted by the students, in addition to the compulsory courses, in order to gain additional credit that would boost the performance level and additional skills. The extra credits are not mandatory for a pass in the programme.

3.19 ‘Project’ means a regular project work with stated credits on which the student conducts a project under the supervision of a teacher in the parent department/any appropriate research centre in order to submit a dissertation on the project work as specified.

3.20 ‘Dissertation’ means a minor thesis to be submitted at the end of a research work carried out by each student under the supervision of a teacher in the parent department on a specific area.

3.21 ‘Plagiarism’ is the unreferenced use of other authors’ material in dissertations and is a serious academic offence.

3.22 ‘Seminar’ means a lecture expected to train the student in self-study, collection of relevant matter from books and internet resources, editing, document writing, typing and presentation.

3.23 ‘Tutorial’ means a class to provide an opportunity to interact with students at their individual level to identify the strength and weakness of individual students.

3.24 ‘Evaluation’ means every student shall be evaluated by in-semester assessment (20%) and end-semester assessment (80%).

3.25 ‘Improvement Examination’ is an examination conducted to improve the performance of a student in the courses of a particular semester.

3.26 ‘Supplementary Examination’ is an examination conducted for students who fail in the courses of a particular semester.

3.27 ‘Improvement Course’ is a course registered by a student for improving the performance in that particular course.

3.28 ‘Supplementary Course’ is a course that is repeated by a student for having failed in that course in an earlier registration.

3.29 The minimum credits required for completing undergraduate programme in Computer Application is one hundred and twenty (120).

3.30 ‘Credit’ (C) of a course is a measure of the weekly unit of work assigned for that course in a semester.

3.31 ‘Course Credit’: One credit of the course is defined as a minimum of one (1) hour lecture/minimum of two (2) hours laboratory work per week for eighteen (18) weeks in a semester. The course will be considered as completed only by conducting the final examination.

3.32 ‘Grade’ means a letter symbol (A, B, C etc.) which indicates the broad level of performance of a student in a course/semester/programme.

3.33 ‘Grade Point’ (GP) is the numerical indicator of the percentage of marks awarded to a student in a course.

3.34 ‘Credit Point’ (CP) of a course is the value obtained by multiplying the grade point (GP) by the credit (C) of the course.

3.35 ‘Semester Credit Point Average’ (SCPA) of a semester is calculated by dividing total credit points obtained by the student in a semester by total credits of that semester and shall be rounded off to two decimal places.

3.36 ‘Cumulative Credit Point Average’ (CCPA) is the value obtained by dividing the sum of credit points in all the courses obtained by the student for the entire programme by the total credits of the whole programme and shall be rounded off to two decimal places.

3.37 ‘Institution Average’ is the value obtained by dividing the sum of the marks obtained by all students in a particular course by the number of students in respective course.

3.38 ‘Weighted Average Score’ means the score obtained by dividing sum of the products of marks secured and credit of each course by the total credits of that semester/programme and shall be rounded off to two decimal places.

3.39 'Grace Marks' means marks awarded to course/courses as per the choice of the student, in recognition of meritorious achievements of a student in NCC/NSS/Sports/Arts and cultural activities.

3.40 First, Second, Third, Fourth and Fifth position shall be awarded to students who come in the first five places on the basis of overall marks in the programme in the first chance itself.

4. PROGRAMME STRUCTURE

4.1 Students shall be admitted into six semester undergraduate programme in Computer Application.

4.2 The programme shall include Core courses, Complementary courses, Common courses, Open course and Elective courses. There shall be a Project with dissertation to be undertaken by all students. The programme will also include assignments, seminars, practical, viva-voce, etc.,

4.3 Total credits for the programme is one hundred and twenty (120). The credit distribution for the programmes is shown below.

i.	Programme duration	6 Semesters
ii.	Total Credits required for successful completion of the programme	120
iii.	Minimum credits required from Core + Complementary courses including Project	109
iv.	Minimum credits required from Common courses	8
v.	Minimum credits required from Open course	3
vi.	Minimum attendance required	75%

4.4 **Project**

Mini project:

All students shall do a mini project in the fifth semester. The project shall be done individually or as a group of maximum five (5) students. The report of the project shall be submitted before the examiners appointed by the College. The project report shall be subject to internal and external evaluation followed by a viva-voce.

Main project:

All students shall do a major project in the sixth semester. The project shall be done individually. The report of the project shall be submitted to the department during sixth

semester and shall be produced before the examiners appointed by the College. The project report shall be subject to internal and external evaluation followed by a viva-voce.

4.5 **Evaluations**

The evaluation of each course shall contain two parts.

i Internal or In-Semester Assessment (ISA)

ii External or End-Semester Assessment (ESA)

Both ISA and ESA shall be carried out using indirect grading. The ISA: ESA ratio shall be 1:4, for courses with or without practical. There shall be a maximum of eighty (80) marks for external evaluation and twenty (20) marks for internal evaluation.

4.6 **In-semester assessment**

The components of the internal or in-semester assessment and their marks are as below.

For all theory courses

There are three components for ISA, which include attendance, assignment/seminar/viva-voce and in-semester examination. All the three components of the internal assessment are mandatory.

Components of ISA	Marks
Attendance	5
Assignment	5
In-semester examination (2×5 = 10)	10
Total	**20**

Marks for attendance

% of Attendance	Marks
90 and above	5
85 - 89	4
80 - 84	3
76 - 79	2
75	1

(Decimals shall be rounded off to the next higher whole number)

Internal assessment of practical courses

The internal assessment of practical courses shall be conducted in each semester. The components for internal assessment are given below.

Internal assessment of practical courses in semesters I and V

ISA - Components of Practical	Marks
Attendance	5
Test (at least one) (1×10 = 5 or 2×5 = 10)	10
Viva-Voce	5
Total	**20**

Marks for attendance

% of Attendance	Marks
90 and above	5
85 - 89	4
80 - 84	3
76 - 79	2
75	1

(Decimals shall be rounded off to the next higher whole number)

Internal assessment of practical courses in semesters II, III and IV

ISA - Components of Practical	Marks
Attendance	2
Test (at least one) (1×5 = 5 or 2×2.5 = 10)	5
Viva-Voce	3
Total	**10**

Marks for attendance

% of Attendance	Marks
90 and above	2
75 - 89	1

(Decimals shall be rounded off to the next higher whole number)

4.7 **Assignments**

Assignments shall be submitted for every course in all the semesters. At least one assignment for each course shall be submitted in each semester.

4.8 **Seminar/Viva-Voce**

A student shall present a seminar in the sixth semester and appear for viva-voce in the sixth semester.

4.9 **Internal assessment of mini and main project**

The components of the internal or in-semester assessment and their marks are as below.

Components	Marks
Attendance	5
Project demonstration	10
Viva	5
Total	**20**

4.10 **In-semester examination**

Every student shall undergo at least two in-semester examinations as class test as an internal component for every course.

4.11 To ensure transparency of the evaluation process, the ISA mark awarded to the students in each course in a semester shall be published on the notice board according to the schedule in the academic calendar published by the College. There shall not be any chance for improvement for ISA. The course teacher and the faculty mentor shall maintain the academic record of each student registered for the course which shall be forwarded to the office of the Controller of Examinations through the Head of the Department and a copy should be kept in the office of the Head of the Department for at least two years for verification.

4.12 A student who has not secured minimum marks in internal examinations can redo the same before the end semester examination of the semester concerned.

4.13 **End-semester assessment**

The end-semester examination in theory and practical courses shall be conducted by the College.

4.14 The end-semester examinations shall be conducted at the end of each semester. There shall be one end-semester examination of three (3) hours duration in each lecture based course.

4.15 The question paper should be strictly on the basis of model question paper set by Board of Studies.

4.16 A question paper may contain short answer type/annotation, short essay type questions/problems and long essay type questions.

For all theory courses

Section	Type of Questions	Number of Questions to be answered	Marks	Total Marks
A	Very short answer type	10 out of 10	1	10
B	Short answer type	8 out of 12	2	16
C	Short essay/problem solving type	6 out of 9	4	24
D	Essay type	2 out of 4	15	30
				80

4.17 Photocopies of the answer scripts of the external examination shall be made available to the students for scrutiny as per the regulations in the examination manual.

4.18 Practical examination shall be conducted in each semester. The duration and frequency of practical examination shall be decided by the respective Board of Studies.

4.19 Practical examination shall be conducted by one external examiner and one internal examiner. The question paper setting and evaluation of answer scripts shall be done as per the directions in the examination manual of the College.

4.20 The marks for end-semester theory and practical examinations are given below

Course	Marks
Theory courses	80
Practical courses (semester I and V)	80
Practical courses (semester II, III and IV)	40

4.21 The project report shall be subject to internal and external evaluation followed by a viva-voce at the end of the programme. Internal Evaluation is to be done by the supervising teacher and external evaluation by an external evaluation board consisting of an examiner appointed by the College and the Head of the Department or his nominee. A viva-voce related to the project work shall be conducted by the external evaluation board and students have to attend the viva-voce individually.

Components of Project Evaluation	Marks
Internal Evaluation	20
Dissertation (External)	50
Viva-Voce (External)	30
Total	**100**

4.22 If the student fails in project evaluation, he or she shall submit the project report after modifying it on the basis of the recommendations of the examiners.

4.23 For all courses (theory and practical) an indirect grading system based on a ten (10) point scale according to the percentage of marks (ISA + ESA) is used to evaluate the performance of the student in that course. The percentage shall be rounded mathematically to the nearest whole number.

Percentage of Marks	Grade	Performance	Grade Point
90 and above	A+	Outstanding	10
80 - 89	A	Excellent	9
70 - 79	B	Very Good	8
60 - 69	C	Good	7
50 - 59	D	Satisfactory	6
40 - 49	E	Adequate	5
Below 40	F	Failure	-

5. CREDIT POINT AND CREDIT POINT AVERAGE

5.1 Credit Point

Credit Point (CP) of a course is calculated using the formula

CP = C × GP

where C = Credit; GP = Grade Point

5.2 Semester Credit Point Average

Semester Credit Point Average (SCPA) is calculated using the formula

SCPA = TCP/TC

where TCP = Total Credit Point of all the courses in the semester; TC = Total Credits in the semester

CPA shall be rounded off to two decimal places.

