REGULATIONS 2016

CURRICULUM AND SYLLABI

B.Sc

Computer Science

VISION AND MISSION OF THE INSTITUTION

VISION

B.S. Abdur Rahman Crescent Institute of Science and Technology aspires to be a leader in Education, Training and Research in Engineering, Science, Technology and Management and to play a vital role in the Socio-Economic progress of the Country.

MISSION

- To blossom into an internationally renowned Institution
- To empower the youth through quality education and to provide professional leadership
- To achieve excellence in all its endeavors to face global challenges
- To provide excellent teaching and research ambience
- To network with global institutions of Excellence, Business, Industry and Research Organizations
- To contribute to the knowledge base through Scientific enquiry, Applied research and Innovation

VISION AND MISSION OF THE DEPARTMENT OF COMPUTER APPLICATIONS

VISION

Aspires to provide quality education in the field of computer applications with state of the art computational facilities and undertake quality research in collaboration with industries and universities to produce committed professionals and academicians to meet the needs of the industries and society.

MISSION

The Department of Computer Applications, endeavors

- To disseminate knowledge through education and training of graduates in the field of computer applications.
- To focus on teaching - learning, research and consultancy to promote excellence in computer applications.
- To foster graduates with opportunities required to explore, create and face challenges of IT related industries.
- To equip the graduates with the necessary skills in communication, team work and leadership qualities to meet the needs of the IT related sector globally.
- To disseminate the outcome of projects and research work undertaken by the department through appropriate measures for the benefit of society and industry.

PROGRAMME EDUCATIONAL OBJECTIVES:

The students of B.Sc Computer science Programme would be able to

- Communicate computing concepts and solutions to bridge the gap between industry and academic institution.
- Utilize their knowledge of computing principles to develop solutions to current and future computing problems.
- Understand professional, ethical, legal, security, and social issues and responsibilities.
- Use current techniques, skills, and tools necessary for computing practices
- apply design and development principles in the construction of software systems of varying complexity.

PROGRAMME OUTCOMES:

On successful completion of the programme, the graduates will have

- Have knowledge of computing and mathematics appropriate to the discipline
- Identify analyze a problem and define the computing requirements appropriate to its solution;
- Have use current techniques, skills, and tools necessary for computing practices;
- Be prepared for career in Information Technology oriented business or industry for graduate study in technical fields.

B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE & TECHNOLOGY

REGULATIONS -2016

FOR

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

BACHELOR OF SCIENCE (B.Sc)/

BACHELOR OF BUSINESS ADMINISTRATION (B.B.A)/

BACHELOR OF COMMERCE (B.Com)

DEGREE PROGRAMME (Semester Scheme)

(Candidates to be admitted from the academic year 2016-2017 onwards)

1.0 PRELIMINARY DEFINITIONS & NOMENCLATURE

In these Regulations, unless the context otherwise requires:

i) **"Programme"** means Under Graduate Degree Programme (B.C.A/B.Sc/B.Com/B.B.A).

ii) **"Course"** means a theory or practical subject that is normally studied in a semester.

iii) **"Institution"** means B.S. Abdur Rahman Crescent Institute of Science & Technology.

iv) **"Dean (Academic Affairs)"** means the Dean (Academic Affairs) of B.S. Abdur Rahman Crescent Institute of Science & Technology.

v) **"Dean (Student Affairs)"** means the Dean (Students Affairs) of B.S. Abdur Rahman Crescent Institute of Science & Technology.

vi) **"Controller of Examinations"** means the Controller of Examination of B.S. Abdur Rahman Crescent Institute of Science & Technology, who is responsible for conduct of examinations and declaration of results.

2.0 PROGRAMME OFFERED, DURATION AND ELIGIBILITY CRITERIA

2.1 U.G. Programmes Offered

Degree	Mode of Study
B.C.A	Full Time
B.Sc	Full Time
B.B.A	Full Time
B.Com	Full Time

2.2 Duration of the Programme

The duration of the undergraduate program shall be six semesters (three

academic years).

2.3 Eligibility Criteria

2.3.1 Students for admission to the first semester of the under graduate degree programme must have passed the Higher Secondary Certificate examination or any other examination of any authority accepted by this Institution as equivalent thereto.

S.No	Programme	Eligibility Criteria
1	B.C.A	10 +2 (Higher Secondary) with Mathematics or equivalent subject
2	B.Sc Computer Science	10 +2 (Higher Secondary) with Mathematics or equivalent subject
3	B.Sc Bio Technology	10 +2 (Higher Secondary) with Chemistry as one of the subjects.
4	B.B.A (Financial Services)	10 +2 (Higher Secondary) with any stream or equivalent
5	B.Com General	10 +2 (Higher Secondary) with Mathematics, Physics and Chemistry/Physics, Chemistry, Botany and Zoology /Commerce /Statistics as subjects.
6	B.Com (Accounts and Finance)	

2.3.2 Eligibility conditions for admission such as marks obtained, number of in the qualifying examination and physical fitness will be as prescribed by this Institution from time to time.

2.4 Streams of Study

Taking into consideration the rapid developments in technology and to cater the needs of the industry, the following programmes are offered

S.No	Program	Streams of Study
1.	**B.C.A**	i. specialization in Cloud Technology and Information Security ii. specialization in Mobile Applications and Information Security

		iii. specialization in Big Data Analytics
2.	**B.Sc**	i. Computer Science ii. Bio Technology
3.	**B.B.A**	i. Financial Services
4.	**B.Com**	i. General ii. Accounts and Finance

3.0 STRUCTURE OF THE PROGRAMME

3.1 The UG Programme consists of the following components as prescribed in the curriculum

- Core Courses
- Allied Courses
- Elective Courses
- Laboratory courses
- Laboratory integrated theory courses
- Value added Courses
- Project Work

3.2 The curricula and syllabi of all UG programmes shall be approved by Board of Studies of the respective department and Academic Council of this Institution.

3.3 Each course is normally assigned certain number of credits :

- One credit for one lecture period per week.
- One credit for one tutorial period per week.
- One credit each for lab sessions/project of two or three periods per week.
- One credit each for value added courses of two or three periods per week.

3.4 The medium of instruction, examinations and project report shall be English, except for courses in languages other than English.

3.5 The minimum number of credits to be earned for the successful completion of the program shall be normally in the range as follows:

S.No	Programme	Credits
1	B.C.A (Cloud Technology and Information Security)	120 - 126

2	B.C.A (Mobile Applications and Information Security)	120 - 126
3	B.C.A (Big Data Science)	120 - 130
4	B.Sc. (Computer Science)	120 – 126
5	B.Sc. (Bio Technology)	145 – 150
6	B.B.A (Financial Services)	120 - 125
7	B.Com	150 – 158
8	B.Com (Accounts and Finance)	150 – 158

3.6 The number of credits registered by a student in non-project semester and project semester shall be normally in the range as follows:

Non Project Semester: 20-28

Project Semester: 19-27

3.7 Elective courses from the curricula are to be chosen with the approval of the Head of the Department/ Dean of School

4.0 DURATION OF THE PROGRAMME

4.1 The minimum and maximum periods for the completion of the UG programmes are three years (6 semesters) and five years (10 semesters) respectively.

4.2 Each semester shall consist of a minimum of 90 working days.

4.3 Semester end examination will normally follow within a week after the last working day of the semester.

5.0 CLASS ADVISOR AND FACULTY ADVISOR

5.1 Class Advisor

A faculty member will be nominated by the HOD/Dean of School as Class Advisor for the class throughout the period of study.

The Class Advisor shall be responsible for maintaining the academic, curricular and co-curricular records of students of the class.

5.2 Faculty Advisor

To help the students in planning their courses of study and for general counseling, the Head of the Department / Dean of School of the students will attach a maximum of 20 students to a faculty member of the department who shall function as faculty advisor for the students throughout their period of

study. Such faculty advisor shall guide the students in taking up the elective courses for registration and enrolment in every semester and also offer advice to the students on academic and related personal matters.

6.0 COURSE COMMITTEE

Each common theory course offered to more than one group of students shall have a "Course Committee" comprising all the teachers teaching the common course with one of them nominated as course coordinator. The nomination of the course coordinator shall be made by the Head of the Department / Dean of School / Dean (Academic Affairs) depending upon whether all the teachers teaching the common course belong to a single department or to several departments. The Course Committee shall meet as often as possible and ensure uniform evaluation of the tests and arrive at a common scheme of evaluation for the tests. Wherever it is feasible, the Course Committee may also prepare a common question paper for the test(s).

7.0 CLASS COMMITTEE

A class committee comprising faculty members handling the courses, student representatives and a senior faculty member not handling the courses as chairman will be constituted semester-wise by the head of the department.

7.1 The composition of the class committee will be as follows:

- One senior faculty member preferably not handling courses for the concerned semester, appointed as chairman by the Head of the Department
- Faculty members of all courses of the semester
- Six student representatives (male and female) of each class nominated by the Head of the Department in consultation with the relevant faculty advisors
- All faculty advisors and the class advisors
- Head of the Department - Ex-Officio Member

7.2 The class committee shall meet at least four times during the semester. The first meeting will be held within two weeks from the date of commencement of classes, in which the nature of continuous assessment for various courses and the weightages for each component of assessment will be decided for the

first and second assessment. The second meeting will be held within a week after the date of first assessment report, to review the students' performance and for follow up action. The third meeting will be held within a week after the second assessment report, to review the students' performance and for follow up action.

7.3 During these three meetings the student members representing the entire class, shall meaningfully interact and express opinions and suggestions to improve the effectiveness of the teaching-learning process.

7.4 The fourth meeting of the class committee, excluding the student members, shall meet within 5 days from the last day of the semester end examination to analyze the performance of the students in all the components of assessments and decide their grades in each course. The grades for a common course shall be decided by the concerned course committee and shall be presented to the class committee(s) by the concerned course coordinator.

8.0 REGISTRATION AND ENROLMENT

8.1 Except for the first semester, every student shall register for the ensuing semester during a specified week before the semester end examination of the ongoing semester. Every student shall submit a completed registration form indicating the list of courses intended to be enrolled during the ensuing semester. Late registration with the approval of the Dean (Academic Affairs) along with a late fee will be permitted up to the last working day of the current semester.

8.2 From the second year onwards, all students shall pay the prescribed fees for the year on or before a specific day at the beginning of the semester confirming the registered courses. Late enrolment along with a late fee will be permitted up to two weeks from the date of commencement of classes. If a student does not enroll, his/her name will be removed from rolls.

8.3 The students of first semester shall register and enroll at the time of admission by paying the prescribed fees.

8.4 A student should have registered for all preceding semesters before registering for a particular semester.

9.0 COURSE CHANGE/ WITHDRAWAL

9.1 Change of a Course

A student can change an enrolled course within 10 working days from the commencement of the course, with the approval of the Dean (Academic Affairs), on the recommendation of the Head of the Department/ Dean of School of the student.

9.2 Withdrawal from a Course

A student can withdraw from an enrolled course at any time before the first assessment test for genuine reasons, with the approval of the Dean (Academic Affairs), on the recommendation of the Head of the Department/ Dean of School of the student.

10.0 TEMPORARY BREAK OF STUDY FROM A PROGRAMME

A student may be permitted by the Dean (Academic Affairs) to avail temporary break of study from the programme up to a maximum of two semesters for reasons of ill health or other valid grounds. A student can avail the break of study before the start of first assessment of the ongoing semester. However the total duration for completion of the programme shall not exceed the prescribed maximum number of semesters (vide clause 4.1).If any student is debarred for want of attendance or suspended due to any act of indiscipline, it will not be considered as break of study. A student who has availed break of study has to rejoin in the same semester only.

10.1 ASSESSMENT PROCEDURE AND PERCENTAGE WEIGHTAGE OF MARKS

10.2 Every theory course shall have a total of three assessments during a semester as given below:

Type of Assessment	Course Coverage in Weeks	Duration	Weightage of Marks
Assessment 1	1 to 6	1.5 hours	25%
Assessment 2	7 to 12	1.5 hours	25%
Semester End Exam	Full course	3 hours	50%

10.3 The components of continuous assessment for theory/practical/laboratory integrated theory courses shall be finalized in the first class committee meeting.

10.4 Appearing for semester - end examination for each course is mandatory and a student should secure a minimum of 40% marks in each course in semester end examination for the successful completion of the course.

10.5 Every practical course will have 60% weightage for continuous assessments and 40% for semester end examination. However a student should secure a minimum of 50% of the marks in the semester end practical examination.

10.6 For laboratory integrated theory courses, the theory and practical components shall be assessed separately for 100 marks each and consolidated by assigning a weightage of 75% for theory component and 25% for practical component. Grading shall be done for this consolidated mark. Assessment of theory component shall have a total of three assessments with two continuous assessments carrying 25% weightage each and semester end examination carrying 50% weightage. The student shall secure a separate minimum of 40% in the semester end theory examination. The evaluation of practical component shall be through continuous assessment.

10.7 In the case of Industrial training /Internship, the student shall submit a report, which will be evaluated along with an oral examination by a committee of faculty members, constituted by the Head of the Department/ Dean of School. The weightage for report shall be 60% and 40% for Viva Voce examination.

10.8 In the case of project work, a committee of faculty members constituted by the Head of the Department/ Dean of School will carry out three periodic reviews. Based on the project report submitted by the student(s), an oral examination (viva-voce) will be conducted as the semester end examination, for which one external examiner, approved by the Controller of Examinations, will be included. The total weightage for all periodic reviews will be 50%. Of the remaining 50%, 20% will be for the project report and 30% for the Viva Voce examination.

10.9 Assessment of seminars and comprehension will be carried out by a committee of faculty members constituted by the Head of the Department/ Dean of School.

10.10 For the first attempt of the arrear theory examination, the internal assessment marks scored for a course during first appearance will be used for grading along with the marks scored in the arrear examination. From the subsequent appearance onwards, full weightage shall be assigned to the marks scored in the semester end examination and the internal assessment marks secured during the course of study shall be ignored.

11.0 SUBSTITUTE EXAMINATIONS

12.1 A student who has missed, for genuine reasons, a maximum of one of the two continuous assessments of a course may be permitted to write a substitute examination paying the prescribed substitute examination fees. However, permission to write a substitute examination will be given under exceptional circumstances, such as accidents, admission to a hospital due to illness, etc. by a committee constituted by the Dean of School for that purpose. However there is no Substitute Examination for Semester End examination.

12.2 A student who misses any continuous assessment test in a course shall apply for substitute exam in the prescribed form to the Head of the Department / Dean of School within a week from the date of missed assessment test. However the Substitute Examination will be conducted after the last working day of the semester and before Semester End Examination.

12.0 ATTENDANCE REQUIREMENT AND SEMESTER / COURSE REPETITION

12.1 A student shall earn 100% attendance in the contact periods of every course, subject to a maximum relaxation of 25% (for genuine reasons such as medical grounds or representing the Institution in approved events etc.) to become eligible to appear for the semester-end examination in that course, failing which the student shall be awarded “I” grade in that course. For the courses in which “I” grade is awarded, the student shall register and repeat the course when it is offered next.

12.2 The faculty member of each course shall cumulate the attendance details for the semester and furnish the names of the students who have not earned the required attendance in that course to the Class Advisor. The Class Advisor will consolidate and furnish the list of students who have earned less that 75% attendance, in various courses, to the Dean (Academic Affairs) through the Head of the Department/ Dean of School. Thereupon, the Dean (Academic

Affairs) shall announce the names of such students prevented from writing the semester end examination in each course.

12.3 A student who has obtained 'I' grade in all the courses in a semester is not permitted to move to next higher semester. Such student shall repeat all the courses of the semester in the subsequent academic year.

12.4 A student should register to re-do a core course wherein "I" or "W" grade is awarded. If the student is awarded, "I" or "W" grade in an elective course either the same elective course may be repeated or a new elective course may be taken with the approval of Head of the Department / Dean of School.

12.5 A student who is awarded "U" grade in a course will have the option either to write the semester end arrear examination at the end of the subsequent semesters, or to redo the course in the evening when the course is offered by the department. Marks scored in the continuous assessment during the redo classes shall be considered for grading along with the marks scored in the semester-end (redo) examination. If any student obtained "U" grade in the redo course, the marks scored in the continuous assessment test (redo) for that course will be considered as internal mark for further appearance of arrear examination.

12.6 If a student with "U" grade, who prefers to redo the course, fails to earn the minimum 75% attendance while redoing that course, then he / she will not be permitted to write the semester end examination and his / her earlier "U" grade and continuous assessment marks shall continue.

14.0 REDO COURSES

14.1 A student can register for a maximum of two redo courses per semester in the evening after regular college hours, if such courses are offered by the concerned department. Students may also opt to redo the courses offered during regular semesters.

14.2 The Head of the Department, with the approval of Dean Academic Affairs, may arrange for the conduct of a few courses during the evening, depending on the availability of faculty members and subject to a specified minimum number of students registering for each of such courses.

14.3 The number of contact hours and the assessment procedure for any redo course will be the same as those during regular semesters except that there is

no provision for any substitute examination and withdrawal from an evening redo course.

15.0 PASSING AND DECLARATION OF RESULTS AND GRADE SHEET

15.1 All assessments of a course will be made on absolute marks basis. The Class Committee, without the student members, shall meet within 5 days after the semester-end examination and analyze the marks of students in all assessments of a course and award suitable letter grades. The letter grades and the corresponding grade points are as follows:

Letter Grade	Grade Points
S	10
A	9
B	8
C	7
D	6
E	5
U	0
W	0
I	0
AB	0

"W" denotes withdrawal from the course.

"I" denotes inadequate attendance and hence prevention from semester-end examination

"U" denotes unsuccessful performance in the course.

"AB" denotes absence for the semester-end examination.

15.2 A student who earns a minimum of five grade points in a course is declared to have successfully completed the course. Such a course cannot be repeated by the student for improvement of grade.

15.3 The results, after awarding of grades, shall be signed by the Chairman of the Class Committee and Head of the Department/Dean of Schools and the results shall be declared by the Controller of Examinations.

15.4 Within one week from the date of declaration of result, a student can apply for revaluation of his / her semester-end theory examination answer scripts of one or more courses, on payment of prescribed fee, through proper

application to Controller of Examination. Subsequently the Head of the Department/ Dean of School offered the course shall constitute a revaluation committee consisting of Chairman of the Class Committee as Convener, the faculty member of the course and a senior member of faculty knowledgeable in that course. The committee shall meet within a week to revalue the answer scripts and submit its report to the Controller of Examinations for consideration and decision.

15.5 After results are declared, grade sheets shall be issued to each student, which will contain the following details:

- credits for each course registered for that semester.
- performance in each course by the letter grade obtained.
- total credits earned in that semester.
- Grade Point Average (GPA) of all the courses registered for that semester and the Cumulative Grade Point Average (CGPA) of all the courses taken up to that semester.

