

**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 (2009), CURRICULUM AND SYLLABUS
FOR
M.Tech. INFORMATION TECHNOLOGY
(Updated upto June 2012)**

**REGULATIONS -2009 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 the University.
- vi) **'Dean (Academic Courses)'** means Dean (Academic Courses) of B.S.Abdur Rahman University.
- vii) **'Dean (Students)'** means Dean(Students) 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

Candidates 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 Head of the Institution through the Head of the Department, if the student satisfies the clause 2.3.5 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 candidates 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 candidates are required to attend only evening classes.

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

2.3. ADMISSION REQUIREMENTS

2.3.1 Candidates 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 1 or any other examination of any University or authority accepted by the University as equivalent thereto.

2.3.2 Notwithstanding the qualifying examination the candidate might have passed, he/she shall have a minimum level of proficiency in the appropriate programme/courses as prescribed by the institution from time to time.

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

2.3.4 All part-time candidates should satisfy other conditions regarding experience, sponsorship etc., which may be prescribed by the institution from time to time.

2.3.5 A candidate 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 the institution.

2.3.6 A candidate eligible for admission to M.B.A. Part Time - Evening programme shall have a working experience of 2 years at least at supervisory level. He/ she shall have his/her place of work within a distance of 65 km from the campus of the 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. Practical training

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

3.4 The 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 75 to 80 working days spread over sixteen weeks. End-semester examinations will follow immediately after these working days.

M.Tech.Information Technology**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) M.Tech. (Construction Engineering and Project Management)	B.E / B.Tech. (Civil Engineering) / (Structural Engineering) B.E. / B.Tech. (Civil Engineering) / (Structural Engineering)
02.	Mechanical Engineering	M.Tech. (CAD - CAM) M.Tech. (Manufacturing Engineering)	B.E. / B.Tech. (Mechanical / Auto / Manufacturing / Production / Industrial/Mechatronics / Metallurgy / Aerospace/Aeronautical / Material Science / Marine 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) M.Tech. (Power Electronics & Drives)	B.E/B.Tech (EEE/ECE/E&I/ I&C/ Electronics / Instrumentation) B.E/B.Tech (EEE/ECE/E&I/ I&C/ Electronics/ Instrumentation)
05.	Electronics and Communication Engineering	M.Tech. (Communication Systems) M.Tech. (VLSI and Embedded Systems)	M.Tech (Power System Engg) B.E / B.Tech (EEE/ ECE / E&I / I&C / Electronics / Instrumentation) B.E./ B.Tech. in ECE / Electronics / EIE
06.	ECE Department jointly with Physics Department	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) M.Tech. (Software Engineering)	B.E. /B.Tech. (CSE/IT/ECE/EEE/EIE/ICE/ Electronics / MCA) B.E. / B.Tech. (CSE / IT) MCA
09	Information Technology	M.Tech. (Information Technology)	B.E /B.Tech. (IT/CSE/ECE/EEE/EIE/ICE/ Electronics) MCA
10	Computer Applications	M.C.A. M.Tech. (Systems Engineering and Operations Research)	Any degree. Must have studied Mathematics / Statistics /Computer oriented subject. Any degree. Must have studied Mathematics / Statistics /Computer oriented subject.
11	Mathematics	M.Sc. (Actuarial Science)	B.Sc. (Mathematics) of B.Sc. (Applied Science)
12	Chemistry	M.Sc.(Chemistry)	B.Sc (Chemistry) of B.Sc. (Applied Science)

M.Tech.Information Technology

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 lie within the limits specified below:

Programme	Minimum prescribed credit range
M.Tech.	70 to 80
M.C.A	130 to 140
M.Sc	74 to 80

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 of two or three periods per week
- * One credit for four weeks of practical training

3.8 The number of credits registered by a candidate 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 23	12 to 20
M.Tech. (Part Time)	6 to 12	12 to 16
M.C.A. (Full Time)	12 to 25	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 candidate may be permitted by the Head of the Department to choose electives offered from other P.G. Programmes either within a 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 candidate 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 Dean (AC) 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 Practical training or industrial attachment, if specified in the curriculum shall be of not less than four 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 candidate may however, in certain cases, be permitted to work on the project in an Industrial/Research Organization, on the recommendation of Head of the Department, with the approval of the Head of the Institution. In such cases, the project work shall be jointly supervised by a supervisor of the Department and an Engineer / Scientist from the organization and the student shall be instructed to meet the supervisor 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 Head of the Institution.

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 candidate 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 FACULTY ADVISER

To help the students in planning their courses of study and for getting general advice on academic programme, the concerned department will assign a certain number of students to a faculty member who will be called the Faculty Adviser.

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. One or two students of the class, nominated by the Head of the Department.
- iv. Faculty Advisers 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 the 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 the Head of the Institution. 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, once at the beginning of the semester, another time after the end-semester examination to finalise the grades, and once in between.

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 / Head of the Institution 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 the courses he/she intends to undergo on a specified day notified to the student. The concerned Faculty Adviser will be present and guide the students in the registration/enrolment process.

7.2 For the subsequent semesters registration for the courses will be done by the student during a specified week before the end-semester 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 is filled in and signed by the student and the Faculty Adviser.

7.3 Late registration will be permitted with a prescribed fine up to two weeks from the last date specified for registration.

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 (AC), 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 by the Departmental Consultative Committee and approved by the Head of the Institution. 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 Institution 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 Fast-track summer courses of 30 periods for 3 credit courses and 40 periods for 4 credit courses will be offered for students with I grades. They may also opt to redo such courses during regular semesters with slotted time-tables. Students with U grades will have the option either to write semester end arrears exam or to redo the courses during summer / regular semesters with slotted time-table, if they wish to improve their continuous assessment marks also.

The assessment procedure in a summer term course will also be similar to the procedure for a regular semester course.

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

8.0 TEMPORARY WITHDRAWAL FROM THE PROGRAMME

A student may be permitted by the Head of the Institution to temporarily withdraw from the programme up to a maximum of two semesters for reasons of ill health or other valid grounds. However the total duration for completion of the programme shall not exceed the prescribed number of semesters (vide clause 3.1).

9.0 MINIMUM REQUIREMENTS TO REGISTER FOR PROJECT / THESIS / DISSERTATION

9.1 A candidate 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 enrol for project semester
M.Tech. (Full time)	18 (III semester)
M.Tech. (Part-time)	18 (V semester)
M.C.A. (Full time)	45 (VI semester)
M.Sc. (Full-time)	28 (IV semester)

9.2 M.Tech.: If the candidate has not earned minimum number of credits specified, he/she has to earn the required credits (at least to the extent of minimum credit specified in clause 9.1) and then register for the project semester.

9.3 M.C.A.: If the candidate has not earned the required 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 work in subsequent semesters.

10.0 DISCIPLINE

10.1 Every candidate 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 candidate reported to the Head of the Institution will be referred to a Discipline and Welfare Committee for taking appropriate action.

10.3 Every candidate 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-clauses.

11.2 A student **shall 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 end-semester examination in that course, failing which the student shall be awarded "I" grade in that course. If the course is a core course, the candidate should register for and repeat the course when it is offered next.