5.3 Cumulative Credit Point Average

Cumulative Credit Point Average (CCPA) is calculated using the formula

CCPA = TCP/TC

where TCP = Total Credit Point of all the courses in the whole programme; TC = Total Credit in the whole programme

CPA shall be rounded off to two decimal places.

Grades for the different semesters, Semester Credit Point Average (SCPA) and grades for overall programme, Cumulative Credit Point Average (CCPA) are given based on the corresponding Credit Point Average (CPA) as shown below:

CPA	Grade	Performance
9.00 and above	A+	Outstanding
8.00 - 8.99	A	Excellent
7.00 - 7.99	B	Very Good
6.00 - 6.99	C	Good
5.00 - 5.99	D	Satisfactory
4.00 - 4.99	E	Adequate
Below 4.00	F	Failure

5.4 A separate minimum of 30% marks each for internal and external (for both theory and practical) and aggregate minimum of 40% are required for a pass in a course.

5.5 For a pass in a programme, a separate minimum of grade E is required for all the individual courses.

5.6 If a candidate secures F Grade for any one of the courses offered in a semester/programme, only F grade will be awarded for that semester/programme until the student improves this to E grade or above within the permitted period.

5.7 Candidate who secures E grade and above will be eligible for higher studies.

6. SUPPLEMENTARY/IMPROVEMENT EXAMINATION

There will be supplementary examinations and chance for improvement. Only one chance will be given for improving the marks of a course.

7. ATTENDANCE

7.1 The minimum requirement of aggregate attendance during a semester for appearing the end semester examination shall be 75%. Condonation of shortage of attendance to a maximum of ten (10) days in a semester subject to a maximum of two times during the whole period of undergraduate programme may be granted by the College.

7.2 If a student represents the College, University, State or Nation in Sports, NCC, NSS or Cultural or any other officially sponsored activities such as College union/University union activities etc., he/she shall be eligible to claim the attendance for the actual number of days participated subject to a maximum of ten (10) days in a semester based on the specific recommendations of the Faculty Mentor and Head of the Department.

7.3 A student who does not satisfy the requirements of attendance shall not be permitted to appear for the end-semester examinations.

7.4 Those students who are not eligible even with condonation of shortage of attendance shall repeat the course along with the next batch.

8. BOARD OF STUDIES AND COURSES

8.1 The Board of Studies in Computer Science shall design all the courses offered in the UG programme. The Board shall design and introduce new courses, modify or re-design existing courses and replace any existing courses with new/modified courses to facilitate better exposure and training for the students.

8.2 The syllabus of a course shall include the title of the course, contact hours, the number of credits and reference materials.

8.3 Each course shall have an alpha numeric code which includes abbreviation of the course in two letters, the semester number, code of the course and the serial number of the course.

8.4 Every Programme conducted under Credit Semester System shall be monitored by the Academic Council.

9. REGISTRATION

9.1 A student shall be permitted to register for the programme at the time of admission.

9.2 A student may be permitted to complete the programme, on valid reasons, within a period of twelve (12) continuous semesters from the date of commencement of the first semester of the programme.

9.3 The minimum strength of students for open courses is 15 and the maximum is 75 per batch.

9.4 Each student shall register for the open courses in the prescribed registration form in consultation with the faculty mentor during fourth semester. Faculty mentor shall permit registration on the basis of the preferences of the student and availability of seats.

9.5 Those students who possess the required minimum attendance and progress during an academic year/semester and could not register for the annual/semester examination in time are permitted to apply for Notional Registration to the examinations concerned enabling them to get promoted to the next semester.

10. ADMISSION

10.1 The admission to undergraduate programme in Computer Application shall be as per the rules and regulations of the College/University.

10.2 The eligibility criteria for admission shall be as announced by the College/University from time to time.

10.3 Separate rank lists shall be drawn up for seats under reservation quota as per the existing rules.

10.4 There shall be a uniform academic and examination calendar prepared by the College for the conduct of the programmes.

11. ADMISSION REQUIREMENTS

11.1 Candidates for admission to the first semester of the undergraduate programme in Computer Application through SB-CSS-UG shall be required to have passed Plus Two or equivalent examination or any other examination of any recognized authority, accepted by the Academic council of Mahatma Gandhi University as equivalent thereto.

11.2 Students admitted under this programme are governed by the Regulations in force.

12. **PROMOTION**

A student who registers his/her name for the external examination for a semester will be eligible for promotion to the next semester.

13. **MARK CUM GRADE CARD**

13.1 The College under its seal shall issue to the students, a Mark cum Grade card on completion of each semester, which shall contain the following information.

i. Name of the Student
ii. Register Number
iii. Photo of the student
iv. Degree
v. Programme
vi. Semester and Name of the Examination
vii. Month and Year of Examination
viii. Stream
ix. Course Code, Title and Credits of each course opted in the semester
x. Marks for ISA, ESA, Total Marks (ISA + ESA), Maximum Marks, Letter Grade, Grade Point (GP), Credit Point (CP) and Institution Average in each course opted in the semester
xi. Total Credits, Marks Awarded, Credit Point, SCPA and Letter Grade in the semester
xii. Weighted Average Score
xiii. Result

13.2 The final Mark cum Grade Card issued at the end of the final semester shall contain the details of all courses taken during the entire programme including those taken over and above the prescribed minimum credits for obtaining the degree. The final Mark Cum Grade Card shall show the CCPA and the overall letter grade of a student for the entire programme.

14. AWARD OF DEGREE

The successful completion of all the courses with 'E' grade shall be the minimum requirement for the award of the degree.

15. MONITORING COMMITTEE

There shall be a Monitoring Committee constituted by the Principal to monitor the internal evaluation conducted by the College. The Course Teacher, Faculty Mentor, and the College Coordinator should keep all the records of the continuous evaluation, for at least a period of two years, for verification.

16. GRIEVANCE REDRESSAL MECHANISM

16.1 In order to address the grievance of students regarding ISA, a two-level Grievance Redressal mechanism is envisaged.

16.2 A student can approach the upper level only if grievance is not addressed at the lower level.

16.3 Department level: The Principal shall form a Grievance Redressal Committee in each Department comprising of course teacher and one senior teacher as members and the Head of the Department as Chairman. The Committee shall address all grievances relating to the internal assessment of the students.

16.4 College level: There shall be a College level Grievance Redressal Committee comprising of Faculty Mentor, two senior teachers and two staff council members (one shall be an elected member) and the Principal as Chairman. The Committee shall address all grievances relating to the internal assessment of the students.

17. TRANSITORY PROVISION

Notwithstanding anything contained in these regulations, the Principal shall, for a period of three years from the date of coming into force of these regulations, have the power to provide by order that these regulations shall be applied to any programme with such modifications as may be necessary.

Model Mark cum Grade Card – Semester I

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MARK CUM GRADE CARD

Date:

Name of the Candidate :
Register Number :
Degree : Bachelor of Computer Application
Programme : Computer Application
Stream : Model I
Name of Examination : First Semester SB-CSS-UG Examination, Month YYYY

Photo

Course Code	Course Title	Credits (C)	Marks						Grade Awarded (G)	Grade Point (GP)	Credit Point (CP)	Institution Average	Result
			ISA		ESA		Total						
			Awarded	Maximum	Awarded	Maximum	Awarded	Maximum					
	Common Course - I												
	Core Course												
	Complementary Course												
	Total												
	Weighted Average Score												
	Semester Result												
	SCPA												
	End of Statement												

Entered by:

Verified by:

Controller of Examinations

Principal

Model Mark cum Grade Card (Semester V)

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MARK CUM GRADE CARD

Date:

Name of the Candidate :
Register Number :
Degree : Bachelor of Computer Application
Programme : Computer Application
Stream : Model I
Name of Examination : Fifth Semester SB-CSS-UG Examination, Month YYYY

Photo

Course Code	Course Title	Credits (C)	Marks						Grade Awarded (G)	Grade Point (GP)	Credit Point (CP)	Institution Average	Result
			ISA		ESA		Total						
			Awarded	Maximum	Awarded	Maximum	Awarded	Maximum					
	Core Course												
	Open Course												
	Total												
	Weighted Average Score												
	Semester Result												
	SCPA												
	End of Statement												

Entered by:

Verified by:

Controller of Examinations

Principal

Model Mark cum Grade Card (Semester VI)

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MARK CUM GRADE CARD

Date:

Name of the Candidate :
Register Number :
Degree : Bachelor of Computer Application
Programme : Computer Application
Stream : Model I
Name of Examination : Sixth Semester SB-CSS-UG Examination, Month YYYY

Photo

Course Code	Course Title	Credits (C)	Marks						Grade Awarded (G)	Grade Point (GP)	Credit Point (CP)	Institution Average	Result
			ISA		ESA		Total						
			Awarded	Maximum	Awarded	Maximum	Awarded	Maximum					
	Core Course Elective Course Project Total Weighted Average Score Semester Result SCPA												

Semester Results								Programme Part Results					
Semester	Marks Awarded	Maximum Marks	Credits	SCPA	Grade	Month & Year of Passing	Result	Course Category and Subject Studied	Marks Awarded	Maximum Marks	Credits	CCPA	Grade
I								Common Course I					
II								Common Course II					
III								Core Course					
IV								Complementary Course					
V								Complementary Course					
VI								Open Course					
								Project					
								Elective Course					
								Total					

Final Result
Cumulative Credit Point Average (CCPA):
Grade Awarded:

Entered by:

Verified by:

Controller of Examinations

Principal

PROGRAMME STRUCTURE

Semester I

Sl. No.	Course Title	Hours/ week	Credits	Marks
1	Common Course I	5	4	100
2	Core Course	5	4	100
3	Core Course	5	4	100
4	Core Course Practical	2	1	100
5	Complementary Course: Mathematics	4	3	100
6	Complementary Course: Statistics	4	3	100
	Total	**25**	**19**	**600**

Semester II

Sl. No.	Course Title	Hours/ week	Credits	Marks
1	Common Course I	5	4	100
2	Core Course	4	4	100
3	Core Course	4	4	100
4	Core Course	4	4	70
5	Core Course Practical	2	1	50
6	Core Course Practical	2	1	50
7	Complementary Course: Mathematics	4	3	100
	Total	**25**	**21**	**600**

Semester III

Sl. No.	Course Title	Hours/ week	Credits	Marks
1	Core Course	4	4	70
2	Core Course	4	4	100
3	Core Course	4	4	70
4	Core Course	5	4	100
5	Core Course Practical	2	1	50
6	Core Course Practical	2	1	50
7	Complementary Course: Statistics	4	4	100
	Total	**25**	**22**	**600**

