UNIVERSITY VISION AND MISSION

VISION

B.S. Abdur Rahman Institute of Science & 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 University.
- 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

- 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 AND OUTCOMES
MASTER OF COMPUTER APPLICATIONS

PROGRAMME EDUCATIONAL OBJECTIVES:

- To impart knowledge and required skills to the graduates in the field of computer applications and software development
- To provide necessary training in analysis and design of software systems using appropriate tools and techniques
- To pursue research in the emerging area of computer applications of different domains to meet the industrial and societal needs
- To equip the graduates with the necessary skills in communication, team work and leadership qualities to meet the needs of the industry

PROGRAMME OUTCOMES:

On completion of the programme the graduates will

- Have the ability to analyze problems, articulate their requirements and identify the computing techniques to provide solutions
- Have the capability to use latest software and tools
- Be able to effectively communicate and document processes and solutions in software development
- Be able to participate and manage team projects effectively
- Have capability to carry out research to meet the dynamic needs of industry and society

B.S.ABDUR RAHMAN
UNIVERSITY
B.S. ABDUR RAHMAN INSTITUTE OF SCIENCE & TECHNOLOGY
(Estd.u/s 3 of the UGC Act, 1956)
(FORMERLY B.S.ABDUR RAHMAN CRESCENT ENGINEERING COLLEGE)
Seethakathi Estate, G.S.T. Road, Vandalur, Chennai - 600 048.

REGULATIONS 2013
FOR
M.TECH./MCA/M.SC. DEGREE PROGRAMMES

REGULATIONS - 2013 FOR
FOR M.TECH / MCA / M.Sc. DEGREE PROGRAMMES

1.0 PRELIMINARY DEFINITIONS AND NOMENCLATURE

In these Regulations, unless the context otherwise requires

i) **"Programme"** means Post Graduate Degree Programme (M.Tech./ MCA / M.Sc.)

ii) **"Course"** means a theory or practical subject that is normally studied in a semester, like Applied Mathematics, Structural Dynamics, Computer Aided Design, etc.

iii) **"University"** means B.S.Abdur Rahman University, Chennai, 600048.

iv) **"Institution"** unless otherwise specifically mentioned as an autonomous or off campus institution means B.S.Abdur Rahman University.

v) **"Academic Council"** means the Academic Council of this University.

vi) **"Dean (Academic Affairs)"** means Dean (Academic Affairs) of B.S.Abdur Rahman University.

vii) **"Dean (Student Affairs)"** means Dean(Student Affairs) of B.S.Abdur Rahman University.

viii) **"Controller of Examinations"** means the Controller of Examinations of B.S.Abdur Rahman University who is responsible for conduct of examinations and declaration of results.

2.0 PROGRAMMES OFFERED, MODE OF STUDY AND ADMISSION REQUIREMENTS

2.1 P.G. Programmes Offered

The various P.G. Programmes and their modes of study are as follows:

Degree	Mode of Study
M.Tech.	Full Time
M.Tech.	Part Time - Day / Evening
M.C.A.	Full Time
M. Sc.	Full Time

2.2 MODES OF STUDY

2.2.1 Full-time

Students admitted under "Full-Time" shall be available in the Institution during the complete working hours for curricular, co-curricular and extra-curricular activities assigned to them.

2.2.2 A full time student, who has completed all non-project courses desiring to do the Project work in part-time mode for valid reasons, shall apply to the Dean (Academic Affairs) through the Head of the Department, if the student satisfies the clause 2.3.4 of this Regulations. Permission may be granted based on merits of the case. Such conversion is not permitted in the middle of a semester.

2.2.3 Part time - Day time

In this mode of study, the students are required to attend classes for the courses registered along with full time students.

2.2.4 Part time - Evening

In this mode of study, the students are required to attend normally classes in the evening and on Saturdays, if necessary.

2.2.5 A part time student is not permitted to convert to full time mode of study.

2.3 ADMISSION REQUIREMENTS

2.3.1 Students for admission to the first semester of the Master's Degree Programme shall be required to have passed an appropriate degree examination of this University as specified in Table shown for eligibility entry qualification for admission to PG Programmes or any other degree examination of any University or authority accepted by this University as equivalent thereto.

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

2.3.3 All part-time students should satisfy other conditions regarding experience, sponsorship etc., which may be prescribed by this Institution from time to time.

2.3.4 A student eligible for admission to M.Tech. Part Time - Day Time programme shall have his/her permanent place of work within a distance of 65km from the campus of this Institution.

3.0 DURATION AND STRUCTURE OF THE P.G. PROGRAMME

3.1 The minimum and maximum period for completion of the P.G. Programmes are given below:

Programme	Min. No. of Semesters	Max. No. of Semesters
M.Tech. (Full Time)	4	8
M.Tech.(Part Time)	6	12
M.C.A. (Full Time)	6	12
M.Sc. (Full Time)	4	8

3.2 The P.G. programmes will consist of the following components as prescribed in the respective curriculum

i. Core courses

ii. Elective courses

iii. Project work / thesis / dissertation

iv. Laboratory Courses

v. Case studies

vi. Seminars

vii. Industrial Internship

3.3 The curriculum and syllabi of all the P.G. programmes shall be approved by the Academic Council of this University.

3.4 The minimum number of credits to be earned for the successful completion of the programme shall be specified in the curriculum of the respective specialization of the P.G. programme.

3.5 Each academic semester shall normally comprise of 80 working days. Semester-end examinations will follow immediately after the last working day.

ELIGIBLE ENTRY QUALIFICATIONS FOR ADMISSION TO P.G. PROGRAMMES

Sl. No.	Name of the Department	P.G. Programmes offered	Qualifications for admission
01.	Civil Engineering	M.Tech. (Structural Engineering)	B.E / B.Tech. (Civil Engineering) / (Structural Engineering)
		M.Tech. (Construction Engineering and Project Management)	B.E. / B.Tech. (Civil Engineering) / (Structural Engineering)
02.	Mechanical Engineering	M.Tech. (Manufacturing Engineering)	B.E. / B.Tech. (Mechanical / Auto / Manufacturing / Production / Industrial / Mechatronics / Metallurgy / Aerospace /Aeronautical / Material Science / Marine Engineering)
03.	Polymer Technology	M.Tech. (Polymer Technology)	B.E./ B.Tech. degree Mech./Production/ Polymer Science or Engg or Tech / Rubber Tech / M.Sc (Polymer Sc./ Chemistry Appl. Chemistry)
04.	Electrical and Electronics Engineering	M.Tech. (Power Systems Engg)	B.E / B.Tech (EEE / ECE / E&I / I&C / Electronics / Instrumentation)
		M.Tech. (Power Electronics & Drives)	B.E / B.Tech (EEE / ECE / E&I / I&C / Electronics / Instrumentation)
05.	Electronics and Communication Engineering	M.Tech. (Communication Systems)	B.E / B.Tech (EEE/ ECE / E&I / I&C / Electronics / Instrumentation)
		M.Tech.(VLSI and Embedded Systems)	B.E./ B.Tech. in ECE / Electronics / EIE
06.	ECE Department jointly with Physics Dept	M.Tech. (Optoelectronics and Laser Technology)	B.E./B.Tech. (ECE / EEE / Electronics / EIE / ICE) M.Sc (Physics / Materials Science / Electronics / Photonics)
07.	Electronics and Instrumentation Engineering	M.Tech. (Electronics and Instrumentation Engineering)	B.E./ B.Tech. (EIE/ICE/Electronics/ECE/ EEE)
08.	Computer Science and Engineering	M.Tech. (Computer Science and Engineering)	B.E. /B.Tech. (CSE/IT/ECE/EEE/EIE/ICE/ Electronics / MCA)
		M.Tech. (Software Engineering)	B.E. / B.Tech. (CSE / IT) MCA
		M.Tech (Network Security)	B.E. /B.Tech. (CSE/IT/ECE/EEE/EIE/ICE/ Electronics / MCA)
		M.Tech (Computer and Predictive Analytics)	B.E. /B.Tech. (CSE/IT/ECE/EEE/EIE/ICE/ Electronics / MCA)
09	InformationTechnology	M.Tech. (Information Technology)	B.E /B.Tech. (IT/CSE/ECE/EEE/EIE/ICE/ Electronics) MCA
		M.Tech. (Information Security & Digital Forensics)	B.E /B.Tech. (IT/CSE/ECE/EEE/EIE/ICE/ Electronics) MCA
10	Computer Applications	M.C.A.	Bachelor Degree in any discipline with Mathematics as one of the subjects (or) Mathematics at +2 level
		M.Tech. (Systems Engineering and Operations Research)	BE / B.Tech. (Any Branch) or M.Sc., (Maths / Physics / Statistics / CS / IT / SE) or M.C.A.
		M.Tech. (Data & Storage Management)	BE / B.Tech. (Any Branch) or M.Sc., (Maths / Physics / Statistics / CS / IT / SE) or M.C.A.

ELIGIBLE ENTRY QUALIFICATIONS FOR ADMISSION TO P.G. PROGRAMMES

Sl. No.	Name of the Department	P.G. Programmes offered	Qualifications for admission
11	Mathematics	M.Sc. (Actuarial Science)	Any Degree with Mathematics / Statistics as one of the Subjects of Study.
12	Chemistry	M.Sc.(Chemistry)	B.Sc (Chemistry) of B.Sc. (Applied Science)

3.6 The curriculum of P.G. programmes shall be so designed that the minimum prescribed credits required for the award of the degree shall be within the limits specified below:

Programme	Minimum prescribed credit range
M.Tech.	75 to 85
M.C.A.	120 to 130
M.Sc.	75 to 85

3.7 Credits will be assigned to the courses for all P.G. programmes as given below:

* One credit for one lecture period per week
* One credit for one tutorial period per week
* One credit each for seminar/practical session/project of two or three periods per week
* one credit for two weeks of industrial internship.

3.8 The number of credits registered by a student in non-project semester and project semester should be within the range specified below:

P.G. Programme	Non-project Semester	Project semester
M.Tech. (Full Time)	15 to 29	12 to 20
M.Tech. (Part Time)	6 to 18	12 to 16
M.C.A. (Full Time)	15 to 29	12 to 20
M.Sc. (Full Time)	15 to 25	12 to 20

3.9 The electives from the curriculum are to be chosen with the approval of the Head of the Department.

3.10 A student may be permitted by the Head of the Department to choose electives offered from other P.G. Programmes either within the Department or from other Departments up to a maximum of three courses during the period of his/her study, provided the Heads of the Departments offering such courses also agree.

3.11 To help the students to take up special research areas in their project work and to enable the department to introduce courses in latest/emerging areas in the curriculum, "Special Electives" may be offered. A student may be permitted to register for a "Special Elective" up to a maximum of three credits during the period of his/her study, provided the syllabus of this course is recommended by the Head of the Department and approved by the Chairman, Academic Council before the commencement of the semester, in which the special elective course is offered. Subsequently, such course shall be ratified by the Board of Studies and Academic Council.

3.12 The medium of instruction, examination, seminar and project/thesis/ dissertation reports will be English.

3.13 Industrial internship, if specified in the curriculum shall be of not less than two weeks duration and shall be organized by the Head of the Department.

3.14 PROJECT WORK/THESIS/DISSERTATION

3.14.1 Project work / Thesis / Dissertation shall be carried out under the supervision of a qualified teacher in the concerned Department.

3.14.2 A student may however, in certain cases, be permitted to work for the project in an Industrial/Research Organization, on the recommendation of the Head of the Department. In such cases, the project work shall be jointly supervised by a faculty of the Department and an Engineer / Scientist from the organization and the student shall be instructed to meet the faculty periodically and to attend the review committee meetings for evaluating the progress.

3.14.3 Project work / Thesis / Dissertation (Phase - II in the case of M.Tech.) shall be pursued for a minimum of 16 weeks during the final semester, following the preliminary work carried out in Phase-1 during the previous semester.

3.14.4 The Project Report/Thesis / Dissertation report / Drawings prepared according to approved guidelines and duly signed by the supervisor(s) and the Head of the Department shall be submitted to the concerned department.

3.14.5 The deadline for submission of final Project Report / Thesis / Dissertation is within 30 calendar days from the last working day of the semester in which Project / Thesis / Dissertation is done.

3.14.6 If a student fails to submit the Project Report / Thesis / Dissertation on or before the specified deadline he / she is deemed to have not completed the Project Work / Thesis / dissertation and shall re-register the same in a subsequent semester.

3.14.7 A student who has acquired the minimum number of total credits prescribed in the Curriculum for the award of the Masters Degree will not be permitted to enroll for more courses to improve his/her cumulative grade point average (CGPA).

4.0 CLASS ADVISOR AND FACULTY ADVISOR

4.1 CLASS ADVISOR

A faculty member will be nominated by the HOD as Class Advisor for the whole class.

He/she is responsible for maintaining the academic, curricular and co-curricular records of all students throughout their period of study.

4.2 FACULTY ADVISOR

To help the students in planning their courses of study and for general counseling on the academic programme, the Head of the Department of the students will attach a certain number of 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 offer advice to the students on academic and personal matters, and guide the students in taking up courses for registration and enrolment every semester.

5.0 CLASS COMMITTEE

5.1 Every class of the P.G. Programme will have a Class Committee, constituted by the Head of the Department as follows:

i. Teachers of all courses of the programme

ii. One senior faculty preferably not offering courses for the class, as chairperson.

iii. Minimum two students of the class, nominated by the Head of the Department.

iv. Class Advisor / Faculty Advisor of the class - Ex-Officio Members

v. Professor in-charge of the P.G. Programme - Ex-Officio Member.

5.2 The Class Committee shall be constituted by the respective head of the department of the students.

5.3 The basic responsibilities of the Class Committee are to review periodically the progress of the classes, to discuss problems concerning curriculum and syllabi and the conduct of classes. The type of assessment for the course will be decided by the teacher in consultation with the Class Committee and will be announced to the students at the beginning of the semester. Each Class Committee will communicate its recommendations to the Head of the Department and Dean(Academic Affairs). The class committee, without the student members, will also be responsible for finalization of the semester results.

5.4 The Class Committee is required to meet at least thrice in a semester, first within a week of the commencement of the semester, second, after the first assessment and the third, after the semester-end examination to finalize the grades

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(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 REGISTRATION AND ENROLMENT

7.1 For the first semester every student has to register and enroll for all the courses.

7.2 For the subsequent semesters registration for the courses will be done by the student during a specified week before the semester-end examination of the previous semester. The curriculum gives details of the core and elective

courses, project and seminar to be taken in different semester with the number of credits. The student should consult his/her Faculty Adviser for the choice of courses. The Registration form shall be filled in and signed by the student and the Faculty Adviser.

7.4 From the second semester onwards all students shall pay the prescribed fees and enroll on a specified day at the beginning of a semester.

A student will become eligible for enrolment only if he/she satisfies clause 9 and in addition he/she is not debarred from enrolment by a disciplinary action of the Institution. At the time of enrolment a student can drop a course registered earlier and also substitute it by another course for valid reasons with the consent of the Faculty Adviser. Late enrolment will be permitted on payment of a prescribed fine up to two weeks from the date of commencement of the semester.

7.5 Withdrawal from a course registered is permitted up to one week from the date of the completion of the first assessment test.

7.6 Change of a course within a period of 15 days from the commencement of the course, with the approval of Dean (Academic Affairs), on the recommendation of the HOD, is permitted.

7.6.1 Courses withdrawn will have to be taken when they are offered next if they belong to the list of core courses.

7.7 SUMMER TERM COURSES

7.7.1 Summer term courses may be offered by a department on the recommendation of the Departmental Consultative Committee and approved by the Dean (Academic Affairs). No student should register for more than three courses during a summer term.

7.7.2 Summer term courses will be announced by the Head of the department at the end of the even semester before the commencement of the end semester examinations. A student will have to register within the time stipulated in the announcement. A student has to pay the fees as stipulated in the announcement.

7.7.3 The number of contact hours and the assessment procedure for any course during summer term will be the same as those during regular semesters.

Students with U grades will have the option either to write semester end arrears exam or to redo the courses during summer / regular semesters, if they wish to improve their continuous assessment marks subject to the approval of the Head of the department.

7.7.4 Withdrawal from a summer term course is not permitted. No substitute examination will be conducted for the summer term courses.

8.0 TEMPORARY BREAK OF STUDY FROM THE 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. Such student has to rejoin only in the same semester from where he left. However the total duration for completion of the programme shall not exceed the prescribed maximum number of semesters (vide clause 3.1).

9.0 MINIMUM REQUIREMENTS TO REGISTER FOR PROJECT / THESIS / DISSERTATION

9.1 A student is permitted to register for project semester, if he/she has earned the minimum number of credits specified below:

Programme	Minimum No. of credits to be earned to enroll for project semester
M.Tech. (Full time)	18 (III semester)
M.Tech. (Part-time)	18 (V semester)
M.C.A. (Full time)	45 (V semester)
M.Sc.(Full-time)	30 (IV semester) if project is in IV semester
	18 (III semester) if project is in III semester

9.2 If the student has not earned minimum number of credits specified, he/she has to earn the required credits, at least to the extent of minimum credits specified in clause 9.1 and then register for the project semester.

10.0 DISCIPLINE

10.1 Every student is required to observe discipline and decorous behaviour both inside and outside the campus and not to indulge in any activity, which will tend to bring down the prestige of the Institution.

10.2 Any act of indiscipline of a student reported to the Head of the Institution will be referred to a Discipline and Welfare Committee for taking appropriate action.

10.3 Every student should have been certified by the HOD that his / her conduct and discipline have been satisfactory.

11.0 ATTENDANCE

11.1 Attendance rules for all Full Time Programme and Part time - day Time Programmes are given in the following sub-clause.