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 at the Class Committee will be announced to the students right at the beginning of the semester by the teacher and informed to Dean(AC)

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 practical training or industrial attachment, the candidate shall submit a certificate from the organization where he/she has undergone training 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 sessional assessments	-	50%
End-semester examination	-	50%

ii) Laboratory based courses

Laboratory work assessment	-	75%
End-semester examination	-	25%

iii) Project work

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

13.2 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 end-semester 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(AC) 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 end-semester 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	-

Flexible range grading system will be adopted

"W" denotes withdrawal from the course.

"I" denotes inadequate attendance and hence prevention from End Semester examination.

"U" denotes unsuccessful performance in a course.

15.2 A student is considered to have completed a course successfully and earned the credits if he / she secure five grade points or higher. A letter grade U in any course implies unsuccessful performance in that course. A course successfully completed cannot be repeated for any reason.

16.0 METHOD OF AWARDING 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 Three copies of the results sheets for each course, containing the final grade and three copies with the absolute marks and the final grade should be submitted by the teacher to the concerned Class Committee Chairman. After finalisation of the grades at the class committee meeting the Chairman will forward two copies of each to the Controller of Examinations and the other copies to the Head of the Department in which course is offered.

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. In case any student feels aggrieved, he/she can apply for revaluation after paying the prescribed fee for the purpose, within two weeks from the commencement of the semester immediately following the announcement of results. A committee will be constituted by the Controller of Examinations comprising the Chairperson of the concerned Class Committee (Convener), the teacher concerned and another 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 mark to the Controller of Examinations with full justification for the revision if any.

17.2 The “U” 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” grade in a course shall write the end-semester examination as arrear examination, at the end of the next semester, along with the regular examinations of next semester courses. **The marks earned earlier in the continuous assessment tests for the course, will be used for grading along with the marks earned in the end-semester arrear examination for 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

$$GPA = \frac{\sum_i (C_i)(GP_i)}{\sum_i C_i}$$

where C_i is the number of credits assigned for i^{th} course

GP_i - Grade point obtained in the i^{th} 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 in time.

I and W grades will be excluded for GPA calculations.

U, 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 in first appearance in 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 candidate 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 candidate 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 candidates 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 first decimal place. For the purpose of comparison of performance of candidates and ranking, CGPA will be considered up to three decimal places.

20 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) registered for and undergone all the core courses and completed the Project Work,
- ii) successfully acquired the required credits as specified in the Curriculum corresponding to his/her programme within the stipulated time,
- iii) successfully completed the field visit/industrial training, if any, as prescribed in the curriculum.
- iv) has no dues to the Institution, Hostels and Library.
- v) 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.

**M.TECH INFORMATION TECHNOLOGY
CURRICULUM AND SYLLABI (REGULATIONS 2009)
QUALIFICATION FOR ADMISSION FOR M.TECH.
(INFORMATION TECHNOLOGY)**

B.E/B.TECH(IT/CSE/ECE/EEE/EIE/ICE/ ELECTRONICS) / MCA

SEMESTER I						
Code No.	Course Title	L	T	P	C	TC
MA622	Operation Research	3	1	0	4	
IT601	Data Structures and Algorithms	3	1	0	4	
CS601	Computer Architecture	3	1	0	4	
CS605	Computer Networks And Management	3	0	2	4	
IT602	Advanced Data Base Management Systems	3	0	0	3	
IT603	Object Oriented Software Engineering	3	0	0	3	
	Practical					
IT604	Data Structures Laboratory	0	0	3	1	
IT605	Java Programming Laboratory	0	1	3	2	25

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SEMESTER II						
Code No.	Course Title	L	T	P	C	TC
IT606	Multimedia Technology and Applications	3	0	0	3	
IT607	Distributed Systems (* CS601)	3	0	0	3	
IT608	Information Security	3	1	0	4	
IT609	Software Testing And Quality Assurance (* IT603)	3	0	0	3	
IT610	Advanced Web Technology	3	0	0	3	
	Elective I	3	0	0	3	
	Practical					
IT611	Web Technology Lab	0	0	3	1	
IT612	Software Development and Testing Laboratory	0	0	3	1	21

SEMESTER III						
Code No.	Course Title	L	T	P	C	TC
IT701	Grid Computing	3	0	0	3	
IT702	Integrated Software Project Management (* IT609)	3	0	0	3	
	Elective –II	3	0	0	3	
	Elective –III	3	0	0	3	
	Practical					
IT 703	Multimedia Lab	0	0	3	1	
IT 704	Project Phase -I	0	0	12	**	
	** 6 credits added with 12 credits of Phase II					13

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SEMESTER IV						
IT 704	Project Phase - II	0	0	36	12	18(6+12)

* Indicates Pre requisite Subject

Total No. Of Credits : 77

Total No. Of Theory Courses : 16

Total No. Of Practical Courses : 5

No. of Electives : 3/ 20

Total no. of Tutorials : 6

ELECTIVE I, II & III

Project

LIST OF ELECTIVES					
ITY 001	Pervasive Computing	3	0	0	3
ITY 002	Bio Informatics	3	0	0	3
ITY 003	Cloud Computing	3	0	0	3
ITY 004	Supply Chain Management	3	0	0	3
ITY 005	Wireless Networks	3	0	0	3
ITY 006	Enterprise Resource Planning	3	0	0	3
ITY 007	Soft Computing	3	0	0	3
ITY 008	Component Based Technology	3	0	0	3
ITY 009	Web Design and Management	3	0	0	3
ITY 010	Web Services	3	0	0	3
ITY 011	Design Patterns	3	0	0	3
ITY 012	Data Warehousing and Data Mining	3	0	0	3
ITY 013	Wireless Mobile Communication	3	0	0	3
ITY 014	Applied Cryptography	3	0	0	3
ITY 015	Digital Image Processing	3	0	0	3
ITY 016	Software Metrics	3	0	0	3
ITY 017	Software Requirements Management	3	0	0	3
ITY 018	Service Oriented Architecture	3	0	0	3
ITY 019	User Interface Design	3	0	0	3
ITY 020	High Speed Networks	3	0	0	3

SEMESTER I

MA 622	OPERATIONS RESEARCH	L	T	P	C
		3	1	0	4

OBJECTIVES

- The objective of the course is to give the student experience in modeling, solving and analyzing problems using linear programming. Emphasis will be stressed on theory, applications, and computer usage. By the end of the course the student should have developed the skills to consider real-world problems and determine whether or not linear programming is an appropriate modeling framework; develop linear programming models that consider the key elements of the real world problem; solve the models for their optimal solutions; interpret the models' solutions and infer solutions to the real-world problems.

UNIT I QUEUEING MODELS 9

Poisson Process - Markovian Queues - Single and Multi-server Models - Little's formula - Machine Interference Model - Steady State analysis - Self Service Queue - Network Optimal Path

UNIT II ADVANCED QUEUEING MODELS 9

Non- Markovian Queues - Pollaczek Khintchine Formula - Queues in Series - Open Queuing Networks -Closed Queuing networks - Sequencing and Scheduling

UNIT III SIMULATION 9

Discrete Event Simulation - Monte-Carlo Simulation - Stochastic Simulation - Applications to Queuing systems.

UNIT IV LINEAR PROGRAMMING 9

Formulation - Graphical solution - Simplex method - Two phase method - Transportation and Assignment Problems.

UNIT V NON-LINEAR PROGRAMMING 9

Lagrange multipliers - Equality constraints - Inequality constraints - KuhnTucker conditions - Quadratic Programming.