Semester IV

Sl. No.	Course Title	Hours/ week	Credits	Marks
1	Core Course	4	4	100
2	Core Course	5	4	100
3	Core Course	4	4	100
4	Core Course	4	4	100
5	Core Course Practical	2	1	50
6	Core Course Practical	2	1	50
7	Complementary Course: Statistics	4	4	100
	Total	**25**	**22**	**600**

Semester V

Sl. No.	Course Title	Hours/ week	Credits	Marks
1	Core Course	5	4	100
2	Core Course	5	4	100
3	Core Course	5	4	100
4	Core Course Practical	2	1	100
5	Open Course	4	3	100
6	Mini Project	4	2	100
	Total	**25**	**18**	**600**

Semester VI

Sl. No.	Course Title	Hours/ week	Credits	Marks
1	Core Course	5	4	100
2	Core Course	5	4	100
3	Elective Course	5	4	100
4	Seminar	1	1	100
5	Main Project	9	4	100
6	Viva-Voce	-	1	100
	Total	**25**	**18**	**600**
	Grand Total		**120**	**3600**

OUTLINE OF THE CORE COURSES

Course Code	Title of the Course	Instructional hours/week	Instructional hours for the course	Credits	ISA	ESA	Total
Semester I							
ABCS101	Introduction to IT	5	90	4	20	80	100
ABCS102	Programming in C	5	90	4	20	80	100
ABCS1P01	Programming in C (P)	2	36	1	20	80	100
Semester II							
ABCS203	Internet Programming	4	72	4	20	80	100
ABCS204	Data Structures and Algorithms	4	72	4	20	80	100
ABCS205	Fundamentals of Digital Systems	4	72	4	20	80	100
ABCS2P02	Internet Programming Lab (P)	2	36	1	10	40	50
ABCS2P03	DS Lab (P)	2	36	1	10	40	50
Semester III							
ABCS306	Computer Graphics	4	72	4	20	80	100
ABCS307	Computer Architecture and Parallel Processing	4	72	4	20	80	100
ABCS308	Object Oriented Programming and C++	4	72	4	20	80	100
ABCS309	Introduction to Information Security	5	90	4	20	80	100
ABCS3P04	Graphics using Scilab (P)	2	36	1	10	40	50
ABCS3P05	C++ Lab (P)	2	36	1	10	40	50
Semester IV							
ABCS410	Operating Systems	4	72	4	20	80	100
ABCS411	Software Engineering	5	90	4	20	80	100
ABCS412	Data Base Management Systems	4	72	4	20	80	100
ABCS413	Web Programming with PHP	4	72	4	20	80	100
ABCS4P06	PHP Lab (P)	2	36	1	10	40	50
ABCS4P07	MYSQL Lab (P)	2	36	1	10	40	50
Semester V							
ABCS514	Data Communications and Computer Networks	5	90	4	20	80	100
ABCS515	Software Project Management	5	90	4	20	80	100
ABCS516	Java Programming	5	90	4	20	80	100
ABCS5P08	JAVA Lab (P)	2	36	1	20	80	100
ABCS5PJ	Mini Project	4	72	2	20	80	100
Semester VI							
ABCS617	Programming with .NET	5	90	4	20	80	100
ABCS618	Software Testing	5	90	4	20	80	100
	Elective Course	5	90	4	20	80	100
ABCS6SR	Seminar	1	18	1	100	-	100
ABCS6PJ	Main Project	9	162	4	20	100	100
ABCS6VV	Viva-Voce	-	-	1	-	100	100

ELECTIVE COURSES

Course Code	Title of the Course	Instructional hours/week	Instructional hours for the course	Credits	ISA	ESA	Total
ABCS6E01	FOSS	5	90	4	20	80	100
ABCS6E02	Wireless Computing Technology	5	90	4	20	80	100
ABCS6E03	E - Commerce	5	90	4	20	80	100

SEMESTER I

ABCS101: INTRODUCTION TO IT

Instructional Hours: 90

Credits: 4

Aim: To provide the students Basic knowledge of computers and information technology.

Objectives:

- To understand the evolution of computers in different generations.
- To provide the basic knowledge about the functional units of computer system
- To familiarize the operating system and network.

Unit-1: Introduction: Parts of Computer System- Hardware, Software, Data, Users, Different types of computers, Characteristics of computers, Computer Languages - Machine, Assembly Language and Higher Level languages - 3GL, 4GL, 5GL

Unit-2: Interacting with Computers:-Input Devices - Key Board, Mouse, Variants of Mouse, Handheld devices, Optical Input devices, Output Devices: Monitors, Sound Systems, and Hard copy devices, Graphics software. Display devices- Raster Scan Display, DVST, Flat panel, LCD, Raster Scan systems, Random Scan systems.

Unit-3: Data Processing: Representation of data, processing of data - The CPU, Memory- different types of RAM and ROM, Factors affecting speed

Unit-4: Storing Information in a Computer: Types of Storage Devices - Magnetic Storage Devices –Data storage and organization on a Magnetic Disk, Finding data on a disk - Diskettes - Hard Disks- Tape drives- Optical Storage devices, Solid state storage devices

Unit-5: System Maintenance: Installation - Operating System, CD-ROM Drive, Sound Card, printer, Control panel - Display properties, Adding and removing software, setting date and time, screen saver, appearance. Antivirus installation, Formatting, Disk clean up, Disk defragmenter. Configure and Connect Dial-Up Networking, Configure a Peer-to-Peer Network, Writing data on disc- CD/DVD Burning, Customize the Windows Desktop, Use Files and Folders

Core Reference:

1. Peter Norton's Introduction to Computers, Published by Tata McGraw Hill, Seventh Edition

References:

1. P K Sinha & Priti Sinha, Computer Fundamentals, BPB Publications, Sixth Edition
2. Introduction to Computer Science, ITL Education Solution limited, Second edition

ABCS102: PROGRAMMING IN C

Instructional Hours: 90

Credits: 4

Aim: To Understand the Programming Fundamentals and the basics of the 'C' Programming Language.

Objectives:

- To be able to build own logic for a given problem and finally develop one's own programs
- To understand the syntax and the semantics of C programming language.

UNIT 1: Program Concept, Characteristics of Programming, Various stages in Program Development Programming aids Algorithms, Flow Charts - Symbols, Rules for making Flow chart, Programming Techniques – Top down, Bottom up, Modular, Structured - Features, Merits, Demerits, and their Comparative study. Programming Logic- Simple, Branching, Looping.

Unit 2: C language basics: C character set, Identifiers and keywords, Data types, Enumeration type, constants, variables, declarations, qualifiers – long, short and unsigned declarations, expressions, symbolic constants, input/output functions, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, increment and decrement operators, Precedence and order of evaluation, conditional operators, bit operators, type casting, using library functions in math.

Unit 3: Control flow: If statement, if….else statement, nested if ..else statement, switch statements, looping – for loop , while loop, do … while statements, nested loop structure, break, continue and go to statements.

Arrays & Strings: Single dimensional arrays, multidimensional arrays, initializing array using static declaration, Searching and sorting of Arrays, Array of Characters, Character arrays and strings, String handling Functions.

Unit 4: User Defined Functions: Function declaration, definition & scope, recursion, Arrays and functions, call by value, call by reference, Storage Classes: automatic, external (global), static & registers.

Unit 5: Structures: Definition of Structures, declaration, structure passing to functions, array of structures, arrays with in structures, unions, type def statements.

Pointers: Pointer Definition, pointer arithmetic, array & pointer relationship, pointer to array, pointer to structure, dynamic memory allocation.

Core References:

1. E. Bala Guruswamy, Programming in ANSI C 6E, TMH
2. Byron S Gottfried, Shaum's Outline series, Programming in C, TMH

References:

1. P K Sinha & Priti Sinha Computer Fundamentals, Sixth Edition.
2. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI, Second Edition

PRACTICAL

ABCS1P01: PROGRAMMING IN C

Instructional Hours: 36

Credits: 1

1. Programs using Basic Constructs: Fundamental data types, qualifiers- long, short, unsigned, input/output functions – scanf(), printf(), Arithmetic expressions, Evaluation of integer, real and mixed mode arithmetic expressions, truncation effect, type casting, relational and logical expressions, Conditional operators, trigonometric functions- sin(), cos(), tan(), mathematical functions – abs(), sqrt(), round() defined in math.h, printing formatted outputs using width specifier.

2. Programs using control structures: if, switch, for, while, do…while, nested structures, break and continue. Sample programs should include printing of Fibonacci numbers, prime numbers, check for Armstrong numbers, summation series – exp(x), sin series etc and verification of result using built in functions, printing pyramid like pattern & other similar patterns using nested loops.

3. Programs using Arrays: Array based programs – Creation of array containing prime numbers, matrix addition, matrix multiplication, transpose of a matrix, array sorting, preparing rank lists based on marks, searching of arrays (linear) for finding price of an item. Static initialization of arrays.

4. String manipulation programs – reading strings using %s, gets(), getchar(), copying one string into another, counting number of characters, vowels, words etc, using string handling functions.

5. User Defined Functions: Programs using return type functions, void type functions, example program using recursive functions, array sorting program using function with call by reference, function to copy one string into another.

6. Program using structures: array of structures, program using structure containing arrays and array of structures. Rank list preparation

7. Simple program using pointers

8. IT (for In Semester Assessment only-ISA)

1. Installation - Operating System, CD-ROM Drive, Sound Card, printer
2. Control panel –

2.1 Display properties

2.2 Adding and removing software

2.3 Setting date and time

2.4 Setting Screen saver, appearance using windows accessories.

2.5 Antivirus installation

2.6 Formatting, Disk clean up, Disk defragmenter.

2.7 Configure and Connect Dial-Up Networking, Configure a Peer-to-Peer Network, Troubleshoot Software and Hardware,

3. Writing data on disc using CD DVD Burner
4. Customize the Windows Desktop
5. File & Folder Operations

SEMESTER II

ABCS203: INTERNET PROGRAMMING

Instructional Hours: 72

Credits: 4

Aim: To highlight the features of different technologies involved in Web Development

Objectives:

- To design and implement websites.
- To use client-side technologies (CSS, forms, JavaScript).
- To recognize and evaluate website organizational structure and design elements.