11.2 Ideally every student is expected to attend all classes and earn 100% attendance in the contact periods of every course, subject to a maximum relaxation of 25% for genuine reasons like on medical grounds, representing the University 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. If the course is a core course, the student should register for and repeat the course when it is offered next. If the course is an elective, either he/she can register and repeat the same elective or can register for a new elective.

12.0 ASSESSMENTS AND EXAMINATIONS

12.1 The following rule shall apply to the full-time and part-time P.G. programmes (M.Tech./ M.C.A. / M.Sc.)

For lecture-based courses, normally a minimum of two assessments will be made during the semester. The assessments may be combination of tests and assignments. The assessment procedure as decided in the Class Committee will be announced to the students right at the beginning of the semester by the course teacher.

12.2 There shall be one examination of three hours duration, at the end of the semester, in each lecture based course.

12.3 The evaluation of the Project work will be based on the project report and a Viva-Voce Examination by a team consisting of the supervisor concerned, an Internal Examiner and External Examiner to be appointed by the Controller of Examinations.

12.4 At the end of industrial internship, the student shall submit a certificate from the organization and also a brief report. The evaluation will be made based

on this report and a Viva-Voce Examination, conducted internally by a Departmental Committee constituted by the Head of the Department.

13.0 WEIGHTAGES

13.1 The following shall be the weightages for different courses:

i) Lecture based course

Two continuous assessments	- 50%
Semester-end examination	- 50%

ii) Laboratory based courses

Laboratory work assessment	- 75%
Semester-end examination	- 25%

Project work

Periodic reviews	- 50%
Evaluation of Project Report by External Examiner	- 20%
Viva-Voce Examination	- 30%

13.2 Appearing for semester end examination for each course (Theory and Practical) is mandatory and a student should secure a minimum of 40% marks in semester end examination for the successful completion of the course.

13.3 The markings for all tests, tutorial, assignments (if any), laboratory work and examinations will be on absolute basis. The final percentage of marks is calculated in each course as per weightages given in clause 13.1.

14.0 SUBSTITUTE EXAMINATION

14.1 A student who has missed for genuine reasons any one of the three assessments including semester-end examination of a course may be permitted to write a substitute examination. However, permissions to take up a substitute examination will be given under exceptional circumstances, such as accident or admissions to a hospital due to illness, etc.

14.2 A student who misses any assessment in a course shall apply in a prescribed form to the Dean (Academic Affairs) through the Head of the department within a week from the date of missed assessment. However the substitute tests and examination for a course will be conducted within two weeks after the last day of the semester-end examinations.

15.0 COURSEWISE GRADING OF STUDENTS AND LETTER GRADES

15.1 Based on the semester performance, each student is awarded a final letter grade at the end of the semester in each course. The letter grades and the corresponding grade points are as follows, but grading has to be relative grading

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

Flexible range grading system will be adopted

"W" denotes withdrawal from the course.

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

"U" denotes unsuccessful performance in a course.

"AB" denotes Absent for the semester end examination

15.2 A student is considered to have completed a course successfully if he / she secure five grade points or higher. A letter grade U in any course implies unsuccessful performance in that course.

15.3 A course successfully completed cannot be repeated for any reason.

16.0 AWARD OF LETTER GRADE

16.1 A final meeting of the Class Committee without the student member(s) will be convened within ten days after the last day of the semester end

examination. The letter grades to be awarded to the students for different courses will be finalized at the meeting.

16.2 After finalisation of the grades at the class committee meeting the Chairman will forward the results to the Controller of Examinations, with copies to Head of the Department and Dean (Academic Affairs).

17.0 DECLARATION OF RESULTS

17.1 After finalisation by the Class Committee as per clause 16.1 the Letter Grades awarded to the students in the each course shall be announced on the departmental notice board after duly approved by the Controller of Examinations.

17.2 In case any student feels aggrieved about the results, he/she can apply for revaluation after paying the prescribed fee for the purpose, within one week from the announcement of results.

A committee will be constituted by the concerned Head of the Department comprising of the Chairperson of the concerned Class Committee (Convener), the teacher concerned and a teacher of the department who is knowledgeable in the concerned course. If the Committee finds that the case is genuine, it may jointly revalue the answer script and forward the revised marks to the Controller of Examinations with full justification for the revision if any.

17.3 The "U" and "AB" grade once awarded stays in the grade sheet of the students and is not deleted when he/she completes the course successfully later. The grade acquired by the student later will be indicated in the grade sheet of the appropriate semester.

18.0 COURSE REPETITION AND ARREARS EXAMINATION

18.1 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.

18.2 A student who is awarded "U" or "AB" grade in a course shall write the semester-end examination as arrear examination, at the end of the next semester, along with the regular examinations of next semester courses.

18.3 The marks earned earlier in the continuous assessments for the course, will be used for grading along with the marks earned in the semester end arrear examination of the course.

19.0 GRADE SHEET

19.1 The grade sheet issued at the end of the semester to each student will contain the following:

(i) the credits for each course registered for that semester.

(ii) the performance in each course by the letter grade obtained.

(iii) the total credits earned in that semester.

(iv) the 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.

19.2 The GPA will be calculated according to the formula

$$GPA = \frac{\sum_{i=1}^{n}(C_i)(GPi)}{\sum_{i=1}^{n} C_i} \qquad Where\ \ n = number\ of\ courses$$

where C_i is the number of credits assigned for ith course GP_i - Grade point obtained in the ith course for the cumulative grade point average (CGPA) a similar formula is used except that the sum is over all the courses taken in all the semesters completed up to the point of time.

I and W grades will be excluded for GPA calculations.

U, AB, I and W grades will be excluded for CGPA calculations.

19.3 Classification of the award of degree will be as follows:

CGPA	Classification
8.50 and above, having completed all courses	First class with Distinction
6.50 and above, having completed within a period of 2 semesters beyond the programme period	First Class
All others	Second Class

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 P.G. Programme within a minimum period covered by the minimum duration (clause 3.1) plus authorized break of study, if any (clause 8). To be eligible for First Class, a student should have passed the examination in all courses within the specified minimum number of semesters reckoned from his/her commencement of study plus two semesters. For this purpose, the authorized break of study will not be counted. The 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.

20.0 ELIGIBILITY FOR THE AWARD OF THE MASTERS DEGREE

20.1 A student shall be declared to be eligible for the award of the Masters Degree, if he/she has:

i) successfully acquired the required credits as specified in the Curriculum corresponding to his/her programme within the stipulated time,

ii) no disciplinary action is pending against him/her

20.2 The award of the degree must be approved by the University.

21.0 POWER TO MODIFY

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

CURRICULUM & SYLLABI FOR MCA (MASTER OF COMPUTER APPLICATIONS)

(SIX SEMESTERS / FULL TIME)

CURRICULUM

SEMESTER I

Sl. No.	Course Code	Course Title	L	T	P	C
1.	MAB6198	Mathematical Foundations for Computer Applications	3	1	0	4
2.	CAB6101	Problem Solving and Programming in C	3	0	0	3
3.	CAB6102	Computer Architecture	3	0	0	3
4.	CAB6103	Database Management Systems	3	0	0	3
5.	CAB6104	Software Engineering	3	0	0	3
6.	CAB6105	Computer Networks	3	0	0	3
7.	CAB6106	C Programming Lab	0	0	5	2
8.	CAB6107	DBMS Lab	0	0	5	2
						23

SEMESTER II

Sl. No.	Course Code	Course Title	L	T	P	C
1.	MSB6281	Accounting and Financial Management	3	1	0	4
2.	MAB6299	Resource Management Techniques	3	1	0	4
3.	CAB6211	Data Structures	3	0	0	3
4.	CAB6212	Operating Systems	3	0	0	3
5.	CAB6213	Design and Analysis of Algorithms	3	0	0	3
6.	CAB6214	Object Oriented Programming using C++	3	0	0	3
7.	CAB6215	Object Oriented Programming Lab	0	0	5	2
8.	CAB6216	Algorithms and Data Structures Lab	0	0	5	2
9.	ENB6211	Communication Skills Laboratory	0	0	2	1
						25

SEMESTER III

Sl. No.	Course Code	Course Title	L	T	P	C
1.	CAB7101	Internet and Java Programming	3	0	0	3
2.	CAB7102	Computer Graphics and Multimedia Systems	3	0	0	3
3.	CAB7103	Microprocessors and its Applications	3	0	0	3
4.	CAB7104	Distributed Computing	3	0	0	3
5.		Elective I	3	0	0	3
6.		Elective II	3	0	0	3
7.	CAB7105	Java Programming and Graphics & Multimedia Lab	0	0	5	2
8.	CAB7106	Microprocessor Lab	0	0	5	2
9.	CAB7107	Soft Skills	0	0	2	1
						23

SEMESTER IV

Sl. No.	Course Code	Course Title	L	T	P	C
1.	CAB7211	Object Oriented Analysis and Design	3	0	0	3
2.	CAB7212	Web Design and Development	3	0	0	3
3.	CAB7213	Unix and Network Programming	3	0	0	3
4.	CAB7214	XML and Web Services	3	0	0	3
5.		Elective III	3	0	0	3
6.		Elective IV	3	0	0	3
7.	CAB7215	Unix and Network Programming Lab	0	0	5	2
8.	CAB7216	XML and Web Services Lab	0	0	5	2
						22

SEMESTER V

Sl. No.	Course Code	Course Title	L	T	P	C
1.	MSB8101	Organizational Behaviour	3	0	0	3
2.	CAB8101	Middleware Technologies	3	0	0	3
3.		Elective V	3	0	0	3
4.		Elective VI	3	0	0	3
5.	CAB8102	Middleware Lab	0	0	5	2
6.	CAB8103	Project Phase - I	0	0	12	6*
						14

SEMESTER VI

Sl. No.	Course Code	Course Title	L	T	P	C
1.	CAB8103	Project Phase - II	0	0	24	12
		Total				**6 + 12 = 18***

TOTAL CREDITS : 125

*Credits for Project Work (Phase I) to be accounted along with Project work (Phase II) in VI Semester

LIST OF ELECTIVES

Sl. No.	Course Code	Course Title
1.	CABY01	Management Information System
2.	CABY02	E-Commerce
3.	CABY03	Advanced Databases
4.	CABY04	Digital Image Processing
5.	CABY05	TCP/IP Protocol Suite
6.	CABY06	Visual Programming
7.	CABY07	Mobile Computing
8.	CABY08	Software Quality Management
9.	CABY09	Data Mining and Data Warehousing
10.	CABY010	Component Based Technology
11.	CABY011	Supply Chain Management
12.	CABY012	Business Processes
13.	CABY013	Software Project Management
14.	CABY014	Enterprise Resource Planning
15.	CABY015	Software Agents
16.	CABY016	Unix Internals
17.	CABY017	Grid Computing
18.	CABY018	Network Security
19.	CABY019	Embedded Systems
20.	CABY020	Software Quality Assurance
21.	CABY021	Adhoc Networks
22.	CABY022	Principles of Compiler Design
23.	CABY023	Business Intelligence
24.	CABY024	Service Oriented Architecture
25.	CABY025	Content Management System
26.	CABY026	Software Testing

SEMESTER I

MAB6198	MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS	L	T	P	C
		3	1	0	4

OBJECTIVE:

- The aim of this course is to familiarize students with applications of Formal language and Algebraic Theory to Computer Science problems.

MODULE I FUNDAMENTAL STRUCTURES 8

Set theory:- Relationships between sets - Operations on sets - Set identities - Principle of inclusion and exclusion - Minsets Relations – Binary relations - Partial orderings - Equivalence relations. Functions:– Properties of functions - Composition of functions – Inverse functions - Permutation functions.

MODULE II LOGIC 8

Prepositional, logic – Logical connectives – Truth tables – Normal forms (conjunctive and disjunctive) - Predicate logic - Universal and existential quantifiers - Proof techniques – direct and indirect – Proof by contradiction – Mathematical Induction.

MODULE III COMBINATORICS 5

Basics of counting – Counting arguments – Pigeonhole principle - Permutations and Combinations - Recursion and Recurrence relations – Generating functions.

MODULE IV ALGEBRAIC STRUCTURES 8

Introduction- Properties of an algebraic systems –Morphisms – Semigroups – Monoids – Sub semigroups and Submonoids –Groups-Order of a group – order of an element-permutation groups-subgroups –cyclic groups.

MODULE V MORPHISMS ON ALGEBRAIC STRUCTURES 8

Morphisms of groups –kernal of homomorphism - Cosets and Lagrange's theorem – Normal subgroups – Rings and Fields.

MODULE VI MODELING COMPUTATION AND LANGUAGES 8

Finite state machines – Deterministic and Non- deterministic finite state

machines – Turing Machines - Formal Languages – Classes of Grammars – Type_0 – Context Sensitive – Context – Free – Regular Grammars – Ambiguity.

Total Hours: 45

REFERENCES:

1. Judith L. Gersting, “Mathematical Structures for Computer Science”, 5th Edition, W.H. Freeman and Company, New York, 2003.
2. J.P. Tremblay and R. Manohar, “Discrete Mathematical Structures with Applications to Computer Science”, Tata Mcgraw Hill, 1997.
3. Rosen K.H., “Discrete Mathematics and its Applications”, Tata McGraw-Hill Publishing Company Limited, New Delhi, 5th Edition, 2003.
4. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, “Introduction to Automata Theory, Languages, and Computation”, Pearson/Addison Wesley, 2007.
5. Michael Sipser, “Introduction to Theory of Computation”, 3rd edition, Cengage Learning, 2012.

OUTCOME:

- At the end of the course students will be able to apply the concepts of set theory, logic, combinatorics, groups and finite state machines in solving engineering problems.

CAB6101 PROBLEM SOLVING AND PROGRAMMING IN C

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of the course is

- to introduce students to the foundations of computing, programming and problem-solving.
- to develop basic programming skills necessary for engineering education.
- to develop the programming ability in students, and to improve their proficiency in applying the computing fundamentals to their field of study.

MODULE I INTRODUCTION TO COMPUTER PROBLEM SOLVING 9

Introduction – The Problem Solving aspect – Top down Design – Implementation of Algorithms – Program Verification – Efficiency of Algorithms – Analysis of Algorithms.

MODULE II FUNDAMENTAL ALGORITHMS 9

Introduction – Exchanging the values – Counting – Factorial Computation – SINE computation – Base Conversion – Factoring Methods – Array Techniques.

MODULE III INTRODUCTION TO C LANGUAGE 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 – dynamic and multi-dimensional arrays - Character arrays and Strings – String handling Functions - User defined Functions – Categories of 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 – Dynamic Memory allocation – Linked Lists – Preprocessors.

Total Hours: 45

TEXT BOOKS:

1. R.G.Dromey " How to Solve it by Computer ", PHI , 1998

2. E.Balagurusamy " Programming in ANSI C " , Tata McGraw Hill, 2004.

REFERENCES:

1. Deitel and Deitel " C How to Program ", Addisson Wesley , 2001.

2. Brian W.Kernighan & Dennis Ritchie "C Programming Language", PHI, 1990.

3. Byron.S.Gottfried "Schaum's Outline of Programming with C ", 2nd Edition,1996.

OUTCOME:

- At the end of the course the student will have strong fundamentals in C.

CAB6102 COMPUTER ARCHITECTURE L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is to

- understand the digital logic fundamentals.
- know about the digital components.
- understand the computer organization and Programming concepts.
- know in detail I-O organization.
- describe about the memory organization and CPU.

MODULE I INTRODUCTION TO DIGITAL DESIGN 9

Data Representation – Data Types – Complements – Arithmetic Operations – Representations – Fixed –Point, Floating – Point , Decimal Fixed – Point – Binary Codes- Logic Gates, Boolean Algebra, Map Simplification – Combinational Circuits: Half-Adder, Full Adder- Flip Flops - Sequential Circuits

MODULE II DIGITAL COMPONENTS REGISTER TRANSFER & MICRO OPERATIONS 9

ICs – Decoders – Multiplexers – Registers – Shift Registers – Binary Counters – Memory Unit – Register Transfer Language – Register Transfer – Bus And Memory Transfers – Arithmetic, Logic And Shift Micro Operations, Arithmetic Logic Shift Unit.

MODULE III COMPUTER ARCHITECTURE AND PROGRAMMING 9

Instruction Codes – Computer Registers – Computer Instructions – Timing And Control – Instruction Cycle – Memory Reference Instructions – I/O And Interrupt – Machine Language – Assembly Language – Assembler - Program Loops – Programming Arithmetic And Logic Operations – Subroutines – I/O Programming.

MODULE IV INPUT – OUTPUT ARCHITECTURE 9

Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes Of Transfer – Priority Interrupt – DMA – IOP – Serial Communication.

MODULE V MEMORY ARCHITECTURE AND CPU 9

Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware – CPU: General Register Organization – Control Word – Stack Organization – Instruction Format – Addressing Modes – Data Transfer And Manipulation – Program Control.

Total Hours: 45

TEXTBOOK :

1. M.Morris Mano, “Computer System Architecture”, Prentice Hall of India, 2001.

REFERNCES :

1. John .P.Hayes, “Computer Architecture and Organization”, Tata McGraw Hill, 1996.

2. V.C.Hamatcher,et al “Computer Organization”, Tata Mcgraw Hill,1996

OUTCOMES:

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

- understand the major components of a computer including CPU, memory, I/O and storage.
- understand the role of the operating system in interfacing with the computer hardware.
- understand the basic components of the CPU including the ALU and control unit.

CAB6103 DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	0	0	3

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 **9**

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 **9**

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 **9**

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 **9**

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

MODULE V TRANSACTION MANAGEMENT **9**

Transaction Concept-Static Implementation-Concurrency Control-Protocols-Deadlock Handling-Recovery Systems-Recovery with Concurrent Transactions-Shadow Paging-Buffer Management-Case Studies-Oracle-Microsoft SQL Server.