L: 45 T: 15

Total: 60

TEXT BOOKS

1. Winston.W.L. 'Operations Research', Fourth Edition, Thomson - Brooks/Cole, 2003.
2. Taha, H.A. 'Operations Research: An Introduction', Ninth Edition, Pearson Education Edition, Asia, New Delhi, 2002.
3. Kanti Swarup, P.K.Gupta, Manmohan, 'Operations Research' 11th edition, Sultan Chand & sons, New Delhi, 2008.

REFERENCES

1. Robertazzi. T.G. 'Computer Networks and Systems - Queuing Theory and Performance Evaluation', Third Edition, Springer, 2002 Reprint.
2. Ross. S.M., 'Probability Models for Computer Science', Academic Press, 2002.

IT 601	DATA STRUCTURES AND ALGORITHMS	L T P C
		3 1 0 4

OBJECTIVES

- To develop proficiency in the specification, representation and implementation of Data Types and Data Structures.
- To be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.
- To get a good understanding of applications of Data Structures.
- To develop a base for advanced computer science study.
- At the end of this course, the student should be able to choose, implement and evaluate the appropriate data structures for specific programming problems; Use and manage memory efficiently in data presentation.

UNIT I INTRODUCTION 8

Basic concepts of OOPs - Templates - Algorithm Analysis - ADT - List (Singly, Doubly and Circular) Implementation - Array, Pointer, Cursor Implementation

UNIT II BASIC DATA STRUCTURES 11

Stacks and Queues - ADT, Implementation and Applications - Trees - General, Binary, Binary Search, Expression Search, AVL, Splay, B-Trees - Implementations - Tree Traversals.

UNIT III ADVANCED DATA STRUCTURES 10

Set - Implementation - Basic operations on set - Priority Queue - Implementation - Graphs - Directed Graphs - Shortest Path Problem - Undirected Graph - Spanning Trees - Graph Traversals.

UNIT IV MEMORY MANAGEMENT 7

Issues - Managing Equal Sized Blocks - Garbage Collection Algorithms for Equal Sized Blocks - Storage Allocation for Objects with Mixed Sizes - Buddy Systems - Storage Compaction.

UNIT V SEARCHING, SORTING AND DESIGN TECHNIQUES 9

Searching Techniques, Sorting - Internal Sorting - Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Bin Sort, Radix Sort - External Sorting - Merge Sort, Multi-way Merge Sort, Polyphase Sorting - Design Techniques - Divide and

Conquer - Dynamic Programming - Greedy Algorithm - Backtracking - Local Search Algorithms.

L: 45 T: 15

Total: 60

TEXTBOOKS

1. Mark Allen Weiss, 'Data Structures and Algorithm Analysis in C++', Pearson Education, 2002.
2. Aho, Hopcroft, Ullman, 'Data Structures and Algorithms', Pearson Education, 2002.

REFERNCES

1. Horowitz, Sahni, Rajasekaran, 'Computer Algorithms', Galgotia, 2000
2. Tanenbaum A.S., Langram Y, Augestien M.J., 'Data Structures using C & C++', Prentice Hall of India, 2002

CS 601	COMPUTER ARCHITECTURE	L T P C
		3 1 0 4

OBJECTIVES

- To make students learn the fundamentals of compute design and ILP.
- To explain the compiler techniques for exposing ILP.
- To introduce multiprocessors and thread level parallelism.

UNIT I FUNDAMENTALS OF COMPUTER DESIGN 9

Measuring and Reporting performance - Quantitative principles of computer Design - Classifying instruction set Architecture - Memory addressing - Addressing modes - Type and size of operands - Operations in the instruction set - Operands and operations for media and signal processing - Instructions for control flow - Encoding an instruction set - Example Architecture - MIPS and TM32.

UNIT II INSTRUCTION LEVEL PARALLELISM 9

Pipelining and Hazards - Concepts of ILP - Dynamic scheduling - Dynamic Hardware prediction - Multiple issues - Hardware based speculation - Limitations of ILP - Case studies: IP6 Micro architecture

UNIT III INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES 9

Compiler techniques for exposing ILP - Static branch prediction - Static multiple issues: VLIW - Advanced compiler support - Hardware support for exposing parallelism -Hardware Vs software speculation. Mechanism - IA 64 and Itanium Processor.

UNIT IV MEMORY AND I/O 9

Cache performance - Reducing cache miss penalty and miss rate - Reducing hit time - Main memory and performance - Memory technology. Types of storage devices - Buses - RAID - Reliability, availability and dependability - I/O performance measures - Designing I/O system.

UNIT V MULTIPROCESSORS AND THREAD LEVEL PARALLELISM 9

Symmetric and distributed shared memory architectures - Performance issues - Synchronization - Models of memory consistency - Multithreading.

**L: 45 T: 15
Total: 60**

TEXTBOOK

1. John L. Hennessey and David A. Patterson,' Computer Architecture: A Quantitative Approach', Third Edition, Morgan Kaufmann, 2003.

REFERNCES

1. D. Sima, T. Fountain and P. Kacsuk, ' Advanced Computer Architectures: A Design Space Approach', Addison Wesley, 2000.
2. Kai Hwang 'Advanced Computer Architecture Parallelism Scalability Programmability' Tata McGraw Hill Edition 2001.
3. Vincent P.Heuring, Harry F.Jordan, 'Computer System Design and Architecture', Addison Wesley, 2nd Edition, 2004.

OBJECTIVES

- To understand the organization and functioning of computer networks.
- To explain the basic concepts of protocol design including algorithms for congestion control and flow control.
- To provide background knowledge on the basic concepts of link layer properties.
- To give some exposure on the basic concepts of wireless networks and the multimedia networks
- To prepare the students on the basic concepts of network security.

UNIT I COMPUTER NETWORKS AND THE INTERNET

9

Network edge - Network core - Delay, loss and throughput in Packet-switched networks - Protocol layers and their service models - Networks under attack - History of computer networking and the Internet.

UNIT II APPLICATION AND TRANSPORT LAYER

9

Principles of network applications - The Web and HTTP - File transfer: File transfer protocol - DNS - Peer-to-Peer applications - Socket programming - Transport - layer and services - Multiplexing and demultiplexing - Connectionless transport: User datagram protocol - Principles of reliable data transfer - Connection-oriented transport: Principles of congestion control - Congestion control mechanism.

UNIT III THE NETWORK LAYER AND THE LINK LAYER AND LOCAL AREA NETWORKS

9

Introduction - Virtual circuit and datagram networks - Internet Protocol (IP): Routing algorithms - Routing in the Internet - Broadcast and multicast routing - Link layer : Services - Error-detection and correction techniques - Multiple access protocols - Link-layer addressing - Ethernet - Link-layer switches - Point-to-Point protocol - Link virtualization: A Network as a Link Layer.

UNIT IV WIRELESS AND MOBILE NETWORKS AND MULTIMEDIA NETWORKING

9

Introduction - Wireless links and network characteristics - WiFi: 802.11 Wireless LANs - Cellular internet access - Mobility management: Mobile IP -

Managing mobility in cellular networks - Impact on higher-layer protocols - Multimedia networking applications - Streaming stored audio and video - Making the best of the Best-effort service - Protocols for real-time interactive applications - Quality of service guarantees.

UNIT V SECURITY IN COMPUTER NETWORKS & NETWORK MANAGEMENT

9

Introduction - Principles of cryptography - Message integrity - End-point authentication - Securing e-mail - Securing TCP Connections: SSL - Network layer security: Ipsec - Securing wireless LANs - Operational security: Firewalls and intrusion detection systems - Network management - The infrastructure for network management - The Internet-Standard management framework - ASN.1.