UNIT 1: INTERNET- Basics of internet- Addresses & names for the internet, Web objects & site , E-mail, WWW, File transfer, The TELNET, The USENET , Gopher, Wais, Archie, Veronica, Internet chat, Web server, Proxy server, Fast ready connections to the Web, Web Browser.

UNIT 2: HTML, Basic HTML, Document Body Text, Hyperlink, Adding more formatting, LISTS- Using Colour& images- Tables, Multimedia objects, Frames, forms- MARQUEE.

UNIT 3: DHTML, Cascading ,style sheets, Introduction using styles, Working simple examples, Defining your own styles, Properties & values in styles , Style sheets– A worked example , Formatting blocks of information.

UNIT 4: Java script – Introduction to Java script – Basics – Variables – String manipulation – Mathematical Functions – Operations – Arrays – Functions – Objects in Java script- regular expressions – Built- in objects – Data validation – Messages & Confirmation – Status bar- Writing to a different frame.

UNIT 5: CGI Programming: HTML Forms and Fields; Perl: Basic control structures, datatypes and basic features; CGI Programs: GET & POST methods, simple applications; Cookies; Server Side Includes; Example Applications

Core References:

1. Raj Kamal, Internet & Web Technologies, Tata McGraw Hill
2. Chris Bates, Web Programming, John Wiley & Sons, Third Edition

References:

1. Steven Holzner, HTML Black Book, Dreamtech Publishers

ABCS204: DATA STRUCTURES AND ALGORITHMS

Instructional Hours: 72

Credits: 4

Aim: To understand the use of the basic data structures along with their applications.

Objectives:

- To learn the use and working of the various data structures.
- To build own algorithms and pseudocodes for the various applications of the basic data structures.

Unit 1: Concept of Structured data: Data structure definition, Different types and classification of data structures, Arrays– representation of array in the memory, linear array operations, Bubble sort, Selection sort, linear search, binary search, sparse matrix.

Unit 2: Stacks and Queues: organization and operation on stacks– Conversion between infix to postfix & prefix representations- Expression Evaluation - Organization and operations on queues-circular queue-multiple stacks and queue - Applications of stacks and queues.

Unit 3:**Linked list**: Concept of dynamic data structures, linked list, types of linked list, linked list using pointers, insertion and deletion– examples, circular list – doubly linked lists, garbage collection.

Unit 4: **Trees**: Concept of recursion, definition of - trees, binary trees, strictly binary trees, complete binary tree and Binary search tree, Creation of binary search tree, traversing methods - examples.

Unit 5: **Algorithm**: Introduction, Definition, Areas of algorithm study, performance analysis - space complexity, time complexity, asymptotic notations

Core References:

1. G.S Baluja Danapat Rai & Co. Data Structures through C (A Practical Approach)
2. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures, Galgotia Publications, Second Edition

References:

1. Ashok N. Kamthane, Introduction to data structures in C, Person Education
2. Seymour Lipschutz, Theory and Problems of Data Structures, Schaum's Outline Series
3. Tanenbaum, Data structures using C and C++, Second Edition

ABCS205: FUNDAMENTALS OF DIGITAL SYSTEMS

Instructional Hours: 72

Credits: 4

Aim: To understand various digital systems and their applications.

Objectives:

- To understand number systems
- To learn about the design principles of different digital electronic circuits
- To design different logic circuits

Unit 1: Number Systems: Base of a number system, Positional number system, Popular number systems(Decimal, Binary, Octal and Hexadecimal), Counting in binary number system, Conversion-Decimal to Binary, Binary to Decimal, Decimal to Octal, Octal to decimal and binary, Decimal to hexadecimal, Hexadecimal to decimal, Binary and octal, Concept of binary addition and subtraction, Complements in binary number systems,1's Complement, 2's Complement and their applications, Number representation in memory- bi-stable devices, Signed magnitude form, Representation of real numbers, BCD numbers-concept and addition, Concept of parity bit.

Unit 2: Boolean Algebra: Basic laws of Boolean Algebra, Simplification of Expressions, De Morgan's theorems, Dual expressions, Canonical expressions, Min terms and Max terms, SOP and POS expressions, Simplification of expression using K-MAP (up to 4 variables), Don't care conditions

Unit 3: Gate Networks: Logic gates- AND, OR, NOT, NAND and NOR – Truth tables and graphical representation, Representation of simplified expressions using NAND/NOR Gates, XOR and it's applications, parity generator and checker.

Unit4: Sequential and Combinational Logic. Flip flops- Latch, Clocked, RS, JK, T, D and Master slave , Triggering of flip flops , Counters- Synchronous and asynchronous , BCD, Ripple counters, Half adder, Full adder(need and circuit diagram), Encoders, Decodes, Multiplexers and Demultiplexers (working of each with diagram), Analog to digital and digital to analog converters (Diagram and working principle).

Unit 5: The Memory Elements: Concept of Registers, Shift Registers, and Flip flops as building blocks of memory, introduction to RAM & ROM

Core References:

1. M. M. Mano-Digital Logic and Computer design

References:

1. Thomas C Bartee- Digital computer Fundamentals, Sixth Edition
2. Floyd- Digital Fundamentals, Tenth Edition
3. Malvino & Leach- Digital Principles and Applications

PRACTICAL

ABCS2P02: INTERNET PROGRAMMING LAB

Instructional Hours: 36

Credits: 1

1. Web page designing using basic HTML tags
2. Style specifications using CSS
3. Programs using JavaScript
4. CGI Programming

ABCS2P03: DS LAB

Instructional Hours: 36

Credits: 1

Data Structures using C

1. Array search and sort – Bubble sort, Selection sort, linear search, binary search, sparse matrix, polynomial addition.
2. Stack implementation, Application of stacks – Conversion of infix expression to postfix, expression evaluation.
3. Queue implementation, Implementation of circular queue.
4. Linked list- implementation, concatenation etc., circular list and doubly linked list implementation, implementation of stacks and queue using linked lists.
5. Creation and traversal of binary search trees.

SEMESTER III

ABCS306: COMPUTER GRAPHICS

Instructional Hours: 72

Credits: 4

Aim: To understand the computer graphics and its applications.

Objectives:

- To provide a comprehensive introduction to computer graphics
- To focus on 2D & 3D Modelling
- To create interactive graphics techniques using different algorithms

Unit 1: Points and lines: Line drawing algorithms, Simple DDA. Circle generation, Midpoint circle algorithm, Character generation.

Unit 2: 2D Transformations: Translation, Rotation, Scaling – Matrix representation and homogenous coordinates, composite transformation, raster methods for transformations. **Two-dimensional viewing:** viewing pipeline, concept of window and view port, window to viewport transformation. Clipping operations – point clipping, line clipping, Cohen Sutherland line clipping, polygon clipping, Sutherland-Hodgeman polygon clipping.

Unit 3: Structure Concepts: Basic structure functions, setting structure attributes, Editing structures. **Graphical User interface and interactive input methods:** Input of graphical data, interactive picture construction techniques.

Unit 4:Three-dimensional concepts: Three dimensional display methods, three dimensional graphics packages. **Three dimensional object representations:** Polygon surfaces, sweep representations, constructive solid geometry methods, octrees and quad trees.

Unit 5: Working with Scilab: Installation of the software Scilab. Basic syntax, Mathematical Operators, Predefined constants, Built in functions. Complex numbers, Polynomials, Vectors, Matrix. Handling these data structures using built in functions. Programming – Functions, Loops, Conditional statements, Handling .sci files. Graphics handling- 2D, 3D, Generating .jpg files

Core References:

1. Hearn D & Baker MP, “Computer Graphics”, PHI
2. Amarendra Sinha, Computer Graphics, PHI

References:

1. Newman W M & R F Sproul, “Principles of Interactive Computer Graphics”, Mc-Graw Hill Book Company.
2. Plastock R & Xiang Z, “Theory and problems of computer Graphics”, Schaum Series, McGraw Hill book Company.

ABCS307: COMPUTER ARCHITECTURE AND PARALLEL PROCESSING

Instructional Hours: 72

Credits: 4

Aim: To understand the organization & architecture of computer

Objectives:

- To gain knowledge in addressing modes, memory organization
- To know about parallel computer structures
- To familiarize different processing techniques

Unit 1: Functional units of a computer: Basic operational concepts, Bus structure, Addressing methods, Memory locations and addresses, Instructions and instruction sequencing, Instruction execution**.**

Unit 2: Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Instruction Classification, Addressing modes.

Unit 3:Main Memory: Organization of RAM, SRAM, DRAM,, Read Only Memory-ROM,PROM,EROM,EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.

Unit 4: **Input-Output organization:** Peripheral devices, I/O interface, Accessing I/O devices- Modes of transfer, interrupts, DMA, Buses

Unit 5: **Pipelining and Vector processing:** Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD. Introduction to pipelining, Instruction and Arithmetic pipelines (design) Vector processing, Array Processors.

Core References:

1. M.M Mano-Computer Systems Architecture, Third Edition
2. Hamachar-Computer Organization, TMH, Fifth Edition

References:

1. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India

ABCS308: OBJECT ORIENTED PROGRAMMING AND C++

Instructional Hours: 72

Credits: 4

Aim: To understand the basics of Object Oriented Programming and their applications.

Objectives:

- To discuss the principles of object oriented model and its implementation in C++.
- To know about constructing programs using Bottom-up design approach.
- To implement different stream operations.

Unit 1: Introduction: Object Orientation- object oriented development-Object oriented Methodology-Object oriented Models-Object oriented themes-Modeling-Objects and classes concepts-Links and association concepts-Generalization and Inheritance-state modeling-interaction modeling

Unit 2:Object Oriented language C++: Basic concept of object oriented programming - benefits of oops-Structure of C++ Program-Basic, derived and user defined data types-Symbolic constants-operators in C++ - Control Structures -Functions in C++-The main function, function prototyping-call by reference-return by reference- inline function-function overloading- friend and virtual functions

Unit 3:Classes and objects-specifying a class - Defining member functions - Nesting of member functions - Private member functions - arrays within a class - static data members - static member functions - Arrays of objects-objects as function arguments. Constructors and Destructors- Constructors- Parameterized Constructors-Multiple constructors - Copy constructor - Dynamic constructor-Destructors –

Unit 4: Operator overloading & Inheritance-Operator overloading& Type conversions. Inheritance-Defining derived classes-Single, Multiple, Multilevel, Hierarchical and hybrid inheritance- private, public, protected inheritance-virtual base classes-Abstract classes-Constructors in derived classes- nesting of classes.