Total Hours: 45

TEXT BOOK:

1. Abraham Silberschatz, Hentry F.Korth and S.Sudharssan,"Database System Concepts", 4th Edition, Tata McGraw Hill, 2002

REFERENCE:

1. Raghu Ramakrishnan & Johannesgerhrke, "Data Base Management Systems", Mc Graw Hill International Edition, 2000

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.

CAB6104 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**

A Generic View of Process – Process Models-The Waterfall Model-Incremental Model-Evolutionary Model-Specialized Model-The Unified Process–Agile Process – Agile Models – Software Cost Estimation – Planning – Risk Analysis – Software Project Scheduling.

MODULE II REQUIREMENT ANALYSIS **9**

System Engineering Hierarchy – System Modeling – Requirements Engineering: Tasks- Initiating The Process-Eliciting Requirements-Developing Use Cases-Negotiating Requirements-Validating Requirements – Building the Analysis Models: Concepts.

MODULE III SOFTWARE DESIGN **9**

Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – Component – Class Based And Conventional Components Design – User Interface – Analysis And Design

MODULE IV SOFTWARE TESTING **9**

Software Testing – Strategies: Conventional - Object Oriented – Validation Testing – Criteria – Alpha – Beta Testing- System Testing – Recovery – Security – Stress – Performance - Testing Tactics – Testing Fundamentals-Black Box – White Box – Basis Path-Control Structure

MODULE V SCM AND QUALITY ASSURANCE 9

Software Configuration And Management-Features-SCM Process-Software Quality Concepts – Quality Assurance – Software Review–Technical Reviews – Formal Approach To Software Quality Assurance – Reliability – Quality Standards – Software Quality Assurance Plan.

Total Hours: 45

TEXT BOOK:

1. Roger Pressman.S., “Software Engineering: A Practitioner's Approach”, 6th Edition, Mcgraw Hill, 2005.

REFERENCES:

1. P. Fleeger, “Software Engineering”, Prentice Hall, 1999.
2. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, “Fundamentals Of Software Engineering”, Prentice Hall Of India 1991.
3. I. Sommerville, “Software Engineering” , 5th Edition: Addison Wesley, 1996.

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 .

CAB6105 COMPUTER NETWORKS L T P C
3 0 0 3

OBJECTIVES:

The aims of the course are as follows

- The intent of this course is to provide students with enough knowledge in networking, various types of networks and to analyze different network applications.
- To explains the overall end-to-end behavior of networks.
- It describes many of the issues that all data link protocols must address, including encoding, framing, and error detection.
- It includes core concepts, existing protocol specifications, real protocols which are used to illustrate most of the important ideas.

MODULE I INTRODUCTION 9

Building a network – Requirements – Network Architecture – OSI – Internet – Direct Link Networks – Hardware building blocks – Framing – Error detection – Reliable transmission.

MODULE II NETWORK FUNDAMENTALS 9

LAN Technology – LAN Architecture – BUS/Tree – Ring – Star – Ethernet – Token Rings – Wireless.

MODULE III NETWORK LAYER 9

Packet Switching – Switching and Forwarding – Bridges and LAN switches – Internetworking – Simple Internetworking – Routing.

MODULE IV TRANSPORT LAYER 9

Reliable Byte Stream (TCP) – Simple Demultiplexer (UDP) – TCP Congestion Control – Congestion Avoidance Mechanisms.

MODULE V PRESENTATION LAYER and APPLICATIONS 9

Presentation formatting – Data compression – Cryptographic Algorithms: RSA - DES –– Applications – Domain Name Service – Email - SMTP – MIME – HTTP – SNMP.

Total Hours: 45

TEXT BOOK:

1. Larry L. Peterson & Bruce S. Davie, “Computer Networks - A systems Approach”, 2nd Edition, Harcourt Asia/Morgan Kaufmann, 2000.

REFERENCES:

1. James F. Kurose and Keith W. Ross, “Computer Networking - A Top Down Approach featuring the Internet”, 1st Edition, Addison Wesley Publishing Company, 2001.

2. William Stallings, “Data and Computer Communications”, 5th Edition, PHI, 1997.

3. Andrew S. Tanenbaum, “Computer Networks”, Tata Mcgraw Hill, 3rd Edition, 2001.

OUTCOMES:

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

- identify and describe the layers of the OSI and TCP/IP.
- illustrate how networks work in practice.
- analyze the applications of network.
- make effective use of networking topologies.

CAB6106	C PROGRAMMING LAB	L	T	P	C
		0	0	5	2

OBJECTIVES:

The aim of the course is

- to impart knowledge on the fundamentals of C Programming
- to brief on Data Types, Operators, Statements, Loops, Functions, Array, Pointers, Structures

LIST OF EXERCISES :

1. Display the following:

i. Floyd's triangle

ii. Pascal Triangle

2. Generate the following series of numbers:

i. Armstrong numbers between 1 to 100

ii. Prime numbers between 1 to 50

iii. Fibonacci series up to N numbers

3. Manipulate the strings with following operations.

i. Concatenating two strings

ii. Reversing the string

iii. Finding the substring

iv. Replacing a string

v. Finding length of the string

4. Find the summation of the following series:

i. Sine

ii. Cosine

iii. Exponential

5. Create the sales report for M sales person and N products using two dimensional array.

6. Simulate following Banking operations using functions.
    i. Deposit
    ii. Withdrawal
    iii. Balance Enquiry

7. Implement using recursion

    i. Find the solution of Towers of Hanoi problem using recursion.
    ii. Fibonacci number generation.
    iii. Factorial

8. Generate Student mark sheets using structures.

9. Create a collection of books using arrays of structures and do the following:
    i. Search a book with title and author name
    ii. Sorts the books on title.

OUTCOME:

- At the end of the course, the students will learn the fundamentals of C Programming.

CAB6107	DBMS LAB	L T P C 0 0 5 2

OBJECTIVES:

The aim of the course is

- to learn SQL (Structured Query Language) which would provide functionality to:
- learn how to create tables which are fundamental storage blocks of data.
- learn how to place constraints on data that is entered on tables to ensure data integrity.
- learn how to add, change and remove data from tables.
- learn how to select a subset of the data you want to see from the collection of tables and data.
- 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:
- write programming blocks with conditional structure, assignment structure, loop structure, etc.
- use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc.
- use cursors which would allow row wise access of data.
- use triggers which would allow you define pre and post actions when something changes in the database tables.

LIST OF EXERCISES:

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 triggers.

9. Write a PL/SQL block for transaction operations of a typical application using package.

10. 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, Pay roll, Insurance, Inventory, etc.

OUTCOMES:

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

- get an idea about database and how this is widely used in real time business activities.
- create and do manipulation on table.
- work with table by using PL/SQL Program.
- get a clear idea about database transaction activities.

SEMESTER – II

MSB6281 ACCOUNTING AND FINANCIAL MANAGEMENT

L	T	P	C
3	1	0	4

OBJECTIVES:

- Finance has rightly been termed as the "Master Key" providing access to all resources required for running business activities. Hence efficient management of business enterprises is closely linked with the efficient management of their finances. In view of the growing importance of the finance function, Financial Management and Accounting plays an important role in any organization.

MODULE I FINANCIAL ACCOUNTING **12**

Meaning and Scope of Accounting-Principles-Concepts-Conventions-Accounting Standards-Final Accounts-Trial Balance-Trading Account-Profit and Loss Account-Balance Sheet.

MODULE II COST ACCOUNTING **12**

Meaning-Objectives-Elements of Cost-Cost Sheet-Marginal Costing and Cost Volume Profit Analysis- Break Even Analysis-Applications-Limitations.

MODULE III MANAGEMENT ACCOUNTING **12**

Budgets and Budgetary Control-Meaning-Types-Sales Budget-Production Budget- Budget-Flexible Budgeting-Cash Budget- Computerized Accounting - Accounting Ratios Analysis-Funds Flow Analysis-Cash Flow Analysis.

MODULE IV INVESTMENT DECISION **12**

Objectives and Functions of Financial Management-Foreign exchange(Forex)-Risk-Return Relationship-Time Value of Money Concepts-Capital Budgeting-Methods of Appraisal.

MODULE V FINANCING DECISION AND WORKING CAPITAL MANAGEMENT **12**

Capital Structure-Factors Affecting Capital Structure-Dividend Policy-Types of Dividend Policy- Concepts of Working Capital-Working Capital Policies-Factors affecting Working Capital-Estimation of Working Capital Requirements

Total Hours: 60

TEXTBOOKS:

1. S.N.Maheswari, “Financial and Management Accounting”, Sultan Chand & Sons, 2003

2. I.M.Pandey, “Financial Management”, Vikas Publications, 4th Reprint, 2002

REFERENCES:

1. S.P. Iyengar, “Cost and Management Accounting”, Sultan Chand & Co.

2. I.M.Pandey, “Elements of Management Accounting” Vikas Publishing House, 1999

OUTCOMES:

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

- prepare final accounts of a concern to find out the profit or loss
- analyze the firm by applying various ratios.
- analyze the factors affecting a capital structure, working capital and dividends.

MAB6299 RESOURCE MANAGEMENT TECHNIQUES

L	T	P	C
3	1	0	4

OBJECTIVES:

To teach students how to solve a real world problem by

- constructing a model representation of the problem under study.
- deriving a solution from the model.
- testing the model and solution
- implementing the solution.

MODULE I LINEAR PROGRAMMING MODELS **12**

Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method.

MODULE II TRANSPORTATION AND ASSIGNMENT MODELS **12**

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm – Variants of the Assignment problem.

MODULE III INTEGER PROGRAMMING MODELS **12**

Formulation – Gomory's IPP method – Gomory's mixed integer method – Branch and bound technique.

MODULE IV SCHEDULING BY PERT AND CPM **12**

Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling.

MODULE V QUEUEING MODELS **12**

Characteristics of Queuing Models – Poisson Queues - (M / M / 1) : (FIFO / 8 /8), (M / M / 1) : (FIFO / N / 8), (M / M / C) : (FIFO / 8 / 8), (M / M / C) : (FIFO / N / 8) models.

Total Hours: 60

TEXT BOOK:

1. Taha H.A., “Operations Research : An Introduction “ 7th Edition, Pearson Education, 2004.

REFERENCES:

1. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, “Operations Research”, Pearson Education, Asia, 2005.

2. Prem Kumar Gupta, D.S. Hira, “Operations Research”, S.Chand & Company Ltd, New Delhi, 3rd Edition, 2003.

OUTCOMES:

Resource Management Techniques gives students the power to make more effective decisions and build more productive systems based on:

- Data.
- careful predictions of outcomes and estimates of risk.
- the latest decision tools and techniques.

CAB6211 DATA STRUCTURES L T P C
3 0 0 3

OBJECTIVES:

The aims of the course are as follows

- Data structure is a particular way of storing and organizing data in a computer so that it can be used efficiently.
- Different kinds of data structures are suited to different kinds of applications and some are highly specialized to specific tasks.
- Data structures are used in almost every program or software system.
- Data structures provide a means to manage huge amounts of data efficiently, such as large databases and internet indexing services.

MODULE I DATA STRUCTURES 9

Introduction – Arrays – Structures – Stack: Definition and examples, Representing Stacks - Queues and lists: Queue and its Representation, lists – Applications of Stack, Queue and Linked Lists.

MODULE II TREES 9

Binary Trees – Operations on binary trees - Binary Tree Representations – node representation, internal and external nodes, implicit array representation – Binary tree Traversals - Huffman Algorithm – Representing Lists as Binary Trees.

MODULE III SORTING AND SEARCHING 9

General Background – Exchange sorts – Selection and Tree Sorting – Insertion Sorts – Merge and Radix Sorts – Basic Search Techniques – Tree Searching – General Search Trees – Hashing.

MODULE IV GRAPHS AND THEIR APPLICATIONS 9

Graphs – An application of graphs – Representation – transitive closure - Warshall's algorithm – Shortest path algorithm - a flow Problem – Dijkstra's algorithm – An application of scheduling - Linked representation of Graphs – Graph Traversals

MODULE V STORAGE MANAGEMENT **9**

General Lists: Operations, linked list representation, using lists, Freeing list nodes - Automatic list Management: Reference count method, Garbage Collection, Algorithms, Collection and compaction

Total Hours: 45

TEXT BOOK :

1. Tanaenbaum A.S.,Langram Y. Augestein M.J " Data Structures using C" Pearson Education , 2004

REFERENCES:

1. Robert Kruse & Clovis L. Tondo "Data Structures and Program Design in C", Prentice Hall, 2nd edition.,1991.

2. Weiss "Data Structures and Algorithm Analysis in C", Addison Wesley, Second Edition, 1997.

OUTCOMES:

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

- understand the properties of various data structures;
- identify the strengths and weaknesses of different data structures concepts;
- possess the knowledge of various existing algorithms;
- analyze and compare the efficiency of algorithms;

CAB6212 OPERATING SYSTEMS L T P C
3 0 0 3

OBJECTIVE:

- This course provides an overview of computer system and operating system, concepts of process management, memory management, storage management, protection and security issues, and distributed systems.

MODULE I INTRODUCTION 7

Definition of OS-Mainframe System-Desktop Systems-Multi processor System-Distributed-Clustered-Real time Systems-Handheld Systems-Operating System Structure-System Components-Services-System Calls-System Programs-System Design and Implementation

MODULE II PROCESS MANAGEMENT 8

Concepts-Process Scheduling-Operations on Processes-Co-operating Processes-Inter Process Communication-CPU Scheduling-Scheduling Concepts-Criteria-Scheduling Algorithms-Multiprocessor Scheduling-Real time Scheduling

MODULE III PROCESS SYNCHRONIZATION 10

Critical Section-Synchronization Hardware-Semaphores-Problems of Synchronization-Critical Regions-Monitors-Deadlocks-Characterization-Handling Deadlocks-Deadlock Prevention-Avoidance-Detection-Deadlock Recovery

MODULE IV MEMORY MANAGEMENT 10

Storage Hierarchy-Storage Management Strategies-Contiguous-Non Contigous Storage Allocation-Single User-Fixed Partition-Variable Partition-Swapping-Virtual Memory-Basic Concepts-Multilevel Organization-Block Mapping-Paging-Segmentation-Page Replacement Methods-Locality-Working Sets

MODULE V I/O AND FILE SYSTEMS 10

Disk Scheduling-File Concepts-File System Structure-Access Methods-Directory Structure-Protection-Directory Implementation-Allocation Methods-Free Space Management-Case Study: Linux System

Total Hours: 45

TEXT BOOK:

1. Silberschatz and Galvin, Operating System Concepts, 6th Edition, John Wiley & Sons, Inc., 2004

REFERENCES:

1. Milankovic M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, 1992

2. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2004

3. H.M.Deitel, An Introduction to Operating Systems, 2nd Edition, Pearson Education, 2002

OUTCOMES:

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

- master understanding of design issues associated with operating systems.
- master various process management concepts including scheduling, synchronization, deadlocks and multithreading.
- master concepts of memory management including virtual memory also the master issues related to file system interface and implementation, disk management.

CAB6213 DESIGN AND ANALYSIS 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
- introduce sorting and searching algorithms
- introduce various algorithmic techniques
- teach how to apply the algorithms and design techniques to solve problems;
- devise correct and efficient algorithms for solving a given problem
- learn whether efficient algorithm exists for solving a given problem
- explain NP-Completeness and deal with NP-complete problems

MODULE I INTRODUCTION 8

Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms.

MODULE II DIVIDE AND CONQUER METHOD AND GREEDY METHOD 7

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Multiplication of large integers – Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

MODULE III DYNAMIC PROGRAMMING 10

Computing a binomial coefficient – Warshall's and Floyd' algorithm – Optimal binary search tree – Knapsack problem – Memory functions.

MODULE IV BACKTRACKING AND BRANCH AND BOUND 10

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

MODULE V NP-HARD AND NP-COMPLETE PROBLEMS 10

P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems – Traveling salesman problem – Knapsack problem.

Total Hours: 45

TEXT BOOK:

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.

REFERENCE:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to algorithms" Prentice Hall 1990.

OUTCOMES:

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

- understand, explain, model and analyze a given software problem as a solution.
- understand various design methods and analyzing techniques will be learnt by the students.
- understand NP-Completeness and deal with NP-complete problems.

CAB6214 OBJECT ORIENTED PROGRAMMING USING C++ **L T P C**
3 0 0 3

OBJECTIVES:

The aim of the course is to

- identify and practice the object-oriented programming concepts and techniques
- practice the use of C++ classes and class libraries
- get a clear understanding of object-oriented concepts.
- understand object oriented programming through C++.
- gain the basic knowledge on Object Oriented concepts.
- develop applications using Object Oriented Programming Concepts.
- implement features of object oriented programming to solve real world problems.

MODULE I OOP PARADIGAM **8**

Programming Paradigms-Procedural Programming-Modularity-Exception Handling-Data Abstraction-User Defined Types-Concrete Types-Abstract Types-Virtual Functions-Object Oriented Programming-Generic Programming-Containers-Algorithms.

MODULE II INTRODUCTION TO C++ **11**

Overview of C++-Classes and Objects-Friend Functions-Friend Classes-Inline Function-Static Members-Arrays-Pointers-References-Dynamic Allocation

MODULE III OVERLOADING **7**

Function Overloading-Overloading Constructor Functions-Copy Constructors-Default Argument-Operator Overloading-Member Operator Overloading-Overloading new and delete

MODULE IV ADDITIONAL FEATURES **10**

Inheritance-Base Class-Access Control-Virtual Functions-Pure Virtual Functions-Templates-Generic Functions-Applying Generic Functions-Generic Classes-Exception Handling-C++ I/O Streams-File I/O-STL-Overview-

Container Classes-Lists-Maps-Algorithms Using Functions and Objects-String Class

MODULE V DESIGN CONCEPTS **9**

Role of Classes-Kinds of Classes-Concrete Types-Abstract Types-Nodes-Changing Interfaces-Object I/O-Actions-Interface Classes-Handles-Use Counts Applications frame works

Total Hours: 45

TEXT BOOKS:

1. Herbert Schildt,"C++ The Complete Reference", Tata McGrawHill Edition, 2003 (unit 2, 3, 4)
2. Bjanne Stroustrup,"The C++ Programming Language",3rd Edition, Addison Wesley, 2000 (Unit 1 & 5)

REFERENCES

1. Robert Lafore."Waite Groups OOP in Turbo C++",Galgotia Publications, 2001
2. Stanley, B.Lippman,Jove Lagrie,"C++Primer",3rd Edition, Addison Wesley,1998

OUTCOMES:

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

- understand object-oriented programming features in C++.
- gain some practical experience of C++.
- understand implementation issues related to object-oriented techniques.
- further develop skills in software development using a procedural language.