TOTAL : 45

TEXT BOOK

1. James F. Kurose and Keith W. Ross, 'Computer Networking: A Top-Down Approach', 4th edition, Addison-Wesley, 2007.

REFERENCES

1. Larry Peterson and Bruce Davie, 'Computer Networks: A System Approach', 4th edition, Morgan Kaufmann, 2007.
2. C. Siva Ram Murthy and B. S. Manoj, 'Ad Hoc Wireless Networks: Architectures and Protocols', Prentice Hall, 2004.
3. William Stallings, 'Wireless Communications & Networks', 2nd edition, Prentice Hall, 2005.
4. Jochen Schiller, 'Mobile Communications', 2nd edition, Addison-Wesley, 2003.

IT 602	ADVANCED DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

OBJECTIVES

- To understand the architecture of database management systems.
- To get experience with analysis and design of database.
- To know the difference between DBMS, RDBMS and OODBMS.
- To understand the concept of distributed databases.
- To know about semi structured and web databases.
- To acquire knowledge about data analysis and mining.

UNIT I DATABASE SYSTEM ARCHITECTURES 9

Centralized, Client-Server, Parallel and Distributed, Relational Databases-
Overview of Relational Database Design, Query Processing and Optimization

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES 10

Complex Data Types, Implementing Object and Object-Relational Features,
SQL3, Parallel Databases: Data Partitioning, Interquery, Intraquery,
Intraoperation and Interoperation Parallelisms

UNIT III DISTRIBUTED DATABASES 9

Distributed data storage, Transactions, Commit Protocols, Concurrency and
Availability and Query Processing.

UNIT IV SEMI STRUCTURED AND WEB DATABASES 7

Data Models, XML, XML schema, Querying and Transformation, Storage of
XML data

UNIT V DATA ANALYSIS AND MINING 10

Decision-Support Systems, Data Analysis and OLAP, Data Warehousing and
Data Mining, Other Emerging Database Technologies and Applications Time
in Databases, Spatial and Geographic Data, Active Databases, Multimedia
Databases, Mobile Databases, Genome Data Management.

Total: 45

REFERENCES

1. Silberschatz, Korth and Sudarshan, 'Database System Concepts', Fifth Edition, McGraw Hill, 2005.
2. Ramez Elmasri and S B Navathe, 'Fundamentals of Database Systems', Fifth Edition Addison-Wesley, 2006.
3. Ramakrishnan and Gehrke, 'Database Management Systems', Third Edition, McGraw Hill, 2002.

IT 603	OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To give students a detailed understanding of processes and techniques for building large object-oriented software systems.
- To study and experiment with alternative models of the software development process from the classical waterfall model to Extreme programming
- To develop skills to evolve object-oriented systems from analysis, to design, to implementation.
- To understand most of the major object-oriented technologies including basic OO concepts, processes, languages, databases, user interfaces, frameworks, and design patterns.
- To develop skills to work as a team for developing a software project
- To discuss and explore recent innovations in OOSE.

UNIT I CLASSICAL PARADIGM 9

System Concepts - Project Organization - Communication - Project Management

UNIT II PROCESS MODEL 9

Life cycle models - Unified Process - Iterative and Incremental - Workflow - Agile Processes

UNIT III ANALYSIS 9

Requirements Elicitation - Use Cases - Unified Modeling Language, Tools - Analysis Object Model (Domain Model) - Analysis Dynamic Models - Non-functional Requirements - Analysis Patterns.

UNIT IV DESIGN 9

System Design, Architecture - Design Principles - Design Patterns - Dynamic Object Modeling - Static Object Modeling - Interface Specification - Object Constraint Language.

UNIT V IMPLEMENTATION, DEPLOYMENT AND MAINTENANCE 9

Mapping Design (Models) to Code - Testing - Usability - Deployment - Configuration Management - Maintenance

Total: 45

REFERENCES

1. Bernd Bruegge, Alan H Dutoit, 'Object-Oriented Software Engineering', 2nd ed, Pearson Education, 2004.
2. Craig Larman, 'Applying UML and Patterns' 3rd ed, Pearson Education, 2005.
3. Stephen Schach, 'Software Engineering' 7th ed, McGraw-Hill, 2007.
4. Ivar Jacobson, Grady Booch, James Rumbaugh, 'The Unified Software Development Process', Pearson Education, 1999.
5. Alistair Cockburn, 'Agile Software Development' 2nd ed, Pearson Education, 2007.

OBJECTIVES:

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures
- At the end of this lab session, the student will be able to design and analyze the time and space efficiency of the data structure; be capable to identify the appropriate data structure for a given problem; have practical knowledge on the application of data structures.

LIST OF EXERCISES

1. Min/Max Heaps (Insertion, Delete Min / Delete Max)
2. Binary Search Trees (Insertion, Deletion and Search)
3. AVL Trees (Insertion, Deletion and Search)
4. B-Trees (Insertion, Deletion and Search)
5. Finding Spanning Trees
6. Finding connected components of a graph
7. Knapsack problem
8. Graph coloring
9. Depth-first and Breadth-first searches
10. Real time Case Studies in Data Structures

OBJECTIVES

- To make students familiar with object-oriented concepts can learn how to develop Java technology applications.
- To provide an object-oriented programming with the Java programming language; creating graphical user interfaces (GUIs), exceptions, file input/output (I/O), and threads; and networking.
- To create Java technology applications that leverage the object-oriented features of the Java language, such as encapsulation, inheritance, and polymorphism and to create multithreaded programs

LIST OF EXERCISES

1. Develop static pages using HTML.
2. Create dynamic web pages using DHTML.
3. Enrich the web pages using CSS and Validate using Java Script.
4. Implementation of Object Oriented Concepts in JAVA
5. Simple Java programming using APPLETS.
6. Create a Java application and connect the database using JDBC.
7. Java networking concepts: Socket programming
8. Simple programs using RMI concept in Java
9. Java Bean application using BDK
10. Java Application using NETBEANS 5.1

SEMESTER II

IT 606	MULTIMEDIA TECHNOLOGY AND APPLICATIONS	L	T	P	C
		3	0	0	3

OBJECTIVES

- To introduce students to various multimedia elements along with the theoretical underpinnings and to expose them to integration of these elements.

By the end of this course, students should be:

- Familiar with features of text, audio, images, video and active contents as multimedia elements
- Familiar with representational methods for the above elements
- Familiar with the file formats for the above elements
- Aware of various application softwares used to process the above elements
- Aware of various applications of multimedia

UNIT I MULTIMEDIA CONCEPTS 9

Introduction to Multimedia: Multimedia Elements - Multimedia System Architecture - Evolving technologies for Multimedia - Defining objects for Multimedia systems - Multimedia Data interface standards - Multimedia Databases

UNIT II MULTIMEDIA COMPONENTS 9

Overview of Text and Character representations - Audio: Basic Concepts - Data acquisition and digitization - Audio Formats - Image : Image Representation Formats and compression techniques - Color Schemes - Video : Analogue and Digital Video - Recording Formats and Standards - Transmission of Video Signals - Video Capture - Video compression techniques.

UNIT III DOCUMENT ARCHITECTURE AND CONTENT MANAGEMENT 9

Content Management: Content Design and Development - General Design Principles - Hypertext Concepts - Open Document Architecture (ODA) - Multimedia and Hypermedia Coding Expert Group (MHEG) - Standard Generalized Markup Language (SGML) - Document Type Definition (DTD) - Hypertext Markup Language (HTML) in Web Publishing.