If Ci, is the number of credits assigned for the i^{th} course and GPi is the Grade Point in the i^{th} course, GPA will be calculated according to the formula

$$GPA = \frac{\sum_{i=1}^{n}(C_i)(GPi)}{\sum_{i=1}^{n} C_i}$$

Where n = number of courses

The Cumulative Grade Point Average CGPA shall be calculated in a similar manner, considering all the courses enrolled from first semester.

“I” and "W" grades will be excluded for calculating GPA.

"U", “I”, "AB" and **"W"** grades will be excluded for calculating CGPA.

The formula for the conversion of CGPA to equivalent percentage of marks shall be as follows:

Percentage Equivalent of Marks = CGPA X 10

15.6 After successful completion of the programme, the Degree will be awarded with the following classifications based on CGPA.

Classification	**CGPA**
First Class with Distinction	8.50 and above and passing all the courses in first appearance and completing the programme within the Prescribed period of

	6 semesters.
First Class	6.50 and above, having completed within a period of 8 semesters.
Second Class	Others

However, to be eligible for First Class with Distinction, a student should not have obtained 'U' or 'I' grade in any course during his/her study and should have completed the U.G. programme within 6 semesters (except break of study). To be eligible for First Class, a student should have passed the examination in all the courses within 8 semesters reckoned from his/her commencement of study. For this purpose, the authorized break of study will not be counted. The successful students who do not satisfy the above two conditions will be classified as second class. For the purpose of classification, the CGPA will be rounded to two decimal places. For the purpose of comparison of performance of students and ranking, CGPA will be considered up to three decimal places.

16.0 ELECTIVE CHOICE:

16.1 Apart from the various elective courses listed in the curriculum for each programme, the student can choose a maximum of two electives from any stream of the same program during the entire period of study, with the approval of the Head of the parent department and the Head of the other department offering the course.

16.2 Online / Self Study Courses

Students are permitted to undergo department approved online/ self study courses not exceeding a total of six credits with the recommendation of the Head of the Department / Dean of School and with the prior approval of Dean Academic Affairs during his/ her period of study. In case of credits earned through online mode ratified by the respective Board of Studies, the credits may be transferred following the due approval procedures. The students shall undergo self study courses on their own with the mentoring of a member of the faculty. The online/ self study courses can be considered in lieu of elective courses.

17.0 SUPPLEMENTARY EXAMINATION

Final Year students can apply for supplementary examination for a maximum

of two courses thus providing an opportunity to complete their degree programme. The students can apply for supplementary examination within three weeks of the declaration of results.

18.0 PERSONALITY AND CHARACTER DEVELOPMENT

18.1 All students shall enroll, on admission, in any of the personality and character development programmes, NCC / NSS / NSO / YRC / Rotaract and undergo practical training.

- **National Cadet Corps (NCC)** will have to undergo specified number of parades.
- **National Service Scheme (NSS)** will have social service activities in and around Chennai.
- **National Sports Organization (NSO)** will have sports, games, drills and physical exercises.
- **Youth Red Cross (YRC)** will have social service activities in and around Chennai.
- **Rotaract** will have social service activities in and around Chennai.

19.0 DISCIPLINE

19.1 Every student is required to observe disciplined and decorous behavior both inside and outside the campus and not to indulge in any activity which will tend to affect the prestige of the Institution.

19.2 Any act of indiscipline of a student, reported to the Dean (Student Affairs), through the HOD / Dean will be referred to a Discipline and Welfare Committee nominated by the Vice-Chancellor, for taking appropriate action.

20.0 ELIGIBILITY FOR THE AWARD OF DEGREE

20.1 A student shall be declared to be eligible for the award of 3 year Bachelor provided the student has:

i) Successfully completed all the required courses specified in the programme curriculum and earned the number of credits prescribed for the specialization, within a maximum period of 10 semesters. from the date of admission, including break of study

ii) no dues to the Institution, Library, Hostels

iii) no disciplinary action pending against him/her.

20.2 The award of the degree must have been approved by the Institution.

21.0 POWER TO MODIFY

Notwithstanding all that has been stated above, the Academic Council has the right to modify the above regulations from time to time.

B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE & TECHNOLOGY

B.S.c (COMPUTER SCIENCE)

CURRICULUM & SYLLABUS, REGULATIONS 2016

SEMESTER I

Sl. No.	Course Code	Course Title	L	T	P	C	
1	ENC1182	General English - I	3	0	0	3	
2	MAC1187	Algebra, Calculus and Trigonometry	3	1	0	4	
3	CAC1151	Computer Fundamentals & Organization	3	0	0	3	
4	CAC1152	Problem Solving Techniques and Programming in C	3	1	0	4	
5	CAC1153	Introduction to Linux	3	0	0	3	
6	CAC1154	Problem Solving Techniques and Programming in C Lab	0	0	4	2	
7	CAC1155	Linux Lab	0	0	4	2	**23**

SEMESTER II

l. No.	Course Code	Course Title	L	T	P	C
1	ENC1283	General English - II	3	0	0	3
2	MAC1288	Probability and Statistics	3	1	0	4
3	CAC1251	Operating Systems	3	0	0	3
4	CAC1252	OOPS with C++	3	1	0	4
5	CAC1253	Data Structures Using C	3	0	0	3
6	CAC1254	OOPS with C++ Lab	0	0	4	2

7	CAC1255	Data Structures Using C Lab	0	0	4	2	
8	CAC1256	Environmental Studies	2	0	0	2	**21**

SEMESTER III

Sl. No.	Course Code	Course Title	L	T	P	C	
1	CAC2151	Database Management Systems	3	1	0	4	
2	CAC2152	Digital Electronics	3	0	0	3	
3	CAC2153	Computer Networks	3	0	0	3	
4	CAC2154	Fundamentals of Algorithms	3	0	0	3	
5	CAC2155	Multimedia and its Applications	3	0	0	3	
6	CAC2156	Database Management Systems Lab	0	0	4	2	
7	CAC2157	Multimedia Lab	0	0	4	2	
8	CAC2158	Communication Skills	0	0	4	2	**22**

SEMESTER IV

Sl. No.	Course Code	Course Title	L	T	P	C	
1	CAC2251	Programming in Java	3	1	0	4	
2	CAC2252	Computer Security	3	0	0	3	
3	CAC2253	Software Engineering	3	0	0	3	
4	CAC2254	Information Storage and Management	3	0	0	3	
5		Elective I	3	0	0	3	

6	CAC2255	Programming in Java Lab	0	0	4	2	**20**
7	CAC2256	Soft Skills and Personality Development	0	0	4	2	

SEMESTER V

Sl. No.	Course Code	Course Title	L	T	P	C	
1	CAC3151	C# and .NET Programming	3	1	0	4	
2	CAC3152	Web Designing	3	0	0	3	
3	CAC3153	Software Testing	3	0	0	3	
4		Elective 2	3	0	0	3	
5		Elective 3	3	0	0	3	
6	CAC3154	C# and .NET Programming Lab	0	0	4	2	
7	CAC3155	Web Designing Lab	0	0	4	2	**20**

SEMESTER VI

Sl. No.	Course Code	Course Title	L	T	P	C	
1	CAC3251	Network Security	3	1	0	4	
2	CAC3252	Data Mining and Warehousing	3	1	0	4	
3		Elective 4	3	0	0	3	
4		Elective 5	3	0	0	3	
5	CAC3253	Project	0	0	12	6	**20**

TOTAL CREDITS – 124

LIST OF PROGRAMME ELECTIVES

SEMESTER IV

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C
1.	PE	CACX01	Advanced Computer Architecture	3	0	0	3
2.	PE	CACX02	Compiler Design	3	0	0	3
3.	PE	CACX03	Database Design	3	0	0	3
4.	PE	CACX04	E-Commerce	3	0	0	3
5.	PE	CACX05	High Performance Computer Systems	3	0	0	3
6.	PE	CACX06	Internet and Web Programming	3	0	0	3
7.	PE	CACX07	Management Information Systems	3	0	0	3
8.	PE	CACX08	Parallel Algorithms	3	0	0	3
9.	PE	CACX09	Wireless Networks	3	0	0	3

SEMESTER V

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C
1.	PE	CACX10	Artificial Intelligence	3	0	0	3
2.	PE	CACX11	Client / Server Technology	3	0	0	3
3.	PE	CACX12	Distributed Operating System	3	0	0	3
4.	PE	CACX13	Embedded Systems	3	0	0	3
5.	PE	CACX14	Enterprise Resource Planning	3	0	0	3
6.	PE	CACX15	Mobile Commerce	3	0	0	3
7.	PE	CACX16	Mobile Computing	3	0	0	3
8.	PE	CACX17	Software Project Management	3	0	0	3
9.	PE	CACX18	Web Technology	3	0	0	3

SEMESTER VI

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C
1.	PE	CACX19	Big Data Analytics	3	0	0	3
2.	PE	CACX20	Human Computer Interaction	3	0	0	3
3.	PE	CACX21	Software Quality Assurance	3	0	0	3
4.	PE	CACX22	Web Services and Service Oriented Architecture	3	0	0	3

ENC1181 **GENERAL ENGLISH – I** **L T P C**

4 1 0 4

OBJECTIVES:

- To help the students acquire efficiency in Spoken English through role plays.
- To enable them to make Presentation effectively.
- To develop reading skills among students through extensive readers.
- To orient them in writing letters.
- To train them in appreciating and interpreting English literature.

MODULE I **7**

Oral and Written Communication – implications in real life and workplace situations
Essential English Grammar - 1-6 units

MODULE II **8**

One–minute Presentations (JAM) on concrete and abstract topics that test their creative thinking (ii) Prepared p and extempore presentations
Short Story; O Henry - “Robe of Peace” (Extensive Reading)

MODULE III **8**

Role-Play – establishing a point of view - convincing someone on social issues such as preservation of water, fuel, protection of environment, gender discrimination.
Poetry: William Shakespeare - “All the World’s a Stage”

MODULE IV **8**

Letter Writing- Letter of Invitation & Permission Developing story from hints- Short Story: John Galsworthy - “Quality” (Extensive Reading)

MODULE V **8**

Précis Writing- Writing instructions and recommendations Reading Comprehension: Short Story**--**Rudyard Kipling – “The Miracle of Puran Bhagat”(Extensive Reading)
Written correspondence - - e-mail writing Prose : Education, Employment, Unemployment

MODULE VI **6**

Written correspondence - - e-mail writing
Prose : Education, Employment, Unemployment

TOTAL HOURS – 45

REFERENCES:

1. Anderson, Kenneth & et.al. “Study Speaking : A Course in Spoken English for Academic Purposes” (Second Edition). Cambridge University Press, UK. 2004.
2. Sharma, R.C. & Krishna Mohan, “Business Correspondence and Report Writing”.
3. Tata MacGraw – Hill Publishing Company Limited, New Delhi. 2002
4. Hurlock, B. Elizabeth “Personality Development”. Tata McGraw Hill, New York, 2004.
5. Krishnaswamy. N, Sriraman T. Current English for Colleges. Hyderabad: Macmillan Indian Ltd, 2006.
6. Dahiya SPS. Ed. Vision in Verse- An Anthology of Poems. New Delhi: Oxford University Press, 2002
7. Murphy, Raymond. Essential English Grammar. New Delhi: Cambridge University Press, 2009.
8. Seshadri, K G Ed. Stories for Colleges. Chennai: Macmillan India Ltd, 2003.

OUTCOMES:

Students would be able to

- Actively take part in role plays
- Make effective presentation s
- Read and comprehend various texts.
- Write letters without making mistakes.
- Analyse literary texts.

MAC1187	ALGEBRA, CALCULUS AND TRIGONOMETRY	L	T	P	C
		3	1	0	4

OBJECTIVES:

The course is aimed at

- Developing the skills of students in applying basic concepts in chosen topics of mathematics that are imperative for effective understanding of application oriented topics.
- Laying the foundation for learning concepts of Differentiation, Integration and Trigonometry.

MODULE I MATRICES **(9+3)**

Symmetric – Skew-Symmetric - Orthogonal and Unitary matrices - Rank of a Matrix -Consistency - Characteristic equation - Eigenvalues and Eigenvectors - properties -Cayley Hamilton’s Theorem (proof not needed) - Simple applications.

MODULE II THEORY OF EQUATIONS **(9+3)**

Partial Fractions - Theory of equations- Polynomial Equations with real Coefficients -Irrational roots - Complex roots - Symmetric functions of roots - Transformation of equation by increasing or decreasing roots by a constant - Reciprocal equations.

MODULE III DIFFERENTIAL CALCULUS **(9+3)**

Rules of differentiation - Derivative of implicit function - Successive differentiation nth derivatives - Leibnitz theorem (without proof) and applications - maxima and minima of functions of two variables - Partial differentiation - Euler’s Theorem.

MODULE IV INTEGRAL CALCULUS **(9+3)**

Integration of rational functions - algebraic expressions involving only one irrational quantity- rational functions of sinx and cosx - Trigonometric substitutions - Bernoulli's formula for integration by parts - reduction formulae - properties of definite integral -Evaluation of double and triple integrals.

MODULE V TRIGONOMETRY **(9+3)**

De Moivre's theorem and its application - Circular and Hyperbolic functions – Inverse circular and hyperbolic functions - Expansion of trigonometric functions in terms of power and multiples - Separation of real and imaginary parts of logarithmic -trigonometric and inverse trigonometric functions - Summation of series including C+iS method.

TOTAL HOURS – 60

TEXT BOOKS:

1. Narayanan, S. and Manicavachagom Pillay, T.K. (2015) Calculus Vol. I,II &III S.Viswanathan (Printers & publishers) Pvt. Ltd., Chennai.
2. Venkataraman, M.K., "Higher Mathematics for Engineering and Science", Third Edition, The National Publishing Co., Madras, 1986.
3. Kandasamy P, K. Thilagavathi and K. Gunavathy- Allied Mathematics aper-I, First semester, 1/e, S. Chand & Co., New Delhi, 2003

REFERENCES:

1. Stewart J - Single Variable Calculus (4th edition) Brooks / Cole, Cenage Learning 2010.
2. Tom M. Apostol - Calculus, Vol. I (second edition) John Wiley and Sons, Inc., Jan 2007.
3. Burnside W.S. and A.W. Panton - The Theory of Equations, Dublin University Press, 1954.
4. MacDuffee, C.C. - Theory of Equations, John Wiley & Sons Inc., 1954.
5. Ushri Dutta, A.S.Muktibodh and S.D. Mohagaonkar: Algebra and Trigonometry, PHI India, 2006.

OUTCOMES:

On completion of the course the students will be able to

- solve eigenvalue and eigenvector problems
- classify and solve polynomial equations of different types.
- differentiate different types of functions.
- integrate rational and trigonometric functions and to evaluate definite integrals (double and triple).
- demonstrate the application of Demoivre's theorem and find the sum of series of trigonometric functions.

CAC1151	COMPUTER FUNDAMENTALS &ORGANIZATION	L	T	P	C
		3	0	0	3

OBJECTIVES:

- The basic knowledge of how a computer works is very important for any fresh networking or operating system professional.
- The functional knowledge of a computers working and its main building parts are paramount.
- The computers of today may come with variety of features but the basic working principles remain the same.
- Students will explore the fundamentals of organization of a computer and the principles and building units of a computer (its hardware).
- Also, they will be introduced to the basics of networking and MS Office

MODULE I GENERAL FEATURES OF A COMPUTER **9**

General features of a computer, Generation of computers, Personal computer, workstation, mainframe computer and super computers. Computer applications – data processing, information processing, commercial, office automation, industry and engineering, healthcare, education, graphics and multimedia.

MODULE II COMPUTER ORGANIZATION **9**

Computer organization, central processing unit, computer memory – primary memory and secondary memory, Secondary storage devices – Magnetic and optical media, Input and output units, OMR, OCR, MICR, scanner, mouse, modem.

MODULE III COMPUTER HARDWARE AND SOFTWARE **9**

Computer hardware and software, Machine language and high level language, Application software, computer program, operating system, Computer virus, antivirus and computer security, Elements of MS DOS and Windows OS, Computer arithmetic, Binary, octal and hexadecimal number systems, Algorithm and flowcharts, illustrations, elements of a database and its applications, Basic Gates (Demorgans theorems, duality theorem, NOR, NAND, XOR, XNOR gates), Boolean expressions and logic diagrams, Types of Boolean expressions

MODULE IV MS OFFICE 9

Word processing and electronic spread sheet, An overview of MSWORD, MSEXCEL and MSPOWERPOINT

MODULE V INTRODUCTION TO NETWORKING 9

Network of computers, Types of networks, LAN, Intranet and Internet, Internet applications, World Wide Web, E-mail, browsing and searching, search engines, multimedia applications

TOTAL HOURS – 45

TEXT BOOKS

1. M. Morris Mano and Michael D.Ciletti, "Digital Design with an introduction to the Verilog HDL", Pearson Education, Fifth Edition, ISBN-13: 978-0-13-277420-8, 2012.
2.

REFERENCES

1. Charles H.Roth, Jr., Kinney," Fundamentals of Logic Design", Brooks Publications, Seventh Edition,. ISBN-13 :978 -1-133-62848-4,2013
2. Ashok N Kamthane, "Computer Programming", Pearson Education, 2nd Edition, ISBN 13: 9788131704370, 2012

OUTCOMES:

- Students will get in-depth knowledge about the general features of a computer.
- Student which will allow introduce them to various features of computer,
- Understand the computer concepts on which they can base their learning and design.
- Student will be able to understand the basic MS- office.
- To get a better knowledge on networking aspects
- An insight to the different software and hardware components of a computer will take them a step ahead in terms of what they can accomplish from their learning.

CAC1152	PROBLEM SOLVING TECHNIQUES AND PROGRAMMING IN C	L	T	P	C
		3	1	0	4

OBJECTIVES:

The aims of the course are as follows

- This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code.
- To learn and acquire art of computer programming.
- Programming language for solving a problem
- To gain experience about structured programming
- To understand various features in C

MODULE I INTRODUCTION TO COMPUTER PROBLEM SOLVING 9

Problem Solving Process - Hierarchy charts to plan the program design - Algorithms - Iterative versus recursive style - Modular Programming - Structured Programming - Algorithm representation using Psuedocode, Algorithm Testing, brief introduction to Efficiency of Algorithms - Data Verification v/s Validation – Module design – Cohesion – Coupling – Fan-in – Fan-out concepts

MODULE II FUNDAMENTAL ALGORITHMS FOR PROBLEM SOLVING 9

Algorithms for Exchanging the values – Counting – Factorial Computation – some trigonometric functions computation as a sum of series – Base Conversion of numbers – Factoring Methods – Array Techniques – Sorting Algorithms - Bubble, Selection, Insertion, Merge Sort, Quick Sort–Sequential and Binary Search Algorithms. Algorithms for implementing numerical methods such as Newton Raphson and RungaKutta Methods.