CAB6215 OBJECT ORIENTED PROGRAMMING LAB

L	T	P	C
0	0	5	2

OBJECTIVES:

The aim of the course is to

- 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 EXERCISES :

1. Programs using Constructor and Destructor.
2. Creation of classes and use of different types of functions.
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. Write a program using exception handling mechanism.
9. Programs using files.
10. Programs using function templates.

OUTCOMES:

On completion of this course the students will be able to

- describe the syntax and semantics of the C++ programming language
- explain the use of class and object.
- work in a team to analyze engineering problems and develop C++ programs for solving these problems.
- use the basic utilities and facilities for software development.
- debug and test software.
- develop a minor software in C++ language.

CAB6216 ALGORITHMS AND DATA STRUCTURES LAB

L	T	P	C
0	0	5	2

OBJECTIVES:

The aim of the course is to

- introduce the concept of efficiency of an algorithm
- study run-time efficiency of an algorithm
- introduce Big-O notation
- determine the Big-O of an algorithm

ALGORITHMS:

1. Apply the divide and Conquer technique to arrange a set of numbers using merge sort method.
2. Perform Strassen's matrix multiplication using divide and conquer method.
3. Solve the knapsack problem using greedy method.
4. Construct a minimum spanning tree using greedy method.
5. Construct optimal binary search trees using dynamic programming method of problem solving.
6. Find the solution for traveling salesperson problem using dynamic programming approach.
7. Perform graph traversals.
8. Implement the 8 Queens Problem using backtracking.
9. Implement knapsack problem using backtracking.
10. Find the solution of traveling salesperson problem using branch and bound technique.

DATA STRUCTURES:

1. Represent the given sparse matrix using one dimensional array and linked list.
2. Create a Stack and do the following operations using arrays and linked lists

   (i)Push (ii) Pop (iii) Peep

3. Create a Queue and do the following operations using arrays and linked lists

   (i)Add (ii) Remove

4. Implement the operations on singly linked list, doubly linked list and circular linked list.

5. Create a binary search tree and do the following traversals

   (i)In-order (ii) Pre order (iii) Post order

6. Implement the following operations on a binary search tree.

   (i) Insert a node (ii) Delete a node

7. Sort the given list of numbers using heap and quick sort.

8. Perform the following operations in a given graph

   (i) Depth first search (ii) Breadth first search

9. Find the shortest path in a given graph using Dijkstra algorithm

OUTCOMES:

On completion of this course the students will be able to:

- analyze the complexity of a given algorithm.
- apply classical sorting, searching, optimization and graph algorithms.
- compare, contrast, and choose appropriate algorithmic design techniques to present an algorithm that solves a given problem.
- develop program that implements krushkals algorithm, Binary Search, all types of sorting, prims algorithm, greedy algorithm, optimal binary search tree, Dijkstra's Algorithm, solution for n-queens problem, and program to implement traveling salesperson problem using dynamic programming.

ENB6211 COMMUNICATION SKILLS LABORATORY

L	T	P	C
0	0	2	1

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 LANGUAGE FUNDAMENTALS **3**

Tenses, Subject – Verb Agreement, Correction of Errors.

MODULE II ORAL COMMUNICATION **10**

Oral practice – Introducing oneself, Conversations, Role-play - Activities based on real life situations and professional situations such as marketing, advertising, etc. Debating on a topic, Group Discussion, Oral Presentation, Non-verbal communication, Mock Interviews, Conducting meetings, Participating in meetings- Phonetics- Correct Pronunciation.

MODULE III WRITTEN COMMUNICATION **6**

Writing a letter of application with resume- practical training- calling for quotations – placing an order – letter of complaint, Memoranda, Writing an email, Minutes - Report Writing - Project report - Writing a proposal.

MODULE IV LANGUAGE LABORATORY **6**

Language fundamental practices - Listening Comprehension, Reading Comprehension, Listening to correct pronunciation , Accent, Viewing models of Presentations, Interviews, Group Discussions in the language lab and practice in the class room.

Total Hours: 25

REFERENCES:

1. A.J.Thomson & A.V. Martinet, "A Practical English Grammar" Oxford University Press, 1999.
2. Andrea J. Rutherford, "Basic Communication Skills for Technology", second edition, Pearson Education, 2007.
3. P.K.Dutt, G. Rajeevan and C. L. N. Prakash, " A Course in Communication Skills", Cambridge University Press, India 2007.
4. Krishna Mohan and Meera Banerjee, " Developing Communication Skills " Macmillan India Ltd. (reprinted 1994-2007.)
5. Riordan, Pauley, "Report Writing Today" , AIT B.S. Publisher, New Delhi(2000)
6. Gerson, Sharon, Steve m. Gerson, "Technical Writing: Process and Product", Pearson Education, New Delhi(2004).
7. R.K. Bansal, J.P. Harrison, "Spoken English", Orient Longman , Mumbai(1999)
8. Grant Taylor, "English Conversation Practice"Tata MCGraw Hill, New Delhi(1997).

OUTCOMES:

This lab 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.
- Face interviews.
- Write project/research reports/technical reports.
- 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 – III

		L	T	P	C
CAB7101	**INTERNET AND JAVA PROGRAMMING**	**3**	**0**	**0**	**3**

OBJECTIVES:

The aims of this course are to

- learn basic internet concepts, fighting against spam, conferencing on the internet, planning and creating website.
- 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 performs 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.
- work with collection of API and develop fast programs.

MODULE I BASIC INTERNET CONCEPTS 8

Connecting to the Internet – Domain Name System - Exchanging E-mail – Sending and Receiving Files - Fighting Spam, Sorting Mail and avoiding e-mail viruses – Chatting and Conferencing on the Internet – Online Chatting - Messaging – Usenet Newsgroup – Internet Relay chat (IRC) – Instant Messaging - Voice and Video Conferencing.

MODULE II WORLD WIDE WEB 8

Overview – Web Security, Privacy, and site-blocking – Audio and Video on the web – Creating and Maintaining the Web – Web site creation concepts – Web Page Editors – Optimizing Web Graphics – Web Audio Files – Forms, Interactivity, and Database-Driven Web sites – File Transfer and downloading – FTP – Peer to Peer – Downloading and Installing software.

MODULE III JAVA FUNDAMENTALS 8

Java features – Java Platform – Java Fundamentals – Expressions, Operators, and Control Structures – Classes, Packages and Interfaces – Exception Handling.

MODULE IV PACKAGES **12**

AWT package – Layouts – Containers – Event Package – Event Model – Painting – Garbage Collection - Multithreading – Language Packages.

MODULE V ADVANCED JAVA PROGRAMMING **9**

Utility Packages – Input Output Packages – Inner Classes – Java Database Connectivity - Servlets - RMI – Java Beans.

Total Hours : 45

TEXT BOOKS :

1. Margaret Levine Young, “Internet and WWW”, 2nd Edition, Tata McGraw Hill, 2002. (Unit 1 & 2)

2. Herbert Schildt, The Complete Reference – Java 2 , 4th Edition, Tata McGraw Hill, 2001. (Unit 3, 4 & 5)

REFERENCES :

1. Keyur shah, “Gateway to Java Programmer Sun Certification”, Tata Mc Graw Hill 2002.

2. Deitel & Deitel, Java How to Program, Prentice Hall 1999.

OUTCOMES:

On completion of this course the students will be able to

- develop Java computer programs that perform various problem-solving algorithms.
- improve the programming skills in Object Oriented language.
- graphics programming and Internet Programming skills are developed.

CAB7102	COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

The goal of this course is to

- provide complete guidelines for theoretical and practical usage of computer graphics and multimedia.
- provide students with an overview of the key concepts of digital production of animation and visual effects with reference to workflow, people and technology.
- enable students to be practically sound in area of 2D, 3D and animation.

MODULE I INTRODUCTION 9

Overview of Graphics System - Bresenham technique – Line Drawing and Circle Drawing Algorithms - DDA - Line Clipping - Text Clipping.

MODULE II 2D TRANSFORMATIONS 9

Two dimensional transformations – Scaling and Rotations - Interactive Input methods - Polygons - Splines – Bezier Curves - Window view port mapping transformation.

MODULE III 3D TRANSFORMATIONS 9

3D Concepts - Projections – Parallel Projection - Perspective Projection – Visible Surface Detection Methods - Visualization and polygon rendering – Color models – XYZ-RGB-YIQ-CMY-HSV Models - animation – Key Frame systems - General animation functions - morphing.

MODULE IV OVERVIEW OF MULTIMEDIA 9

Multimedia hardware & software - Components of multimedia – Text, Image – Graphics – Audio – Video – Animation – Authoring.

MODULE V MULTIMEDIA SYSTEMS AND APPLICATIONS 9

Multimedia communication systems – Data base systems – Synchronization Issues – Presentation requirements – Applications – Video conferencing – Virtual reality – Interactive video – video on demand

Total Hours: 45

TEXT BOOKS :

1. Hearn D and Baker M.P, “Computer graphics – C Version”, 2nd Edition, Pearson Education, 2004(unit 1, 2 &3)

2. Ralf Steinmetz, Klara steinmetz, “Multimedia Computing, Communications and Applications”, Pearson education, 2004(unit 4 & 5)

REFERENCES :

1. Siamon J. Gibbs and Dionysios C. Tsichritzis, “Multimedia programming”, Addison Wesley, 1995.

2. John Villamil, Casanova and Leony Fernanadez, Eliar, “Multimedia Graphics”, PHI, 1998.

OUTCOMES:

On completion of this course,

- the students will attain the complete knowledge in graphics & multimedia domain.
- students can show their proficiency while working with Graphics and multimedia software’s and tools.

CAB7103 MICROPROCESSORS AND APPLICATIONS

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of this course is to

- introduce features and technology of microprocessor based systems, gain assembly language programming, interfacing of memory and peripheral devices and gain knowledge about the architecture, instruction set, programming, addressing mode interfacing and applications of INTEL 8085, INTEL 8086 and INTEL 80386.

MODULE I INTRODUCTION TO 8085 MICRO PROCESSOR 9

Evolution of the Microprocessor - INTEL 8085- Introduction- Register Architecture - Memory Addressing - 8085 Addressing Modes -8085 Instruction Set -Timing Methods 8085 Pins and Signals -8085 Instruction Timing and Execution –Interrupts-DMA- Serial port-8085 Based System Design

MODULE II INTRODUCTION TO 8086 MICROPROCESSOR 9

Introduction -8086 Architecture -8086 Addressing Modes -8086 Instruction Set –Data Movement Instructions Arithmetic and Logic Instructions - Program Control Instructions

MODULE III 8086 MICROPROCESSOR INTERFACING 9

System Design Using 8086- Basic System concepts-Bus Cycle - Address and data bus concepts- interfacing with memories-RAM - EPROM - DRAMs - Programmed I/O : 8086-Based Microcomputer.

MODULE IV 80386 AND PENTIUM MICRO PROCESSORS 9

Introduction to Intel 80386- Basic Programming model - Memory Organisation - I/O Space - 80386 pins and signals- Bus transfer techniques - 80386 Modes – Introduction to Intel Pentium Microprocessor: Block diagram and Registers.

MODULE V PERIPHERAL INTERFACING 9

Keyboard Display Interface-Hex key and display interface to 8085, 8279 Keyboard display controller chip- Printer Interface: LR 7040 Printer interface

using 8295 printer controller-CRT controller interface: CRT Fundamentals, 8275 CRT Controller- Coprocessors.

Total Hours: 45

TEXT BOOK:

1. Mohamed Rafiquzzaman "Introduction to Microprocessors and Microcomputer- Based System Design" 2nd edition, CRC Press,1995.

REFERENCES:

1. Walter A.Triebel, Avtar Singh, "the 8088and8086 Microprocessors Programming, Interfacing, Software, Hardware and Applications", Prentice Hall of India Pvt. Ltd., 2002.
2. Barry B.Brey, "The INTEL microprocessors 8086/8088, 80186, 80286, 80386 and 80486 Architecture, Programming and Interfacing," Prentice Hall of India, 2001.

OUTCOMES:

Upon completion of this course the student shall be able to understand and do the following

- Develop a program in assembly language for the INTEL 8085 and INTEL 8086.
- Design interfacing logic to connect external devices to microprocessor.
- Design and develop a microprocessor based system for specific applications.

CAB7104 DISTRIBUTED COMPUTING

L	T	P	C
3	0	0	3

OBJECTIVES:

The students will be able to learn

- Architecture Models of Distributed Computing
- Communication among various protocols
- Distributed File Systems
- Basics of Cloud Computing

MODULE I INTRODUCTION **9**

Introduction to distributed systems-examples of distributed systems-Characteristics-goals-Hardware and Software concepts-Design Issues-Resource Sharing and the web-Challenges: System Models: Introduction, Architectural Model, Fundamental Models and Client Server Models.

MODULE II INTERPROCESS COMMUNICATION **9**

Interprocess Communication: Message oriented communication, Stream oriented communication: Layered Protocols: Lower-level, Transport Level and Higher Level protocols-Distributed Objects: RPC and LRPC, RMI, Events and Notifications.

MODULE III DISTRIBUTED FILE SYSTEMS **9**

Distributed File Systems-CODA,SUN NFS :Naming Services: Name entities, Locating Mobile Entities, Removing unreferenced entities: Case Studies: DNS Directory, Global Name Service, X.500 DS Synchronization-Clock Synchronization, Logical clocks, global state.

MODULE IV FAULT TOLERANCE **9**

Fault Tolerance: Process resilience, Reliable Client Server Communication, Reliable group Communication, Distributed Commit and Recovery.

MODULE V CLOUD COMPUTING **9**

Cloud computing – Introduction - Cloud Architecture - Cloud storage - Advantages & disadvantages-Cloud services.

Total Hours: 45

REFERENCES:

1. Shehal Kamalapur, Mrs.Neeta Deshpand Distributed Systems, Technical Publication, 2009

2. Michael Miller, "Cloud Computing: Web – Based Applications that change the way you look and Collaborate Online", Que publishing, 2008.

OUTCOMES:

The student will have

- Knowledge about the various protocols and communication in distributed systems
- Distributed File systems.

CAB7105	JAVA PROGRAMMING AND GRAPHICS & MULTIMEDIA LAB	L	T	P	C
		0	0	5	2

OBJECTIVES:

The aims of the course are

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

JAVA PROGRAMMING:

1. Program to illustrate the use of overloading and overriding.
2. Program to implement the concept of inheritance
3. Program to illustrate the use of multi threading
4. Program to implement the concept of Interfaces and packages.
5. Generate the program using exceptions handling mechanism..
6. Implement the file operations.
7. Program using Applets.
8. Program using JDBC.

GRAPHICS AND MULTIMEDIA:

1. Write a Java program for Line drawing using Bresenham, DDA Line Drawing Algorithms.
2. Write a Java program for Circle Drawing using Bresenham Circle Drawing Algorithms.
3. Write a Java program for Line Clipping using Cohen-Sutherland Line clipping algorithm.
4. Write a Java program for 2D and 3D Transformations like Translations and Scaling and Rotations.
5. Create Frame by Frame Animations using multimedia authoring tools.

6. Develop a presentation for a product using techniques like Guide Layer, masking and onion Skin using authoring tools.

7. Create a JPEG image which demonstrates the various features of an image editing tool.

OUTCOMES:

On completion of this course

- the programming skill of students in object oriented language especially in java gets improved and they become a good internet programmer.
- they will be able to utilize the advance features of Java technology.
- they will be able to work with collection of API and develop fast programs.
- they will be able to develop good multithreaded programs.

CAB7106	MICROPROCESSORS LAB	L	T	P	C
		0	0	5	2

OBJECTIVES:

- The aim of this course is to provide students with enough knowledge in the fundamentals of Microprocessors, to learn programming in assembly language and to use Interfaces with Microprocessor.

LIST OF EXERCISES :

1. Write an assembly language program to perform arithmetic operations on block of data using Hexadecimal numbers.
2. Write an assembly language program to perform arithmetic operations on block of data using BCD numbers.
3. Write an assembly language program to perform byte and string manipulation.
4. Write an assembly language program to interface Programmable Peripheral Interface.
5. Write an assembly language program to interface Programmable Timer.
6. Write an assembly language program to interface Programmable Communication Interface.
7. Write an assembly language program to interface Keyboard/Display Controller.
8. Write a program to Perform Power on Self Test.
9. Write a program for floppy disk trouble shooting.
10. Write a program for printer trouble shooting.

OUTCOMES:

On completion of the course, students will be able to

- attain knowledge in Microprocessors
- program in assembly language efficiently
- make effective use of microprocessors in various applications
- utilize various Interfaces along with Microprocessor

CAB7107	SOFT SKILLS	L	T	P	C
		0	0	2	1

OBJECTIVES:

This course is intended to provide

- attitude Control and Quick Personal Self Esteem Improvement
- interview Motivation and Developing Personal Confidence using NLP
- effective Answering and Maintaining Fluent Communication
- positive Body Language
- effective Resume Creation
- leadership Skills, Team Player Skills and Career Plan to HR

MODULE I MOTIVATION **5**

Awareness of Real World Industry and Situations - Conscious Self-Awareness - Practical Visualizations - Neuro- Linguistic Programming Basics - Developing Self Esteem and Self Motivation - Confident Goal Setting - Positive Attitude Development and Positive Thinking - Developing Inner Achievement Mindset.