UNIT IV MULTIMEDIA NETWORKS

9

Multimedia Networks: Basics of Multimedia Networks - Multimedia Network Communications and Applications - Quality of Multimedia Data Transmission - Multimedia over IP - Multimedia over ATM Networks - Transport of MPEG-4 - Media-on-Demand (MOD).

UNIT V APPLICATIONS

9

Multimedia in the Real World: Video conferencing - Virtual reality - Interactive video - video on demand - Training and Education - Kiosks - Image Processing - The Multimedia Office - Multimedia in the Home - Case Study: Application for Industrial - Educational and Medical Domains.

L- 45

Total - 45

TEXT BOOKS

1. Ralf Steinmetz and Klara Nahrstedt, 'Multimedia: Computing, Communications and Applications ', Prentice - Hall, India. 2008.
2. Vaughan T, Multimedia, Tata McGraw Hill, Seventh Edition ,2008

REFERENCES

1. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia , Pearson Education, 2008.
2. Jeffcoate, J. 'Multimedia in Practice: Technology and Application.' Prentice Hall, 2009.
3. Andleigh P.K., Thakrar K., Multimedia Systems Design (PHI).2003.
4. Steinmetz R., Nahrstedt K. Multimedia Fundamentals (Vol I: Media coding & content processing) 2nd ed - (Pearson Ed.).2002.
5. Nalin K. Sharda, Multimedia Information Networking, Prentice-Hall, 2009.
6. Halsall F. Multimedia Communications: Applications, Networks, Protocols and Standards, Pearson Ed., 2002.
7. Mark J Bunzel, Sandra K. Morris, Multimedia Application Development - Second Edition, McGraw Hill, 1994.

OBJECTIVES

- To understand the importance of communication in distributed environment and the actual implementation of various communication mechanisms.
- To study how a distributed operating system works and how it differs from the single processor OS.
- To learn how to manage the resources in a distributed environment.
- To learn how to make a distributed systems fault tolerant.
- To study how the above-mentioned techniques have been used in actual, real-life distributed systems.
- To study the various distributed systems as case studies.
- To develop a fault tolerant real time distributed system.

UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT 8

Introduction - Client - Server Paradigm - Threads in distributed Systems - Remote Procedure Call - Remote Object Invocation - Message-Oriented Communication - Unicasting - group Communication - Reliable and Unreliable Multicasting.

UNIT II DISTRIBUTED OPERATING SYSTEMS 12

Issues in Distributed Operating System - Lamport's Logical clock - Vector Clock - Causal Ordering - Global States - Election Algorithms - Distributed Mutual Exclusion - Distributed Transaction - Distribute Deadlock - Agreement Protocol.

UNIT III DISTRIBUTED SHARED MEMORY 10

Introduction - Data - Centric Consistency Models - Client - Centric Consistency Models - Distribution Protocols - Consistency Protocols - ivy - Munin - Atomic Transaction.

UNIT IV FAULT TOLERANCE AND DISTRIBUTED FILE SYSTEMS 7

Introduction to fault Tolerance - Distributed Commit Protocol - Distributed File System Architecture - Issues in Distributed File Systems - Sun NFS.

UNIT V CASE STUDIES

8

Distributed Object - Based System - CORBA - COM - Distributed Coordination-
Based System - JINI.

Total: 45

TEXT BOOKS:

1. George Coulouris, Jean Dollimore, Tim Kindberg, 'Distributed Systems Concepts and Design' , Third Edition, Pearson Education Asia, 2002.
2. Mukesh Singhal, 'Advanced Concepts in Operating Systems', McGraw Hill Series in Computer Science, 1994.

REFERENCES:

1. A.S. Tanenbaum, M. Van Steen, 'Distributed Systems', Pearson Education, 2004.
2. M.L.Liu, 'Distributed Computing Principles and Applications' , Pearson Addison Wesley, 2004.

IT 608	INFORMATION SECURITY	L T P C
		3 1 0 4

OBJECTIVES

- To understand the basics of cryptography.
- To understand the basics of Information Security.
- To know the legal, ethical and professional issues in Information Security.
- To know the requirement of security in Operating System, Database and Network.
- To know the technological aspects of Information Security.
- Upon completion of this course, attendees should be able to the critical need for ensuring Information Security in Organizations

UNIT I CRYPTOGRAPHY 9

Security problem in computing - Elementary Cryptography - Symmetric Key Encryption Public Key Encryption - Uses of Encryption.

UNIT II PROGRAM SECURITY 9

Security Programs - Non-malicious program Errors - Virus and other Malicious Code - Targeted Malicious Code - Control against program threats.

UNIT III OPERATING SYSTEM AND DATABASE 9

Memory and Address Protection - File Protection Mechanisms - User Authentication - Trusted Operating Systems - Designing Trusted Operating Systems- Assurance in Trusted Operating Systems-Database Security Requirements - Multilevel Databases and Multilevel Security.

UNIT IV NETWORK SECURITY 9

Threats in Networks - Network Security Controls - firewalls - Intrusion Detection Systems - Secure E-Mail

UNIT V ADMINSTERING SECURITY AND ETHICAL ISSUES 9

Security Planning - Risk Analysis - Organizational Security Policies - Physical Security - Protecting Programs and Data - Information and the Law - Software Failures - Computer Crime - Privacy - Ethical Issues.

L: 45 T: 15

Total: 60

TEXT BOOK

Charles B. Pfleeger, Shari Lawrence Pfleeger, Third Edition, 'Security in Computing' Pearson Education, 2003.

REFERENCES

1. William Stallings, 'Cryptography and Network Security - Principles and Practices', Third Edition, Pearson Education 2003.
2. Atul Kahate, 'Cryptography and Network Security', Tata McGraw Hill, 2003.

OBJECTIVES

- To introduce internet principles and basic concepts of Markup Languages.
- To develop programming skills in Common Gateway interface.
- To develop web applications using server side scripting languages
- To enhance the knowledge of students with rich internet applications and multimedia in web.
- To understand the concepts of web services and its technologies.
- To enable the students to learn advanced concepts in web and to impart knowledge for developing web 2.0 applications.

UNIT I INTRODUCTION 8

Internet Principles - Basic Web Concepts: World Wide Web-HTTP-Information Retrieval - HTML and Scripting Languages - Markup Languages

UNIT II COMMON GATEWAY INTERFACE PROGRAMMING 9

Client Side Programming: Java Script Language - Functions - Objects - Browsers and DOM - Server -Browser Communication - E-Mail Generation - CGI Concepts - CGI Client Side Applets - CGI Server Side Applets - Authorization and Security - Review of Socket Programming

UNIT III SERVER SIDE PROGRAMMING 10

Servlet Architecture Overview - Dynamic Web Content - Cascading Style Sheets - Representing Web Data : XML - Data Storage - Active and Java Server Pages - Servlets and Concurrency - Firewalls - Proxy Servers - JSP Technology.

UNIT IV MULTIMEDIA 8

Audio and video speech synthesis and recognition - On Line Data Bases-Internet Information Systems -Internet Commerce - Principles of Web Mining.