MODULE III INTRODUCTION TO 'C' 9

Overview of C – Constants, Variables and Data Types; Operators and Expressions; Managing Input/Output Operations – Formatted I/O; Decision Making – Branching - IF, Nested IF – Switch – goto; Looping- While, do, for statements

MODULE IV ARRAYS, FUNCTIONS, STRUCTURES AND UNIONS 9

Arrays – static, dynamic and multi-dimensional arrays - Character arrays and Strings – String handling Functions - User defined Functions – Recursion; Structures and Unions – Array of Structures – Structures and Functions

MODULE V POINTERS AND FILE MANAGEMENT 9

Pointers– Declaration, Accessing a variable, character strings, pointers to functions and structures; File Management in ‘C’ any programming language; Dynamic Memory allocation– Linked Lists; Preprocessor Directives; Storage Classes, Command-line Arguments, multi-file programs and use of make utility.

TOTAL HOURS – 45

TEXT BOOKS:

1. Jeri R. Hanly and Eliot B. Koffman “Problem Solving and Program Design in C” Pearson Education, VII Edition, 2012
2. R.G.Dromey "How to Solve it by Computer ", PHI, 2006.

REFERENCES:

1. Paul J. Deitel, Deitel & Associates, “C How to Program”, Pearson Education, 7th Edition, ISBN-13: 978-0132990448, 2012
2. E.Balagurusamy " Programming in ANSI C " , Sixth Edition, 2004

OUTCOMES:

At the completion of this course, the student will able to

- Study, analyze, understand logical structure and compare various programming methodologies of a computer program, and different construct to develop a program in ‘C’ language
- Write small programs related to simple/ moderate mathematical, and logical problems in ‘C’.
- Study, analyze and understand simple data structures, use of pointers, memory allocation and data handling through files in ‘C’.

CAC1153	INTRODUCTION TO LINUX	L	T	P	C
		3	0	0	3

OBJECTIVES:

At the end of this course the learner is expected:

- To gain knowledge on the basic Linux commands.
- To have a hands on experience in open office
- To have clear understanding in open source softwares

MODULE I - INTRODUCTION TO LINUX 9

What Is Linux? -The Problems with Windows -The Benefits of Linux - Proprietary Software and the GPL- GNU and Linux Together- Different Flavors of Linux- Who Uses Linux?- Understanding How Linux Differs from Windows- Using Ubuntu

MODULE II BASH SHELL 9

What Is the BASH Shell? -Working with Files-Listing Files-Copying Files and Directories -Moving Files and Directories -Deleting Files and Directories -Changing and Creating Directories-Real Files and Virtual Files. -Users and File Permissions - The File System Explained -File Searches -Using the find Command -Using the locate Command -Using the whereis Command-File Size and Free Space -Viewing File Sizes -Finding Out the Amount of Free Space.

MODULE III INITIALIZATION 9

Linux kernel and kernel initialization - system initialization – hardware support - boot loaders.

MODULE IV DEVICE HANDLING 9

Device driver basics - module utilities - file systems - MTD subsystems – busybox.

MODULE V DEVELOPMENT TOOLS 9

Embedded development environment - GNU debugger - tracing & profiling tools - binary utilities - kernel debugging - debugging embedded Linux applications - porting Linux - Linux and real time - SDRAM interface.

TOTAL HOURS – 45

TEXT BOOKS:

1. Keir Thomas and Andy Channelle with Jaime Sicam (2009), “Beginning Ubuntu
2. Karim Yaghmour, Jon Masters, Gillad Ben Yossef, Philippe Gerum, “Building

embedded Linux systems", O'Reilly, 2008.

REFERENCES:

1. Christopher Hallinan, "Embedded Linux Primer: A practical real world approach", Prentice Hall, 2007.
2. Craig Hollabaugh, "Embedded Linux: Hardware, software and Interfacing", Pearson Education, 2002.

OUTCOMES:

Students are provided learning experiences that enable them to:

- Use Linux desktop and GNU tool chain with Eclipse IDE.
- Cross compile Linux kernel and port it to target board.
- Add applications and write customized application for the Linux kernel in the target board.

CAC1154	PROBLEM SOLVING TECHNIQUES AND PROGRAMMING IN C LAB	L	T	P	C
		0	0	4	2

OBJECTIVES:

The aims of the course are as follows

- To make the student learn C programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear and non linear data structures such as lists, stacks, queues, trees and graphs and use the efficient for problem solving

LIST OF PROGRAMS

1. Write a C program to find the sum of individual digits of a positive integer.
2. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
3. Write a C program to calculate the following Sum:

   $Sum=1+x^2/2! +x^4/4!+x^6/6!+x^8/8!+x^{10}/10!$
4. Write a C program to find the roots of a quadratic equation.
5. Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer.
   ii) To find the GCD (greatest common divisor)of two given integers.
   iii) To solve Towers of Hanoi problem.
6. Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*,/,% and use Switch Statement)
7. Write a C program to find both the larges and smallest number in a list of integers.
8. Write a C program that uses functions to perform the following:
   i)Addition of Two Matrices
   ii)Multiplication of Two Matrices
9. Write a C program that uses functions to perform the following operations:
   i)To insert a sub-string in to given main string from a given position.
   ii)To delete n Characters from a given position in a given string.
10. Write a C program to determine if the given string is a palindrome or not
11. Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.
12. Write a C program to count the lines, words and characters in a given text and C program to generate Pascal's triangle.

13. Write a C program to construct a pyramid of numbers.
14. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
15. Write a C program to convert a Roman numeral to its decimal equivalent.
16. Write a C program that uses functions to perform the following operations:
    i) Reading a complex number
    ii) Writing a complex number
    iii) Addition of two complex numbers
    iv) Multiplication of two complex numbers

TOTAL HOURS :45

TEXT BOOKS:

1. Reema Thareja, Computer Fundamentals and Programming in C, Oxford Press, 2012

REFERENCES:

1. Programming in C by Pradip Dey, Manas Ghosh 2nd edition Oxford University Press.
2. E.Balaguruswamy, Programming in ANSI C 5th Edition McGraw-Hill

OUTCOMES:

At the completion of this course, the student will able to

- Able to write, compile and debug programs in C language.
- Able to use different data types in a computer program.
- Able to design programs involving decision structures, loops and functions.
- Able to understand the dynamics of memory by the use of pointers.
- Able to use different data structures and create/update basic data files.

CAC1155	LINUX LAB	L	T	P	C
		0	0	4	2

OBJECTIVES:

The main objective of this course is to

- Learn and get familiar with the Unix operating system through Red hat
- Linux. UNIX basic commands working and their purpose will be defined.

LIST OF PROGRAMS

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
3. Write C programs to simulate UNIX commands like ls, grep, etc.
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies,
6. compute and print the average waiting time and average turnaround time.

TOTAL HOURS –30

TEXT BOOKS:

1. The Design of Unix Operating System, Maurice J. Bach, Pearson Education, 2010

REFERENCES:

1. Advance UNIX, a Programmer's Guide, S. Prata, BPB Publications, and New Delhi, 2011
2. Unix Concepts and Applications, Sumitabh Das, 2010

OUTCOMES:

- To use Linux desktop and GNU tool chain with Eclipse IDE.
- Cross compile Linux kernel and port it to target board.
- Add applications and write customized application for the Linux kernel in the target board.

SEMESTER II

ENC1283	GENERAL ENGLISH-II	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To prepare students for Interviews and Group Discussions
- To train them in writing official letters, resume' writing and reports.
- To train them in analysing different genre of literature.

MODULE I **7**

Filling Money Order Challan and Bank Challan
Short Story :G.K.Chesterton – The Hammer of God (Extensive Reading)
Essential English Grammar – 7-12 units

MODULE II **8**

Brainstorming – Think, pair and share activity
Poetry **:** Walt Whitman- I Celebrate Myself

MODULE III **8**

Dialogue Writing- Discussion etiquette -Assigning different roles in a GD (Note-taker, Manager, Leader and Reporter)
Prose**:** Environment

MODULE IV **8**

Interview skills- SWOT Analysis
Letter Writing- Letter to the Editor- Letter of Application and CV

MODULE V **8**

Report Writing- feasibility report and survey report
Short Story : Katherine Mansfield—A Cup of Tea (Extensive Reading)

MODULE VI **6**

Technical reports –Writing a technical report – format and content

TOTAL HOURS – 45

REFERENCES:

1. M. Ashraf Rizvi ‘Effective Technical Communication”. Tata McGraw – Hill Education, 2005. Gerson, Sharon & Steven M. Gerson, “ Technical Writing : Process and Product”
2. Pearson Education, New Delhi, 2004. 6. Riordan & Pauley. ‘Report Writing Today’. 9th Edition. Wadsworth Cengage Learning, USA. 2005.
3. Krishnaswamy. N, Sriraman T. **Current English for Colleges.** Hyderabad:
4. Macmillan Indian Ltd, 2006.
5. Dahiya SPS. Ed. **Vision in Verse- An Anthology of Poems**. New Delhi: Oxford
6. University Press, 2002.
7. Murphy, Raymond. **Essential English Grammar**. New Delhi: Cambridge
8. University Press, 2009.
9. Seshadri, K G Ed. **Stories for Colleges.** Chennai: Macmillan India Ltd, 2003.

OUTCOMES:

Students would be able to

- Take part in group discussions and interviews with confidence.
- Write official letters, their application letter with CV and reports.
- Analyse various genre of literature.

MAC1288 PROBABILITY AND STATISTICS

L	T	P	C
3	1	0	4

OBJECTIVES:

- To impart knowledge about the basic concepts of probability in solving application oriented problems
- To provide an understanding on the concepts of statistics

Recap Introduction to Probability (4)

Sample space - events - algebraic operations on events - definition of probability - Conditional probability - addition and multiplication theorems of probability – Baye's theorem.

MODULE I RANDOM VARIABLES AND DISTRIBUTION FUNCTIONS (10+3)

Discrete and continuous random variables - distribution function and its properties - probability mass function and probability density function - discrete and continuous probability distributions - Binomial, Geometric, Poisson, Uniform, Exponential and Normal distributions.

MODULE II MOMENTS AND MOMENT GENERATING FUNCTIONS (8+3)

Expectation of a random variable – probability generating function – properties - moment generating function.

MODULE III TWO DIMENSIONAL RANDOM VARIABLES (6+3)

Joint, marginal and conditional distribution functions - independence of random variables.

MODULE IV DESCRIPTIVE STATISTICS (8+3)

Types of data - primary and secondary data - classification and representation of data -formation of frequency distribution - various measures of central tendency, dispersion - and their merits and demerits - concept of skewness and kurtosis.

MODULE V CORRELATION AND CURVE FITTING (9+3)

Correlation coefficient and regression - rank correlation - curve fitting by least square methods - fitting a straight line, parabola, power curve and exponential curves. (no derivation, numerical problems only)

TOTAL HOURS – 60

TEXT BOOKS:

1. Richard Arnold Johnson, Irwin Miller, John E. Freund , Miller & Freund's
2. Probability and Statistics for Engineers, Prentice Hall, 2011.
3. Dr. P. Kandaswamy, Dr. K. Thilagavathy and Dr. K. Gunavathy, Probability and Queuing Theory, Revised edition, S. Chand Publishing, 2013.
4. T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw Hill, 2nd edition.

REFERENCES:

1. Goon, A.M., M. K. Gupta and B. Das Gupta Fundamentals of Statistics- Vol. I, World Press Ltd, Kolkata, 2002.
2. Gupta, S.C. and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 2002.
3. Hogg, R.V. and A. Craig, Introduction to Mathematical Statistics, McMillan Publishing co., Inc. 1978.
4. Mood A.M., F.A. Graybill and D.C. Boes, Introduction to Theory of Statistics McGraw Hill Book Co., 1974.
5. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, Fourth Edition, Elsevier.

OUTCOMES:

On completion of the course the students will be able to

- solve basic problems in probability and fundamentals of statistics.
- solve problems using standard probability distributions.
- find the marginal and conditional distributions of two dimensional random
- variables.
- calculate rank correlation and fitting curves for the given data.
- use method of moments and moment generating functions.

CAC1251	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

To gain knowledge about operating system, memory management and scheduling concepts and to study about the basics of OS, process management, Synchronization, memory management and File management.

MODULE I INTRODUCTION: 9

What is an operating system – operating system concepts – system calls – operating system structure

MODULE II PROCESSES AND THREADS 9

Process – Inter process communication – Scheduling; Deadlocks: Resources – Introduction to deadlocks – Deadlock detection and recovery – deadlock avoidance – Deadlock Prevention.

MODULE III MEMORY MANAGEMENT: 9

Basic memory management – Swapping – Virtual Memory – Page replacement algorithms – Implementation Issues – Segmentation.

MODULE IV INPUT / OUTPUT: 9

Principles of I/O hardware – Principles of I/O software – I/O software layers – Disks – Character oriented terminals – Graphical user interfaces – Network terminals.

MODULE V FILE SYSTEMS: 9

Files – Directories – File System Implementation – Example file systems – Case study 1: Unix and Linux; Case Study 2 : Windows 2000.

TOTAL HOURS – 45

TEXT BOOKS:

1. Abraham Silberschatz and P. B. Galvin - Operating system concepts - Addison Wesley Publication, Eighth Edition.,2012

REFERENCES:

1. Stalling William, Operating Systems: Internals and Design Principles, 7th

Edition, Prentice Hall, 2011.
2. Dietel et al, Operating Systems, 3rd Edition, Pearson Education, 2004.
3. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Prentice Hall, 2007.

OUTCOMES:

At the completion of this course, students will be able to

- Demonstrate understanding of the concepts, structure and design of operating
- Systems Demonstrate understanding of operating system design and its impact on application system design and performance
- Demonstrate competence in recognizing and using operating system features.

CAC1252	OOPS WITH C++	L	T	P	C
		3	0	0	3

OBJECTIVES:

The aim of the course is to

- Understand the concepts of classes and object
- Define classes for a given situation and instantiate objects for specific problem solving.
- Reuse available classes after modifications if possible
- Possess skill in object oriented thought process

MODULE I INTRODUCTION TO OBJECT ORIENTED PROGRAMMING 9

Concept of Object orientation – comparison with procedural and structured programming – Classes and objects – data Abstraction, encapsulation, dynamic binding, message passing. Advantages of object orientation -Basic data types and declarations.

MODULE II CLASSES AND OBJECTS 9

Classes and objects in C++, access modifiers, static members, friend functions, Constructors and Destructors, polymorphism, Operator Overloading and type conversion

MODULE III INHERITANCE 9

Inheritance - parent and child classes, private, public and protected inheritance, multiple inheritances and multi-level inheritance, Virtual base classes. new and delete operators, objects.

MODULE IV POLYMORPHISM AND EXCEPTION HANDLING 9

Binding & Polymorphism: Early binding, Late Binding, Pointers to derived class objects, virtual functions, Pure virtual functions, exception handling in C++: try, throw and catch.

MODULE V FILE STREAM CLASSES AND TEMPLATES 9

Study of File stream classes in C++. Templates – class and function templates, Templates versus macros, String objects in C++, Standard Template Library in C++ .

TOTAL HOURS – 45

TEXT BOOKS:

1. Bjarne Stroustrup, “ Programming: Principles and Practice Using C++ “, Addison Wesley, 2nd edition, ISBN-13: 978-0321992789, 2014.

REFERENCES:

1. Bjarne Stroustrup," The C++ Programming Language", Addison Wesley, 4 th edition, ISBN-13: 978-0321563842, 2013.
2. Herbert Schildt, "C++ The Complete Reference", Tata McGraw Hill fourth Edition, 2003

OUTCOMES:

After completion of this course, the students would be able to

- Understand concepts of objects and their significance in real world
- Learn to co-relate relationship among different entities involved in a system
- Develop software in terms of objects, associations, and integrity constraints
- Identify, understand and analyze various sample development models
- Design classes and inheritances
- Real life problem formulation in terms of objects and classes
- Data handling through files

CAC1253	DATA STRUCTURES USING C	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To introduce the fundamental concepts of data structure
- To understand the basic operations of stacks and queues for real time scenario
- To comprehend the significance of sorting algorithms
- To demonstrate the understanding of various searching algorithms

MODULE I INTRODUCTION TO DATA STRUCTURES 9

Definition, Classification of data structures : primitive and non primitive. Operations on data structures. Dynamic memory allocation and pointers: Definition Accessing the address of a variable, Declaring and initializing pointers. Accessing a variable through its pointer. Meaning of static and dynamic memory allocation. Memory allocation functions: malloc, calloc, free and realloc.

MODULE II INTRODUCTION TO STACK AND QUEUE 9

Stack – Definition, Array representation of stack, Operations on stack: Infix, prefix and postfix notations- Conversion of an arithmetic expression from Infix to postfix. Applications of stacks. Queue - Definition, Array representation of queue, Types of queue: Simple queue, circular queue, double ended queue (deque) priority queue, operations on all types of Queues

MODULE III LINKED LISTS 9

Definition, Components of Linked List, Representation of Linked List, Advantages and Disadvantages of Linked List. Types of Linked List: Singly Linked Lists – Doubly Linked Lists – Circular List – Representing Stacks and Queues in C using Arrays and Linked Lists, Infix to Postfix Conversion, Postfix Expression Evaluation. Applications of Linked Lists.

MODULE IV TREES 9

Trees – Binary Trees - Terminology – Representation – Traversals – Graphs – Terminology – Representation – Graph Traversals (DFS & BFS).

MODULE V SEARCHING AND SORTING 9

Searching - Linear Search Methods - Binary Search Methods, Sorting - Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort.

TOTAL HOURS – 45

TEXT BOOKS:

1. Narasimha Karumanchi, "Data Structures and Algorithms Made Easy: Data Structure and Algorithmic Puzzles", 2nd Edition, Create Space Independent Publishing Platform, 2011.
2. Ashok N. Kamthane, "Introduction to Data Structures in C", 2nd Edition, Wiley Publications, 2008.

REFERENCES:

1. Classic Data Structures, D. Samanta, PHI Learning , New Delhi 2011
2. Data Structure made simple, Sathish Jain, Shashi Singh, BPB Publications, New Delhi 2006

OUTCOMES:

On completion of this course, students will be able to

- Describe common applications for arrays
- Apply Stack and Queue data structures for real time applications
- Analyse, evaluate and choose appropriate abstract data types and algorithms to solve particular problems

CAC1254	OOPS WITH C++ LAB	L	T	P	C
		0	0	4	2

OBJECTIVES:

- Understand and solve logical & mathematical problems through C++ language
- Strengthen knowledge of a procedural programming language.
- Design and develop solutions to intermediate level problems
- Develop their skills in software development using a procedural language
- Get programming in skill the object oriented technology with the usage of C++.