Unit 5: Pointers-Virtual functions and polymorphism-Pointers-Pointers to objects-this pointer-pointer to derived classes-virtual functions-Pure virtual functions-C++ streams-Stream classes-Unformatted and Formatted console I/O operations- Managing output with manipulators, Manipulating strings.

Core References*:*

1. E. Balaguruswamy, Object oriented Programming with C++, Sixth edition
2. James Rumbaugh, Michael Blaha, Object Oriented Modeling and Design with UML, Second Edition

References:

1. Yashwant Kanetkar, Let Us C++, BPB Publications, Second Edition
2. John R Hubbard, Programming with C++, Shaum's Outline series.
3. Rajesh K Shukla, Wiley India, Objected-Oriented Programming in C++
4. Venugopal, Rajkumar, Ravishankar, *Mastering C++*, TMH

ABCS309: INTRODUCTION TO INFORMATION SECURITY

Instructional Hours: 90

Credits: 4

Aim:

- To introduce internetworking and the issues and methods of information security over internetworks.

Objectives:

- Be aware of principles and protocols of internetworks
- Understand the basic issues in information security
- Understand the concept of ciphers and cryptography.
- Understand the concept of digital signatures and e-mail security policies
- To impart an idea on malicious software and remedies.

Unit I: Information Security: Elements, Confidentiality, integrity, authentication, security policy, basic network security terminology, cryptography, symmetric encryption, substitution ciphers, transposition ciphers, steganography.

Unit 2: Data Encryption Standards: Block ciphers, modes of operation, Data Encryption Standard, Public key cryptography, applications, strength and weakness, RSA algorithm, key distribution (concepts only).

Unit3: Authentication, authentication methods, message digest, digital signatures, digital signature algorithm, DSS, E-mail security: Pretty Good Privacy, working of PGP, S/MIME, MIME, IP Security, Architecture, IPSec: strengths and benefits, IPv4, IPv6, ESP protocol, Web Security: Secure Socket layer, SSL session and connection.

Unit4: Malicious Software, viruses, working of anti-virus software, worms, Trojans, spyware, firewall, characteristics of firewall, packet filters, application level gateways, firewall architecture, trusted systems.

Unit5: Security and Law:- Regulations in India. Information Technology Act 2000/2008.Cyber Crime and the IT Act 2000/2008.Indian Contract Act 1872, Indian Penal Code, Indian Copyright Act, Consumer Protection Act, Future Trends – The Law of Convergence.

Core References:

1. Pachghare, V.K., Cryptography and Information Security, PHI.
2. Brijendra Singh, Network Security& Management, PHI.

References:

1. Behrouz A. Forouzan, “Cryptography and Network Security”, Tata McGraw Hill, Special Indian Edition
2. William Stallings, “Cryptography and Network Security: Principles and Practice”, Pearson Education, Sixth edition

PRACTICAL

ABCS3P04: GRAPHICS USING SCILAB

Instructional Hours: 36

Credits: 1

1. Write a program to draw a line
2. Write a program to draw a circle
3. Write a program to implement 2D transformation.
4. Write a program to implement clipping
5. Write a program to move a car
6. Write a program to bounce a ball and move it with sound effect.
7. Write a program to test whether a given pixel is inside or outside or on a polygon.

ABCS3P05: C++ LAB

Instructional Hours: 36

Credits: 1

I. Programs using C++

1. Programs based on class, objects and manipulation of objects using member functions
2. Programs based on friend functions, passing objects as arguments to function.
3. Programs based on array of objects.
4. Programs based on function overloading, Default arguments.
5. Programs based on operator overloading (binary, unary) using member functions and friend functions.
6. Programs based on constructors, different types of constructors- copy constructor, default constructor.
7. Programs based on Inheritance, different types of inheritance.
8. Programs using virtual functions and polymorphism, this pointer

SEMESTER IV

ABCS410: OPERATING SYSTEMS

Instructional Hours: 72

Credits: 4

Aim: To introduce the Operating System and describe the functionalities of Operating System.

Objectives:

- To understand the services provided by an operating system.
- To understand what a process is and how processes are synchronized and scheduled.
- To know about memory management and the file system.

Unit 1: Introduction: OS Definition, Functions, OS as a resource manager, types of OS Evolution of OS, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

Unit 2: Process: Basic Concepts, Process Scheduling, Operations on 'Processes, Inter process communication, Process Scheduling – Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

Unit 3: Process Coordination: Synchronization – The Critical Section problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors. Dead Locks: System Model, Dead Lock Characterization, Methods of Handling Dead Locks, Dead Lock Prevention, Dead Lock Avoidance, Dead Lock Detection, Recovery from Dead Lock.

Unit 4: Memory Management: Memory Management Strategies–Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management- Demand paging, Page Replacement

Unit 5: Storage Management :-File System :- File Concept, Access Methods, Directory Structure, protection , Implementing File Systems-File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

Core References:

1. Abraham Silberschatz, Peter Galvin and Greg Gagne, John Wiley Operating System Principles, Seventh Edition.
2. William Stallings, Operating Systems, Fifth Edition

Reference:

1. Milan Kovic, Operating Systems, TMH, Second Edition

ABCS411: SOFTWARE ENGINEERING

Instructional Hours: 90

Credits: 4

Aim: To understand the importance, limitations and challenges of processes involved in software development.

Objectives:

- To gain knowledge of various software models.
- To gain knowledge of various software design activities.
- To familiarize about coding and metrics.

Unit 1: Introduction to Software Engineering, Definition, Program Vs Software, and Software process and product matrices, Software Characteristics, Brief introduction about product and process, Software process and product matrices. Software life cycle models-Definition, Waterfall model, Increment process models, spiral model, prototyping model, Evolutionary process models, Selection of a life cycle model.

Unit 2:Software Requirement Analysis and Specification, Requirements Engineering, type of requirements, Feasibility Studies, Requirement Elicitation, Various steps for requirement analysis, DFD, Leveling of DFD, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO).

Unit 3: Software Design: **Function oriented design**-Design principles, problem partitioning, abstraction, modularity, top-down & bottom-up approach, **Object oriented design**- OO Analysis & design, design methodology, **Detailed design**- PDL, logic algorithm design, state modeling of classes.

Unit 4: Coding& Testing: Programming practice- top-down & bottom-up approach, structured programming, information hiding, programming style, internal documentation, verification-code reading, static analysis, symbolic execution, code inspections and reviews. Software Testing-Functional testing & structural testing.

Unit 5: Software Maintenance: Categories, problems, process, Maintenance models, estimation of maintenance cost.

Core References:

1. K K Aggarwal, Yogesh Singh, Software Engineering, New Age International Publications, Third Edition

2. Pankaj Jalote, An Integrated approach to Software Engineering, Narosa Publishing Company, Pearson Education, Third Edition

References:

1. Rajib Mall, Fundamentals of Software Engineering, PHI, Fourth edition
2. Waman S Jawadekar, Software Engineering Principles and Practice, Tata McGraw-Hill

ABCS412: DATA BASE MANAGEMENT SYSTEMS

Instructional Hours: 72

Credits: 4

Aim: To introduce the concept of Back end, data storage in computers, design of a DBMS, Queries to construct database, store and retrieve data from the database

Objectives:

- To understand conceptual and physical design of a database.
- To understand RDBMS and queries to design database and manipulate data in it.
- To know basic database backup and recovery.

Unit 1: Introduction: Characteristics of database approach, Data base users-DBA, Data base designers and end users, Advantages of using DBMS, Data Modes- Schemas and instances, DBMS architecture and data independence. DBMS language-DDL, DML,DCL Data Base system environment, DBMS Component and modules.

ER Modeling- Introduction- Entity types, Entity sets, Attributes and Keys, Relationship Types, Relationship Sets relationship instances, Constraints on relationship types, Weak entity types, sample ER diagrams.

Unit 2: Relational Data Model: Relational model concepts domains, attributes, tuples and relations, characteristics of relations. Relational Model constraints Relational Databases and relational data base schemas, entity integrity, referential integrity and foreign keys with examples.

Relational algebra and Relational calculus:

Relations Operations- SELECT, PROJECT, , UNION, INTERSECTION, The CARTESIAN PRODUCT, JOIN, EQUIJOIN, Aggregate functions. Examples of queries in Relations Algebra Tuple relations calculus, Domain relational calculus.

Relational Data base design using ER-to-Relational mapping.

Unit 3: SQL: Data definition commands- CREATE, ALTER,DROP, Adding constraints, Basic SQL queries-INSERT, SELECT,DELETE,UPDATE Ordering of rows UNION,EXCEPT,INTERSET Substring comparisons using LIKE operator, BETWEEN operator, Complex Queries-Nested queries, EXISTS and UNIQUE functions, NULL values, Renaming of attributes and joining of tables, Aggregate functions and grouping, Managing views

Unit 4: Data Normalization:- Informal Design Guide lines for relation schemas, functional dependencies, Normal forms- first, second and third normal form, Boyce- Codd normal form.

Indexing structures for files- types of single level ordered indexes.

Unit 5: Transaction processing:- Introduction to transaction processing, Transaction and system concepts, Desirable properties of transactions. Concurrency Control:- Locking techniques for concurrency control.

Database Security and Authorization:- Types of security , control measures, database security and the DBA, Access protection, User accounts and database audits, Access Control based on granting and Revoking privileges.

Core Reference:

1. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems" Pearson Education, Fifth edition

References:

1. C.J Date, An Introduction to Database systems
2. Reghu Ramakrishnan, Data base Management Systems, McGraw Hill International Edition.
3. Bipin Desai, " An Introduction to Database Systems" Galgotia Publications

ABCS413: WEB PROGRAMMING WITH PHP

Instructional Hours: 72

Credits: 4

Aim: To highlight the features of different technologies involved in Web Development

Objectives:

- To implement different navigation strategies in website.
- To develop simple back-end database to support a website.
- To recognize and evaluate website organizational structure and design elements.