MODULE II 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 III 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 IV EFFECTIVE COMMUNICATION II **5**

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

Total Hours: 18

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
- Interviews: Handling Pressure

SEMESTER – IV

CAB7211 OBJECT ORIENTED ANALYSIS AND DESIGN

L	T	P	C
3	0	0	3

OBJECTIVES:

The objective of this course is to

- enhance correct way to do object-orientation.
- explores the basic code qualities of cohesion, coupling, redundancy, testability, readability, encapsulation and dispersion.

MODULE I INTRODUCTION **9**

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle.

MODULE II METHODOLOGY AND UML **9**

Introduction – Survey – Rumbugh, Booch, Jacobson methods – Patterns – Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

MODULE III OBJECT ORIENTED ANALYSIS **9**

Identifying Usecase – Business object analysis – Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility

MODULE IV OBJECT ORIENTED DESIGN **9**

Design process – Axions – Cololllaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface.

MODULE V SOFTWARE QUALITY **9**

Quality assurance – Testing strategies – Object orientation testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction testing.

Total Hours: 45

TEXT BOOK :

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 1999.

REFERENCES:

1. Craig Larman, Applying UML and Patterns, 2nd Edition, Pearson, 2002.
2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Long man, 1999.
3. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004

OUTCOMES:

By the end of this course students will be able to

- analyze software requirements and document those using Use Cases.
- perform software analysis and record the results using UML notation.
- perform software design and record the results using UML notation.
- apply object-oriented patterns.
- discuss how object-oriented software development affects testing and quality.

CAB7212 WEB DESIGN AND DEVELOPMENT

L	T	P	C
3	0	0	3

OBJECTIVES:

- Students will get an introduction about various Scripting Languages.
- Students will be provided with an up-to-date survey of developments in Web Technologies.
- Enable the students to know techniques involved to support real-time Software development.
- To make the students to create interactive animations using Flash.
- Students will attain knowledge in HTML5 and CSS3.

MODULE I INTRODUCTION **9**

History of the Internet and World Wide Web-Web essentials-clients-servers-communications-markup languages-web pages types and issues- Web page design and site building – Client Side Scripting and Server Side Scripting-Domains and Hosting- Static Website Designing, Dynamic Websites and WebApps- Web Standards and W3C recommendations.

MODULE II CASCADING STYLE SHEET 3 **9**

The need of dynamic web pages; an overview of DHTML, cascading style sheet (css), comparative studies of different technologies of dynamic page creation – Understanding CSS Transitions -colors and backgrounds-Fonts-text-Links-gradients- transforming the messages-enriching forms-creating different css3 Box shadows effects.

MODULE III HTML 5 **9**

A brief history of markup-Design of HTML5-Rich media-attributes-events-Web Forms 2.0-Semantics-HTML5 for web designers- HTML5 web storage-HTML5 web SQL-HTML5 canvas-audio-video-Geolocation.

MODULE IV MULTIMEDIA **9**

Bitmaps- vector graphics-Creating clippings –frame rate-resolution- Animations with sound effects – Adding audio or Video – Windows Media Player ActiveX Control – Agent control – Real Player ActiveX control-creating website with particular theme using all the utilities-animations and interaction.

MODULE V JAVASCRIPT AND JQUERY 9

Introduction to java script-variables-functions-if conditions-loops-element selector-events-Java Script design patterns-Using jQuery UI-jQuery fundamentals-Design patterns in jQuery-Ajax,JSON and API essentials-jQuery mobile essentials.

Total Hours: 45

TEXT BOOKS:

1. Aferganatel, “Web Programming: Desktop Management”, PHI, 2004
2. Dan Cederholm, “CSS3 for Web Designers”,2010.
3. Jeremy Keith, “HTML5 for Web Designers” ,2010.
4. James L. Mohles, Flash 5.0 Graphics, Animation & Interaction, Macromedia 2000.
5. Robert Reinhardt, Jon Warren Lentz ,”Flash 5 Bible”, Hungry Minds Inc, 2001.
6. Addy Osmani, “Essential JavaScript & JQuery Design Patterns”
7. Murach’s ,“JavaScript and jQuery”, 2012.

REFERENCES:

1. Web Technologies - Godbole A. S. & Kahate A., TMH.
2. Professional Java Server Programming-Allamaraju et al WROX

OUTCOMES:

After learning this course, students are able to

- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Styles sheets.
- Build dynamic web pages using JavaScript (client side programming).
- Build interactive web applications using flash.

CAB7213 UNIX AND NETWORK PROGRAMMING L T P C
3 0 0 3

OBJECTIVES:

The main objective of this course is to

- learn and get familiar with the UNIX operating system and UNIX process environment. The creation, communication and execution of process are studied with well defined examples through this course.

MODULE I INTRODUCTION & FILE SYSTEM 9

Overview of UNIX OS - File I/O – File Descriptors – File sharing - Files and directories – File types - File access permissions – File systems – Symbolic links - Standard I/O library – Streams and file objects – Buffering - System data files and information - Password file – Group file – Login accounting – system identification.

MODULE II PROCESSES 9

Environment of a UNIX process – Process termination – command line arguments - Process control – Process identifiers - Process relationships terminal logins – Signals -threads.

MODULE III INTERPROCESS COMMUNICATION 9

Introduction - Message passing (SVR4)- pipes – FIFO – message queues - Synchronization (SVR4) – Mutexes – condition variables – read – write locks – file locking – record locking – semaphores –Shared memory (SVR4).

MODULE IV SOCKETS 9

Introduction – transport layer – socket introduction - TCP sockets – UDP sockets - raw sockets – Socket options - I/O multiplexing - Name and address conversions.

MODULE V APPLICATIONS 9

Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat.

Total Hours: 45

TEXT BOOKS :

1. W.Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 1999.(Unit 1,2 &3)

2. W. Stevens, Bill Fenner, Andrew Rudoff, "Unix Network Programming",Volume 1,The Sockets Networking API,3rd Edition, Pearson education, Nov 2003.(unit 4 & 5)

REFERENCE BOOK :

1. Meeta Gandhi,Tilak Shetty and Rajiv Shah – The 'C' Odyssey Unix –The open Boundless C ,1st Edition ,BPB Publications1992.

OUTCOMES:

On completion of this course,

- the students will attain the complete knowledge in network communication in UNIX platform.
- different types of networking and their functionality will be understood by the students.
- students get the broad knowledge on network details of a system which is configured as UNIX supported components.

CAB7214 XML AND WEB SERVICES L T P C
3 0 0 3

OBJECTIVES:

The aim of this course is to

- describe the role of SOAP in building web services, the basics of the SOAP protocol, and the structure of a SOAP document.
- explain the role of WSDL and UDDI in building web services and be familiar with their usage.
- design a .NET web service, taking advanced design considerations into account.
- design and deploy .NET web services.
- explain the use of UDDI registries and WSDL in creating web-services clients.
- design a web service using Microsoft .NET.

MODULE I INTRODUCTION 9

Role Of XML – XML and The Web – XML Language Basics – SOAP – Web Services – Revolutions Of XML – Service Oriented Architecture (SOA).

MODULE II XML TECHNOLOGY 9

XML – Name Spaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation – XML Infrastructure.

MODULE III SOAP 9

Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments.

MODULE IV WEB SERVICES 9

Overview – Architecture – Key Technologies - UDDI – WSDL – ebXML – SOAP And Web Services In E-Com – Overview of .NET And J2EE.

MODULE V XML SECURITY 9

Security Overview – Canonicalization – XML Security Framework – XML

Encryption – XML Digital Signature – XKMS Structure – Guidelines For Signing XML Documents – XML In Practice.

Total Hours: 45

TEXT BOOK:

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

REFERENCES:

1. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.

2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.

3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.

OUTCOMES:

Students will learn:

- the role of web services in commercial applications.
- the principles of web service provision.
- use of Java for implementing web services.
- use of BPEL (Business Process Execution Logic) and WSDL (Web Service Description Language) for implementing web services.

CAB7215 UNIX AND NETWORK PROGRAMMING LAB

L	T	P	C
0	0	5	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 EXERCISES :

1. Program using basic network commands
2. Program using system calls : create, open, read, write, close, stat, fstat, lseek
3. Program to implement inter process communication using pipes
4. Program to perform inter process communication using message queues
5. Program to perform inter process communication using shared memory
6. Program to perform synchronization using semaphores
7. Program to capture packets : sniffer
8. Program using TCP sockets (Client and Server)
9. Program using UDP sockets (Client and Server)
10. Program using URL class to download webpages

OUTCOMES:

On completion of this course,

- basic UNIX commands their syntax and purpose can be well understood by the students.
- the students will attain the hands on experience in working with Red hat Linux.
- the inter-process communication concepts were implemented practically by the students.
- different types of networking and their functionality is understood by the students.
- students get the practical knowledge on network details of a system which is configured as UNIX supported components.

CAB7216	XML AND WEB SERVICES LAB	L	T	P	C
		0	0	5	2

OBJECTIVES:

The aim of the course is

- to provide the knowledge necessary to build and validate XML.
- to with XML being a core technology in Web Services, this will give students a background in the underlying technologies.
- to cover the basics of XML, Schemas, WSDL, and Web Services concepts.

LIST OF EXERCISES :

1. Create an XML document to store an address book.
2. Create an XML document to store information about books and create the DTD files.
3. Create an XML schema for the book's XML document from exercise 2.
4. Create an XML document to store resumes for a job web site and create the DTD file
5. Present the book's XML document using cascading style sheets (CSS).
6. Write an XSLT program to extract book titles, authors, publications, book rating from the book's XML document and use formatting.
7. Use Microsoft DOM to navigate and extract information from the book's XML document.
8. Use Microsoft DSO to connect HTML form or VB form to the book's XML document and display the information.
9. Create a web service for temperature conversion with appropriate client program.
10. Create a web service for currency conversion (at five currencies) with appropriate client program.

OUTCOMES:

On completion of this course, students will be able to

- build effective XML documents.

- build DTD documents to validate XML.
- build Schema documents to validate XML.
- describe services using WSDL.
- build and consume Web services.
- understand the role of web services in commercial applications.
- understand the principles of web service provision.
- understand the use of Java for implementing web services.

SEMESTER – V

MSB8101 ORGANIZATIONAL BEHAVIOUR

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of the course is

- to enable the students to understand the need of Organizational Behaviour in technical environment
- to explain concepts, principles and techniques relating to different functional areas of Organizational Behaviour
- to make the students to understand the need for applying the concepts of Organizational Behaviour to improve the overall performance.

MODULE I LEADERSHIP **9**

Technical Leadership - Leader's Goal, Conviction, Vision - Transformational and Transactional Leadership - Leader's Vision - Professionalism : Importance, Elements - Managing Awareness - Performance - Manager's Role in Professionalism.

MODULE II MANAGING TECHNICAL AND PROFESSIONAL PEOPLE **9**

Goals of Engineers and Scientists - Work Assignment - Need for Influence - Professional Career and Goals - Age and Creativity - Performance - Motivation - Employee Partnership - Career Risks - Technical Competence - Professional Discipline - Manager's Role in Professional Discipline - Guidelines.

MODULE III IDENTIFICATION AND DEVELOPMENT OF TALENTED PEOPLE **9**

Talented Professionals – Importance - Characterization - Identification – Assessment and Recognizing Talent - Development - Development Needs - Counseling.

MODULE IV INNOVATION **9**

The Importance of Innovation - Risk of Failure - Nature of Creativity - Imagination - Managing Innovative Teams - Needs of Creative Teams - Team Dynamics - A Software Development Example - Manager's Responsibility - Team's Personal Needs - Political versus Technical Solutions - Team Synergism.

MODULE V TEAM ENVIRONMENT AND RECOGNITION 9

Innovative Team Environment -Award Programs - Recognition Programs - An Example Award Plan - Industry Award Plans - Award Guidelines - Incentive Plans - A Caution on Recognition Programs

Total Hours: 45

TEXT BOOK:

1. Watts S. Humphrey, "Managing Technical People: Innovation, Teamwork, and the Software Process", Addison-Wesley, 1996.

REFERENCES:

1. Saiyadain, M.S. Organizational Behaviour, 2009, Tata McGraw Hill.

2. Prasad C.M, Organizational Behaviour, 2002, Publisher: Sultan Chand and Sons.

OUTCOME:

- Students would be encouraged to work in team and also to lead and come up with more innovative ideas.

CAB8101 MIDDLEWARE TECHNOLOGIES L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is to learn

- the fundamentals of three tier architecture
- about the Client/Server Architecture
- about the concepts of Enterprise Java Beans
- about the concepts of ASP.Net
- about the concepts of VB.Net

MODULE I CLIENT / SERVER CONCEPTS 9

Client – Server – File Server, Database server, Group server, Object server, Web server. Middleware – General middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

MODULE II EJB ARCHITECTURE 9

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and Deploying EJBs – Roles in EJB.

MODULE III EJB APPLICATIONS 9

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

MODULE IV ASP.NET 9

Basics of HTML - Introduction to Microsoft Visual Studio 2005 API - Overview of the .NET 2.0 Framework - Language Primer - Understanding Web Form Pages - Form Validation - Building Business Components - Building User Controls - Designing Web Sites with Master Pages - Adding Standard Navigation Elements - Securing ASP.NET 2.0 Web Sites - Building Applications.

MODULE V VB.NET AND ADO.NET 9

Overview of VB.Net - Variables, Constants, Operators and Calculations - Conditions, Switches and Loops - Arrays - Structures and Enumerators - Class, Methods, Objects and Namespaces - Method overloading and Object

overloading - Delegates - Inheritance - Exception Handling - Multi-Threading - Overview of ADO.NET 2.0 - Displaying and Editing Data - Crystal Report - Building Applications.

Total Hours: 45

TEXT BOOKS :

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd., 2002. (Unit 1)

2. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002.(Unit 2 & 3)

3. Dream Tech Software Team, "ASP.Net 2.0 Black Book", Dream Tech Press, 2006. (Unit 4)

4. Jeffrey R. Shapiro, "Visual Basic.Net - Complete Reference" (Unit 5)

REFERENCE:

1. Greg Buczek,"ASP.Net Developer Guide", Tata McGraw-Hill.

OUTCOMES:

On completion of the course, the students will understand

- the basics of Client/Server Architecture.
- the role played by EJB in developing different types of applications.
- importance of .Net Framework.
- the basics of ASP.

CAB8102 MIDDLEWARE LAB

L	T	P	C
0	0	6	3

OBJECTIVES:

The aim of the course is

- to explain the main principles of component technology,
- to explain how Object-Oriented middleware can be used for parallel and distributed programming,
- to state and detail how Object-Oriented middleware, together with components turn out to be very effective for the Grid.

LIST OF EXERCISES :

1. Create a distributed application to download various files from various servers using RMI
2. Create a Java Bean to draw various graphical shapes and display it using or without using BDK
3. Develop an Enterprise Java Bean for Banking operations
4. Develop an Enterprise Java Bean for Library operations
5. Create an Active-X control for File operations
6. Develop a middleware component for retrieving Stock Market Exchange information using .NET
7. Develop a middleware component for retrieving Weather Forecast information using .NET
8. Develop a component for converting the currency values using VB.NET
9. Develop a component for encryption and decryption using VB.NET
10. Develop a component for retrieving employee information from a Database Table (Oracle or Access) using VB.NET and ADO.NET

OUTCOMES:

On completion of the course, students will have

- ability to bring together resources across dissimilar networks or computing platforms.
- ability to develop an independent programming interface without Application Programme Interface (API)

ELECTIVES

CABY01 MANAGEMENT INFORMATION SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of the course is

- to understand the basic principles of how the information system support the management in the various arena in the business units. MIS is the basic necessity of organization and encompasses all decisions in life, more particularly, business decisions and implementation.
- to provide an understanding of the Information Systems (IS) management framework of E-business.
- to focus on best practices, tools and models to implement an effective management system
- to provide insights on how to develop and implement enterprise-wide IT strategies, initiatives and programs
- to explore MIS subsystems and technologies including hardware, software and networking.

MODULE I SYSTEM CONCEPTS **7**

Definition – Computer based user machine system – Integrated system – Need for a database – Utilization of models – Evolution – Subsystems – Organizational subsystems – Activities subsystems.

MODULE II ORGANIZATIONAL STRUCTURE **9**

Basic model – Hierarchical – Specialization – Formalization – Centralization – Modifications of basic organizational structure – Project organization – Lateral relations – Matrix organization – Organizational culture and power organizational change

MODULE III STRUCTURE OF MIS **10**

Operating elements – Physical components – Processing functions – Outputs – MIS support for decision making – Structured programmable decisions – Unstructured non-programmable decisions – MIS structure based on management activity and organizational functions – Synthesis of MIS structure

MODULE IV SYSTEM SUPPORT **10**

Data representation – Communication network – Distributed systems – Logical data concepts – Physical storage devices – File organizations – Data base organization – Transaction processing.

MODULE V DEVELOPMENT AND MANAGEMENT **9**

A contingency approach to choosing an application – Developing strategy – Lifecycle definition stage – Lifecycle development stage – Lifecycle installation and operation stage – Project management.

Total Hours: 45

TEXT BOOK:

1. Gordon B. Davis, Margrethe H. Olson, Management Information Systems: Conceptual foundations, Structure and development –2nd Edition – Tata-Mc Graw hill International book company, 2000.

REFERENCES :

1. E.Wainright Martin, Carol V. Brown, Danial W. DeHayes, Jeffrey A. Hoffer, William C. Perkins, "Managing Information Technology" 3rd Edition, Prentice Hall International edition 1999.
2. Harold Koontz, Heinz Weihrich, "Essentials of Management", 5th Edition, Tata McGraw Hill 1998.