LIST OF PROGRAMS

1. Creation of classes and use of different types of functions.
2. Programs using Constructor and Destructor
3. Count the number of objects created for a class using static member function.
4. Write programs using function overloading and operator overloading.
5. Programs using inheritance.
6. Program using friend functions.
7. Program using virtual function.
8. Program using exception handling mechanism.
9. Programs using files.
10. Programs using function templates.

TEXT BOOKS

1. Bjarne Stroustrup, " Programming: Principles and Practice Using C++ ", Addison Wesley, 2nd edition, ISBN-13: 978-0321992789, 2014.

REFERENCES:

1. Bjarne Stroustrup," The C++ Programming Language", Addison Wesley, 4 th edition, ISBN-13: 978-0321563842, 2013.
2. Herbert Schildt, "C++ The Complete Reference", Tata McGraw Hill Edition, 2003

OUTCOMES:

- After completion of this course, the students would be able to Create classes and objects in C++
- Implement inheritance, polymorphism and object relationship in C++

- Design methods and procedure
- Manipulate data through file in C++
- Debug and test software.
- Develop a minor software in C++ language

CAC1255	DATA STRUCTURES USING C LAB	L	T	P	C
		0	0	4	2

OBJECTIVES:

The objective of this course is to teach the students to

- Be familiar with writing recursive methods
- Implement stack and queue using array
- Implement circular queue using array
- Implement singly linked list and doubly linked list using dynamic variables and pointers
- Implement quick sort, selection sort, insertion sort and bubble sort techniques to sort a given list of integers.
- Implementation of binary search method for a given list of integers

LIST OF PROGRAMS

1. Write a C program to demonstrate the working of stack of size N using an array. The operations to be supported are 1. PUSH 2. POP 3. DISPLAY. The program should print appropriate messages for STACK overflow and Under flow.
2. Write a C program to simulate the working of an ordinary Queue using an array. Provide the operations QINSERT, QDELETE and QDISPLAY. Check the Queue status for empty and full.
3. Write a C program to simulate the working of an Circular Queue using an array. Provide the operations CQINSERT, CQDELETE and CQDISPLAY. Check the Circular Queue status for empty and full.
4. Using dynamic variables and pointers Write a C program to construct a singly linked list consisting of the following information in each node; Roll – No (Integer), Name (Character string). The operations to be supported are :
    - Inserting a node in the front of the list
    - Deleting the node based on Roll – No
    - Searching a node based on Roll-No
    - Displaying all the nodes in the list
5. Write a C program to implement doubly linked list
6. Write a C program to sort a list of N elements of integer type using quick sort Algorithm
7. Write a C program to sort a list of N elements using Bubble sort Technique

8. Write a C program to search for an element in an array using Binary search
9. Write a C program to implement insertion sort method to sort a given list of integers in descending order.
10. Write a C program to implement selection sort method to sort a given list of integers in descending order.

TOTAL HOURS –30

TEXTBOOKS:

1. Magnifying Data Structures, Aprita Gopal , First Edition , PHI Learning, New Delhi Data Structures in C, Horowitz, Sahni, Anderson-Freed, Universities Press
2. Narasimha Karumanchi, "Data Structures and Algorithms Made Easy: Data Structure and Algorithmic Puzzles", 2nd Edition, Create Space Independent Publishing Platform, 2011.

REFERENCES:

1. Ashok N. Kamthane, "Introduction to Data Structures in C", 2nd Edition, Wiley Publications, 2008.
2. DataStructures Using C - A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson education.

OUTCOMES:

The completion of this course the students will be able to

- Write and demonstrate recursive methods
- Implement stack and queue and evaluate various operations involved in it
- Implement and execute circular queue using array
- Develop an application using singly linked list and doubly linked list
- Implement and analyze various searching techniques and sorting techniques

CAC1256	ENVIRONMENTAL STUDIES	L	T	P	C
		2	0	0	2

OBJECTIVES:

To impart knowledge on

- Various natural resources, availability, utilization and its current scenario.
- Different ecosystems, energy transfer.
- Values, threats and conservation of biodiversity.
- Levels of different pollutants and its impact and the causes and effects of natural disasters

MODULE I NATURAL RESOURCES 8

Land resources: land degradation, soil erosion and desertification - Forest resources: use and over-exploitation, deforestation - Water resources: use and over-utilisation of surface and ground water, water conservation (rainwater harvesting and watershed management) - Food resources: world food problems, changes in land use by agriculture and overgrazing, modern agriculture and its effects - Energy resources: increasing energy needs, renewable and non-renewable, use of alternate energy sources.

MODULE II ECOSYSTEM 8

Ecosystem- energy flow in the ecosystem - food chains, food webs and ecological pyramids - characteristics, structure and function of (a) Terrestrial ecosystems (forest, grassland, desert) and (b) Aquatic fresh water ecosystems (pond, lake, river) (c) Aquatic salt water ecosystems (ocean, estuary) - ecological succession.

MODULE III BIODIVERSITY AND ITS CONSERVATION 8

Biodiversity - genetic, species and ecosystem diversity – hot-spots of biodiversity – bio geographic classification of India - endangered, endemic, extinct and invasive species of India - red data book - values of biodiversity: consumptive, productive, social, ethical, aesthetic and option values - threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts - conservation of biodiversity: in-situ and ex-situ conservation of biodiversity

MODULE IV ENVIRONMENTAL POLLUTION AND NATURAL DISASTER 6

Definition, cause, effects and control measures of (a) air pollution (b) water pollution

(c) soil pollution (d) marine pollution (e) noise pollution (f) thermal pollution (g) nuclear hazards - ill-effects of fireworks and upkeep of clean environment - solid waste management: types (urban, industrial, biomedical and electronic wastes), collection, processing and disposal (incineration, composting and land-fill).

Natural disaster and management: flood, cyclone, drought, landslide, earthquake and tsunami.

Case studies related to current situation.

TOTAL HOURS – 30

TEXT BOOKS:

1. Erach Bharucha, Textbook for Environmental Studies For Undergraduate Courses of all Branches of Higher Education for University Grants Commission, Orient Blackswan Pvt Ltd, Hyderabad, India, 2013.
2. Benny Joseph, Environmental Studies, Tata McGraw-Hill Education, India, 2009.
3. Ravikrishnan A, Environmental Science and Engineering, Sri Krishna Publications, Tamil Nadu, India, 2015.
4. Raman Sivakumar, Introduction to Environmental Science and Engineering, McGraw Hill Education, India, 2009.
5. Venugopala Rao P, Principles of Environmental Science and Engineering, Prentice Hall India Learning Private Limited; India, 2006.
6. Anubha Kaushik and Kaushik C.P., Environmental Science and Engineering, New Age International Pvt Ltd., New Delhi, India, 2009.
7. Rajah G, Basic Environmental Studies, Margham Publications, Chennai, 2016.

REFERENCE BOOKS:

1. Masters G.M. and **Wendell P.,** Introduction to Environmental Engineering and Science, **3rd** Edition, Prentice Hall, New Delhi, 2007.
2. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. Boston, USA, 2016.

OUTCOMES:

At the end of the course the student will be able to

- Predict the scenario of various natural resources and suggest remedies to curb the exploitation of these resources.

- Identify food chain and web and its role in various ecosystems.
- Assess the impacts on biodiversity and provide solutions to conserve it.
- Analyze the impacts of pollutants in the environment and propose suitable method to alleviate the pollutants and the natural disasters.

SEMESTER III

CAC2151	**DATABASE MANAGEMENT SYSTEMS**	**L**	**T**	**P**	**C**
		3	**1**	**0**	**4**

OBJECTIVES:

The aim of the course is to

- Provide an introduction to the management of database systems.
- Understand the fundamentals of relational systems including data models, database architectures, and database manipulations.

MODULE I INTRODUCTION 12

Database Systems vs. File Systems - View of Data - Data Models- Database Languages -Transaction Management - Database Systems Structure - History of Database Systems - Database Systems Applications - Entity Relationship Model.

MODULE II RELATIONAL DATABASES 12

SQL - Basic Structure - Set Operations - Complex Queries - Joined Queries - DDL-Embedded SQL-Dynamic SQL-Other SQL Functions-Query by Example- Integrity and Security of searching-Relational Database Design.

MODULE III DATA STORAGE AND INDEXING 12

Storage & File Structure - Disks-RAID-File Organization - Indexing &Hashing- B+ TREE-B Tree-Static Hashing-Dynamic Hashing-Multiple Key Access.

MODULE IV QUERY EVALUATION & OPTIMIZATION 12

Query Processing-Selection Operation-Sorting-Join Operation-Evaluation of Expressions

MODULE V QUERY OPTIMIZATION 12

Query Optimization Overview - Transformation of Relational Expressions -Estimating Statistics of Expression Results - Choice of Evaluation Plans

Total Hours –60

TEXT BOOK:

1. Elmasri and Navathe, "Fundamentals of Database Systems", 6th Edition, Addison-Wesley, 2011

REFERENCES:

1. Raghu Ramakrishnan & Johannesgerhrke, “Data Base Management Systems”, Mc Graw Hill International Edition, 2000.
2. C.J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

OUTCOMES:

At the conclusion of the course, the student will be able to:

- Understand terms related to database design and management.
- Understand the objectives of data and information management.
- Develop physical data models for relational database management systems.
- Implement relational databases using a RDBMS retrieve data using SQL.

CAC2152 DIGITAL ELECTRONICS L T P C

3 0 0 3

OBJECTIVES:

The main objective of the Course Digital Electronics is the students will learn

- through the basic understanding of Boolean Algebra and Number systems,
- introduces the student to the fundamentals of combination logic design and then to sequential circuits(both synchronous and asynchronous)
- Understandings in Flip Flops, Multiplexers, ADC and DAC

MODULE I NUMBER SYSTEMS 9

Number Systems and Codes Decimal, binary, octal, hex numbers, conversion from one to another- codes, BCD, excess 3 , gray codes conversion from one to another - Error detection codes.

MODULE II BOOLEAN ALGEBRA AND THEOREMS 9

Boolean Algebra and Theorems : Basic, Universal logic gates - Boolean theorems - sum of products , products of sums expressions , simplification by Karnaugh Map method, simplification based on basic Boolean theorems - don't care conditions.

MODULE III COMBINATIONAL DIGITAL CIRCUITS 9

Combinational Digital Circuits Arithmetic Building blocks , Basic Adders and subtractors, BCD adders - Data of processing circuits, multiplexers, demulitiplexers, encoders, decoders - TTL, CMOS digital logic families.

MODULE IV SEQUENTIAL DIGITAL CIRCUITS 9

Sequential Digital Circuits : Flip-flops , RS, Clocked SR, JK, D, T, master-slave types-shift registers, ring counters - ripple counters - synchronous counters, timer IC 555, applications.

MODULE V DAC AND ADC 9

DAC and ADC : Parameters, Accuracy, resolution - DAC, variable resister network, R-2R ladder network types - ADC, counting continuous, successive approximation, dual - slope types - comparison of various types of DAC and ADC.

Total Hours –45

TEXT BOOKS:

1. M. Morris Mano and Michael D.Ciletti, "Digital Design with an introduction to the Verilog HDL", 5th Edition, Pearson Education, 2012.

REFERENCES:

1. Donald D. Givone, "Digital Principles and Design", 13th reprint, Tata McGraw Hill, 2003.
2. S.P. Bali, Solved Problems in Digital Electronic, Sigma Series, Tata McGraw-Hill,(2005)

OUTCOMES:

A student who successfully fulfills the course requirements will have demonstrated:

- An ability to understand basic parameters of a logic Gates.
- An ability to analyze and design a CMOS logic inverter.
- An ability to analyze a TTL and ECL logic inverter.
- An ability to understand the operation of latch circuit and flip-flop circuits.
- An ability to understand the operation of different types of semiconductor memories.

CAC2153	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

OBJECTIVES:

This course provides a comprehensive introduction to

- Understand the underlying Network model and Communication principles.
- Switching techniques and Multiplexing approaches
- knowledge in Internetworking Devices

MODULE I NETWORK FUNDAMENTALS

A communications model - Data Communications - Data Communications Networking - computer communication architecture - standards Data Transmission - Concepts and terminology - Analog and Digital - Transmission - Transmission Impairments - Transmission media.

MODULE II PHYSICAL LAYER

Data encoding - Digital data Digital signals ,Digital data Analog signals,, Analog data Analog signals Data Communications Interface : Asynchronous and synchronous Transmission - Line configuration - Interfacing.

MODULE III DATA LINK LAYER

Data link control: Flow controls - Error Detection - Error Control - High Level Data Link Control (HDLC) - MULTIPLEXING - Frequency Division multiplexing - Synchronous time - Division multiplexing - Statistical time division multiplexing.

MODULE IV NETWORK LAYER

Circuit switching: Circuit switching networks switching concepts - Routing in circuit switched networks - Packet switching principles - Routing in packet switching - Congestion control.

MODULE V HIGH PERFORMANCE NETWORKS

Frame relay: Frame relay Protocol Architecture - Frame relay call control user data transfer - Networks functions - Congestion control, ASYNCHRONOUS TRANSFER MODE (ATM) Protocol Architecture – ATM logical connection - ATM Cells – Transmission of ATM cells - ATM adaption layer - Traffic and congestion control.

TOTAL HOURS – 45

TEXT BOOKS:

1. Larry L. Peterson and Bruce S. Davie, "Computer Networks: A Systems Approach", 4th Edition, Elsevier, 2007.

2. Forouzan: Introduction to Data Communication & Networking, McGraw-Hill, 2007.

REFERENCES:

1. Andrew S. Tanenbaum, "Computer Networks", 4 th Edition, Prentice-Hall of India, 2003.

2. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 3rd Edition, Pearson Education, 2006.

OUTCOMES:

Upon completion of the subject, students will be able to

Explain the importance of data communications and the Internet in supporting business communications and daily activities.

- Understand how communication works in data networks and the Internet.
- Recognize the different internetworking devices and their functions.
- Explain the role of protocols in networking.
- Analyze the services and features of the various layers of data networks

CAC2154 FUNDAMENTALS OF ALGORITHMS

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of the course is to

- introduce mathematical aspects and analysis of algorithms
- analyze sorting and searching algorithms
- study various algorithmic techniques
- devise correct and efficient algorithms for solving a given problem
- explain the NP-Completeness and deal with NP-complete problems

MODULE I INTRODUCTION 9

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive algorithm and Non-recursive algorithms.

MODULE II DIVIDE-AND-CONQUER 9

Brute Force – Closest-Pair and Convex-Hull Problems-Exhaustive Search – Traveling Salesman Problem – Knapsack Problem – Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication.

MODULE III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE 9

Computing a Binomial Coefficient – Warshall's and Floyd' algorithm – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm.

MODULE IV BACKTRACKING 9

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem

MODULE V BRANCH AND BOUND 9

Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

TOTAL HOURS –45

TEXT BOOKS:

1. Baase,S., Gelder,A.V., Computer Algorithms: Introduction To Design And Analysis, 3rd Edition, Pearson India.
2. Anany Levitin, Introduction to the Design and Analysis of Algorithms, 3rd Edition, Pearson Education.

REFERENCES:

1. Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, Introduction to Algorithms, 2ndEdition, PHI, 2006.
2. Introduction to the Design and Analysis of Algorithms A Strategic Approach, R.C.T. Lee, S.S. Tseng, R.C. Chang & Y.T.Tsai, TMH, 2005.

OUTCOMES:

At the completion of this course, students will be able to

- Ability to decide the appropriate data type and data structure for a given problem.
- Ability to select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.
- understand NP-Completeness and deal with NP-complete problems.

CAC2155 MULTIMEDIA AND ITS APPLICATIONS L T P C

3 0 0 3

OBJECTIVES:

- Understand the Flash/Animate working environment and its terminology.
- Explore and implement the different types of animation Flash/Animate supports.
- Learn how to import and use sound and sound effects in animation programs.
- To edit images in Photoshop

MODULE I -INTRODUCTION 9

What is multimedia: Definitions - Where to use Multimedia - Introduction to making Multimedia- The stages of a Project - What You Need – Multimedia Skills and Training: Basic Tools :Text Editing and Word Processing Tools - Painting and Drawing Tools - 3- D Modeling and Animation Tools - Image Editing Tools - Sound Editing Tools - Animation, Video and Digital Movie Tools - Helpful Accessories

MODULE II VECTOR AND RASTER GRAPHICS 9

Adding multimedia to the web-Raster image editing software Introduction -Image Basics -File Formats -GIF -JPEG -Color Palette –Color models-Layers -Creating new Images - Brushes –Grids and guides-Gradients -Scaling Images -Moving and Merging Layers - Tool Palette -Dialogs -masking –Filters –Adding text to images – Designing icons and background images.

MODULE III IMAGE HANDLING 9

Introduction –Creating Simple Vector graphics –Creating banners -Images -Working with layers –Tweening -Motion guide –Masking –Frame by Frame animation –Onion Skin Effect –Creating special effects -Text effects and animation –Action scripts.

MODULE IV ANIMATIONS AND INTERACTION 9

Creating clippings - Animations with sound effects -Adding audio or Video - Windows Media Player ActiveX Control -Real Player ActiveX control- web site with a particular theme using all the utilities -Graphics -Animations and Interaction

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MODULE V PROJECT PLANNING 9

Estimating -Designing - Producing - Content and Talent- Acquiring Content - Using content created by others - Using Content created for a Project - Using

Talent Delivering: Testing - Preparing for Delivery - Compact Disc Technology - Wrapping It Up - Delivering on the World Wide Web.

TOTAL HOURS –45

TEXT BOOKS:

1. Richard Schrand, Photoshop 6 Visual Jumpstart, Adobe Press 2000.(II)
2. James L. Mohles, Flash 5.0 Graphics, Animation & Interaction, Macromedia 2000. (III&IV)
3. Tay Vaughan, Multimedia: Making It Work, Fourth Edition - Tata McGraw Hill Edition, 1999.(I&V)

REFERENCES:

1. Tay Vaughan , "Multimedia:Making It Work,8th Edition", McGraw Hill, 2010.
2.John F Koegelbuford, Multimedia Systems Addison Wesley - First Indian Reprint, 2000.

OUTCOMES:

On completion of the course, Students will be able to

- Create Flash/Animate banners for websites that will capture and hold viewers attention
- Create animated photo galleries.
- Incorporate audio and video and learn how to edit it within Flash/Animate.
- Design icons and background images.

CAC2156	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
		0	0	4	2

OBJECTIVES:

The aim of the course is

- to learn SQL (Structured Query Language) which would provide functionality to:
- to learn how to create tables which are fundamental storage blocks of data.
- to learn how to place constraints on data that is entered on tables to ensure data integrity.
- to learn how to add, change and remove data from tables.
- to learn how to select a subset of the data you want to see from the collection of tables and data.
- to learn how to combine table and group multiple rows of data in table. to learn PL/SQL which would provide the ability to do iterative
- programming at database level to:
- to write programming blocks with conditional structure, assignment structure, loop structure, etc.
- use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc.