UNIT V WEB SERVICE 10

Introduction - Web Services Technologies: Architecture - Basic Technology: SOAP (Simple Object Access Protocol) - WSDL - UDDI - Service Oriented

Architecture - Service Co ordination Protocol - Web Service Composition - Security / Privacy Issues in Web Services.

Total: 45

TEXT BOOKS

1. Deitel & Deitel, Goldberg, 'Internet and world wide web - How to Program', Pearson Education Asia, 2001
2. Jeffrey C Jackson, 'Web Technologies: A Computer Science Perspective', Prentice Hall, 2006
3. Gustavo Alonso Fabio Casati, Harumi Kuno, Vijay Machiraju , 'Web Services: Concepts, Architecture and Applications', Springer - Verlag, 2004.

REFERENCES

1. Ramesh R Sarukkai 'Foundations of Web Technology', Kluwer Academic Publishers, 2002.
2. Anders Miller,'An Introduction to XML and Web Technologies', Michael Schwartzbach, Addison Wesley, 2006.
3. Michael P Papzoglou, 'Web Services: Principles and Technology', Pearson - Prentice hall, 2007.
4. Scott Johnson, Keith Ballinger, 'Using Active Server Pages', Prentice Hall of India, 1999.

OBJECTIVES

- To Develop simple HTML and DHTML programs
- To enhance the same with Cascading style sheets
- To use Filters and transitions and concepts of data binding in DHTML
- To learn using structured graphics Active X control
- To develop web applications using JavaScript and ASP
- To program web servers and Database.
- To learn advanced concepts of Servlets and JSP.
- To enhance the students knowledge and develop their hands on experience in creating web application using various scripting languages like ASP and JSP and DHTML.

LIST OF APPLICATIONS

1. Simple HTML, DHTML programs
2. Carrying Data from Page to Page: Cookies and Sessions
3. Cascading Style Sheet
4. Filter and Transitions
5. Data binding with tabular data control
6. Structured Graphics Active X control
7. Program using Java script
8. Active Server pages (ASP)
9. Program on web server Data Bases (SQL, MYSQL, DBI)
10. JSP - Servlets

OBJECTIVE

To practice the object oriented system development concepts using CASE tools.

LIST OF SAMPLE APPLICATIONS:

1. Insurance Management System
2. University Mark Analyzing System
3. On line Hotel Reservation System
4. Human Resource Management System
5. Income Tax Calculation

Develop the above applications using the Object Oriented System Methodologies namely

1. Project Planning
2. Software Requirement Analysis
3. Software Estimation
4. Software Design
5. Data Modeling & Implementation
6. Software Testing
7. Software Debugging

Toolkit and gLite - Architecture, Components and Features. Features of Next generation grid.

Total : 45

REFERENCES

1. Ian Foster, Carl Kesselman, 'The Grid 2: Blueprint for a New Computing Infrastructure', Elsevier Series, 2004.
2. Vladimir Silva, 'Grid Computing for Developers', Charles River Media, January 2006.
3. Jarek Nabrzyski, Jennifer M. Schopf, Jan Weglarz, 'Grid Resource Management: State of the Art and Future Trends', (International Series in Operations Research & Management Science), Springer; First edition, 2003
4. Borja Sotomayor , Lisa Childers, 'Globus Toolkit 4 : Programming Java Services , The Elsevier Series in Grid Computing', Morgan Kaufmann, 2005.

OBJECTIVES

- To understand improved planning through better understanding of process performance
- To effective use of organizational process knowledge
- To transfer Knowledge from project level to the organization level
- To learn improved coordination among people involved in a project
- To understand the institutionalizing key management practices such as Reuse of knowledge, Integration of plans, Tracking dependencies & collaboration issues, and “Post mortem” analysis.

UNIT I PROJECT MANAGEMENT CONCEPT 9

Evolution of Software Economics - Software Management Process Framework (Phases, Artifacts, Workflows, Checkpoints) - Software Management Disciplines (Planning / Project Organization and Responsibilities / Automation / Project Control) - Modern Project Profiles - CMMI - ISO Standards

UNIT II SOFTWARE ESTIMATION & COSTING 10

Problems in Software Estimation - Algorithmic Cost Estimation Process, Function Points, SLIM (Software Life cycle Management), COCOMO II (Constructive Cost Model) - Estimating Web Application Development - Concepts of Finance, Activity Based Costing and Economic Value Added (EVA) - Balanced Score Card.

UNIT III RISK MANAGEMENT 10

Risk Definition - Risk Categories - Risk Assessment (Identification / Analysis / Prioritization) - Risk Control (Planning / Resolution / Monitoring) - Failure Mode and Effects Analysis (FMEA)

UNIT IV METRICS 10

Need for Software Metrics - Classification of Software Metrics: Product Metrics (Size Metrics, Complexity Metrics, Halstead's Product Metrics, Quality Metrics), and Process metrics (Empirical Models, Statistical Models, Theory-based Models, Composite Models, and Reliability Models).

Team Management - Client Relationship Management, PCMM

Total: 45

REFERENCES

1. McConnell, S. 'Software Project: Survival Guide', Microsoft Press, 1998.
2. Royce, W. 'Software Project management: A Unified Framework', Addison-Wesley, 1998.
3. Cooper, R., 'The Rise of Activity-Based Costing- PartOne: What is an Activity-Based Cost System' Journal of Cost Management, Vol.2, No.2 (Summer 1988), pp.45 - 54.
4. Grant, J.L. 'Foundations of Economic Value Added', John Wiley & Sons, 1997.
5. Kaplan, R.S., Norton, D.P. 'The Balanced Scorecard: Translating Strategy into Action', Harvard Business School Press, 1996.
6. Demarco, T. and Lister, T. 'Peopleware: Productive Projects and Teams, 2nd Ed.', Dorset House, 1999.

OBJECTIVES

- To Use the Adobe Photoshop, Macromedia Dreamweaver and Macromedia Flash software applications.
- To effectively apply the fundamentals of multimedia design including the aesthetic and technical aspects.
- To Incorporate all of the various multimedia elements to produce an interactive multimedia product.
- To Create a variety of original graphics and animation.
- To Understand the roles and responsibility of a multimedia design team.
- Participate on a design team, understanding and applying effective project planning and time management on both an individual and team level.
- Use effective interpersonal communications skills to enhance clarity of communication, enhance team performance and build effective working relationships.
- To Understand the business process of the multimedia development industry.
- Effectively work with a client in designing, developing and prototyping a multimedia product that meets their needs.

Photoshop:

Getting to Know the Work Area, Basic Photo Corrections, Retouching and Repairing, Working with Selections, Layer Basics, Masks and Channels, Correcting and Enhancing Digital Photographs, Typographic Design, Preparing Files for the Web.

Flash:

Getting Acquainted, Working with Graphics, Creating and Editing Symbols, Working with Text, Adding Animation, Creating Interactive Files, Action Script Basics, Using Components, Working with Sound and Video, Loading and Optimizing Flash Content, Publishing Flash Documents.