OUTCOMES:

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

- become familiar with critical-thinking skills in identifying information systems problems and how to investigate existing literature about hardware and software solutions to problems.
- become familiar with the advances in networking, data communications and the Internet and how they affect the way business is conducted.
- identify which information technology tools are used to solve various business problems.

CABY02 **E - COMMERCE** **L T P C**
3 0 0 3

OBJECTIVES:

The aim of this course is to make the students understand

- the scope of E-Commerce in the realm of modern business.
- the technologies used to develop and deliver E-Commerce applications.
- the marketing methods used in E-Commerce
- the legal and regulatory framework in which e-commerce must operate.

MODULE I INTRODUCTION **6**

Networks and Commercial Transactions - Internet and Other Novelties - Electronic Transactions Today - Commercial Transactions - Establishing Trust - Internet Environment - Internet Advantage - World Wide Web.

MODULE II SECURITY TECHNOLOGIES **9**

Why Internet Is Unsecure - Internet Security Holes - Cryptography : Objective - Codes and Ciphers - Breaking Encryption Schemes - Data Encryption Standard - Trusted Key Distribution and Verification - Cryptographic Applications - Encryption - Digital Signature - Nonrepudiation and Message Integrity.

MODULE III ELECTRONIC PAYMENT METHODS **9**

Traditional Transactions : Updating - Offline and Online Transactions - Secure Web Servers - Required Facilities - Digital Currencies and Payment Systems - Protocols for the Public Transport - Security Protocols - SET - Credit Card Business Basics.

MODULE IV ELECTRONIC COMMERCE PROVIDERS **9**

Online Commerce Options - Functions and Features - Payment Systems : Electronic, Digital and Virtual Internet Payment System - Account Setup and Costs - Virtual Transaction Process - InfoHaus - Security Considerations – Cyber Cash: Model - Security - Customer Protection - Client Application - Selling through Cyber Cash.

MODULE V ONLINE COMMERCE ENVIRONMENTS 12

Servers and Commercial Environments - Payment Methods - Server Market Orientation - Netscape Commerce Server - Microsoft Internet Servers - Digital Currencies - DigiCash-Using Ecash - Ecash Client Software and Implementation - Smart Cards - The Chip - Electronic Data Interchange - Internet Strategies, Techniques and Tools.

Total Hours: 45

TEXT BOOK:

1. Pete Loshin, “Electronic Commerce”, 4th Edition, Firewall media, An imprint of laxmi publications Pvt. Ltd., New Delhi, 2004.

REFERENCES :

1. Jeffrey F.Rayport and Bernard J. Jaworski, “Introduction to E-Commerce”, 2nd Edition, Tata Mc-Graw Hill Pvt., Ltd., 2003.

2. Greenstein, “Electronic Commerce”, Tata Mc-Graw Hill Pvt., Ltd., 2000.

OUTCOMES:

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

- understand E-Commerce concepts and terminology
- process management decisions that are involved in launching, operating and managing business activity on the World Wide Web.
- become familiar with important business, legal issues.

CABY03 ADVANCED DATABASES L T P C
3 0 0 3

OBJECTIVES:

The aim of this course is to make the students to

- use concepts and DBMS features learned previously
- be familiar with data modeling and able to apply the techniques to medium-complexity problems
- be proficient with basic SQL and familiar with advanced usage
- be exposed to database administration
- be familiar with OBDC and Web site use of databases

MODULE I RELATIONAL DATABASES 9

Relational Model - Querying - Storage Structures - Query Processing - Normalization.

MODULE II OBJECT ORIENTED DATABASES 9

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence - Transaction - Concurrency - Recovery - Database Administration.

MODULE III EMERGING SYSTEMS 9

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases.

MODULE IV CURRENT ISSUES 9

Rules - Knowledge Bases - Active and Deductive Databases - Distributed Databases and Parallel databases.

MODULE V DATABASE DESIGN ISSUES 9

Security - Integrity - Consistency - Database Tuning - Optimization and Research Issues.

Total Hours: 45

TEXT BOOK :

1. R. Elmasri and S.B. Navathe, Fundamentals of Database Systems, Addison Wesley, 2000.\

REFERENCES :

1. Gary W. Hanson and James V. Hanson, Database Management and Design, Prentice Hall of India Pvt Ltd, 1999.

2. Alex Benson, Stephen Smith and Kurt Thearling, Building Data Mining Applications for CRM, Tata McGraw-Hill, 2000.

OUTCOMES:

On successful completion of this course, students will:

- discuss the concepts of transaction management.
- be able to design high-quality relational databases and database applications.
- have developed skills in advanced visual & conceptual modeling and database design.
- be able to translate complex conceptual data models into logical and physical database designs.

CABY04 DIGITAL IMAGE PROCESSING

L	T	P	C
3	0	0	3

OBJECTIVES:

The objectives of this course are to

- cover the basic theory and algorithms that are widely used in digital image processing
- expose students to current technologies and issues that are specific to image processing systems
- develop hands-on experience in using computers to process images
- develop critical thinking about shortcomings of the state of the art in image processing

MODULE I DIGITAL IMAGE FUNDAMENTALS 9

Image formation, Image transforms – fourier transforms, Walsh, Hadamard, Discrete cosine, Hotelling transforms.

MODULE II IMAGE ENHANCEMENT & RESTORATION 9

Histogram modification techniques - Image smoothening - Image Sharpening - Image Restoration - Degradation Model – Noise models - Spatial filtering – Frequency domain filtering.

MODULE III IMAGE COMPRESSION & SEGMENTATION 9

Compression Models - Elements of information theory - Error free Compression -Image segmentation –Detection of discontinuities - Edge linking and boundary detection - Thresholding – Region based segmentation - Morphology.

MODULE IV REPRESENTATION AND DESCRIPTION 9

Representation schemes- Boundary descriptors- Regional descriptors - Relational Descriptors.

MODULE V OBJECT RECOGNITION AND INTERPRETATION 9

Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

Total Hours: 45

TEXT BOOK :

1. Gonzalez.R.C & Woods. R.E., Digital Image Processing, II Ed., Pearson Education, 2002.

REFERENCES :

1. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.

2. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.

OUTCOMES:

The student will attain the following outcomes:

- understand the frequency domain description of discrete-time image processing
- understand the design & specification of multi-dimensional digital filters for image processing applications
- gain proficiency in using simulation and design software tools, such as those found in Matlab

CABY05 TCP/IP PROTOCOL SUITE L T P C
3 0 0 3

OBJECTIVES:

To provide the skills necessary for the students to

- design, build and test a small TCP/IP Network, comprising of three subnetworks and two routers.
- to trace and rectify faults on the network.

MODULE I INTRODUCTION 10

Standards – Internet – History- OSI model – Protocol suite – Addressing – Transmission media – Local Area and Wide Area Networks – Switching – Connecting devices – IP addressing

MODULE II INTERNET PROTOCOL 10

Subnetting – Supernetting – IP packets – Delivery – Routing – Routing model – Routing table – Datagram – Fragmentation – Checksum – IP Design – ARP – RARP – Internet control message protocol – Internet group management protocol

MODULE III TRANSMISSION CONTROL PROTOCOL 8

User Datagram protocol – UDP operation – Use – UDP design – TCP services – Flow control – Error control – TCP operation and design – connection – Transition diagram – Congestion control

MODULE IV APPLICATION LAYER AND CLIENT SERVER MODEL 8

Concurrency – BOOTP – DHCP – Domain name system – Name space – Distribution – Resolution – Messages – Telnet – Rlogin – Network Virtual Terminal – Character Set – Controlling the server – Remote login

MODULE V APPLICATION PROTOCOLS 9

File Transfer Protocol – Connections – Communication – Simple Mail Transfer Protocol – Simple Network Management Protocol – Hyper Text Transfer Protocol – Transaction – Request and Response messages.

Total Hours: 45

TEXT BOOK :

1. Behrouz A. Forouzan, “TCP/IP Protocol Suite”, Tata McGraw Hill Edition 2000.

REFERENCE :

1. Douglas E. Comer, David L. Stevens, “Internetworking with TCP/IP – Volume I, II and III”, Prentice- Hall of India Pvt. Ltd., 2nd Edition 1994.

OUTCOMES:

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

- identify the needs and the purpose of each of the protocols at each layer
- use and configure each of the common applications used with TCP/IP
- configure a router using static routing and RIP
- examine a TCP/IP trace at all levels, and diagnose network problems

CABY06 VISUAL PROGRAMMING L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is

- to introduce the concepts of visual programming.
- to introduce GUI programming using Microsoft foundation classes.
- to enable the students to develop programs and simple application using Visual C++.

MODULE I INTRODUCTION 8

GUI Concepts – Overview of Windows programming – Creating the window - Displaying the window - message Loop – windows procedure-WM_PAINT message - WM_DESTROY message – An Introduction to GDI – Scroll Bars – Keyboard – Mouse – Menus.

MODULE II VISUAL BASIC PROGRAMMING 9

IDE – First Visual Basic Program - Introduction to Forms –Intrinsic Controls – working with Files - Accessing databases with data control - Classes and Objects – ADO Object Model.

MODULE III VISUAL C++ PROGRAMMING 9

Windows Programming Model - Visual C++ components – Microsoft foundation classes Library Application Framework – Getting Started with AppWizard – Basic Event handling, Mapping modes, and a Scrolling View - Graphics Device Interface, Colors and fonts – Modal Dialog and Windows Common Dialogs – Modeless Dialog and windows Common dialogs – Using ActiveX controls – Windows Message Processing and Multithreading.

MODULE IV ADVANCED CONCEPTS 9

Menus – Keyboard Accelerators – Rich Edit Control – Tool bars – Status bars – A reusable Frame Window Base Class - Reading and writing documents - SDI and MDI environments – splitter windows and multiple views.

MODULE V APPLICATIONS OF WINDOWS PROGRAMMING 10

Dynamic link library – Component Object Model - Object linking and embedding – Data Base Management With Microsoft ODBC.

Total Hours: 45

TEXT BOOKS:

1. Charles Petzold, "Windows Programming", Microsoft press, 1996. Chapters: 2,5,6,9,10.

2. Francesco Balena, "Programming Microsoft Visual Basic6.0", Microsoft press, Indian Reprint, 2001. Chapters: 1,2,3,5,6,13.

3. David Kruglirski.J, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 1998.

   Chapters: 1,2,3,4,5,6,7,8,12,13,14,15,17,18,20,22,24,31.

REFERENCES:

1. G.Cornell, "Visual Basic 6", Tata McGraw Hill, 1998.

2. Deitel & Deitel, T.R.Nieto, "Visual Basic 6, How to program", Prentice Hall of India, 1999.

OUTCOMES:

The student will

- demonstrate fundamental skills in utilizing the tools of a visual programming studio environment in terms of the set of available command menus and toolbars.
- solve mathematical, scientific, and business problems using visual component based programming.
- use visual programming to create simple computer games.

CABY07 MOBILE COMPUTING L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is to

- understand the basics of wireless and mobile communications.
- realize various wireless telecommunication and satellite system
- know various wireless LAN technologies like ieee 802.11, Bluetooth, etc.,
- study the issues in mobile routing and transport and also to learn the existing solutions.
- study Wireless Application layer Protocol (WAP)

MODULE I INTRODUCTION 9

Medium Access Control : Motivation for Specialized MAC- SDMA- FDMA- TDMA- CDMA- Comparison of Access mechanisms – Tele communications : GSM- DECT- TETRA – UMTS- IMT-200 – Satellite Systems: Basics- Routing- Localization- Handover- Broadcast Systems: Overview – Cyclic Repetition of Data- Digital Audio Broadcasting – Digital Video Broadcasting

MODULE II WIRELESS NETWORKS 9

Wireless LAN: Infrared Vs Radio Transmission – Infrastructure Networks- Ad hoc Networks- IEEE 802.11 – HIPERLAN – Bluetooth- Wireless ATM: Working Group- Services- Reference Model – Functions – Radio Access Layer – Handover- Location Management- Addressing Mobile Quality of Service- Access Point Control Protocol

MODULE III MOBILE NETWORK LAYER 9

Mobile IP : Goals – Assumptions and Requirement – Entities – IP packet Delivery- Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation – Optimization – Reverse Tunneling – IPv6 – DHCP- Ad hoc Networks

MODULE IV MOBILE TRANSPORT LAYER 9

Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP- Fast retransmit/ Fast Recovery- Transmission/ Timeout Freezing – Selective Retransmission- Transaction Oriented TCP

MODULE V WAP **9**

Architecture – Datagram Protocol- Transport Layer Security- Transaction Protocol- Session Protocol- Application Environment-Wireless Telephony Application.

Total Hours: 45

TEXT BOOK :

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

REFERENCES:

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

OUTCOMES:

- This course will provide the basic understanding of wireless and mobile communication.
- It will also provide coverage on wireless telecommunication technologies (GSM, DECT, TETRA, UMTS etc) and satellite systems.
- This course will deal with the basic architecture and the protocols of wireless LAN like IEEE 802.11, Hiperlan, Bluetooth, etc.

CABY08 SOFTWARE QUALITY MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

The objective of the course is to

- make students aware about the importance of the software testing during software development.

MODULE I INTRODUCTION 9

Software Process assessment overview - Assessment phases - Assessment principles - Assessment conduct -Implementation consideration - Quality management - Quality assurance plan - Considerations – Verification and Validation.

MODULE II CONFIGURATION MANAGEMENT 9

Need for configuration Management - Software product nomenclature - configuration management functions - Baselines - Responsibilities - Need for automated tools - plan – SCM support functions - The requirement phase Design control - The implementation phase - Test phase - SCM Tools - Configuration accounting and audit.

MODULE III SOFTWARE STANDARDS AND INSPECTION 9

Definitions - Reason for software standards - Benefits - Establishing standards - Guidelines - Types of reviews - Inspection of objectives - Basic inspection principles - The conduct of inspection - Inspection training.

MODULE IV TESTING AND MANAGING SOFTWARE QUALITY 9

Testing: principles - Types - Planning - Development - Execution and reporting – Tools and methods - Real Time testing - quality management paradigm - Quality motivation – Measurement criteria - Establishing a software quality program - Estimating software quality.

MODULE V DEFECT PREVENTION 9

Principles of software defect prevention - Process changes for defect prevention - Defect prevention considerations - Managements role - Framework for software process change - Managing resistance to software process change - Case studies.

Total Hours: 45

TEXT BOOK:

1. Watts S. Humphrey, Managing the software process, Addison Wesley, 1999.

REFERENCES:

1. Tsum S.Chow, Software Quality Assurance a Practical Approach, IEEE Computer Society press, 1985.

2. Richard E. Fairley, Software Engineering - A Practitioner's approach, McGraw Hill, 1982.

OUTCOMES:

On completion of the course, the student

- 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.

CABY09 DATA MINING AND DATA WAREHOUSING

L	T	P	C
3	0	0	3

OBJECTIVES:

This Course has been designed to

- provide students with enough knowledge to extract data from large databases. The different algorithms provide knowledge to the student regarding the process of Knowledge discovery & data mining which is one of the emerging fields of Information Technology.

MODULE I INTRODUCTION **9**

Relation To Statistics, Databases- Data Mining Functionalities-Steps In Data Mining Process-Architecture Of A Typical Data Mining Systems- Classification Of Data Mining Systems - Overview Of Data Mining Techniques.

MODULE II DATA PREPROCESSING AND ASSOCIATION RULES **9**

Data Preprocessing-Data Cleaning, Integration, Transformation, Reduction, Discretization Concept Hierarchies-Concept Description: Data Generalization And Summarization Based Characterization- Mining Association Rules In Large Databases.

MODULE III PREDICTIVE MODELING **9**

Classification And Prediction: Issues Regarding Classification And Prediction-Classification By Decision Tree Induction-Bayesian Classification-Other Classification Methods-Prediction-Clusters Analysis: Types of Data In Cluster Analysis- Categorization Of Major Clustering Methods: Partitioning Methods – Hierarchical Methods.

MODULE IV DATA WAREHOUSING **9**

Data Warehousing Components -Multi Dimensional Data Model- Data Warehouse Architecture-Data Warehouse Implementation- -Mapping the Data Warehouse to Multiprocessor Architecture- OLAP.-Need- Categorization of OLAP Tools.

MODULE V APPLICATIONS **9**

Applications of Data Mining-Social Impacts of Data Mining-Tools-An Introduction To DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases.

Total Hours: 45

TEXT BOOK:

1. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

REFERENCES:

1. Alex Berson,Stephen J. Smith, “Data Warehousing, Data Mining,& OLAP”, Tata McGraw- Hill, 2004.

2. Usama M.Fayyad, Gregory Piatetsky - Shapiro, Padhrai Smyth And Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.I.T Press, 1996.

3. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.

4. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

OUTCOMES:

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

- make more effective use of data stored in databases.
- create a clean, consistent repository of data within a data warehouse.
- discover patterns and knowledge that is embedded in the data using several different techniques, such as neural nets, decision trees and statistical techniques.

CABY010 COMPONENT BASED TECHNOLOGY

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of the course is

- to introduce the fundamental properties of components, technology and architecture and middleware.
- to give exposure to java based component technologies
- to impart knowledge on component technologies such as CORBA, ORB and application server.
- to introduce COM, DCOM and .NET technologies.
- to impart knowledge in component frameworks and development.

MODULE I INTRODUCTION **8**

Definition - Industrialization of software development - CBD drivers and benefits - Technology evolution - Components and network computing.

MODULE II FUNDAMENTALS **10**

Basic concepts of CBD - Scenarios for CBD - Evolution or revolution - Build, find and use components and objects.

MODULE III MODELS **10**

Basic concepts of object models - Components and interfaces - Working with interfaces - Component and interface modeling - Specification models - domain modeling - Describing classes - Patterns and frameworks.