LIST OF PROGRAMS

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using package.
9. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).

Typical Applications – Banking, Electricity Billing, Library Operation)

TOTAL HOURS –30

OUTCOMES

At the end of this course, a student will be able to

- Use in real time business activities.
- create and do manipulation on database in any domain.
- work with table by using PL/SQL Program.
- get a clear idea about database transaction activities.

TEXTBOOK:

1.Ramez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2008.

REFERENCES:

1.Abraham Silberschatz, Henry F. Korth and S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata Mc Graw Hill, 2011.

2. C.J.Date, A.Kannan and S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

CAC2157	MULTIMEDIA LAB	L	T	P	C
		0	0	3	1

OBJECTIVES:

- Expose students to various interactive multimedia based software such as Flash
- Gain a working knowledge of all the Adobe Flash/Animate tools and their functions.

LIST OF PROGRAMS

Exercises Using Flash

1. Drawing a Semi Circle by snap tool, spokes on a wheel.
2. Placing a text along a curved path .
3. Changing on objects shape using shape tweening, text tweening.
4. Application using buttons, animating the button
5. Tweening a using the shape hints, motion tweening
6. An application to show the masking effect in Flash
7. Slide show presentation(minimum 5 slides)
8. Creating smudge effect for an image
9. Usage of textbox, dynamic text box, buttons with action scripts.

Exercises Using Photoshop

1. Working with the clone stamp tool , custom shape
2. Using the sponge Tool
3. Removing an element from an image
4. Creating an edge mask
5. Applying Transformations
6. Correcting brightness and contrast

TOTAL HOURS – 30

TEXT BOOKS:

1.Richard Schrand, Photoshop 6 Visual Jumpstart, Adobe Press 2000.

2. James L. Mohles, Flash 5.0 Graphics, Animation & Interaction, Macromedia 2000

REFERENCES:

1. John F Koegelbuford, Multimedia Systems Addison Wesley - First Indian Reprint, 2000.

2. Walter Worth John, A - Multimedia Technologies and Applications, Ellis Horwood Ltd., London,1991.

OUTCOMES:

On completion of the course, Students will be able to

- Draw simple images prepare them for animation and add motion.
- Animate a sequence with a soundtrack.

CAC2158	COMMUNICATION SKILLS	L	T	P	C
		0	0	4	2

OBJECTIVES:

The aim of the course is to

- enable the students to speak English with correct accent and pronunciation.
- interact effectively in real life situations and in workplace.
- develop the writing ability of students by providing them the required practice.
- improve the written communication skill so as to write reports, letters etc.

MODULE I

Introduction to Communication-Need for Effective Communication. The Process of Communication:Levels of communication- Flow of communication- Use of language in communication- Communication networks- Significance of technical communication.

MODULE II

Barriers to Communication:Types of barriers- Miscommunication- Noise- Overcoming measures. Listening Skills:Listening as an active skill- Types of Listeners- Listening for general content- Listening to fill up information- Intensive Listening- Listening for specific information-Developing effective listening skills- Barriers to effective listening skills.

MODULE III

Reading Skills :Previewing techniques- Skimming- Scanning- Understanding the gist of an argument-Identifying the topic sentence- Inferring lexical and contextual meaningrecognizing coherence and sequencing of sentences- Improving comprehension skills. Writing Skills:Sentence formation- Use of appropriate diction- Paragraph and Essay Writing- Coherence and Cohesion.

MODULE IV

Technical Writing:Differences between technical and literary style, Elements of styleCommon Errors. Letter Writing: Formal, informal and demi-official letters- business letters. Job Application :Cover letter, Differences between bio-data, CV and Resume. Group Discussion:Differences between group discussion and debate; Ensuring success in group discussions.

MODULE V

Non-verbal Communication and Body Language: Forms of non-verbal

communicationInterpreting body-language cues- Kinesics- Proxemics- Chronemics- Effective use of body language. Interview Skills:Types of Interviews- Ensuring success in job interviewsAppropriate use of non-verbal communication. Presentation Skills:Oral presentation and public speaking skills- business presentations

TOTAL HOURS –20

TEXT BOOKS:

1.Deparment of English,Anna University,Mindscapes,English for Technologists & Engineers,Orient Longman Pvt.Ltd,Chennai :2012.

2.M.Ashraf Rizvi,,Effective Technical Communication,Tata McGraw Hill Publishing Company Ltd,New Delhi,2009.

REFERENCES:

1. Sangeetha Sharma,Binod Mishra,'Communication Skills for Engineers & Scientists,PHI,Learning Pvt Ltd,New Delhi,2009.
2. Sumant S,Technical English, 2nd Edition,McGraw-Hill Education Pvt Ltd,2008.

OUTCOMES:

This course will enable students to use „good" English and perform the following
Gather ideas and information, to organise ideas relevantly and coherently.

- Engage in debates.
- Participate in group discussions.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- Take part in social and professional communication.

SEMESTER IV

CAC2251	PROGRAMMING IN JAVA	L	T	P	C
		3	1	0	4

OBJECTIVES:

The aim of the course is to

- Learn the fundamentals of the capabilities of Java and to introduce encapsulation, polymorphism, and the Java language mechanism (classes and objects) to implement it.
- Develop Java computer programs that perform various problem-solving algorithms.
- Develop the programming skills to use the Java object oriented programming methodology to produce quality computer based solutions to real problems.

MODULE I INTRODUCTION TO JAVA 12

The Confidentiality, Integrity & Availability (CIA) Triad, Cryptographic concepts, methodologies &practices, Symmetric& Asymmetric cryptography, public& private keys, Cryptographic algorithms and uses, Construction& use of Digital signatures

MODULE II CLASS AND INHERITANCE 12

The Java Class- Inheritance, Deriving Classes, Method Over-riding, Method Overloading, Access Modifiers, Abstract Class and Method, Interfaces, Packages, Imports and Class Path.

MODULE III THREADS AND EXCEPTION HANDLING 12

Exception Handling, The Try-Catch Statement, Catching more than one Exception, Generating Exceptions, Threads: Introduction, Creating Threads in Applications-Thread Priority

MODULE IV : INPUT STREAM CLASSES 12

IO Packages, Java Input Stream Classes, Java Output Stream Classes, File Class.

MODULE V APPLETS AND AWT PACKAGES 12

Creating an Executable Applet, Applets Life Cycle, AWT and Graphic methods, Fonts, Loading and Viewing Images, Loading and Playing Sound, Event Handling, Layouts

TOTAL HOURS –60

TEXT BOOKS:

1. Hortsmann & Cornell, "Core Java Advance Features VOL II", 9th Edition,

Pearson Education, 2013.

REFERENCES:

1. Patrick Naughton, "Complete Reference: JAVA 2", 8th Edition, Tata McGrawHill, 2011.
2. Andrew Lee Rubinger, Bill Burke "Enterprise JavaBeans 3.1", 6th Edition, O'Reilly Publishers, 2010.

OUTCOMES:

Upon completion of this course, students would be able to:

- Develop Java computer programs that perform various problem-solving algorithms.
- Improve the programming skills in Object Oriented language.
- Understand the concept of OOP as well as the purpose and usage principles of inheritance,
- Develop programs using the Java Collection API as well as the Java standard class library

CAC2252 COMPUTER SECURITY L T P C

3 0 0 3

OBJECTIVES:

- To provide the student with a foundation covering computer security issues
- To determine appropriate mechanisms for protecting Computer systems.
- To help organizations increase awareness of security policies and procedures.

MODULE I INTRODUCTION 8

Physical Security – Viruses – Worms – Trojan Horses –Principles of Computer Security

MODULE II IDENTITY THEFT AND PRIVACY 9

Identity Theft- Shredding – Internet Cookies –Phishing – Homograph Threat – Privacy Issues- Trust.

MODULE III ELEMENTS OF CRYPTOGRAPHY 10

Principles of Cryptography - Modular Arithmetic - Integrity Check Functions - Kirchoff's Principle – Monoalphabetic -Polyalphabetic Cipher – One Time Pad – Key distribution Problem – Diffie Hellman Key Merkle Keys- Public Key Cryptography – RSA – SSL - Digital Signatures – Encryption - Strength of Mechanisms –Performance.

MODULE IV DATABASE SECURITY 9

Introduction - Relational Databases- Access Control - Statistical Database Security – Integration with the Operating System – Privacy

MODULE V COMMUNICATION AND WEB SECURITY 9

Basics of authentication, tokens, certificate-based and biometric authentication, Protocol Design Principles - IP Security - IPsec and Network Address Translation- SSL/TLS – Xtensible Authentication Protocol - Web Services Security.

TOTAL HOURS –45

TEXT BOOK:

1.Chuck Easttom, "Computer Security Fundamentals", 2nd Edition, Pearson Education, 2012.

REFERENCES:

1. Christof Paar, Jan Pelzl, Bart Preneel, "Understanding Cryptography: A Textbook for

Students and Practitioners", 1st Edition, Springer, 2010

2. Bruce Schneider, "Applied Cryptography Protocols, Algorithms, and Source Code in C", 2nd Edition, John Wiley & Sons, 2007.

OUTCOMES:

Students who complete this course will be able to

- identify fundamental concepts of computer security.
- use the World Wide Web to know the latest security alerts and information.
- compare and contrast types of malicious code, including worms, Trojan horses, and viruses.

CAC2253	SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES:

The aims of the course are as follows

- to define software engineering and explain its importance
- to discuss the concepts of software products and software processes
- to solve problems in a team environment through effective use of written and oral communication skills.
- to practice the lifelong learning needed in order to keep current as new issues emerge.
- to develop software in at least one application domain.

MODULE I INTRODUCTION 9

Definition of software and software engineering – Software myths –Software Engineering paradigms: Linear Sequential Model & Prototyping Model Software Project Management – Software Metrics – Software Cost Estimation – Software Project Planning.

MODULE II SOFTWARE REQUIREMENT ANALYSIS 9

Software Risks – Software Configuration Management System Analysis – Modeling the System Architecture – System Specification –Fundamentals of Requirement Analysis – Software Prototyping – Prototyping methods and tools specification – Software requirements Specifications

MODULE III STRUCTURED ANALYSIS 9

Introduction – the elements of the analysis model – data objects, attributes and relationships – Cardinality and Modality – ERD – DFD – Classical Analysis Methods : DSSD, JSD, SADT.

MODULE IV SOFTWARE DESIGN 9

Software Design and Software Engineering – Design and Software Quality – Evolution of Software Design – Design Principles. Design Concepts, Abstraction, Refinement, Modularity – Effective Modular Design, Functional Independence, Cohesion, Coupling.

MODULE V SOFTWARE TESTING METHODS 9

Software Testing Fundamentals – White Box Testing – Black Box Testing – Debugging – Software Quality: McCall's Quality Factors

TOTAL HOURS – 45

TEXT BOOKS:

1. Stephen Withal, "Software Requirement Patterns", 3rd Edition, Microsoft Press, 2011.

REFERENCES:

1. Karl & Joy Beatty," Software Requirements", 3rd Edition, Microsoft Press, 2012..
2. S.K.Kataria, Rajiv Chopra, "Object Oriented Software Engineering", 3rd Edition, 2013.

OUTCOMES:

At the completion of this course students will be able to

- understand and apply foundations of software engineering practice and process within production constraints.
- get an awareness of current industry standards and practices.
- understand and apply principles of project management for single- paired, and team processes.
- have strong oral and written communication skills to help students in preparing good quality documentation.

CAC2254	INFORMATION STORAGE AND MANAGEMENT	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To introduce advanced Storage System, Backup and Security Managements.
- The Concept of Cloud Computing, Virtualization and other related services.
- To Explain Storage networking Technologies
  Security in cloud Environment and cloud Service management activities

MODULE I STORAGE SYSTEM

Introduction to Information Storage, virtualization, and cloud computing, Data center environment, RAID, Intelligent Storage system

MODULE II STORAGE NETWORKING TECHNOLOGIES

Fibre Channel Storage Area Network (FC SAN), IP SAN and Fibre Channel over Ethernet (FCoE), Network Attached Storage (NAS), Object based and Unified Storage

MODULE III BACKUP. REPLICATION AND ARCHIVE

Introduction to Business Continuity, Backup and Archive, Local Replication, Remote Replication

MODULE IV CLOUD COMPUTING

Cloud Computing, benefits, characteristics, deployment models, and Services, cloud challenges and migration considerations

MODULE V SECURING AND MANAGING STORAGE INFRASTRUCTURE

Securing the Information Infrastructure, framework and domains of storage security, security Implementation at storage networking, security in virtualized and cloud environments, Managing the Information Infrastructure, infrastructure monitoring and management, information lifecycle management (ILM), cloud service management activities

TOTAL HOURS –45

TEXTBOOK:

1.G. Somasundaram, Alok Shrivastava, Information Storage and Management - Storing, Managing, and Protecting Digital Information EMC Education Services,2012.

REFERENCE:

1. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.

OUTCOMES:

Upon completion of the subject, students will be able to

- A working understanding of the Storage, Backup, virtualization, and cloud computing
- Acquire knowledge in different technologies of Storage System and Backup System
- An awareness of Security in Cloud and cloud service management activities

CAC2255 PROGRAMMING IN JAVA LAB

L	T	P	C
0	0	4	2

OBJECTIVES

The aim of the course is to

- Develop the programming skills using the object oriented programming methodology to produce quality computer based solutions to real problems.
- Utilize the advance features of Java technology.
- Work with collection API and develop fast programs.
- Develop good multithreaded programs.

LIST OF EXERCISES

1. Programs using basic data types, operators and control structures.
2. Class definitions and usage involving variety of constructors and finalizes
3. Programs involving various kinds of inheritances,
4. Program to demonstrate creation and handling of packages, their imports and Class Path.
5. Programs involving a variety of Exception Handling situations
6. Program involving creating and handling threads in applications and applets.
7. Program to demonstrate AWT/Swing graphic methods
8. Program for Loading and Viewing Images, Loading and Playing Sound
9. Programs to demonstrate various Layouts
10. Programs to demonstrate event handling

TOTAL HOURS –30

TEXT BOOKS:

1. Patrick Naughton, "Complete Reference: JAVA 2", 8th Edition, Tata McGrawHill, 2011.

REFERENCES:

1. Keyur shah, “Gateway to Java Programmer Sun Certification”, Tata McGraw Hill 2002.
2. Herbert Schildt, The Complete Reference – Java 2 , 4th Edition, Tata McGraw Hill, 2007

OUTCOMES:

After completion of this course, the students would be able to

- Understand Java and object-oriented programming language concepts.

- Write, debug, and document well-structured Java applications
- Implement Java classes from specifications
- Effectively create and use objects from predefined class libraries
- Understand the behavior of primitive data types, object references, and arrays
- Implement interfaces, inheritance, and polymorphism as programming techniques
- Apply exceptions handling

CAC2256	SOFT SKILLS AND PERSONALITY DEVELOPMENT	L	T	P	C
		0	0	4	2

OBJECTIVES:

This course is designed to

- provide attitude Control and Personal Self Esteem Improvement
- interview Motivation effective Answering and Maintaining Fluent Communication
- positive Body Language
- effective Resume Creation
- leadership Skills, Team Player Skills

MODULE I INTRODUCTION 4

Awareness of Real World Industry and Situations - Conscious Self-Awareness - Practical Visualizations - Neuro- Linguistic Programming Basics

MODULE II MOTIVATION 4

Developing Self Esteem and Self Motivation - Confident Goal Setting - Positive Attitude Development and Positive Thinking - Developing Inner Achievement Mindset.

MODULE III LEADERSHIP SKILLS 4

Types of Leadership - Leadership Process and Thinking - Innovative Thinking - Role of Competency, Discipline, Planning and Ethics - Creating Cooperation and Trust in Team Building Process – Mentoring.

MODULE IV EFFECTIVE COMMUNICATION I 4

Eliminating Stage Fright - Increasing Fluency - Increasing Focus while Listening - How to communicate as a Follower - How to communicate as a Leader - Assertive and Polite Communication

MODULE V EFFECTIVE COMMUNICATION II 4

Fluency with increased vocabulary - Group Discussion Etiquette - Advanced Group Discussions - Giving a positive Body Language - Interviews: Clear Speaking - Interviews: Handling Pressure

TOTAL HOURS –20

REFERENCES:

1. Charles Faulkner and Steve Andreas, "NLP: The New Technology of Achievement", Harper Paperbacks publishers, 1996.
2. Sarvesh Gulati, "Corporate Soft Skills" , Rupa and Co publishers.

3. P.K.Dutt, G. Rajeevan and C. L. N. Prakash, “A Course in Communication Skills”, Cambridge University Press, India 2007.

OUTCOMES:

By the end of this course students will be able to develop the following:

Awareness of Real World Industry and Situations

- Role of Competency, Discipline, Planning and Ethics
- Advanced Group Discussions
- Giving a positive Body Language
- Interviews: Clear Speaking

SEMESTER V

		L	T	P	C
CAC3151	**C# AND .NET PROGRAMMING**	**3**	**1**	**0**	**4**

OBJECTIVES:

To enable the students to learn and develop Web and Windows application for the .NET platform.

MODULE I INTRODUCTION 12

Vision and goals of .NET, Building blocks of .Net, overview of .Net applications- .Net evolution- The .Net Framework Architecture- Intermediate Language(IL)- Common Language Runtime (CLR)- JIT Compilation- Common Type System (CTS)- Common Language System (CLS)- Assemblies- IL Disassembler (ILdasm.exe)- Namespaces. C# features Working with methods- understanding method structure- calling a method- understanding parameter types- overloading methods- virtual methods- overriding methods.

MODULE II C# CLASSES 12

Constants- fields- methods- properties- events- indexers- operators- constructors- destructors- static modifiers. Class Inheritance Compiling with multiple classes- virtual and override methods- abstract methods- sealed classes- Boxing and Unboxing- Working with namespaces- Understanding interfaces- handling exceptions.

MODULE III WINDOWS APPLICATIONS 12

Understanding Windows Forms Architecture- Windows controls: Common- Containers- Menus and Tool strips- Data- Reporting. Adding and using windows controls to the form.

MODULE IV DATABASE PROGRAMMING WITH ADO.NET II 12

Understanding the Dataset classes and their relatives- Understanding OLEDB and SQL Server Support- Understanding common database operations using ADO.NET – Operations that don’t return rows- Data operations that return single- row entities- data operations that affect single-row entities- data operations returning sets of rows- data operations affecting sets of rows- operations that return hierarchical data.

MODULE V CREATING WEB APPLICATIONS WITH WEB FORMS 12

[Asp.NET]Difference between ASP and ASP.Net- Defining a web application- ASP.NET architecture- ASP.net web forms- Code behind model- Validation controls in ASP.NET- Server controls and data binding- Grid view- data repeater- data list- Data binding in ASP.NET- Data source controls- sqldata source- Data controls – grid view and details view- Login controls.