Unit 1:Introduction - Evaluation of PHP, Basic Syntax, Defining variable and constant, PHP Data type , Operator and Expression, Decisions and loop - Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html

Unit 2:Array - Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and for each(), Some useful Library functions

Unit 3:Function - What is a function, Define a function, Call by value and Call by reference, Recursive function , String - Creating and accessing String, Searching & Replacing String, Formatting String , String Related Library function, String matching with regular expression, regular expression, Pattern matching in PHP, Replacing text, Splitting a string with a Regular Expression

Unit 4:Handling Html Form with PHP - Capturing Form Data, Dealing with Multi-value filed, uploaded form, redirecting a form after submission, Working with file and Directories, Understanding file& directory, Opening and closing a file, Copying, renaming and deleting a file, File Uploading and Downloading

Unit 5:Database–Introduction to OOPS, Class, Object, New Keyword and constructor, Connectivity with MySql, Introduction to RDBMS, Connection with MySql Database, Performing basic database operation (DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query, Join.

Core References:

1. Vikram Vaswani, PHP A Beginner‘s Guide, Tata McGraw-Hill
2. Steven Holzner, PHP: The Complete Reference

References:

1. George Schlossnagle, Advanced PHP Programming, Pearson Education
2. Luke Welling & Laura Thomson, PHP and MYSQL Web Development
3. Steven Holzner, Spring into PHP5 –Tata McGraw Hill Edition

PRACTICAL

ABCS4P06: PHP LAB

Instructional Hours: 36

Credits: 1

1. Designing User Interface
2. Simple programs using decision making and loops.
3. Database Connectivity using Controls - Designing user interface with forms and controls and create database connectivity using MySQL
4. Mini project using PHP

ABCS4P07: MYSQL LAB

Instructional Hours: 36

Credits: 1

1. **Data definition commands** - CREATE, ALTER, DROP, Adding Constraints – Primary key, foreign key, unique key, check, not null.
2. **Basic SQL queries** – INSERT, SELECT, DELETE, UPDATE, Using multiple tables, ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT, INTERSECT, Substring Comparison using LIKE operator, BETWEEN operator.
3. **Complex Queries** – Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.
4. **Managing views, Simple stored procedures.**
5. **Data Control commands** - Access Control and Privilege commands.

SEMESTER V

ABCS514: DATA COMMUNICATIONS AND COMPUTER NETWORKS

Instructional Hours: 90

Credits: 4

Aim: The aim of this course is to allow students to develop background knowledge as well as core expertise in networking technologies.

Objectives:

- To build an understanding of the fundamental concepts of computer networking.
- To familiarize the categories and topologies of networks
- To understand the details of IP operations in the Internet and associated routing principles

UNIT 1: Need of network: Network classifications-LAN, MAN, WAN, wireless networks & Internet. Data and signals-analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth. Transmission impairments- attenuation distortion and noise. Data communication protocols and standards, Network models - OSI model-layers and their functions. TCP/IP protocol suite.

UNIT 2: Bandwidth utilization Multiplexing: FDM, TDM, spread spectrum. Transmission Media- guided media and unguided media. Switching: message, Circuit and packet switched networks, datagram networks, virtual- circuit networks.

UNIT 3: Hop to Hop Delivery: Error Detection and Correction –Type of Errors, Redundancy, Detection, Correction, Forward Error and Retransmission. Coding -Block Coding (Parity Check Code and Hamming Code) and Cyclic Codes. Framing, flow and error control, Protocols - Noiseless channels (Simplest, Stop and Wait) and Noisy channels (Stop and Wait and Piggy Backing).

UNIT 4: Multiple Access Protocols, Random Access-ALOHA, CSMA. Wired LANs-IEEE standards, standard Ethernet, Virtual circuit networks, frame relay, ATM-architecture, layers, congestion control and quality of service.

UNIT 5: Host-To-Host Communication, Network Level Logical addressing-IPv4 addresses, IPv6 addresses, Internet protocol-IPv4 and IPv6, Process to Process Delivery –

Connectionless and Connection Oriented Service: UDP, TCP. Congestion control, quality of service. Client Server Programs. Name space, domain name space, Remote logging, Electronic mail, file transfer.

Core Reference:

1. Data communications and Networking, B.A. Forouzan, fourth edition

References:

1. W. Stallings, Data and Computer Communications, Macmillan Publishing, Fourth Edition
2. Andrew S Tanenbaum, Computer Networks, Fourth Edition

ABCS515: SOFTWARE PROJECT MANAGEMENT

Instructional Hours: 90

Credits: 4

Aim:

To understand the fundamental principles of Software Project management

Objectives:

- To familiarize the different methods and techniques used for project management.
- To create project plans that address real-world management challenges.
- To identify the project management tools and techniques

Unit1: Introduction to Software Project management: Introduction– Why is Software project management is important? – What is a project? – Software project versus other types of project – Contract Management and technical project management – Activities covered by software project management – plans, methods, methodologies – some ways of categorizing software projects. Stepwise: an overview of project planning. Programme Management and Project Evaluation: Programme Management – Managing the Allocation of resources within programmes –strategic programme management – creating a programme – aids to programme management – Benefits Management – Evaluation of Individual projects – technical assessment – cost-benefit analysis - cash flow forecasting – cost-benefit evaluation techniques – risk evaluation.

UNIT 2: Software Effort Estimation: Problem with over and under-estimates – basis for software estimating – software effort estimation techniques – expert judgment – estimating by analogy. Activity Planning: The objectives – When to plan? – Project schedules – project and activities – sequencing and scheduling activities – Network Planning models – formulating a network model – adding time dimension – forward pass – backward pass. Risk Management: Risk – Categories – Dealing with risk – Risk identification, assessment, planning and management – Evaluating risk to schedule.

UNIT 3: Resource Allocation: Introduction - Nature of resources – identifying the resource requirements – scheduling resources – creating critical path – counting the cost – being specific – publishing the resource schedule – cost schedules – scheduling the sequence. Monitoring and Control: Creating framework – collecting the data – visualizing progress – cost monitoring – earned value analysis – prioritizing monitoring – getting the project back to target – change control.

UNIT 4: Managing Contracts: ISO 12207 approach – supply process – types of contract – stages in contract placement, management– acceptance. Managing People and Organizing Terms: understanding behavior – organizational behavior – selecting the right person for the job – instruction in the best methods – Motivation – Working in groups– becoming a team – decision making – Leadership – organizational structures – dispersed and virtual teams - influence of culture – stress– health and safety.

UNIT 5:Software Quality: The place of software quality in project planning – importance of software quality – defining software quality – ISO 9126 - practical software quality measures – product vs process quality management – external standards – techniques to help enhance software quality- quality plans. Small Projects: Introduction – Some problems with student projects – content of a project plan – conclusion.

Core Reference:

1. Bob Hughes & Mike Cotterell, Software Project Management, PHI, Fourth edition

References:

1. Lawrence J Peters, Getting results from software development teams, Microsoft Press
2. Walker Royce, Software project Management, Addison-Wesley

ABCS516: JAVA PROGRAMMING

Instructional Hours: 90

Credits: 4

Aim: To understand the use of object oriented features along with their applications

Objectives:

- To understand the model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism
- To use the Java environment to create, debug and run simple Java programs.
- To write a computer program to solve specified problems.

Unit 1: Object oriented programming: Encapsulation-Inheritance-Polymorphism-Genesis of Java-characteristics of java- program structure-identifiers-operators-variables-literals-data types-Arrays. Control Statements-selection statements-iterative statements-jump statements - Loops- while loop-do while loop- for loop

Unit 2: Classes: Declaration –object references-instantiation- method declaration-method calling – this operator- constructor- method overloading-constructor overloading-method overriding-inheritance-super class-dynamic method dispatch-final-static-abstract classes– String Handling.

Unit 3: Packages: Creating packages-using packages-Interfaces-Exception Handling Techniques-try-catch-throw-throws-finally-Multithreading- creation of multithreaded program-Thread class-Runnable interface- thread priorities.

Unit 4: Event Handling: Delegation Event Model-Event Classes-Sources of Events-Event Listeners- AWT: Frame Class-AWT Controls: Label-Button-Checkbox-List-Choice control-Text Field-Text Area- Lay out Managers.

Unit 5: Applet Fundamentals: Applet tag-applet life cycle-passing parameters to applets-working with graphics –Line-Rectangle-Oval – Arc- color setting-I/O Streams: Data Input Stream-Data Output Stream-Buffered Reader-Buffered Writer classes

Core Reference:

1. E. Balagurusamy, Programming with java, McGraw-Hill Education India, Fifth edition

References:

1. Patrick Naughton, Java2 The Complete Reference, Seventh Edition.

2. Java 6 Programming Black Book, Dreamtech press

PRACTICAL

ABCS5P08: JAVA LAB

Instructional Hours: 36

Credits: 1

Part I: Applet Programs: Graphics- AWT controls- Event Handling (using class and read inputs from keyboard)

Part II: Java Programs: Method Overloading- Method Overriding-inheritance-abstract class – interfaces- packages-Exception Handling-Multithreading.

ABCS5PJ: MINI PROJECT

Instructional Hours: 72

Credits: 2

Mini project shall be a small complete project, to make the student confident in designing a system based on ***Software Engineering*** course, using **PHP** and **MySQL**

SEMESTER VI

ABCS617: PROGRAMMING WITH .NET

Instructional Hours: 90

Credits: 4

Aim: To understand Object Oriented and Object based programming paradigm in event based programming environment.

Objectives:

- To get the Knowledge about different Object Oriented Features.
- To learn programming features of VB.net
- To understand architecture of .Net.

UNIT 1: Introduction to .Net: .net framework- difference between VB6 and VB.Net-Object-Oriented programming and VB.Net-Data types-Variables-Operators-Arrays-Conditional logic.

UNIT 2: Procedures- Dialog boxes- File IO and System objects- Error handling-Namespaces-Classes and Objects- Multithreading-Message Queue- Programming MSMQ.

UNIT 3:VB.Net IDE-Compiling and Debugging-Customizing- Data access: ADO.Net-Visual studio .Net and ADO.Net. Windows Forms: Controls-Specific controls- Irregular forms.

UNIT 4: Vb.Net and web: Introduction to ASP.Net page framework- HTML server controls-Web controls- Validation controls- Events-CSS- State management- Tracing- Security.

UNIT 5: Web Services: Introduction- Infrastructure- SOAP-Building web services-Deploying and publishing web services- Finding and consuming web services.

Core References:

1. Bill Evjen, Jason Beres, et.al, ―Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd.
2. Shirish Chavan, Visual Basic.NET, Pearson Education

References:

1. Fergal Grimes, ―Microsoft .NET for programmers, Shroff Publishers & Distributors (p) Ltd.
2. Thuan Thai & Hoang Q. Lam, ―.NET Framework essentials, Shroff Publishers & Distributors (p) Ltd.