MODULE IV USING CBD **9**

Categorizing & deploying components - CORBA, DCOM.

MODULE V FRAMEWORKS **8**

Class libraries - Encapsulated components - Software frameworks - Pre - built applications.

Total Hours: 45

TEXT BOOK :

1. Kuth Short, Component Based Development and Object Modeling, Sterling software,1997.

REFERENCE :

1. Clemens Szyperski, Component software - Beyond object - Oriented programming, Addison - Wesley, 2000.

OUTCOMES:

On completion of the course, students will

- be familiar with the principles of integrating and exchanging data
- master the use of XML/DOM to integrate and exchange data, and XSL/XSLT to transform data
- be familiar with building server applications that consume web services, exchange, and transform web-based data

CABY011 SUPPLY CHAIN MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

The objective of this course is to

- understand the finer aspects of the supply chain management that can turnaround an organization and can take it to the position of a leader.
- learn from the various successes and failures in making an efficient and effective supply chain and deliver value to the customer.

MODULE I BASIC CONCEPTS 9

Introduction to supply chain management (SCM) – concept of SCM – Components of SCM, an overview – features of SCM – strategic issues in SCM – Systems View - SCM current scenario – value chain management and customer relations management.

MODULE II INTERFACES WITH OTHER DISCIPLINES 10

Marketing and Supply Chain Interface – Customer focus in SCM – Demand planning Purchase planning – Make or Buy decision – Indigenous and global sourcing – Development and management of suppliers – legal aspects of buying – cost management – negotiating for purchasing/subcontracting – purchase insurance – evaluation of purchase performance (performance indices). Inventory management - Finance and Supply Chain Interface. Financial impact of inventory.

MODULE III MANUFACTURING AND WAREHOUSING 9

Manufacturing scheduling – Manufacturing flow system – work flow automation – Flexibility in manufacturing to achieve dynamic optimization. Material handling system design and decision. Warehousing and store keeping – strategies of warehousing and storekeeping – space management.

MODULE IV LOGISTICS MANAGEMENT 8

Logistics management – Role of logistics in SCM – Integrated Logistics management – transportation design and decision – multi modalism – third party logistics services and providers – facilities management (port/ airport.ICD's) channels of distribution – logistics and customer service.

MODULE V INFORMATION TECHNOLOGY AND SCM 9

Information technology and SCM – EDI, ERP, Internet and Intranet, E-Commerce, Bar coding, Telecommunication Network, Advanced planning system, Decision support models for Supply Chain Management, Artificial Intelligence for SCM- Best practice in supply chain management – organizational issues to implement SCM.

Total Hours: 45

TEXT BOOK:

1. B.S.Sahay, Supply chain management for global competitiveness, Macmillan India Limited, 2000.

REFERENCES :

1. Donald J.Bowersox & David J.Closs, Logistical Management, Tata McGraw-Hill Editions, New Delhi, 2000.

2. David Simchi-Levi, Designing and managing the supply chain, Tata McGraw-Hill Editions, New Delhi, 2000.

OUTCOMES:

At the completion of this course,

- the student would be able to examine the design and performance of supply networks and processes in different business contexts.
- Students develop capabilities in logistics, digital coordination for supply chain integration, inventory management; risk pooling, procurement, product and process design, and international supply chain management.

CABY012 BUSINESS PROCESSES L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is

- to develop a business process strategy to meet stakeholder needs.
- to analyse, improve, design and develop processes to meet stakeholder needs.
- to align technology, organisation, and facilities with the business process strategy and design
- to apply their knowledge to manage process projects effectively.
- to identify, clarify and manage business benefits arising from process change

MODULE I ORGANIZATIONAL STRUCTURE 9

Types of Business Organizations-Organizational Structures-Definition-Complexity-Formulization-Size-Technology-Culture-Forms and Outcomes-Explanations of Structures-IT Industry and Organizational Structures-Case Studies.

MODULE II ORGANIZATIONAL OUTCOMES 9

Organizational Power and Power Outcomes-Leadership and Decision Making-Communication and Organizational Change-Organizational Environments and Effects-Inter and Intra organizational Relationships-Organizational Effectiveness-Case Studies

MODULE III BUSINESS PROCESS RE-ENGINEERING 9

Introduction to Business Process Re-engineering (BPR)-Meaning-Types-Process-Impetrative for Survival-Strategic Approach-Implementing Business Process Re-engineering-Methodology and Steps-Indian Scenario of Implementing BPR-Case Studies.

MODULE IV BPR AND IT INDUSTRY 9

BPR and Information Technology Process-People View and Perspectives-Empowering People through IT-Managing Change in the Global Environment-BPR Rediscovering Indian Paradigm-Need of Reengineering-Case Studies

MODULE V E-BUSINESS PROCESS **9**

E-Business-Introduction-E-business vs. E-commerce-Execution of E-business-Trends-Design for Execution-Construction-Types-Organizational Frame Work and Implementation-E-business Application Areas (CRM, ERP, SCM and Selling)-E-business and India-Case Studies

Total Hours: 45

TEXTBOOKS :

1. Richard H.Hall, Organizations-Structures, Processes and Outcomes", Pearson Education, 2004

2. M.S.Jayaraman et. Al, "Business Process Reengineering", Tata Mc Graw Hill Publications, 2001

3. Ravi Kalakota and Marcia Robinson, "E-Business; Roadmap for Success; Pearson Education, 2000

REFERENCES:

1. Gareth Jones, "Organizational Theory, Design and Change", Pearson Education, 4th Edition, 2004

2. Dave Chaffey, "E-business and E-Commerce" Pearson Education, 2nd Edition, 2003

OUTCOMES:

At the completion of this course,

- the student will be able to form the organizational structure,
- improve leadership quality,
- take steps to improve reengineering of Indian scenario, to form organizational frame work and
- Implementation of e-business application areas.

CABY013 SOFTWARE PROJECT MANAGEMENT

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of the course is

- to understand the concepts of Software project management.
- to know the techniques in developing Quality Software Products
- to Manage the Software Product Development

MODULE I INTRODUCTION **9**

Introduction to Competencies-Product Development Techniques - Management Skills - Product Development Life Cycle -Software Development Process and models - The SEI CMM-International Organization for Standardization.

MODULE II DOMAIN PROCESSES **9**

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project -Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

MODULE III SOFTWARE DEVELOPMENT **9**

Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM - Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning - Project Roles and Skills Needed.

MODULE IV SCHEDULING ACTIVITIES **9**

Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

MODULE V QUALITY ASSURANCE **9**

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan -

Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study.

Total Hours: 45

TEXT BOOK:

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, “Quality Software Project Management”, Pearson Education, Asia, 2002.

REFERENCES:

1. Pankaj Jalote, “Software Project Management in Practice”, Addison Wesley, 2002.
2. Hughes, “Software Project Management, 3/E”, Tata McGraw-Hill, 2004.

OUTCOMES:

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

- gain Knowledge to develop Quality Software Products
- plan, organize and manage the various resources effectively to achieve specific
- Handle Software projects effectively.

CABY014 ENTERPRISE RESOURCE PLANNING L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is

- to describe the concept of ERP and the ERP model; define key terms; explain the transition from MRP to ERP; identify the levels of ERP maturity.
- to explain how ERP is used to integrate business processes; define and analyze a process; create a process map and improve and/or simplify the process; apply the result to an ERP implementation.
- to identify the international issues that impact a worldwide implementation of ERP; identify the key technological considerations and infrastructure concerns in ERP implementation; describe the strategic use of technology for ERP.
- to describe project organizational considerations; define the project management tools and resources needed to implement an ERP system; describe the roles and responsibilities of the key organization players; describe the tactics, tools, and methodologies available to implement ERP; evaluate the success of the implementation.

MODULE I INTRODUCTION TO ERP 9

Integrated Management Information Seamless Integration – Supply Chain Management – Integrated Data Model – Benefits of ERP – Business Engineering and ERP – Definition of Business Engineering – Principle of Business Engineering – Business Engineering with Information Technology.

MODULE II BUSINESS MODELLING FOR ERP 9

Building the Business Model – ERP Implementation – An Overview – Role of Consultant, Vendors and Users, Customisation – Precautions – ERP Post Implementation Options-ERP Implementation Technology –Guidelines for ERP Implementaion.

MODULE III ERP AND THE COMPETITIVE ADVANTAGE 9

ERP domain MPGPRO – IFS/Avalon – Industrial and Financial Systems – Baan IV SAP-Market Dynamics and Dynamic Strategy.

MODULE IV COMMERCIAL ERP PACKAGE **9**

Description – Multi-Client Server Solution – Open Technology – User Interface-Application Integration.

MODULE V ARCHITECTURE **9**

Basic Architectural Concepts – The System Control Interfaces – Services – Presentation Interface – Database Interface.

Total Hours: 45

TEXT BOOK:

1. Vinod Kumar Garg and N.K.Venkita Krishnan, "Enterprise Resource Planning – Concepts and Practice", PHI, 1998.

REFERENCE:

1. Jose Antonio Fernandz, The SAP R/3 Handbook, TMH, 1998.

OUTCOMES:

A student completing this course will:

- understand and gain insight into process views of organizations and tools and techniques used to model both as-is and to-be models.
- effectively describe problems typical of ERP implementation projects and translate this information and use this information to anticipate and articulate the challenges associated with post-implementation management of ERP systems.
- be able to evaluate the progress of an ongoing ERP implementation project.

CABY015	SOFTWARE AGENTS	L	T	P	C
		3	0	0	3

OBJECTIVES:

Agent-based systems are software products that not only do things as specified but also have knowledge to do their job and can do it in a cooperative, coordinative and competitive way.

Aim of the course is

- to understand the myths and realities of the agent-based systems?
- to develop an agent-based system for a particular task?
- to evolve from object-oriented development to agent-based systems?
- to incorporate and share knowledge among software agents?

MODULE I AGENT AND USER EXPERIENCE 9

Interacting with Agents - Agent From Direct Manipulation to Delegation - Interface Agent Metaphor with Character - Designing Agents - Direct Manipulation versus Agent Path to Predictable

MODULE II AGENTS FOR LEARNING IN INTELLIGENT ASSISTANCE 9

Agents for Information Sharing and Coordination - Agents that Reduce Work Information Overhead - Agents without Programming Language - Life like Computer character - S/W Agents for cooperative Learning - Architecture of Intelligent Agents

MODULE III AGENT COMMUNICATION AND COLLABORATION 9

Overview of Agent Oriented Programming - Agent Communication Language - Agent Based Framework of Interoperability

MODULE IV AGENT ARCHITECTURE 9

Agents for Information Gathering - Open Agent Architecture - Communicative Action for Artificial Agent

MODULE V MOBILE AGENTS 9

Mobile Agent Paradigm - Mobile Agent Concepts -Mobile Agent Technology - Case Study: Tele Script, Agent Tel

Total Hours: 45

TEXT BOOKS :

1. Jeffrey M.Bradshaw," Software Agents ", MIT Press, 2000. (Unit 1,2,3 & 4)

2. William R. Cockayne, Michael Zyda, “Mobile Agents", Prentice Hall, 1998 (5th Unit)

REFERENCES:

1. Russel & Norvig, " Artificial Intelligence: A Modern Approach ", Prentice Hall, 2nd Edition, 2002

2. Joseph P.Bigus & Jennifer Bigus, “Constructing Intelligent agents with Java: A Programmer's Guide to Smarter Applications ", Wiley, 1997.

OUTCOMES:

After taking this course, the students

- will have an understanding of the agent system terminology and development process of agent-based systems.
- will have learned techniques to design agent-based system.
- will know how to modify architecture of the current software systems and re-structure them to be agent-based.

CABY016 **UNIX INTERNALS** **L T P C**
3 0 0 3

OBJECTIVES:

This course provides an

- in depth knowledge of the UNIX operating system's internal features and their operation. The course describes the data structures, their relationships and the major algorithms used to manage System, processes, system calls, interrupts and exceptions, virtual memory and file systems.

MODULE I INTRODUCTION TO UNIX **9**

Unix operating system - History - System structure –Users Perspective- OS Services- Hardware-Architecture- System Concepts- Kernel data structures – System Administration – Buffer Cache- Heaters – Structure of the Buffer Pool- Scenarios-Reading and writing Disk Blocks.

MODULE II FILE SYSTEMS **9**

INODES - Structure of a regular file- Directories – Conversion of a path name to an INODE - Super Block- INODE assignment – Disk Blocks- System calls for the file system

MODULE III PROCESSES **9**

Process States and Transitions – Layout of System Memory – Context of a Process – Manipulation of the process address space – Sleep – Process Control – Creation – Signals – Awaiting process termination – The Shell – System Boot and Init Process – Process Scheduling and Time – System calls for time – Clock.

MODULE IV MEMORY MANAGEMENT **9**

Swapping – Segmentation - Demand Paging – Driver Interfaces – Disk Drivers – Terminal Drivers - Streams.

MODULE V INTERPROCESS COMMUNICATION **9**

Process Tracing – System V IPC – Network Communications - Sockets – Problem of Multiprocessor Systems – Solution with Master and Slave

Processors – Semaphores – Distributed Unix Systems – Satellite Processors – Newcastle connection – Transparent distributed file systems – System Calls.

Total Hours: 45

TEXT BOOK:

1. Bach M.J., The Design of the Unix Operating System, Prentice Hall India, 1986.

REFERENCES:

1. Goodheart B., Cox.J., The Magic Garden Explained, Prentice Hall India, 1994.

2. Leffler S.J., Mckusick M.K., Karels M.J and Quarterman J.S., The Design and Implementation of the 4.3 BSD Unix Operating System. Addison Wesley, 1998.

OUTCOMES:

Students who have successfully completed this course will have full understanding of the following concepts:

- ability to understand the basic functioning of UNIX operating systems and shell programming,
- to analyze the buffers and kernel representation, to understand the UNIX system structure, system calls and
- to understand UNIX segmentation, scheduling, paging.

CABY017 GRID COMPUTING L T P C
3 0 0 3

OBJECTIVES:

Aim of the course is

- to provide insight into the architectural implications of Grid Computing
- to provide students with awareness of current issues in
- skills in utilizing current grid tools and technologies.
- identifying the weakness of existing tools and technologies and proposing potential areas for improvement.
- justify the applicability, non-applicability of Grid technologies for a specific application

MODULE I INTRODUCTION 9

Grid Computing values and risks – History of Grid computing – Grid computing model and protocols – overview of types of Grids.

MODULE II TYPES OF GRIDS 9

Desktop Grids : Background – Definition – Challenges – Technology – Suitability – Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight – application and Architecture – HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture.

MODULE III ARCHITECTURE AND MANAGEMENT 9

The open Grid services Architecture – Analogy – Evolution – Overview – Building on the OGSA platform – implementing OGSA based Grids – Creating and Managing services – Services and the Grid – Service Discovery – Tools and Toolkits – Universal Description Discovery and Integration (UDDI)

MODULE IV NATIVE PROGRAMMING AND SOFTWARE APPLICATIONS 9

Desktop supercomputing – parallel computing – parallel programming paradigms – problems of current parallel programming paradigms – Desktop supercomputing programming paradigms – parallelizing existing applications

– Grid enabling software applications – Needs of the Grid users – methods of Grid deployment – Requirements for Grid enabling software – Grid enabling software applications.

MODULE V APPLICATIONS, SERVICES AND ENVIRONMENTS 9

Application integration – application classification – Grid requirements – Integrating Applications with Middleware platforms – Grid enabling Network services – managing Grid environments – Managing Grids – Management reporting – Monitoring – Data catalogs and replica management – portals – Different application areas of Grid computing.

Total Hours: 45

TEXT BOOK:

1. Ahmar Abbas, "Grid Computing, A Practical Guide to Technology and Applications", Firewall media, 2004.

REFERENCE:

1. Joshy Joseph, Craig Fellenstein, "Grid Computing", Pearson Education , 2004.
Foster, "Grid Blue print foe new computing".

OUTCOMES:

On completion of the course,

- the students will attain knowledge in Grid Computing.
- students will understand the applications of Grid Computing

CABY018 NETWORK SECURITY L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is

- to acquire an understanding of network security and its changing character
- to understand how network security is conceptualized and carried out
- to analyze both early and contemporary threats to network security
- to articulate informed opinion about issues related to network security
- to appreciate the challenges of network security

MODULE I INTRODUCTION 9

Attacks - Services - Mechanisms - Conventional Encryption - Classical And Modern Techniques – Encryption Algorithms - Confidentiality.

MODULE II PUBLIC KEY ENCRYPTION 9

RSA - Elliptic Curve Cryptography - Number Theory Concepts

MODULE III MESSAGE AUTHENTICATION 9

Hash Functions - Digest Functions - Digital Signatures - Authentication Protocols.

MODULE IV NETWORK SECURITY PRACTICE 9

Authentication, Applications - Electronic Mail Security - IP Security - Web Security.

MODULE V SYSTEM SECURITY 9

Intruders – Viruses – Worms – Firewalls Design Principles – Trusted Systems.

Total Hours: 45

TEXT BOOK:

1. Stallings, Cryptography & Network Security - Principles & Practice, Prentice Hall, 3rd Edition 2002.

REFERENCES:

1. Bruce, Schneier, Applied Cryptography, 2nd Edition, Toha Wiley & Sons, 1996.

2. Man Young Rhee, “Internet Security”, Wiley, 2003.

3. Pfleeger & Pfleeger, “Security in Computing”, Pearson Education, 3rd Edition, 2003.

OUTCOMES:

Completion of the course will have following outcomes:

- understanding of the scientific method through research requirements and in-depth case studies
- improvement in social interaction skills and understanding human behavior through consideration of the impact legal and social systems have on individuals
- preparation for more advanced study in criminal justice/homeland security

CABY019 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 9

I/O Devices - Device I/O Types and Examples – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - 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 III EMBEDDED PROGRAMMING 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 – 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.