TOTAL HOURS –45

TEXT BOOKS:

1. Jeff Ferguson, Brian Patterson, Jason Beres ,C# Programming Bible , Wiley Publishing Inc., Reprint 2006.

REFERENCES:

1. Jeff Prosise, Programming .Net, 2nd Edition, WP Publishers & Distributors Pvt. Ltd, 2009.
2. Kevin Hoffman & Jeff Gabriel, Professional .Net Framework, 1st Edition, Wrox Press Publishers, 2006.

OUTCOMES:

- Upon successful completion of the course, the students would be able to
- Update the students with the latest technologies thereby make them fit for the industry
- Make the students aware of a new development platform for internet and distributed applications
- Simplify application development and deployment

CAC3152 WEB DESIGNING

L	T	P	C
3	0	0	3

OBJECTIVES:

- Introduce the students to the concepts, terms and technologies used in web site design
- Highlight the theories underlying web site design.
- To understand the principles of creating an effective web page
- To use scripting languages to transfer data and add interactive components to web pages.

MODULE I INTRODUCTION 9

Introduction to WWW **-** Introduction to Network, Internet and Intranet, Application and Services, Internet Addressing – URL, Elements of Web – Web Page, Designing Principles-Web Site Building , Web Languages – HTML/DHTML, JavaScript, PHP.

MODULE II HTML 9

Building Web Based Application using HTML**-**Html Document Structure, Various HTML Tags – Text Formatting Tag, Link Tag, List Tag, Image Tag, Table Tag, Line Breaks, Frames, Forms.

MODULE III CASCADING STYLE SHEET 9

Introduction to Style sheet - Types of Style sheet, concept of class &ID - CSS Property– Background Property - Font property- Text - Borders -Margins-Padding.

MODULE IV CLIENT-SIDE SCRIPTING LANGUAGE 9

Types of Scripting language, Introduction to JavaScript-How to develop JavaScript-Operators- Conditional Structure & Looping Structure-Dialog Boxes- Arrays- Built-in Functions (String, Math, Date, Array)- Form Objects and events.

MODULE V SERVER SIDE SCRIPTING LANGUAGE 9

Introduction to PHP-Basic PHP syntax-PHP tags, PHP statements and whitespace, comments, Operators, Conditional and Looping Structure, User Define Functions, Arrays.

TOTAL HOURS –45

TEXT BOOKS:

1. HTML: The Complete Reference**,**Thomas A. Powell , 2000(I,II&III)
2. Beginning JavaScript 2nd Edition, Wrox, Nicholas C. Zakas, 2004(IV)
3. PHP Bible, Wiley Publication, Tim Converse, Joyce Park, 2002(V)

REFERENCES:

1. Developing Web Application, Wiley India Publication, Ralph Moseley, Wiley India, 2007.
2. Web Enabled Commercial Application Development Using HTML, DHTML, PERL, Java Script, BPB Publications, Ivan Bayross, 2005

OUTCOMES:

On completion of the course, Students will be able to

- Demonstrate the knowledge and ability to apply the design principles, techniques and technologies to the development of creative websites.
- Identify most HTML tags and CSS properties and use a text editor to construct the basic HTML and CSS structure for a webpage
- Apply markup languages for processing, identification and presentation of information in web pages.
- Incorporate concepts of layout and organization to design websites that effectively communicate using visual elements

.

CAC3153 SOFTWARE TESTING

L	T	P	C
3	0	0	3

OBJECTIVES:

The aims of the course are as follows

- To learn about purpose of testing.
- To understand various types of testing.
- To understand the metrics of testing

MODULE I : INTRODUCTION **9**

Basic Definitions – test cases –Identifying test cases –Error and fault taxonomies – Level of Testing.

MODULE II : FUNCTIONAL TESTING **9**

Functional Testing: Boundary value Testing, Equivalence class testing, Decision Table based testing, Retrospection.

MODULE III STRUCTURAL TESTING **9**

Role of Strategic Planning for IT, Strategic Direction and Alignment of Security Strategy with Business Objectives, Role of CISO, Security Metrics Program

MODULE IV INTEGRATION AND SYSTEM TESTING **9**

Levels of Testing, Integration Testing, System Testing, Interaction Testing.

MODULE V OBJECT ORIENTED TESTING **9**

Class Testing –GUI Testing – Object Oriented System Testing.

TOTAL HOURS – 45

TEXT BOOKS:

1. Ali Mili, FairouzTchier , “Software Testing: Concepts and Operations”, Wiley, ISBN: 978-1-118-66287-8, 2015.

REFERENCES:

1. .Glenford J. Myers, Corey Sandler, “The Art of Software Testing”, 3rd Edition, Wiley, ISBN 978-1-118-03196-4, 2011
2. Srinivasan Desikan and Gopalswamy Ramesh, “ Software Testing : Principles and Practice”, Pearson ,ISBN-13: 978-8177581218, 2014.

OUTCOMES:

At the completion of this course, the student will able to

- define, formulate and analyse a problem
- Identify the strengths and weaknesses of different types of testing
- choose the appropriate testing for a specified application.

CAC3154	C# AND .NET PROGRAMMING LAB	L	T	P	C
		0	0	4	2

OBJECTIVES:

To obtain overall view of .NET technologies and its programming with C#

LIST OF PROGRAMS

1. To implement the concept of indexers
2. To implement the concept of sealed class
3. To implement the concept of namespace
4. To implement the concept of interfaces
5. To implement the concept of events
6. To implement exception handling
7. To design a calculator in windows form
8. To implement data controls in windows form
9. To implement validation controls in web form
10. To implement Data controls in web form
11. To implement Sql DataReader in ADO.NET
12. To implement Dataset object in ADO.NET

TOTAL HOURS –30

TEXT BOOKS:

1. Jeff Ferguson, Brian Patterson, Jason Beres, C# Programming Bible , Wiley Publishing Inc., Reprint 2006.

REFERENCES:

1. Kevin Hoffman & Jeff Gabriel, Professional .Net Framework, 1st Edition, Wrox Press Publishers, 2006.
2. Jeff Prosise, Programming .Net, 2nd Edition, WP Publishers & Distributors Pvt. Ltd, 2009

OUTCOMES:

At the completion of this course, the student will be able to:

- Create and populate Windows Forms.
- Create and use user controls in a Windows Forms application
- Create menus in a Windows Forms application
- Add code to form and control event procedures in a Windows Forms application
- Create Multiple Document Interface (MDI) applications
- Validate user input in a Windows Forms application

- Bind Windows Forms applications to various data sources by using Microsoft ADO.NET
- Use .NET and COM components in a Windows Forms application

CAC3155	WEB DESIGNING LAB	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To develop webpages that present information, graphics and hypertext links to other webpages in a cohesive manner
- Identify most HTML tags and CSS properties and use a text editor to construct the basic HTML and CSS structure for a webpage
- To validate forms using Javascript.

LIST OF PROGRAMS

1. Create a webpage to illustrate text formatting tags, order and unordered list
2. Develop a web page to display table and frames
3. Create a web page to embed an image map in a web page.
4. Create a web page with all types of Cascading style sheets.
5. Design a web page using different CSS properties like border, background, text, and font.
6. Client Side Scripts for Validating Web Form Controls
7. Develop a simple calculator using JavaScript
8. Designing a digital clock using JavaScript
9. Demonstrate string and math objects predefined methods available in JavaScript
10. To create a html registration form and perform validation.

TOTAL HOURS – 30

TEXT BOOKS:

1. Developing Web Application, Wiley India Publication, Ralph Moseley, Wiley India, 2007.
2. Web Enabled Commercial Application Development Using HTML, DHTML, PERL, Java Script, BPB Publications, Ivan Bayross, 2005

REFERENCES:

1. HTML: The Complete Reference**,**Thomas A. Powell , 2000(I,II&III)
2. Beginning JavaScript 2nd Edition, Wrox, Nicholas C. Zakas, 2004(IV)
3. PHP Bible, Wiley Publication, Tim Converse, Joyce Park, 2002(V)

OUTCOMES:

On completion of the course, Students will be able to

- Demonstrate an understanding of basic HTML , CSS structures and JavaScript.
- Gain the skills needed for entry into web design and development careers.

SEMESTER VI

CAC3251	**NETWORK SECURITY**	**L**	**T**	**P**	**C**
		3	**1**	**0**	**4**

OBJECTIVES:

- Various types of ciphers, DES, AES, message Authentication, digital Signature and Security System.
- Network security, virus, worms and firewall.
- Encrypt and decrypt messages using block ciphers.
- Sign and verify messages using well-known signature generation and verification algorithms.
- The ethical issues related to the misuse of computer security

MODULE I **12**

Computer Security : Introduction, Need for security, Principles of Security, Types of Attacks Cryptography : Plain text and Cipher Text, Substitution techniques, Caesar Cipher, Mono-alphabetic Cipher, Polygram, Polyalphabetic Substitution, Playfair, Hill Cipher, Transposition techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography, Steganography, Key Range and Key Size, Possible Types of Attacks

MODULE II **12**

Symmetric Key Algorithms and AES: Algorithms types and modes, Overview of Symmetric key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), RC4, RC5, Blowfish, Advanced Encryption Standard (AES)

MODULE III **12**

Asymmetric Key Algorithms, Digital Signatures and RSA: Brief history of Asymmetric Key Cryptography, Overview of Asymmetric Key Cryptography, RSA algorithm, Symmetric and Asymmetric key cryptography together, Digital Signatures, Knapsack Algorithm, Some other algorithms (Elliptic curve cryptography, ElGamal, problems with the public key exchange

MODULE IV **12**

Digital Certificates and Public Key Infrastructure (PKI): Digital Certificates, Private Key Management, The PKIX Model, Public Key Cryptography Standards (PKCS), XML,PKI and Security, Hash functions, Key Predistribution, Blom's Scheme, Diffie-

Hellman Key Predistribution, Kerberos, Diffie-Hellman Key Exchange, The Station-to-station Protocol

MODULE V **12**

Network Security, Firewalls and Virtual Private Networks: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN), Intrusion Internet Security Protocols: Basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL vs SET, 3-D Secure Protocol, Electronic Money, E-mail Security, Wireless Application Protocol (WAP) Security, Security in GSM, Security in 3G

Total Hours –60

TEXT BOOKS:

1. Cryptography and Network Security by Atul Kahate, 2nd Edition, Tata McGrawHill,2012

REFERENCES:

1. Cryptography and Network Security by William Stallings, Fifth Edition, Pearson Education,2008.
2. Cryptography: Theory and Practice by Douglas Stinson, CRC Press, CRC Press LLC,2010.

OUTCOMES:

- Understand the basic concept of Cryptography and Network Security, their mathematical models.
- Acquire knowledge in security issues, services, goals and mechanism.
- Understand mathematical foundation required for various cryptographic Algorithms.
- Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.
- Analyze key agreement algorithms to identify their weaknesses.
- Understand the SSL or firewall based solution against security threats.

CAC3252 DATA MINING AND WAREHOUSING

L	T	P	C
3	1	0	4

OBJECTIVES:

The aim of this course is to

- Provide an overview of data mining and warehousing.
- Learn the importance and use of preprocessing techniques
- Comprehend association rules
- Introduce data mining techniques such as Clustering and Classification
- Offer adequate knowledge to work with data warehouse

MODULE I INTRODUCTION 12

Introduction - What is Data mining, Data mining – Importance of Data mining - various kind of data: Relational databases – Data Warehouses - Transactional Databases – Advanced Data and Information Systems and Advanced Applications. Data mining Functionalities: Concept / Class Description, Characterization and Discrimination – Mining Frequent Patterns, Associations and Correlations – Classification and Prediction – Cluster Analysis – Outlier Analysis – Evolution Analysis.

MODULE II DATA PREPROCESSING and ASSOCIATION RULES 12

Why Preprocess Data – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation **-** Mining– Frequent Patterns, Associations Correlations - Basic Concepts - Efficient and Scalable Frequent Item set Mining methods Mining

MODULE III CLASSIFICATION

What is Classification? – Issues regarding Classification - Classification by Decision Tree Induction – Bayesian Classification – Rule Based Classification - KNN Classifiers.

MODULE IV CLUSTERING

Clusters Analysis: Types of Data In Cluster Analysis- Categorization of Major Clustering Methods: Partitioning Methods: k-Means, k-Medoids – Hierarchical Methods: BIRCH, Chameleon – Density based Methods: DBSCAN, OPTICS. Applications.

MODULE V DATA WAREHOUSING

What is a Data Warehouse – A multidimensional Data Model – Data warehouse

Architecture - From Data Warehousing to Data Mining

L – 45; T – 15; Total Hours –60

TEXT BOOK:

1. Author : Jiawei Han and MichelineKamber Data Mining Concepts and Techniques, Second Edtion, Morgan Kaufmann Publishers (An imprint of Elsevier),2011

REFERENCES:

1. Author: Karguta, Joshi, Sivakumar&Yesha, Data Mining Next Generation Challenges and Future Directions, Printice Hall of India, 2007
2. G.K. Gupta, PHI Private limited, Introduction to Data mining with case studies, New Delhi, 2008. 2nd Edition, PHI , 2011

OUTCOMES:

On completion of this course students will be able to:

- Obtain the knowledge of data mining and data warehousing
- Recognize the preprocessing techniques in data mining
- Differentiate clustering and classification
- Make more effective use of data stored in databases
- Apply and analyze association rules
- Compare database and data warehouse

ELECTIVE COURSES

CACX01 ADVANCED COMPUTER ARCHITECTURE L T P C

3 0 0 3

OBJECTIVES:

- To gain knowledge about the concepts of CPU, ALU Design, I/O Instruction format
- Analyze architectures and computational designs.
- Understand the operation of modern CPUs, memory systems and buses.

MODULE I DIGITAL COMPONENTS 9

Integrated circuits -Decoders - Encoders - Multiplexers - Registers with Parallel Load - Shift Registers - Bidirectional Shift Registers with Parallel Load - Binary Counters with Parallel Load - Memory Unit - RAM - ROM - Types of ROMs.

MODULE II COMPUTER ORGANIZATION 9

Instruction codes - Operation codes - Indirect Address - Effective Address – Computer Registers - Common Bus System - Computer Instructions - Timing and Control - Clock Pluses -Control Unit - Instruction Cycle - Fetch and decode - Reference Instructions

MODULE III INPUT – OUTPUT ARCHITECTURE 9

Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes Of Transfer – Priority Interrupt – DMA – IOP – Serial Communication- I/O Configuration - I/O Instructions - Program Interrupt - Interrupt Cycle.

MODULE IV CENTRAL PROCESSOR ORGANIZATION 9

Central Processor Organization- General Register Organization - Control Word - ALU - Stack Organization - Register Stack - Memory Stack - Stack Limits - Instruction Formats - Three Types of CPU Organization - RISC Instructions - Addressing Modes

MODULE V MEMORY ARCHITECTURE 9

Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware

Total Hours –45

TEXT BOOK:

1.William Stallings, "Computer Organization and Architecture - Designing for

Performance", 9th Edition, Pearson Education, 2012.

REFERENCE:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer organization", 5 th Edition, McGraw Hill, 2002.

OUTCOMES:

On completion of the course, Students will be able to

- Describe organization of digital computers and explain the basic principles and operations of different components
- Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main component

CACX02 **COMPILER DESIGN** **L T P C**

3 0 0 3

OBJECTIVES:

The aim of the course is to

- Develop the understanding of functioning of compilers and enable to write Compilers.
- Introduce the major concept areas of language translation and compiler design.
- Enrich the knowledge in various phases of compiler ant its use, code optimization techniques, machine code generation, and use of symbol table.
- Extend the knowledge of parser by parsing LL parser and LR parser.
- provide practical programming skills necessary for constructing a compiler

MODULE I INTRODUCTION TO COMPILER 9

Introduction to assembler, Compiler and linkers, Structure of Compiler, Overview of compilation Process, Compiler writing language, Compiler writing tools.

MODULE II LANGUAGES AND GRAMMAR 9

Programming Languages and grammar, Context free grammar, Ambiguity and Non ambiguity, Role of Lexical analyzer, Finite automat & regular expressions, Transformation of the grammar

MODULE III PARSING APPROACHES 9

Parsing : Top-down and bottom up approaches, Syntax Directed Translations Inherited and Synthesized attributes, Dependency graph, Top Down Parsing Implementation, Predictive Top down Parser, Recursive decent parsing, Table Driver Parser, Bottom up Parsing Implementation, LR Parser, SLR parser.

MODULE IV BRANCHING AND LOOPING 9

Translation of assignment - statement, Boolean expression, Unconditional branching, Conditional branching and looping, Code Optimization-Source of Optimization, Optimization of Basic Blocks, Loops, Error Handling

MODULE V CODE OPTIMIZATION 9

Code Optimization, Basics- Principle source of optimization, Loops in flow graph- Introduction to global data flow analysis- Code improving transformations.

Total Hours –45

TEXT BOOKS:

1.Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman ,"CompilersPrinciples, Techniques and Tools", 2nd Edition, Pearson Education, 2011.

REFERENCES:

1. Parag Himanshu Dave and Himanshu Bhalchandra Dave, "Compilers: Principles and Practice", 1st Edition, Pearson Education, 2012.
2. Keith Cooper and Linda Torczon, "Engineering a Compiler", 2nd Edition, Morgan Kauffman Publications, 2011.

OUTCOMES:

After completing this course students must be able to

- Design and conduct experiments for Intermediate Code Generation in compiler.
- Understand lexical, syntax and semantic analysis processes.
- Deal with different translators.
- Understand, and use Context free grammar, and parse tree construction
- apply error detection and correction methods
- Learn the new code optimization techniques to improve the performance of a program in terms of speed & space.

CACX03 **DATABASE DESIGN** **L T P C**

3 0 0 3

OBJECTIVES:

The aims of the course are as follows:

- To understand and use a relational database system.
- To design ER Diagrams
- To apply normalization techniques to create a database.

MODULE I : INTRODUCTION TO DATABASE SYSTEM CONCEPTS

Introduction – What is Database System – What is Database – Why Database – Data Independence – Relational Systems.

MODULE II DATA MODELING

Architecture – Three levels of Architecture – The External level –Conceptual Level – Internal Level –Client/Server Architecture- Introduction to ER Model –ER diagrams – Database Design with ER model – A brief Analysis of the ERModel

MODULE III NORMALIZATION

Introduction – Trivial and non-trivial Dependencies – Closure of a set of Dependencies – Closure of a set of attributes- Introduction – Nonloss Decomposition and Functional Dependencies – First, Second and Third Normal form – Dependency Preservation – Boyce/Codd Normal form –Relation Valued Attributes.

MODULE IV RELATIONAL DATABASE MODELS

The Relational Database Model: Types – Relations –Relational Algebra –Relational Calculus

MODULE V INTRODUCTION TO SQL

Introduction to SQL: Introduction- Overview – Catalog – Views – Transactions-EmbeddedSQL – Dynamic SQL and SQL /CLI-Data Definition Commands-Data Manipulation Commands.