ABCS618: SOFTWARE TESTING

Instructional Hours: 90

Credits: 4

Aim:

To study fundamental concepts in software testing

Objectives:

- To understand the different testing strategies.
- To understand software test automation problems and solutions.
- To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Unit 1:Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

Unit-2: Flow/Graphs and Path Testing– Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques

Unit 3: Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing.

Unit-4: Linguistic –Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats–Test Cases.

Unit-5: Logic Based Testing – Decision Tables – Transition Testing –States, State Graph, State Testing.

Core Reference:

1. B. Beizer, 2003, Software Testing Techniques, Dream Tech India, Second edition
2. K.V. Prasad, 2005, Software Testing Tools, Dream Tech India, New Delhi.

References:

1. I. Burnstein, Practical Software Testing, Springer International Edition
2. E. Kit, 1995, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.
3. R.Rajani and P. P. Oak, Software Testing, Tata McGraw Hill, New Delhi.

ABCS6SR: SEMINAR

Total Hours: 18

Credits: 1

The student shall choose a modern topic of current day interest in the areas of Computer Science / Information Technology and present a seminar using appropriate presentation media such as LCD projector, OHP etc. A seminar report in bound form in the pattern of a complete technical report (with contents page, well structured presentation, references etc.) shall be submitted.

ABCS6PJ: MAIN PROJECT

Project Hours: 162

Credits: 4

The project topic shall be chosen from areas of current day interest using latest packages/ languages running on appropriate platforms, so that the student can be trained to meet the requirements of the Industry. A project report shall be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals.

ELECTIVE COURSES

ABCS6E01: FOSS

Instructional Hours: 90

Credits: 4

Aim: To study about different Open Source Softwares.

Objectives:

- To understand open, free softwares
- To familiarize open OS & Mobile OS
- To understand the syntax and the semantics of Python programming language

Unit 1: Open Source Software- Definition of open source software, essential requirements for being open, free software vs open source software, 4 degrees of freedom, FOSS examples, open source hardware

Unit 2: Open OS- Features, Advantages, distributions, Basic Architecture, File System Introduction, File System Hierarchies, Desktop environments – KDE, GNOME. Editors-vim, emacs. Overview of Shells– BASH and other. Linux commands-Commands for files and directories– cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, head, tail. Creating and viewing files using cat. Pipes, Introduction to IO redirection. Filters: grep, egrep, sed, wc, cut, sort, uniq, paste.

Unit 3:Mobile OS- Introduction-open handset alliance, Android ecosystem, Advantages, Versions, Features, Architecture, Applications, Designing User interface with view- text, button, image, edit text, checkbox, toggle button, radio button, progress bar, autocomplete text view, spinner, List, grid, scroll, custom toast alert, time and date picker. Brief description of other OS.

Unit 4: Python: Introduction, Line Structure and Indentation, Identifiers and Reserved Words, Numeric Literals, String Literals, Containers, Delimiters, and Special Symbols, Documentation Strings, Decorators, Source Code Encoding, Operators and Expressions-Operations on Numbers, Operations on Sequences, String Formatting, Advanced String Formatting, Operations on Dictionaries, Operations on Sets, Augmented Assignment, The Attribute (.) Operator, The Function Call () Operator, Conversion Functions, Boolean Expressions and Truth Values, Object Equality and Identity, Order of Evaluation, Conditional Expressions

Unit 5: Program Structure and Control Flow: Program Structure and Execution, Conditional Execution, Loops and Iteration, Functions, Parameter Passing and Return Values, Scoping Rules, Functions as Objects and Closures, Decorators, Generators and yield, Coroutines and yield Expressions, Using Generators and Coroutines, List Comprehensions, Generator Expressions, Declarative Programming, The lambda Operator, Recursion, Documentation Strings, Function Attributes, eval(), exec(), and compile()

Core References:

1. Jesús M. González-Barahona et al, "Introduction to Free Software", Free Technology Academy, Europe, 2009.
3. Beginning Linux Programming, Fourth edition, Wrox publications
4. Prasanna Kumar Dixit, Android, Vikas Publications
5. David M Beazley, Python Essential Reference, Fourth edition

References:

1. Christopher Negus, Linux Bible, Willey India publications Ltd
2. Michael Dawson, Python Programming, third edition

ABCS6E02: WIRELESS COMPUTING TECHNOLOGY

Instructional Hours: 90

Credits: 4

Aim: To provide basic knowledge on Wireless Communications, Mobile Internet and Mobile Content Services.

Objectives:

- To learn the basics of Wireless voice and data communications technologies.
- To build working knowledge on various telephone and satellite networks.
- To build skills in working with Wireless application Protocols to develop mobile content applications

UNIT 1: Introduction: Mobility of Bits and Bytes –Wireless The Beginning –Mobile Computing – Dialogue Control – Networks – Middleware and Gateways – Application and services- Developing Mobile computer Applications – security in mobile computing – Standards _ Why is it necessary – Standard bodies. Architecture for mobile computing– Three-tier architecture – Design considerations for mobile computing– Mobile computing through Internet – Making exiting applications mobile enabled

UNIT 2: Mobile Computing through Telephony: Evaluation of telephony – Multiple access procedures – Mobile computing through telephone – IVR Application – Voice XML – TAPI

UNIT 3: Emerging Technologies: Blue Tooth – RFID – WiMAX – Mobile IP – IPv6 – Java Card. GSM : Global System for mobile communications – GSM Architecture – GSM Entities – Call routing in GSM – PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency allocations – Authentications and Security. SMS

UNIT 4: GPRS – GPRS and packet data network – GPRS network architecture – GPRS network operations – Data services in GPRS – Application for GPRS- Limitations – Billing and Charging. WAP: MMS – GPRS Applications

UNIT 5: CDMA and 3G: Spread spectrum technology – Is 95 – CDMA vs GSM – Wireless Data – Third generation networks – Applications on 3G IEEE 802.11 standards – Architecture – Mobile in Wireless LAN – Deploying wireless LAN – Mobile adhoc networks and sensor networks – Wireless LAN Security –WiFivs 3G

Core Reference:

1. Asoke K Talukder, Roopa R Yavagal, Mobile Computing, TMH

Reference:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep Gupta (Author), Golden Richard Iii, Loren Schwiebert

ABCS6E03: E - COMMERCE

Instructional Hours: 90

Credits: 4

Unit 1: Introduction to E-business: E-commerce vs. E-business, trends driving E-business, Business framework, Business models, Revenue models, Value chain, Business technology.

Unit 2: Launching online business: Business plan, Funding, Web hosting, content creation management, Website design and construction, Strategies for web development, 7 Cs frame work, web technologies: website and page development tools, Open source tools.

Unit 3:E-Payment system: Traditional vs. Digital payment systems, Digital Payment requirements, Merchant account, Payment gateway, E-payment methods: Credit cards, E-wallet, Digital Token based E-payment systems, E-Cash, Innovative payment methods, E-loyalty and Reward programmes, E-payment system Design, E-Banking, Main Concerns in Banking.

Unit 4:E-Security: Network and website security, Security Technologies, Internet Security Holes, Cryptography, Codes and Cipher, Data Encryption standard, Authentication, PKI, Digital signature, SSL, Firewalls, VPN, Cryptographic applications . E-Commerce Risk Management, Information Security in India, NASSCOM's Flagship Initiatives, Cyber laws in various countries.

Unit 5: Mobile Commerce: Introduction to mobile commerce, Wireless applications, Hand Held Devices, Mobile Computing, Wireless Web, Concepts of WAP.E-Marketing: Browsing behavior model, Internet Marketing Trends, E-Advertising, E-branding, Marketing Strategies, SEO, Location based commerce, Emergence of Web 2.0, Social Media Strategies.

Core References:

1. Joseph P.T., E-commerce An Indian Perspective, PHI

References:

1. Dave Chaffey, E-Business and E-Commerce Management, Pearson Education
2. Kalakota Ravi and M. Robinson, E-Business 2.0: Roadmap for Success, Pearson Education.

COMPLEMENTARY COURSES FOR UNDERGRADUATE PROGRAMME IN INDUSTRIAL MICROBIOLOGY & ZOOLOGY

Course Code	Title of the Course	Instructional hours/week	Instructional hours for the course	Credits	ISA	ESA	Total
Semester I							
ADCS101	Introduction to IT	2	36	2	10	60	70
ADCS1P01	Software Lab - I	2	36	1	10	20	30
Semester II							
ADCS202	Office Automation	2	36	2	10	60	70
ADCS2P02	Software Lab - II	2	36	1	10	20	30
Semester III							
ADCS303	Trends in IT	3	54	3	10	60	70
ADCS3P03	Software Lab - III	2	36	1	10	20	30
Semester IV							
ADCS404	Python	3	54	3	10	60	70
ADCS4P04	Software Lab - IV	2	36	1	10	20	30

SEMESTER I

ADCS101: INTRODUCTION TO IT

Instructional Hours: 36

Credits: 2

Aim: To provide the students Basic knowledge of computers and information technology.

Objectives:

- To understand the evolution of computers in different generations.
- To provide the basic knowledge about the functional units of computer system
- To familiarize the operating system and network.

Unit-1: Introduction: Parts of Computer System- Hardware, Software, Data, Users, Different types of computers, Characteristics of computers, Computer Languages - Machine, Assembly Language and Higher Level languages - 3GL, 4GL, 5GL

Unit-2: Interacting with Computers:-Input Devices - Key Board, Mouse, Variants of Mouse, Handheld devices, Optical Input devices, Output Devices: Monitors, Sound Systems, and Hard copy devices, Graphics software. Display devices- Raster Scan Display, DVST, Flat panel, LCD, Raster Scan systems, Random Scan systems.

Unit-3: Data Processing: Representation of data, processing of data - The CPU, Memory- different types of RAM and ROM, Factors affecting speed

Unit-4: Storing Information in a Computer: Types of Storage Devices - Magnetic Storage Devices –Data storage and organization on a Magnetic Disk, Finding data on a disk - Diskettes - Hard Disks- Tape drives- Optical Storage devices, Solid state storage devices

Unit-5: System Maintenance: Installation - Operating System, CD-ROM Drive, Sound Card, printer, Control panel - Display properties, Adding and removing software, setting date and time, screen saver, appearance. Antivirus installation, Formatting, Disk cleanup, Disk defragmenter. Configure and Connect Dial-Up Networking, Configure a Peer-to-Peer Network, Troubleshoot Software and Hardware, Writing data on disc- CD/DVD Burning, Customize the Windows Desktop, Use Files and Folders, Familiarize DOS internal & external commands.