MODULE IV REAL TIME OPERATING SYSTEMS – PART - 1 9

OS Services – Interrupt Routines Handling, Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics - Inter

Process Communication And Synchronisation – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – RPCs.

MODULE V REAL TIME OPERATING SYSTEMS – PART - 2 9

Study of RTOS, VxWorks - Basic Features - Task Management Library at the System - Library Header File - VxWorks System Functions and System Tasks - Inter Process (Task) Communication Functions - Case Study of Coding for Sending Application Layer Byte Streams on a TCP/IP Network Using RTOS Vxworks

Total Hours: 45

TEXT BOOK :

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

REFERENCE :

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.

CABY020 SOFTWARE QUALITY ASSURANCE L T P C
3 0 0 3

OBJECTIVES:

This course equips the students with a solid understanding of:

- practices that support the production of quality software
- software testing techniques
- life-cycle models for requirements, defects, test cases, and test results
- process models for units, integration, system, and acceptance testing
- quality Models

MODULE I CONCEPTS 9

Concepts of Quality Control, Quality Assurance, Quality Management - Total Quality Management; Cost of Quality; QC tools - 7 QC Tools and Modern Tools; Other related topics - Business Process Re-engineering –Zero Defect, Six Sigma, Quality Function Deployment, Benchmarking, Statistical process control.

MODULE II SOFTWARE ENGINEERING CONCEPTS 9

Software Engineering Principles, Software Project Management, Software Process, Project and Product Metrics, Risk Management, Software Quality Assurance; Statistical Quality Assurance - Software Reliability, Muse Model; Software Configuration Management; Software Testing; CASE (Computer Aided Software Engineering).

MODULE III QUALITY ASSURANCE MODELS 9

Models for Quality Assurance-ISO-9000 - Series, CMM, SPICE, Malcolm Baldrige Award.

MODULE IV SOFTWARE QUALITY ASSURANCE RELATED TOPICS 9

Software Process - Definition and implementation; internal Auditing and Assessments; Software testing -Concepts, Tools, Reviews, Inspections & Walkthroughts; P-CMM.

MODULE V FUTURE TRENDS **9**

PSP and TSP, CMMI, OO Methodology, Clean-room software engineering, Defect injection and prevention.

Total Hours: 45

TEXT BOOK :

1. Watts Humphery, “Managing Software Process”, Addison - Wesley, 1998.

REFERENCES:

1. Philip B Crosby, “Quality is Free: The Art of Making Quality Certain”, Mass Market, 1992.
2. Roger Pressman, “Software Engineering”, Sixth Edition, McGraw Hill, 2005.

OUTCOMES:

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

- understand and effectively apply software quality assurance (SQA) methods, tools and techniques
- plan for, implement and manage the integrated software quality assurance function
- evaluate how new technologies impact software quality assurance and the system’s development life cycle and understand how to benefit from their application

CABY021 ADHOC NETWORKS L T P C
3 0 0 3

OBJECTIVES:

The aim of this course is to

- provide wireless communication fundamentals, medium access control, network and transport protocols, unicast and multicast routing algorithms, mobility and its impact on routing protocols, application performance, quality of service guarantees, and security. Energy efficiency and the role of hardware and software architectures will also be presented for sensor networks.

MODULE I INTRODUCTION 9

Introduction-Fundamentals of Wireless Communication Technology - The Electromagnetic Spectrum - Radio Propagation Mechanisms - Characteristics of the Wireless Channel - IEEE 802.11a,b Standard – Origin Of Ad hoc: Packet Radio Networks - Technical Challenges - Architecture of PRNETs - Components of Packet Radios – Ad hoc Wireless Networks -What Is an Ad Hoc Network? Heterogeneity in Mobile Devices - Wireless Sensor Networks - Traffic Profiles - Types of Ad hoc Mobile Communications - Types of Mobile Host Movements - Challenges Facing Ad Hoc Mobile Networks-Ad hoc wireless Internet

MODULE II ADHOC ROUTING PROTOCOLS 9

Introduction - Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks - Classifications of Routing Protocols -Table-Driven Routing Protocols - Destination Sequenced Distance Vector (DSDV) - Wireless Routing Protocol (WRP) - Cluster Switch Gateway Routing (CSGR) - Source-Initiated On-Demand Approaches - Ad Hoc On-Demand Distance Vector Routing (AODV) - Dynamic Source Routing (DSR) -Temporally Ordered Routing Algorithm (TORA) - Signal Stability Routing (SSR) -Location-Aided Routing (LAR) - Power-Aware Routing (PAR) - Zone Routing Protocol (ZRP)

MODULE III MULTICASTROUTING IN ADHOC NETWORKS 9

Introduction - Issues in Designing a Multicast Routing Protocol - Operation of Multicast Routing Protocols - An Architecture Reference Model for Multicast Routing Protocols -Classifications of Multicast Routing Protocols - Tree-Based Multicast Routing Protocols- Mesh-Based Multicast Routing Protocols -

Summary of Tree-and Mesh-Based Protocols - Energy-Efficient Multicasting - Multicasting with Quality of Service Guarantees - Application-Dependent Multicast Routing - Comparisons of Multicast Routing Protocols

MODULE IV TRANSPORT LAYER, SECURITY PROTOCOLS 9

Introduction - Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks - Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks -Classification of Transport Layer Solutions - TCP Over Ad Hoc Wireless Networks -Other Transport Layer Protocols for Ad Hoc Wireless Networks - Security in Ad Hoc Wireless Networks - Network Security Requirements - Issues and Challenges in Security Provisioning - Network Security Attacks - Key Management - Secure Routing in Ad Hoc Wireless Networks

MODULE V QoS AND ENERGY MANAGEMENT 9

Introduction - Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks -Classifications of QoS Solutions - MAC Layer Solutions - Network Layer Solutions - QoS Frameworks for Ad Hoc Wireless Networks Energy Management in Ad Hoc Wireless Networks –Introduction - Need for Energy Management in Ad Hoc Wireless Networks - Classification of Energy Management Schemes - Battery Management Schemes - Transmission Power Management Schemes - System Power Management Schemes

Total Hours: 45

TEXT BOOK:

1. C. Siva Ram Murthy and B.S. Manoj “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall PTR, 2004

REFERENCES:

1 C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR, 2001

2. Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000

OUTCOMES:

At the completion of this course, it is envisaged that the students will be able to:

- explain the constraints of the wireless physical layer that affect the design and performance of ad hoc and sensor networks, protocols, and applications;
- explain the performance of various unicast and multicast routing protocols that have been proposed for ad hoc networks;
- explain the operation of several media access protocols that have been proposed for ad hoc and sensor networks;
- Explain various security threats to ad hoc networks and describe proposed solutions.

CABY022 PRINCIPLES OF COMPILER DESIGN L T P C
3 0 0 3

OBJECTIVES:

The aim of the course is

- to introduce the major concept areas of language translation and compiler design
- to develop an awareness of the function and complexity of modern compilers
- to understand the phases of the compilation process and be able to describe the purpose and implementation approach of each phase.
- to give students practical exposure to aspects of theoretical Computer Science including Languages, Grammars, and Machines.
- to exercise and reinforce prior programming knowledge with a non-trivial programming project to construct a compiler.

MODULE I INTRODUCTION 9

Basic concepts - Grammar - Language - Parts of a compiler – Grouping of phases - Compiler construction tools.

MODULE II LEXICAL ANALYZER 9

Role of a lexical analyzer – Input buffering - Specification and recognition of tokens - Finite automata - Regular expression to finite automation – Optimization of DFA-based pattern matchers-Use of a tool for generating lexical analyzer.

MODULE III SYNTAX ANALYZER 9

Role of a parser - Context-free grammars - Top-down parsing - Bottom-up parsing - Use of a tool to generate parsers.

MODULE IV INTERMEDIATE CODE GENERATION 9

Intermediate languages - Declaration - Assignment statements - Boolean expressions - Flow control statements –Back patching.

MODULE V CODE GENERATION 9

Introduction to optimization techniques - Issues in the design of a code generator - Run-time storage management - Design of a simple code generator.

Total Hours: 45

TEXT BOOK:

1. A.V. Aho, Ravi Sethi, J.D. Ullman, Compilers - Principles, Techniques and Tools, Addison- Wesley, 1988.

REFERENCES:

1. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park, 1988.
2. Kennath C.Louden, Compiler Construction Principles and Practice, Vikas publishing House, 2003.
3. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2001.

OUTCOMES:

On completion of this course, students will be able to

- demonstrate a working understanding of the process of semantic analysis through the construction of semantic records based on parse trees, the construction of symbol tables, the organization of run time memory and the writing of a semantic analyzer for a compiler.
- design, analyze, implement and test a working compiler for a small language
- develop a compiler with all the phases

CABY023 BUSINESS INTELLIGENCE L T P C
3 0 0 3

OBJECTIVES:

- To explain the complexity of Business Intelligence decision support projects
- To present a step-by-step guide for the entire Business Intelligence project life cycle
- To impart knowledge of a complete development lifecycle including activities, deliverables, roles, risks, responsibilities, Do's and Don't's, entry and exit criteria for a successful Business Intelligence (BI) decision-support implementation.

MODULE I STAGES AND STEPS 9

Stages and Steps: Guide to the development steps- Business Intelligence (BI) Definition – BI Decision Support Initiatives – Development Approaches – Engineering Stages and Development Steps – Parallel Development Tracks – BI Project Team Structure – Business Case Assessment: Business Justification – Business Drivers – Business Analyst Issues – Cost-Benefit Analysis – Risk Assessment – Business Case Assessment Activities.

MODULE II ENTERPRISE INFRASTRUCTURE EVALUATION 9

Enterprise Infrastructure Evaluation: Technical Infrastructure Evaluation – The Hardware Platform – The Middleware Platform – The DBMS Platform – Technical Infrastructure Evaluation Activities – Deliverables Resulting from these Activities - Roles and Risks involved in these activities. Nontechnical Infrastructure Evaluation – The Effects of Stovepipe Development – The need for Nontechnical Infrastructure Evaluation -Enterprise architecture and Enterprise Standards - Nontechnical Infrastructure Evaluation Activities – Deliverables Resulting from these Activities - Roles and Risks involved in these activities.

MODULE III PROJECT PLANNING 9

Project Planning – Managing, Defining, Planning the BI Project - Project Planning Activities – Deliverables Roles and Risks - Project Requirements Definition – General Business and Project-Specific Requirements – The Interviewing Process – Project Requirements and Deliverables – Roles and

Risks involved - Data Analysis – Business-Focused Data Analysis – Top-Down Logical Data Modeling – Bottom-Up Source Data Analysis - Data Cleansing, Activities, Deliverables, Roles and Risks - Application Prototyping – Purposes, Best Practices, Types – Building Successful Prototypes – Applications, Deliverables, Roles and Risks – Meta Data Repository Analysis.

MODULE IV DATABASE DESIGN **9**

Database Design – Differences, Logical and Physical Database Design and Activities – Deliverables, Roles and Risks - Extract/Transform/Load (ETL) Design – Implementation Strategies – Preparing for the ETL Process – Designing the Extract, Transformation, Load Programs and ETL Process Flow – Evaluating ETL Tools -ETL Design Activities – Deliverables, Roles and Risks – Meta Data Repository Design – Extract/Transform/Load Development.

MODULE V APPLICATION DEVELOPMENT **9**

Application Development – Online analytical Processing Tools – Multidimensional Analysis Factors – Online Analytical Processing Architecture – Development Environments – Application Development Activities – Deliverables, Roles and Risks - Data Mining – Meta Data Repository Development.

Total Hours: 45

TEXT BOOK:

1. Business Intelligence Roadmap: The Complete Project Lifecycle for Decision Support Applications, Larissa T. Moss, Shaku Atre, Addison Wesley Publications, 2003.

REFERENCE BOOK:

1. Business Intelligence Starategy – A practical Guide for Achieving BI Excellence, John Boyer, Bill Frank, Brian Green Tracy Harris and Kay Van De Vanter, First Edition, IBM Corporation, 2010.

OUTCOMES:

- Students can understand the infrastructure components of BI decision-support application and the available tools.
- Students can able to determine number of resources required, type of resources in terms of both technical and human and could able to recognize the components that impairs the success of BI decision-support application.

CABY024 SERVICE ORIENTED ARCHITECTURE L T P C
3 0 0 3

OBJECTIVES:

- To gain understanding of the basic principles of service orientation
- To learn service oriented analysis techniques
- To learn technology underlying the service design
- To learn advanced concepts such as service composition, orchestration and Choreography
- To know about various WS specification standards

MODULE I INTRODUCTION 9

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation

MODULE II SERVICE LAYER 9

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration –Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

MODULE III SERVICE ORIENTED ANALYSIS AND DESIGN 9

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task centric business service design.

MODULE IV TECHNOLOGIES AND DESIGN FOR SOA 9

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE).

MODULE V SERVICE DESIGN AND SECURITY 9

Service design-guidelines- WS-BPEL language basics – WS-Coordination overview – WS -Choreography, WS-Policy, WSSecurity-WSOA platform-SOA support in J2EEand .NET.

Total Hours: 45

TEXT BOOK:

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology, and Design”, Pearson Education, 2005.

REFERENCES:

1. Thomas Erl, “SOA Principles of Service Design “(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.
2. Newcomer, Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
3. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services, An Architect’s Guide”, Pearson Education, 2005.
4. Dan Woods and Thomas Mattern, “ Enterprise SOA Designing IT for Business Innovation” O’REILLY, First Edition, 2006

OUTCOMES:

- Discuss about the principles of service orientation.
- Explain service composition, orchestration and Choreography.
- Provide ASP.NET web services.
- Analyze and design web service.

CABY025 CONTENT MANAGEMENT SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES

- To impart knowledge in installing CMSmadesimple, using the core modules, using Smarty to build templates and it to tell what you are about to do, how to do it.
- To train the students in using an open source content management (CMS) tool – Joomla!, A powerful and robust tool.

MODULE I **9**

Content Management System (CMS) – Introduction - Getting Started - CMS versus website builder – Creating Pages and Navigation.

MODULE II **9**

Design and Layout - Using Core modules – Users and Permissions – Using Third-party Modules – Creating Own Functionality

MODULE III **9**

E-commerce workshop - Advanced Use of CMS - Administration and Trouble Shooting.

MODULE IV **9**

Introduction to dynamic web pages and development tools for dynamic content – Downloading tools for dynamic content – Downloading and Installing a content Management System (Joomla!) – Administration elements of a Content Management System – Organizing Content.

MODULE V **9**

Basic elements: pages, menus and navigation – incorporate components, modules, plug-ins and languages – Case Studies: Marketing strategies and planning for websites – Design and create a school website, restaurant website, blog site, Securing Content Management System.

Total Hours: 45

TEXT BOOKS:

1. CMS Made simple 1.5, Sofia Hauschildt, 2010

2. Joomla! 1.5: A User's Guide – Barrie M. North Second Edition, Prentice Hall.

OUTCOMES:

- Students will be in a position to install CMSmadesimple (CMSMS), Converting other website templates to work with CMSMS
- Students will be able to add a e-commerce functionality and a discussion of users and permissions.
- Students will be able to develop a successful website powered by Joomla!
- Students can understand the key concepts regarding content organization, editing and templates.

CABY026 SOFTWARE TESTING

L	T	P	C
3	0	0	3

OBJECTIVES

The students will be able to learn

- fundamentals of testing
- role of Testing in Software Development Lifecycle
- various techniques of testing
- tools for testing.

MODULE I FUNDAMENTALS OF TESTING **9**

Human and errors, Testing and Debugging, Software Quality, Requirement Behavior and Correctness, Fundamentals of Test Process, Psychology of Testing, General Principles of Testing, Test Metrics.

MODULE II ROLE OF TESTING IN SDLC **9**

Review of software development models (Waterfall Models, Spiral Model, W Model, V Model) Agile Methodology and Its Impact on testing, Test Levels (Unit, Component, Module, Integration, System, Acceptance, Generic)

MODULE III APPROACHES TO TESTING **9**

Black Box Testing- Equivalence Class Partitioning, Boundary Value Analysis, State Transition Test, Cause Effect Graphing and Decision Table Technique and Used Case Testing and Advanced black box techniques: White Box Testing- Statement Coverage, Branch Coverage, Test of Conditions, Path Coverage, Advanced White Box Techniques, Instrumentation and Tool Support Gray Box Testing, Intuitive and Experience Based Testing.

MODULE IV TEST ORGANIZATION **9**

Test Organization: Test teams, tasks and Qualifications: Test Planning : Quality Assurance Plan, Test Plan, Prioritization Plan, Test Exit Criteria: Cost and economy Aspects: Test Strategies: Preventive versus Reactive Approach, Analytical versus heuristic Approach Test Activity Management, Incident Management, Configuration Management Test Progress Monitoring and Control: Specialized Testing: Performance, Load, Stress & Security Testing

MODULE V TESTING TOOLS **9**

Automation of Test Execution, Requirement tracker, High Level Review Types of test Tools: Tools for test management and Control, Test Specification, Static Testing, Dynamic Testing, Non functional testing.

Total Hours: 45

REFERENCES:

1. Software Testing Foundations, Andreas Spillner, Tilo Linz, Hans Schaefer, Shoff Publishers and Distributors.
2. Software Testing: Principles and Practices by Srinivasan D and Gopalswamy R, Pearson Ed, 2006.
3. Foundations of Software Testing by Aditya P. Mathur – Pearson Education custom edition 2000.
4. Testing Object Oriented Systems: models, patterns and tools, Robert V Binder, Addison Wesley, 1996.
5. Software Engineering – A practitioner's approach by Roger S. Pressman, 5th Edition, McGraw Hill.
6. The art of software testing by GJ Myers, Wiley.

OUTCOMES:

The student will have

- strong fundamentals in various software testing strategies.
- basic Knowledge of testing tools available.