Total Hours –45

TEXT BOOKS:

1. Elmasri and Navathe, "Fundamentals of Database Systems", 6th Edition, Addison-Wesley, 2011

REFERENCE:

1. AtulKahate, Introduction to Database Management Systems, Pearson Education (2006).

OUTCOMES:

At the completion of this course, the student will able to

- Able to master the basic concepts and understand the applications of database system.
- Able to construct a database using basic SQL queries.
- To identify strengths and weakness of database design.

CACX04 **E-COMMERCE** **L T P C**

3 0 0 3

OBJECTIVES:

The objective of the course are as follows

- To learn about e-commerce business models.
- To understand different techniques for web security.
- To understand the basics of Mobile E-Commerce.

MODULE I : FOUNDATIONS OF E-COMMERCE 9

Foundations of E-commerce - Business to consumer(B2C) Electronic Commerce - Business to Business(B2B)Electronic Commerce.

MODULE II NETWORK INFRASTRUCTURE FOR E-COMMERCE 9

Network Infrastructure for E-commerce - The Internet, Intranets and Extranets asE commerce Infrastructure

MODULE III WEB SECURITY 9

Web Security - Cryptography – Firewall.

MODULE IV ELECTRONIC PAYMENT SYSTEMS 9

Electronic Funds Transfer – types of Electronic payments – Electronic Payment Mechanisms – credit cards – smart cards –electronic cash – electronic checks.

MODULE V MOBILE E-COMMERCE 9

Mobile Commerce -WAP (Wireless Application Protocol) - Legal Requirements in E-commerce

Total Hours –45

TEXT BOOKS:

1. E-ommerce, MamtaBhusry, Firewall Media, An Imprint of Laxmi Publications Pvt. Ltd. Edition: First 2005

REFERENCES:

1. E-Commerce, P. T. Joseph, S. J. Third edition, Prentice Hall of India Pvt. Lt, NewDelhi, 2008.
2. Electronic Commerce, PeteLoshin/ JhonVacca Firewall Media,An Imprint of Laxmi Publications Pvt. Ltd, NewDelhi , FourthEdition: 2004.

3. David Whiteley, " E-Commerce", Tata McGraw Hill, 2000
4. Eframi Turban, Jae Lee, David King, K. Michale Chung, "Electronic Commerce", Pearson Education, 2000

OUTCOMES:

At the completion of this course, the student will able to

- Apply different strategies of E-Commerce.
- Identify the strengths and weaknesses of different Electronic payment systems.
- Apply different cryptographic techniques

CACX05 HIGH PERFORMANCE COMPUTER SYSTEMS L T P C
3 0 0 3

OBJECTIVES:

- To learn the concept of Parallel computing and High performance computing
- To provide in-depth knowledge of High performance computing concepts,
- design issues, challenges, technologies, architectures, and applications.
- To comprehend the technical capabilities and research benefits of High performance computing and learn how to measure and compare those benefits.

MODULE I PARALLEL PROCESSING CONCEPTS 9

Parallel Processing Concepts , Levels of parallelism, Models (SIMD, MIMD, SIMT, SPMD, Dataflow Models, Demand-driven Computation etc), Architectures: N-wide superscalar architectures, multi-core, multi-threaded

MODULE II PARALLEL PROCESSOR ARCHITECHTURE 9

Processor Architecture, Interconnect, Communication, Memory Organization, and Programming Models in high performance, computing architectures: , Memory hierarchy and transaction specific memory design, Thread Organization

MODULE III DESIGN ISSUES IN PARALLEL COMPUTING 9

Fundamental Design Issues in Parallel Computing, Synchronization, Scheduling, Job Allocation, Job Partitioning, Dependency Analysis, Mapping Parallel Algorithms onto Parallel Architectures, Performance Analysis of Parallel Algorithms

MODULE IV HPC CHALLENGES 9

Cache Coherence Problem - Invalidate vs. Update protocols – Bandwidth Limitations - Latency Limitations - Latency Hiding - Tolerating Techniques and their limitations

MODULE V HIGH PERFORMANCE COMPUTING IN THE CLOUD COMPUTING 9

Classification of scientific applications and services in the cloud – HPC Programming models - The Map Reduce programming model and Implementations

Total Hours –45

TEXTBOOKS:

1. Rajkumar Buyya, “High Performance Cluster Computing: Architectures and Systems”, Volume 1, Pearson Edition, 2008.

2. George Hager & Gerhard Wellein “Introduction to High Performance Computing for Scientists and Engineers”, CRC Press, 2012.

REFERENCES:

1. Ian Foster, “Designing and Building Parallel Programs”, Addison Wesley 1995.
2. David Culler, Jaswinder Pal Singh, Anoop Gupta Parallel Computer Architecture: A hardware/Software Approach, Morgan Kaufmann, 1999.
3. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing, Tata McGraw Hill, 2013.

OUTCOMES:

After the completion of the course, the student will be able to

- Introduce the major scientific application areas and basic concepts of parallel computing
- Solid foundation in High Performance Computing (HPC) and its role in science and engineering.
- outlines the hardware design of modern HPC platforms and the parallel programming models.
- identify the key challenges and research issues in High performance Computing.

CACX06 INTERNET AND WEB PROGRAMMING L T P C

3 0 0 3

OBJECTIVES:

The aims of the course are as follows

- To introduce students to the concepts, terms and technologies in Internet.
- To provide students with basic knowledge of web page design and development.
- To highlight the issues in internet.

MODULE I INTRODUCTION TO INTERNET 9

Basics of Networks – Topologies of Networks – Layers in Networking – Switching in the Networks – Bridges, Routers and Gateways – Types of Networks. Evolution of the Internet.

MODULE II INTERNET CONNECTIVITY AND ISSUES 9

Growth of the World Wide, Web Browsers, Architecture of the Intranet/Internet /Extranet., Domain name, Access methods: dialup, ISDN, ADSL/2+, cable, LAN, WIFI,. Proxy servers. Security policies / Privacy/ Identification/Authentication/Access control. Hardware and Software, Risk assessment, vulnerabilities.

MODULE III ADVANCED INTERNET 9

Threats and attack methods Viruses, Spam, Root kits, “phishing”, Firewalls –spyware plug-ins. Performance: speed, reliability, downtime, bandwidth. Search engine, Client-Server model, Web and Big Data, Mobile & Satellite, Application areas.

MODULE IV BASIC WEB PROGRAMMING 9

Introduction to HTML– Introduction, Tags, Tables, Frames - Linking-Images-special characters and line breaks-unordered lists-simple HTML programs- Static and dynamic HTML., Style Sheet, Embedding Multimedia in Web Pages

MODULE V ADVANCED WEB PROGRAMMING 9

Fluency in at least one of the following client-side scripting languages: JavaScript or VBscript. DOM model, XML, CSS and XSL. Development tools: page and site authoring, delivery and maintenance tools

Total Hours –45

TEXT BOOKS:

1. Paul Deitel, Harvey Deitel and Abbey Deite, "Internet & World Wide Web: How to Program", 5th Edition, Prentice Hal, 2011.
2. Jennifer Niederst Robbins, "Learning Web Design: A Beginner's Guide to

HTML, CSS, JavaScript, and Web Graphics", 4th Edition, O'Reilly Media, 2012.

REFERENCE:

1. Robin Nixon, "Learning PHP, MySQL, JavaScript, and CSS: A Step-by-Step Guide to Creating Dynamic Websites", 2nd Edition, O'Reilly Media, 2012.

OUTCOMES:

At the completion of this course, the student will able to

- To demonstrate knowledge and ability to develop website
- To comprehend concepts in internet technologies.
- To understand various issues in internet.

CACX07 MANAGEMENT INFORMATION SYSTEMS L T P C
3 0 0 3

OBJECTIVES:

The aims of the course are as follows

- Provide students with comprehensive knowledge needed to successfully participate in and support the increasingly applied role of information technology in corporate decision making,
- Enable graduates to conceptualize and manage the specification, design and implementation of applied information systems,
- Provide the knowledge of contemporary issues related to the field of managing information systems,
- Develop knowledge and skills required to work effectively in a profession,
- Enhance self-confidence, ability to make proper decisions and effective communication, and Pursue lifelong learning and continuing education.

MODULE I INTRODUCTION 9

Overview – Structure of MIS – Survey of information System Technology – Hardware, Software and Communication or Information – Storage and Retrieval of Data – Transactions Processing, Office Automation and Information Processing Control Function.

MODULE II CONCEPTIONAL FOUNDATIONS 9

Design Making Process – Concept of Information – Human as Information Processors – System Concepts – Concepts of Planning and control – Organizational Structure and Management Concepts.

MODULE III INFORMATION BASED SUPPORT SYSTEMS 9

Support System for Planning, Control and Decision making – Support System for Management for Knowledge work – Decision Support Systems**.**

MODULE IV INFORMATION SYSTEM REQUIREMENTS 9

Developing a long range Information system – Plant Strategies for the determination of Information requirement – Database requirement – User interface requirements

MODULE V DEVELOPMENT, IMPLEMENTATION AND MANAGEMENT OF INFORMATION SYSTEM RESOURCES 9

Developing and Implementing Application Systems – Quality Assurance and

Evaluation of Information Systems – Organization and Management of the Information resources – further Development and their Organizational and social Implications

Total Hours –45

TEXT BOOKS:

1. Rahul De, MIS: Management Information Systems in Business, Government and Society, Wiley; 1st edition (2012)

REFERENCES:

1. David Kroenke, "Management Information systems", tenth Edition, Pearson Education.

OUTCOMES:

At the completion of this course, the student will able to

- Appreciate the use of IS for effective management,
- Analyze the impact of computing on individuals, organizations and society, including ethical, religious, legal, security and global policy issues.
- Function effectively on teams to accomplish a common goal.
- Understand professional, ethical and social responsibilities.
- Employ effective communication skills consistent with the professional environment, and Pursue lifelong learning and continued professional development

CACX08 **PARALLEL ALGORITHMS** **L T P C**

3 0 0 3

OBJECTIVES:

Students will be able to:

- Understand the scope, design and model of parallelism
- Know the parallel computing architecture.
- Know the Characteristics, model and design of parallel algorithms.

MODULE I **9**

Need for parallel computers, Modules of Computation, Analyzing Algorithms, Expressing Algorithms - Broadcast, All sum and selection algorithms on SIMD model - Searching a sorted sequence: EREW, CREW SMSIMD algorithms, Searching a Random sequence on shared memory SIMD, Tree and mesh interconnected computers.

MODULE II **9**

Sorting on a Linear Array, Sorting on a Mesh, Sorting on EREW SIMD computer, MIMD Enumeration sort, MIMD Quick sort. Sorting on other Networks.

MODULE III **9**

Matrix Transposition: Mesh Transpose, Shuffle Transpose, EREW transpose. Matrix by matrix Multiplication: Mesh multiplication, Cube multiplication. Matrix by vector Multiplication: Linear Array Multiplication, Tree Multiplication.

MODULE IV **9**

Solving Numerical problems, solving systems of Linear equations: An SIMD algorithm, An MIMD algorithm. Finding Roots of Nonlinear Equations: MIMD algorithm. Solving partial Differential Equations, Computing Eigen values.

MODULE V **9**

Solving Graph Theoretical problems, Computing the connectivity matrix. Finding connected components, All-Pairs shortest paths, Traversing combinatorial spaces, sequential tree traversal. The minimal alpha-Beta Tree, MIMD Alpha-Beta algorithm, parallel cutoffs. Storage requirements.

Total Hours –45

TEXT BOOKS:

1. Peter S. Pacheco, “An Introduction to Parallel Programming”, Morgan Kauffman/ Elsevier, ISBN 978-0-12-374260-5, 2011.

REFERENCES:

1. Yan Sohilin, Fundamentals of Parallel Multicore Architecture, Chapman and Hall/CRC Computational Science, ISBN 9781482211184, 2015

OUTCOMES:

At the completion of the course, students will be able to

- Compute speedup, efficiency, and scaled speedup of parallel computations, given appropriate data
- Explain the advantages and disadvantages of constructing parallel computers using commodity off-the-shelf components

CACX09 **WIRELESS NETWORKS** **L T P C**

3 0 0 3

OBJECTIVES:

The aims of the course are as follows:

- Introduction of an advanced element of learning in the field of wireless communication.
- The concepts of wireless devices and mobile computing.
- To introduce wireless communication and networking principles, that support connectivity to cellular networks, wireless internet and sensor devices.

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MODULE I **9**

Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA –TDMA – CDMA

MODULE II **DATA MODELING** **9**

IEEE 802.11 Standards – Architecture – Services

MODULE III **MOBILE COMMUNICATION SYSTEMS** **9**

GSM-architecture-Location tracking and call setup- Mobility management- Handover-Security'

MODULE IV **MOBILE NETWORK AND TRANSPORT LAYERS** **9**

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP

MODULE V **APPLICATION LAYER** **9**

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts

Total Hours –45

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2008.

2. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", 2nd Edition,

Springer, 2007.

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
3. C.K.Toh, “AdHoc Mobile Wireless Networks”, First Edition, Pearson Education, 2002.

OUTCOMES:

At the completion of this course, the student will able to

- Able to master the basic concepts and understand the applications of database system.
- Able to construct a database using basic SQL queries.
- To identify strengths and weakness of database design.

CACX10 ARTIFICIAL INTELLIGENCE L T P C

3 0 0 3

OBJECTIVES:

- Know the difficulties that arise from attempting to define "artificial intelligence."
- Know the three areas of research of AI, and give examples of problems from each area.
- Understand in a general way how a neural network is designed and trained.
- Know the components of a formal system.
- Use evaluation functions to expedite the search process.

MODULE I INTRODUCTION TO ARTIFICIAL INTELLIGENCE 9

Problems of AI, AI technique, Tic - Tac - Toe problem. Intelligent Agents: Agents & environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents. Problem Solving**-** Problems, Problem Space & search.Defining the problem as state space search, production system, problem characteristics, and issues in the design of search programs.

MODULE II SEARCHING TECHNIQUES 9

Search techniques: Solving problems by searching: problem solving agents, searching for solutions. Uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies. Heuristic search strategies: Greedy best-first search, A* search, memory bounded heuristic search

MODULE III SEARCH ALGORITHMS 9

Local search algorithms optimization problems: Hill climbing search, simulated annealing search, local beam search. Genetic algorithms: constraint satisfaction problems, local search for constraint satisfaction problems. Adversarial search: Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.

MODULE IV KNOWLEDGE REPRESENTATION 9

Knowledge: Knowledge representation issues, representation & mapping, approaches to knowledge representation, issues in knowledge representation. Using predicate logic: Representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction. Representing

knowledge using rules: Procedural verses declarative knowledge, logic programming, forward verses backward reasoning, matching, control knowledge.

MODULE V REASONING & PLANNING 9

Reasoning- Probabilistic reasoning: Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory, Fuzzy sets & fuzzy logics. Planning: Overview, components of a planning system, Goal stack planning, Hierarchical planning, other planning techniques

Total Hours –45

TEXT BOOKS:

1. Stephen Lucci, Danny Kopec," Artificial Intelligence in the 21st Century", Mercury Learning and Information, 2012.

REFERENCES:

1. Kevin Warwick, "Artificial Intelligence: The Basics", Routledge Publications, 2011.

OUTCOMES:

On completion of this course, students will be able to

- Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem
- Apply knowledge representation, reasoning, and machine learning techniques to real-world problem
- Implement basic AI algorithms

CACX11 CLIENT / SERVER TECHNOLOGY L T P C

3 0 0 3

OBJECTIVES:

The aims of the course are as follows

- To learn about different kinds of client server technology
- To understand different components of Client Server Systems
- To understand architecture of Client/Server Systems.

MODULE I INTRODUCTION 9

Introduction to client/server technology-What is client/server technology-Benefits of client/server technology-Classification of Client/Server Systems-Development of Client/Server Systems- Client Server Standards- Client Server Technology

MODULE II ARCHITECTURE OF CLIENT/SERVER SYSTEMS 9

Components of C/S – Principles – Client Components – Server Components – Communication Middleware Components- Architecture for Business Information System- Existing Client Server Architecture.

MODULE III CLIENT SERVER APPLICATION COMPONENTS 9

Introduction – Technologies for Client/Server Application – Categories –Client Services-Server Services- Clint /Server Application: Connectivity- Layered Architecture

MODULE IV CLIENT /SERVER TECHNOLOGY AND WEB SERVICES 9

Introduction- Web Services – Role of Java for Client/Server on Web –Server Technology-Web Applications-Balanced Computing – Server's Changing Role

MODULE V FUTURE OF CLIENT/SERVER COMPUTING 9

Introduction – Technology of Next Generation –Enabling Technology – Client/Server Computing and Intranet – Future Perspectives – Transformational System

Total Hours –45

TEXT BOOKS:

1. Subash Chandra Yadav,Sanjay Kumar Singh,An Introduction to Client/Server Computing,New Age International Publisher,First Edition,January 2009.

REFERENCES:

1. Christophe Toulemonde, Anthony Button, Karen Harrison, Jae Hyung Lee, Stephen Longhurst, Luigi Walter Sartore,From Client/Server to Network Computing A Migration to Java., IBM, May 1998.
2. Douglas E.Comer& David L. Stevens: “Internetworking with TCP/IP – Vol. 3, Client-Server Programming and Applications”, BSD Socket Version with ANSI C, 2nd Edition, Pearson Education Asia, 2001

OUTCOMES:

At the completion of this course, the student will able to

- Comprehend the basic concepts of the client-server model for network programming
- Identify the strengths and weaknesses of different client server .
- Analyze the different components for developing client/server applications.

CACX12 DISTRIBUTED OPERATING SYSTEM L T P C

3 0 0 3

OBJECTIVES:

The aims of the course are as follows:

- This course provides an introduction to the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission.
- To learn the principles, architectures, algorithms and programming models used in distributed systems.
- To examine state-of-the-art distributed systems, such as Google File System.
- To design and implement sample distributed systems.
- Through these objectives, the course will transform your computational thinking from designing applications for a single computer system, towards that of distributed systems.

MODULE I INTRODUCTION 9

Fundamentals – evolution – system Models – distributed Operating System – Issues – Distributed Computing environment- Message passing – Introduction – Features – Issues – Synchronization – Buffering – Message – Encoding – Decoding – Process addressing – Failure Handling.

MODULE II COMMUNICATION 9

Remote Procedure calls – Introduction – Model – Transparency – Implementation – Stub Generation – Messages – Marshaling Arguments and results – Server Management. Parameter passing Semantics – Call Semantics – Communication Protocols – Complicated RPC's – client – server Binding – Exception handling – Security distributed shared Memory - Introduction – Architecture – Issues – Granularity Structure – consistency Models – replacement Strategy – Thrashing

MODULE III COMMUNICATION II 9

Synchronization – Introduction – Clock Synchronization – Event ordering – Mutual Exclusion – Deadlock – Election Algorithms.