Windows Movie Maker / Adobe Premier:

Getting Acquainted, Working with pictures, Sound and Video, Working with Text, Adding Animation, Transitions, Preparing Files for the CD / Web

Adobe Dreamweaver:

Developing a Basic Web Page, Adding Hypertext Links to a Web Page, Designing a Web Page, Designing a Web Page with Tables, Using Frames in a Web Site, Creating Web Page Forms, Embedding JavaScript into HTML

XML, Java Script, Networking:

Document Type Definition (DTD) - Extensible Markup Language (XML), Creating Style Sheets using XSL, the Role of Extensible Hypertext Markup Language (XHTML) in Web Publishing. Protocols: HTTP, FTP, SMTP. Common Gateway Interface (CGI) - Script language - Multimedia Applications over the Intranet and Internet.

context aware, automated experience capture. Architecture for pervasive computing- Pervasive devices-embedded controls.- smart sensors and actuators -Context communication and access services

UNIT V

10

Open protocols- Service discovery technologies- SDP, Jini, SLP, UpnP protocols-data synchronization- SyncML framework - Context aware mobile services -Context aware sensor networks, addressing and communications. Context aware security.

TOTAL: 45

REFERENCES

1. Ivan Stojmenovic, 'Handbook of Wireless Networks and Mobile computing', John Wiley & sons Inc, Canada, 2002.
2. Asoke K Taukder, Roopa R Yavagal, 'Mobile Computing', Tata McGraw Hill Pub Co. , New Delhi, 2005.
3. Seng Loke, 'Context-Aware Computing Pervasive Systems', Auerbach Pub., New York, 2007.
4. Uwe Hansmann etl, ' Pervasive Computing', Springer, New York, 2001.

OBJECTIVES

- To emphasize how to use the computer as a tool for biomedical research.
- To understand the use of Databases and Data mining concepts in the field of Biology.
- To study and understand the various modeling techniques that are used for modeling biological data.
- To explore visualization techniques for DNA and RNA molecules.
- To be aware of the microarray technology for genome expression study.

UNIT I INTRODUCTORY CONCEPTS

9

The Central Dogma - The Killer Application - Parallel Universes - Watson's Definition - Top Down Versus Bottom up - Information Flow - Convergence - Databases - Data Management - Data Life Cycle - Database Technology - Interfaces - Implementation - Networks - Geographical Scope - Communication Models - Transmissions Technology - Protocols - Bandwidth - Topology - Hardware - Contents - Security - Ownership - Implementation - Management.

UNIT II SEARCH ENGINES AND DATA VISUALIZATION

9

The search process - Search Engine Technology - Searching and Information Theory - Computational methods - Search Engines and Knowledge Management - Data Visualization - sequence visualization - structure visualization - user Interface - Animation Versus simulation - General Purpose Technologies.

UNIT III STATISTICS AND DATA MINING

9

Statistical concepts - Microarrays - Imperfect Data - Randomness - Variability - Approximation - Interface Noise - Assumptions - Sampling and Distributions - Hypothesis Testing - Quantifying Randomness - Data Analysis - Tool selection statistics of Alignment - Clustering and Classification - Data Mining - Methods - Selection and Sampling - Preprocessing and Cleaning - Transformation and Reduction - Data Mining Methods - Evaluation - Visualization - Designing new queries - Pattern Recognition and Discovery - Machine Learning - Text Mining - Tools.

UNIT IV PATTERN MATCHING

9

Pairwise sequence alignment - Local versus global alignment - Multiple sequence alignment - Computational methods - Dot Matrix analysis - Substitution matrices - Dynamic Programming - Word methods - Bayesian methods - Multiple sequence alignment - Dynamic Programming - Progressive strategies - Iterative strategies - Tools - Nucleotide Pattern Matching - Polypeptide pattern matching - Utilities - Sequence Databases.

UNIT V MODELING AND SIMULATION

9

Drug Discovery - components - process - Perspectives - Numeric considerations - Algorithms - Hardware - Issues - Protein structure - AbInitio Methods - Heuristic methods - Systems Biology - Tools - Collaboration and Communications - standards - Issues - Security - Intellectual property.

Total: 45

REFERENCES

1. Bryan Bergeron, 'Bio Informatics Computing', Second Edition, Pearson Education, 2003.
2. T.K.Attwood and D.J. Perry Smith, 'Introduction to Bio Informatics, Longman Essen, 1999.

OBJECTIVES

- To gain understanding of the basic concepts of cloud computing
- To learn various types of cloud service development and service providers
- To learn technology underlying the applications of cloud computing collaborative technologies
- To learn concepts such as collaborating on event management, contact management & project managements
- To know about advanced concepts such as web mail services, web tools in cloud computing
- To develop the various cloud services using different types of collaborative technologies.

UNIT I

6

Cloud Computing - History of Cloud Computing - Cloud Architecture - Cloud Storage - Why Cloud Computing Matters - Advantages of Cloud Computing - Disadvantages of Cloud Computing - Companies in the Cloud Today - Cloud Services.

UNIT II

10

Web-Based Application - Pros and Cons of Cloud Service Development - Types of Cloud Service Development - Software as a Service - Platform as a Service - Web Services - On-Demand Computing - Discovering Cloud Services Development Services and Tools - Amazon Ec2 - Google App Engine - IBM Clouds.

UNIT III

10

Centralizing Email Communications - Collaborating on Schedules - Collaborating on To-Do Lists - Collaborating Contact Lists - Cloud Computing for the Community - Collaborating on Group Projects and Events - Cloud Computing for the Corporation.

UNIT IV

10

Collaborating on Calendars, Schedules and Task Management - Exploring Online Scheduling Applications - Exploring Online Planning and Task Management - Collaborating on Event Management - Collaborating on Contact

Management - Collaborating on Project Management - Collaborating on Word Processing - Collaborating on Databases - Storing and Sharing Files.

UNIT V

9

Collaborating via Web-Based Communication Tools - Evaluating Web Mail Services - Evaluating Web Conference Tools - Collaborating via Social Networks and Groupware - Collaborating via Blogs and Wikis.

Total:45

REFERENCES

1. Michael Miller, 'Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online', Que Publishing, August 2008.
2. Haley Beard, 'Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs', Emereo Pty Limited, July 2008.

OBJECTIVES

- To explore the key issues associated with the design and management of industrial Supply Chains (SC).
- To cover the efficient integration of suppliers, factories, warehouses and stores so that products are distributed to customers in the right quantity and at the right time.
- To minimize the total supply chain cost subject to various service requirements.
- Students will be able to describe and explain fundamentals of SC and to derive and compute optimal policies/variables, performance measures such as costs/prots, and be aware of SC practices.

UNIT I FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT 9

Supply chain networks, integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT II SCM STRATEGIES, PERFORMANCE 9

Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT III PLANNING AND MANAGING INVENTORIES 9

Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT IV DISTRIBUTION MANAGEMENT 9

Role of transportation in a supply chain - direct shipment, warehousing, cross-

docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning,

UNIT V STRATEGIC COST MANAGEMENT IN SUPPLYCHAIN 9

The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

Total: 45

REFERENCES

1. David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi,' Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies', Second Edition, McGraw-Hill/Irwin, New York, 2003.
2. Sunil Chopra and Peter Meindel. 'Supply Chain Management: Strategy, Planning, and Operation', Prentice Hall of India, 2002.
3. Sunil Chopra & Peter Meindl, 'Supply Chain Management', Prentice Hall Publisher, 2001.
4. Robert Handfield & Ernest Nichols, 'Introduction to Supply Chain Management ', Prentice hall Publishers, 1999.

OBJECTIVES

- To provide in-depth coverage of advances in wireless networks.
- To learn fundamentals of wireless communication.
- To understand the various components of wireless Internet.
- To learn the issues of Adhoc wireless network and wireless sensor networks.
- To understand the applications of sensor networks.
- To study an awareness of trends and developments in wireless networks.
- To develop a wireless LAN.
- To develop a wireless networks which provides quality of services to the end user.