Core Reference:

1. Peter Norton's Introduction to Computers, Seventh Edition, Published by Tata McGraw Hill

References:

1. P K Sinha & Priti Sinha, Computer Fundamentals, Sixth Edition, BPB Publications.
2. Introduction to Computer Science, Second edition, ITL Education Solution limited

PRACTICAL

ADCS1P01: SOFTWARE LAB – I

Instructional Hours: 36

Credits: 1

1. Installation - Operating System, CD-ROM Drive, Sound Card, printer
2. Control panel –
   - 2.1 Display properties
   - 2.2 Adding and removing software
   - 2.3 Setting date and time
   - 2.4 Setting Screen saver, appearance using windows accessories.
   - 2.5 Antivirus installation
   - 2.6 Formatting, Disk cleanup, Disk defragmenter.
   - 2.7 Configure and Connect Dial-Up Networking, Configure a Peer-to-Peer Network, Troubleshoot Software and Hardware,
   - 2.8 Writing data on disc using CD DVD Burner
   - 2.9 Customize the Windows Desktop
3. Files and Folders

SEMESTER II

ADCS202: OFFICE AUTOMATION

Instructional Hours: 36

Credits: 2

Aim:

To provide the basic knowledge about office packages

Objectives:

- To learn how to create documents
- To familiarize about presentations
- To know about spreadsheets

Unit -1: Document: Introduction; Features- Word User Interface Elements; Creating new Documents; Basic Editing, Saving a Document; Printing a Document; Print Preview, Page Orientation- Viewing Documents; Setting tabs-Page Margins; Indents; Ruler, Formatting Techniques; Font Formatting, Paragraph Formatting; Page Setup; Headers & Footers; Bullets and Numbered List; Borders and Shading; Find and Replace; Page Break& Page Numbers; Mail Merging-Spelling and Grammar Checking; Thesaurus; Automating Documents; Macros; Tables; Side-by-side and Nested Tables; Formatting Tables; Drawing; WordArt.

Unit -2 : Desktop Publishing: Introduction to Desktop publishing as a Process- tools and Pallettes - Working with objects -type Styling options Working with text - formatting options: Leading, Margins and indents - Scaling text, Paragraph formatting options - Working with Grids - Creating frames, Layers.

Unit -3 : Spreadsheet package: Introduction, User Interface, Working with cell and cell addresses, Selecting a Range, Moving, Cutting, Copying with Paste, Inserting and Deleting cells, Freezing cells, Adding, Deleting and Copying Worksheet within a workbook, Renaming a Worksheet. Cell Formatting Options, Formatting fonts, Aligning, Wrapping and Rotating text, Using Borders, Boxes and Colors, Centering a heading, Changing row/column height / width, Formatting a Worksheet Automatically, Insert Comments, Clear contents in a cell. Using print Preview, Preparing Worksheet for the printer, Selecting Print Area, Margin and Orientation, Centering a Worksheet, Using header and footer, Inserting page breaks, Creating list, Sorting Data.

Unit -4: Advanced Features of Spreadsheet: Functions- Logical Functions, Statistical functions, Mathematical etc. Linking Data between Worksheet, Elements of Excel Charts, Categories, Create a Chart, Choosing chart type, Edit chart axis - Titles, Labels, Data series and legend, Adding a text box, Rotate text in a chart, Converting a chart on a web page, Saving a chart. Use of Pivot tables, Templates.

Unit -5 : Presentation Package: Advantages of Presentation Screen layout creating presentation inserting slides adding sounds & videos-formatting slides -slide layout views in presentation - colour scheme background action buttons slide transition Custom animation Creating Master slides Managing slide shows - using pen Setting slide intervals

Core References:

1. Leon, Introduction to Computers with MS-Office, TMH
2. Stephen Copestake, Office 2000 in easy steps, Wiley Dreamtech

References:

1. Personal Computer Software, EXCEL BOOKS
3. Krishnan, Windows & MS-Office 2000, SCITECH.

PRACTICAL

ADCS2P02: SOFTWARE LAB - II

Instructional Hours: 36

Credits: 1

1. Familiarization of Office packages

SEMESTER III

ADCS303: TRENDS IN IT

Instructional Hours: 54

Credits: 3

Aim: To study about different Open Source Softwares.

Objectives:

- To understand open, free softwares
- To familiarize open OS & Mobile OS
- To know about the different utilities of the internet

Unit 1: Open Source Software- Definition of open source software, essential requirements for being open, free software vs open source software, 4 degrees of freedom, FOSS examples, open source hardware

Unit 2: Open OS- Features, Advantages, distributions, Basic Architecture, File System Introduction, File System Hierarchies, Desktop environments – KDE, GNOME. Editors-vim, emacs. Overview of Shells – BASH and other.

Unit 3: Mobile OS- Introduction-open handset alliance, Android ecosystem, Advantages, Versions, Features, Architecture, Applications, Desigining User interface with view- text, button, image, edit text, checkbox, toggle button, radio button, progress bar, autocomplete text view, spinner, List, grid, scroll, custom toast alert, time and date picker. Brief description of other OS.

Unit 4: Utilities- Firefox- features, versions, system requirements. Apache- features, versions, Wikipedia, Google drive, Social networking- blogging, chatting, whatsApp.

Unit 5: Googling- Introduction, Chrome, Google+, Google account, customization, doodle, search features, tips, filters, alerts, Google trends, Google beyond.

Core Reference:

1. Beginning Linux Programming, Fourth edition, Wrox publications
2. Prasanna Kumar Dixit, Android, Vikas
3. Jesús M. González-Barahona et al, “Introduction to Free Software”, Free Technology Academy, Europe

References:

1. Christopher Negus, Linux Bible, Willey India publications Ltd
2. Getting Organized in the Google Era - Douglas C. Merril and James A. Martin
3. Advanced Googling: How to Search Smarter, Faster and More Efficiently on Google (Google eBook) Garrett Wasny, MA, CMC, CITP/FIBP

PRACTICAL

ADCS3P03: SOFTWARE LAB - III

Instructional Hours: 36

Credits: 1

1. Working with Open OS- Linux
2. Exploring different internet utilities
   2.1. File management using Google Drive
3. Effective usage of Google.

SEMESTER IV

ADCS404: PYTHON

Instructional Hours: 54

Credits: 3

Aim: To Understand the Programming Fundamentals and the basics of the 'Python' Programming Language.

Objectives:

- To understand Python's essential features
- To understand the syntax and the semantics of Python programming language.

Unit 1: Introduction: Running Python, Variables and Arithmetic Expressions, Conditionals, File Input and Output, Strings, Lists, Tuples, Sets, Dictionaries, Iteration and Looping, Functions, Generators, Co-routines, Objects and Classes

Unit 2: Lexical Conventions and Syntax: Line Structure and Indentation, Identifiers and Reserved Words, Numeric Literals, String Literals, Containers, Operators, Delimiters, and Special Symbols, Documentation Strings, Decorators, Source Code Encoding

Unit 3: Operators and Expressions: Operations on Numbers, Operations on Sequences, String Formatting, Advanced String Formatting, Operations on Dictionaries, Operations on Sets, Augmented Assignment, The Attribute (.) Operator, The Function Call () Operator, Conversion Functions, Boolean Expressions and Truth Values, Object Equality and Identity, Order of Evaluation, Conditional Expressions

Unit 4: Program Structure and Control Flow: Program Structure and Execution, Conditional Execution, Loops and Iteration

Unit 5: Functions and Functional Programming: Functions, Parameter Passing and Return Values, Scoping Rules, Functions as Objects and Closures, Decorators, Generators and yield, Coroutines and yield Expressions, Using Generators and Coroutines, List Comprehensions,

Generator Expressions, Declarative Programming, The lamda Operator, Recursion, Documentation Strings, Function Attributes, eval(), exec(), and compile()

Core Reference:

1. David M Beazley, Python Essential Reference, Fourth edition

References:

1. Michael Dawson, Python Programming, third edition
2. John Zelle, Python Programming: An Introduction to Computer Science, Second edition.

PRACTICAL

ADCS4P04: SOFTWARE LAB - IV

Instructional Hours: 36

Credits: 1

1. Program using variables and arithmetic expressions
2. Program using decision making and looping
3. Program using functions

OPEN COURSE

Course Code	Title of the Course	Instructional hours/week	Instructional hours for the course	Credits	ISA	ESA	Total
AOCS501	Web Designing	4	72	3	20	80	100

AOCS501: WEB DESIGNING

Instructional Hours: 72

Credits: 3

Aim:

Develop the skills to design a web site.

Objectives:

- To understand the importance of the web as a medium of communication.
- To learn the language of the web: HTML and CSS.
- To embed social media content into web pages.

Unit 1: Internet: Basics of Internet, website, domain, Web browser, web server, search and search engine for internet, Internet Agents, mobile agents, meta search sites, URL, Email

Unit 2: HTML: Introduction to HTML, Basic formatting tags: heading, paragraph, underline break, bold, italic, underline, superscript, subscript, font and image. Different attributes like align, color, bgcolor, font face, border, size. Navigation Links using anchor tag: internal, external, mail and image links. Lists: ordered, unordered and definition, Table tag, HTML Form controls: form, text, password, text area, button, checkbox, radio button, select box, hidden controls, Frameset and frames.

Unit 3: Photoshop: Working environment, image and color basics, the painting tools, editing tools, selection, layers, paths, filter

Unit 4: Flash: Getting started, tools panel, working with colors, objects, text, timeline panel, using symbols, instances, library, animation

Unit 5: Dreamweaver: Exploring the Dreamweaver, working with panels and workspace, setting up a website and its files, working with webpage elements-text, graphics, tables, hyperlinks, audio/video, frames and forms.

Core References:

1. Raj Kamal, Internet & Web technologies, Tata McGraw Hill
2. Jon Duckett, Web Programming with HTML, XHTML, CSS, Wrox Beginning.
3. Photoshop CS5, Tata McGraw Hill
4. Flash CS6, Dream Tech Press
5. Dreamweaver CS6, Dream Tech Press

References:

1. Html 4.0 In Simple Steps, Kogent Solutions, Wiley India
2. Ed Tittel & Mary Burmeister, Html 4 for Dummies, Wiley References
3. Harley Hahn, “Internet Complete Reference”

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