MODULE IV RESOURCE ALLOCATION 9

Resource Management – Introduction – features – task Assignment approach – Load Balancing approach – Load – Sharing Approach Process Management – Introduction – Process – Migration - Threads

MODULE V DISTRIBUTED FILE SYSTEMS

Distributed File systems – Introduction – Features – File Models – Accessing Models – sharing Semantics – Catching Schemes – file Replication – Fault Tolerance – Atomic Transactions – Design principles naming – Introduction – features – Terminologies – Concepts.

Total Hours –45

TEXT BOOKS:

1.A.D. Kshemkalyani, M. Singhal, "Distributed Computing: Principles, Algorithms and Systems", Paperback Edition, Cambridge University Press, 2011.

REFERENCES:

1. Andrew S Tanenbaum , Maartenvan Steen, "Distributed Systems - Principles and Pardigms",2nd Edition, Pearson Education, 2007.
2. Pradeep K. Sinha, "Distributed Operating Systems - Concepts, Systems and Applications", 3rd Edition, Prentice Hall India, New Delhi, 2008

OUTCOMES:

At the completion of this course, the student will able to

- Learn about distributed systems design and implementation.
- Exposed to various areas of research in distributed systems mobile computing systems.
- Learn about designing and implementing fault tolerant distributed systems.
- student completing this course successfully will be able to pursue independent research in distributed systems.
- Identify the core concepts of distributed systems: the way in which several machines orchestrate to correctly solve problems in an efficient, reliable and scalable way.
- Students will examine how existing systems have applied the concepts of distributed systems in designing large systems, and will additionally apply these concepts to develop sample systems.

CACX13 EMBEDDED SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

The purpose of the Embedded System course is to

- provide the students, knowledge and hands-on experience in the embedded computer system technology.
- students specializing in software and system design, giving most attention to hardware design, as understanding in this area is vital for most embedded software designers.

MODULE I INTRODUCTION TO EMBEDDED SYSTEMS 9

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits.

MODULE II DEVICES AND BUSES FOR DEVICES NETWORK - PART - 1 9

I/O Devices - Device I/O Types and Examples – Synchronous – Isosynchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices

MODULE III DEVICES AND BUSES FOR DEVICES NETWORK - PART - 2 9

UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - „12C", „USB", „CAN" and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

MODULE IV EMBEDDED PROGRAMMING - PART - 1 9

Programming in assembly language (ALP) vs. High Level Language – C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple function calls in a Cyclic Order in the Main Function Pointers

MODULE V EMBEDDED PROGRAMMING - PART - 2 9

Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, „C" Program compilers – Cross compiler – Optimization of memory codes.

Total Hours –45

TEXT BOOKS:

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw Hill, First reprint 2003.

REFERENCES:

1. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

OUTCOMES:

On completion of the course:

• students get exposure with different families and architectures of Embedded System tools such as Microcontrollers, DSPs, FPGAs etc.

• students shall get the expertise required to design any embedded system (h/ w or s/w or both) based on any of the above tools

• students become highly proficient in Embedded Software particularly in real-time programming with Industry standard RTOS such as VxWorks and RTLinux

CACX14 ENTERPRISE RESOURCE PLANNING L T P C
3 0 0 3

OBJECTIVES:

The aims of the course are as follows

- Comprehend the role and function of human resource management in industry.
- Describe how to strategically plan for the human resources needed to meet the organizational needs.
- Gain insight of concepts of job analysis and compensation function and their legal provisions.

MODULE I INTRODUCTION 9

ERP: An Overview, Enterprise – An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, DataMining,OLAP,SCM

MODULE II ERP IMPLEMENTATION 9

ERP Implementation Lifecycle, Implementation Methodology, Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring

MODULE III BUSINESS MODULES 9

Business modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

MODULE IV THE ERP MARKET 9

ERP Market Place, SAP AG, Peoplesoft, Baan, JD Edwards, Oracle, QAD, SSA

MODULE V ERP – PRESENT AND FUTURE 9

Turbo Charge the ERP System, EIA, ERP and e-Commerce, ERP and Internet, Future Directions

Total Hours –45

TEXT BOOKS:

1.Alexis Leon, Enterprise Resource Planning, second edition, Tata McGrawHill, 2008.

REFERENCES:

1. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise

Resource Planning", Thompson Course Technology, USA, 2001.
2. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008

OUTCOMES:

At the completion of this course, the student will able to

- examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components.
- understand production planning in an ERP system, and systematically develop plans for an enterprise.
- understand the difficulties of a manufacturing execution system, select a suitable performance measure for different objectives, and apply priority rules to shop floor control..

CACX15 MOBILE COMMERCE L T P C

3 0 0 3

OBJECTIVES:

The objective of the course is as follows

- A broad knowledge of mobile commerce applications and technologies
- A high-level understanding of requirements of diverse m-commerce services
- A critical knowledge of wireless infrastructure for location-based services

MODULE I INTRODUCTION 9

Emerging applications, wireless service providers, middleware, wireless infrastructure, different players in m-commerce, and m-commerce life cycle-Requirements and multi-layer frameworks wireless and networking requirements, quality of service, location-management, security, dependability-Mobile financial services, mobile entertainment services, and proactive service management service details and usage scenarios

MODULE II LOCATION BASED M-COMMERCE SERVICES 9

Location, context and user-oriented services, location management in heterogeneous wireless and mobile networks. Location-based m-commerce services**:** push/pull services, role of middleware in location-based services, location-enabled devices

MODULE III GROUP ORIENTED MOBILE COMMERCE SERVICES 9

Mobile auctions, mobile entertainment services, multi-party games-Group-oriented mobile commerce services- wireless multicast and broadcast, multicast in wireless LANs, satellites, and cellular systems, multicast in wireless Internet

MODULE IV TRANSACTIONS IN MOBILE COMMERCE SERVICES 9

Group communications, membership management, transaction support, dis-connection and multi-stage transactions-Transactions in mobile commerce services-impact of failures on transactions, security and reliability of transactions.

MODULE V MANAGEMENT OF MOBILE COMMERCE SERVICES 9

Content development and distribution to hand-held devices, content caching, pricing of mobile commerce services.The emerging issues in mobile commerce - role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, implementation challenges in m-commerce, futuristic m-commerce services

Total Hours –45

TEXT BOOKS:

1. Brian Mennecke and Troy J. Strader, Mobile Commerce: Technology, Theory and Applications Idea Group Publishing,2003.

REFERENCES:

1. Mobile Commerce and Applications, Upkar Varshney, A tutorial at IEEE International Conference on Wireless Communications (WCNC).
2. Mobile Commerce: Frameworks, Applications and Networking Support, ACM/Kluwer Journal on Mobile Networks and Applications (MONET), June 2002(Upkar Varshney and Ron Vetter).
3. Location-based Mobile Commerce Services, ACM Transactions on Internet Technology, August 2003, (Upkar Varshney).
4. Mobile Commerce: An Emerging Frontier, IEEE Computer, Oct 2000 (Varshney and others).
5. Group-oriented Mobile Services, ACM/Kluwer Journal on Mobile Networks and Applications (MONET), 2004 (Upkar Varshney).

OUTCOMES:

At the end of the course the students will be able to

- Identify the different types of service providers.
- Perform real time transactions.
- Identify the issues in Mobile Commerce

CACX16 MOBILE COMPUTING L T P C

3 0 0 3

OBJECTIVES:

- Introduction of an advanced element of learning in the field of wireless communication.
- The concepts of wireless devices and mobile computing.
- To introduce wireless communication and networking principles, that support connectivity to cellular networks, wireless internet and sensor devices.
- To appreciate the social and ethical issues of mobile computing, including privacy.

MODULE I INTRODUCTION

Introduction: Applications – A Simplified Reference Mode. Wireless Transmission: Cellular System. Medium Access Control : Motivation for a Specialized MAC : Hidden and exposed terminals – Near and far terminals – SDMA – FDMA – TDMA : Fixed TDM Classical Aloha – Slotted Aloha – Carrier Sense Multiple Access – Demand assigned Multiple Access – PRMA Packet Reservation Multiple Access – Reservation TDMA – Multiple Access With Collision Avoidance – Polling – Inhibit Sense Multiple Access. CDMA: Spread Aloha multiple access.

MODULE II TELECOMMUNICATIONS

Telecommunication Systems: GSM: Mobile Services – System Architecture – Radio Interface – Protocols - Localization And Calling – Handover – Security – New Data Services. DECT: System Architecture – Protocol Architecture - TETRA.

MODULE III SATELLITE AND BROADCAST SYSTEMS

UMTS and IMT 2000: UMTS Releases and Standardization – UMTS System Architecture - UMTS Radio Interface – UTRAN – Core Network – Handover. Satellite System: History – Applications – Basics: GEO – LEO – MEO . Routing – Localization – Handover. Broadcast Systems: Overview – Cyclical Repetition Of Data – Digital Audio Broadcasting – Digital Video Broadcasting – Convergence of Broadcasting and Mobile Communication.

MODULE IV WIRELESS NETWORKS

Wireless LAN: Infra Red Vs Radio Transmission – Infrastructure and Ad-Hoc Network IEEE 802.11: System Architecture – Protocol Architecture – Physical Layer – Medium Access Control Layer – MAC Management – HIPERLAN: HIPERLAN1 -WATM –

BRAN – HiperLAN2. Bluetooth: User scenarios – Architecture – Radio layer – Base band layer – Link manager protocol.

MODULE V MOBILE NETWORK LAYER

Mobile Network Layer: Mobile IP – Dynamic Host Configuration Protocol – Mobile AdHoc Networks. Mobile Transport Layer: Traditional TCP-Classical TCP Improvement-TCP Over 2.5/3G Wireless Networks – Performance Enhancing Proxies.

Total Hours –45

TEXT BOOKS:

1. Jochen Schiller , Mobile Communications,Pearson Education.,Second Edition,New Delhi,2008.

REFERENCES:

1. William C.Y.Lee, "Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition,Tata McGraw Hill Edition,2006.
2. C.K Toh,"Adhoc Mobile Wireless Networks", First Edition,Pearson Education,2002.

OUTCOMES:

Upon completion of the subject, students will be able to

- A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities
- The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
- A comprehension and appreciation of the design and development of context-aware solutions for mobile devices.
- An awareness of professional and ethical issues, in particular those relating to security and privacy of user data and user behavior.

CACX17 SOFTWARE PROJECT MANAGEMENT

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3	0	0	3

OBJECTIVES:

The aims of the course are as follows

- Understand the fundamental principles of Software Project management
- Be familiar with the different methods and techniques used for project management.
- By the end of this course the student will have good knowledge of the issues and challenges faced while doing the Software project Management.
- Will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques

MODULE I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT **9**

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning.

MODULE II PROJECT EVALUATION **9**

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation – software effort estimation.

MODULE III ACTIVITY PLANNING **9**

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – forward Pass – backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature of Risk – Types of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning and Control.

MODULE IV MONITORING AND CONTROL **9**

Resource allocation – identifying and scheduling resources – publishing resource and cost schedule – scheduling sequence – Creating Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back to Target – change control – Managing Contracts – Introduction – Types of Contract – Stages In Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance

MODULE V MANAGING PEOPLE AND ORGANIZING TEAMS 9

Introduction – Understanding Behavior – Organizatinal Behaviour – Selecting the Right person. Instruction In The Best Methods – Motivation– The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

Total Hours –45

TEXT BOOK:

1. Bob Hughes, “Mike Cotterell, Rajib Mall, Software Project Management”, 5th Edition, The McGraw-Hill Higher Education, ISBN :13:978-0-07-10724- 8 , 2011.

REFERENCE:

1. S. A. Kelkar, “Software Project Management: A Concise Study”, 3rd edition, PHI learning pvt Ltd ,ISBN: 9788120347021, 2013.
2. Robert K. Wysocki, “Effective Project Management – Traditional, Agile, Extreme”, 6th Edition, Wiley Publication, ISBN: 1118080653, 2011.

OUTCOMES:

At the completion of this course, the student will able to

- Understand and practice the process of project management and its application in delivering successful IT projects; •
- Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities; •
- Understand and use risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales;
- Identify the resources required for a project and to produce a work plan and resource schedule;
- Monitor the progress of a project and to assess the risk of slippage, revising targets or counteract drift;
- Distinguish between the different types of project and follow the stages needed to negotiate an appropriate contract

CACX18 WEB TECHNOLOGY L T P C

3 0 0 3

OBJECTIVES:

The aims of the course are as follows

- To learn about different kinds of Network protocols that are suited to different kinds of applications
- To understand the basics of HTML.
- To understand the basics of search engines.

MODULE I INTRODUCTION 9

Concept of the point to point and Broadcast Network , Bus, Ethernet LAN, FDDI LAN, Token Ring, Star, Hub, WAN, MAN, TCP/IP, Routers, Gateways, Bridge, Switches, Subnet, Internet & Intranet, Introduction to TCP/IP and Shell Account, Internet Addressing ,Difference between a Name and Address.

MODULE II NETWORK PROTOCOLS 9

Concept of ISP (Internet Service Provider), Internet Backbones, NAPs, Concept of URL Address, Domain Names, Hypertext Concepts and World Wide Web, FTP, NNTP. The Email Electronic Post Service, Type of Email, SMTP, Configuring a Computer for an email.

MODULE III WEB SECURITY

Web server and proxy server, Web caches, FAQS, Web browser ,Internet Viruses, Internet security issues, Embedded and S/W based firewall, Data encryption and Digital signatures and certificates

MODULE IV INTRODUCTION TO HTML

The art of creating the website and home page, The HTML programming basics, Syntax and rules, Tables, Frames, Forms, Example of HTML page, Choice of page color, banners, Linking with HTML page, Div, Span, metatags, span

MODULE V SEARCH ENGINES

The search and search engine for internet, Spidders, Robotes, Botes, Internet Agents, mobile agents, meta search sites, outlook express and front page.

Total Hours –45

TEXT BOOK:

1. Jeffrey C. Jackson Web Technology : A Computer Science Perspective -

Pearson Education 2012.

REFERENCE:

1. Raj Kamal , Internet and Web Technologies, TATA McGraw Hill 2012

OUTCOMES:

At the completion of this course, the student will able to

- Obtain knowledge on Internet technologies.
- Identify the strengths and weaknesses of different search engines
- choose the appropriate data encryption technique.

CACX19 BIG DATA ANALYTICS L T P C

3 0 0 3

OBJECTIVES:

The aim of the course is to

- Learn tips and tricks for Big Data use cases and solutions
- Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
- Apply Hadoop system components
- bring together several key technologies used in manipulating, storing, and analyzing big data.
- Make the student understand details of Hadoop

MODULE I INTRODUCTION TO BIG DATA 9

Introduction– Big Data and its importance, Big data applications. Four V's of Big Data – Drivers for Big Data – Introduction to Big Data Analytics –

MODULE II BIG DATA TECHNOLOGIES 9

Hadoop's Parallel World – Data discovery – Open source technology for Big Data Analytics – cloud and Big Data –Predictive Analytics – Mobile Business Intelligence and Big Data

MODULE III – INTRODUCTION TO HADOOP 9

Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

MODULE IV HADOOP ARCHITECTURE 9

Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Hadoop Configuration – HDFS Administering –Monitoring & Maintenance

MODULE V MAP REDUCE 9

Hadoop Distributed File Systems – Visualizations - Visual Data Analysis Techniques - Interaction Techniques; Systems and Applications

Total Hours –45

TEXT BOOKS:

1. Kevin Roebuck, "Storing and managing Big Data - NoSql, Hadoop and more: High-Impact Strategies - What You Need to Know", Tebbo Publishers, 2011.

REFERENCES:

1. Tom White, "Hadoop: The Definitive Guide", 3rd Edition, O'Reilly, 2012.
2. Michael Minelli, Michehe Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business", 1st Edition, Wiley CIO Series, 2013.

OUTCOMES:

After completing this course students must be able to demonstrate the knowledge and ability to:

- Explain the human components functions regarding interaction with computer
- Explain Computer components functions regarding interaction with human
- Demonstrate Understanding of Interaction between the human and computer components.
- Implement Interaction design basics
- Use HCI in the software process
- Apply Design rules
- Use Evaluation techniques

CACX21 SOFTWARE QUALITY ASSURANCE L T P C
3 0 0 3

OBJECTIVES:

- To make the students understand the importance of quality in software development.

MODULE I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

MODULE II MANAGING SOFTWARE QUALITY 9

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

MODULE III SOFTWARE QUALITY ASSURANCE METRICS 9

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

MODULE IV SOFTWARE QUALITY PROGRAM 9

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.

MODULE V SOFTWARE QUALITY ASSURANCE STANDARDIZATION 9

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's

Total Hours –45

TEXT BOOKS:

1. Abu SayedMahfuz, "Software Quality Assurance: Integrating Testing, Security, and Audit", CRC Press, Taylor and Francis Group, Auerbach Publications, ISBN 978-1-498-73553-7, 2016.

REFERENCES:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition,Artech House Publishers 2007

2. Nina S Godbole, “Software Quality Assurance: Principles and Practice”, Alpha Science International, Ltd, 2004

OUTCOMES:

On completion of the course, the students will be

- able to identify and determine the practices needed to manage a software system configuration.
- understands the mission of a quality system and knows the applicable standards and norms.
- understands the interrelation between product quality and process quality.
- knows and applies product and process quality control techniques.

CACX21	WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To Understand Web Services and implementation model for SOA
- To Understand the SOA, its Principles and Benefits
- To Understand XML concepts
- To Understand paradigms needed for testing Web Services
- To explore different Test Strategies for SOA-based applications
- To implement functional testing, compliance testing and load testing of Web Services
- To Identify bug-finding ideas in testing Web Services

MODULE I **9**

Evolution and Emergence of Web Services – Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

MODULE II **9**

Web Service Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services. Describing Web Services – WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

MODULE III **9**

Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation. SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model,

Error handling in SOAP.

MODULE IV **9**

Registering and Discovering Services : The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

MODULE V **9**

SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

Total Hours –45

TEXT BOOK:

1. Thomas Erl, "SOA Principles of Service Design", Prentice Hall, 2008.

REFERENCES:

1. Eric Newcomer, Greg Lomow, "Understanding Soa with Web Services", 2nd Edition, Pearson Education, 2009.
2. Shankar Kambhampaty, "Service Oriented Architecture for Enterprise Applications", 1st Edition, Wiley India Private Limited, 2008.

OUTCOMES:

1.Demonstrate an understanding of software oriented architectures.

2. Demonstrate an understanding of the service composition..

3. Demonstrate an ability to manage a modern medium scale software development project using SOA principles.

4.Demonstrate and ability to implement a service oriented application.