UNIT I WIRELESS LANS, PANS AND MANS

9

Introduction, fundamentals of WLAN -technical issues, network architecture, IEEE 802.11- physical layer, Mac layer mechanism, CSMA/CA, Bluetooth-specification, transport layer, middleware protocol group, Bluetooth profiles, WLL -generic WLL architecture, technologies, broadband wireless access, IEEE 802.16 -differences between IEEE 802.11 and 802.16,physical layer, data link layer.

UNIT II WIRELESS INTERNET

9

Introduction -wireless internet, address mobility, inefficiency of transport layer and application layer protocol, mobile IP - simultaneous binding, route optimization, mobile IP variations, handoffs, IPv6 advancements, IP for wireless domain, security in mobile IP, TCP in wireless domain - TCP over wireless , TCPs -traditional, snoop, indirect, mobile, transaction- oriented, impact of mobility.

UNIT III AD-HOC WIRELESS NETWORK AND WIRELESS SENSOR NETWORK

9

Introduction, issues -medium access scheme, routing, multicasting, transport layer protocol, pricing scheme, QoS provisioning, self-organization, security, addressing, service discovery, energy management, deployment consideration, ad-hoc wireless internet.

UNIT IV WIRELESS SENSOR NETWORK

9

Introduction - applications of sensor network, comparisons with MANET, issues and design challenges, architecture - layered and clustered , data dissemination, data gathering, Mac protocols, location discovery, quality of sensor network - coverage and exposure, zigbee standard.

UNIT V RECENT ADVANCES IN WIRELESS NETWORK

9

UWB radio communication- operation of UWB systems, comparisons with other technologies, major issues, advantages and disadvantages, Wi-Fi systems- service provider models, issues, interoperability of Wi-Fi and WWAN, multimode 802.11 - IEEE 802.11a/b/g - software radio-based multimode system, megahdoot architecture -802.11 phone, fundamentals of UMTS.

Total: 45

REFERENCES

1. C.Siva Ram Murthy and B.S. Manoj, 'Ad-hoc wireless networks-architecture and protocols', Pearson education, 2nd, 2005.
2. Kaveh Pahlavan and Prashant Krishnamurthy, 'Principle of Wireless network- A unified approach', Prentice Hall, 2006.
3. Jochen Schiller, 'Mobile Communication', Pearson education, 2nd edition 2005.
4. William Stallings, 'Wireless Communication and Networks', Prentice Hall, 2nd edition, 2005.
5. Clint Smith and Daniel Collins, '3G wireless networks', Tata McGraw Hill, 2nd edition, 2007.

ITY 006	ENTERPRISE RESOURCE PLANNING	L	T	P	C
		3	0	0	3

OBJECTIVES

- To know the basics of ERP
- To understand the key implementation issues of ERP
- To know the business modules of ERP
- To be aware of some popular products in the area of ERP
- To appreciate the current and future trends in ERP

UNIT I INTRODUCTION TO ERP 9

Overview - Benefits of ERP - ERP and Related Technologies - Business Process Reengineering - Data Warehousing - Data Mining - On-line Analytical Processing - Supply Chain Management.

UNIT II ERP IMPLEMENTATION 9

Implementation Life Cycle - Implementation Methodology - Hidden Costs - Organizing Implementation - Vendors, Consultants and Users - Contracts - IT91 Project Management and Monitoring.

UNIT III BUSINESS MODULES 9

Business Modules in an ERP Package - Finance - Manufacturing - Human Resource - Plant Maintenance - Materials Management - Quality Management - Sales and Distribution.

UNIT IV ERP MARKET 9

ERP Market Place - SAP AG - PeopleSoft - Baan Company - JD Edwards World Solutions Company - Oracle Corporation - QAD - System Software Associates.

UNIT V ERP - PRESENT AND FUTURE 9

Turbo Charge the ERP System - EIA - ERP and E-Commerce - ERP and Internet - Future Directions in ERP.

Total: 45

REFERENCES

1. Alexis Leon, 'ERP Demystified', Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, 'Concepts in Enterprise Resource Planning', Thomson Learning, 2001.
3. Vinod Kumar Garg and N.K .Venkata Krishnan, 'Enterprise Resource Planning - concepts and Planning', Prentice Hall, 1998.
4. Jose Antonio Fernandz, ' The SAP R /3 Hand book', Tata McGraw Hill,1998.

ITY 007	SOFT COMPUTING	L T P C
		3 0 0 3

OBJECTIVES

- To have the basic idea of artificial intelligence with the use of heuristics based search algorithms.
- To become familiar with neural networks that can learn from available and generalize to form appropriate rules for inference systems.
- To introduce the ideas of fuzzy sets, fuzzy logic and fuzzy based systems.
- To familiarize with basics of genetic algorithms.
- To be able to develop an application using the various soft computing techniques.

UNIT I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS 10

Evolution of Computing - Soft Computing Constituents - From Conventional AI to Computational Intelligence - Machine Learning Basics - Supervised Learning Neural Networks - Unsupervised Learning - Competitive Learning Networks - Kohonen Self - Organizing Networks - Learning Vector Quantization - Hebbian Learning

UNIT II FUZZY SYSTEMS 9

Fuzzy sets and Fuzzy reasoning - Fuzzy Matrices - Fuzzy functions- Decomposition - Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making.

UNIT III GENETIC ALGORITHMS 9

Introduction to Genetic Algorithms (GA) - Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT IV NEURO - FUZZY MODELING 9

Adaptive networks based Fuzzy interface systems - Classification and Regression Trees - Data clustering algorithms - Rule based structure identification - Neuro- Fuzzy controls - simulated annealing - Evolutionary computation.

UNIT V APPLICATION OF COMPUTATIONAL INTELLIGENCE 8

Printed Character Recognition - Inverse Kinematics Problems - Automobile Fuel Efficiency prediction - Soft Computing for Color Recipe Prediction.

Total: 45

TEXT BOOKS

1. Jyh-shing Roger Jang, Chuen - Tsai Sun, Eiji Mizutani, 'Neuro- Fuzzy and Soft Computing', Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, 'Fuzzy Sets and Fuzzy Logic-Theory and Application', Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, 'Neural Networks Algorithms, Applications, and Programming Techniques', Pearson Edn., 2003
4. Davis E. Goldberg, 'Genetic Algorithms: Search, Optimization and Machine Learning' Addison Wesley, N.Y., 1989.

ITY 008	COMPONENT BASED TECHNOLOGY	L	T	P	C
		3	0	0	3

OBJECTIVES

- Introduces in depth JAVA, CORBA and .Net Components
- To deal with fundamental properties of components, technology and architecture and middleware.
- To cover Component Frameworks and Development in depth.

UNIT I INTRODUCTION 9

Software Components - Objects - fundamental properties of Component technology - Modules - interfaces - callbacks - directory services - component architecture - components and middleware.

UNIT II COM TECHNIQUES 9

COM - Distributed COM - COM Facilities and Services - Applying COM Objects - Interface Objects - Class - Factory Components - Servers - Clients - Object Orientation Infrastructures - Memory Transparency - Concurrency - Security.

UNIT III JAVA BASED COMPONENT TECHNOLOGIES 9

Threads - Java Beans - Events and connections - properties - introspection - JAR files - reflection - Object serialization - Enterprise Java Beans - Distributed Object models - RMI and RMI-IIOP.

UNIT IV CORBA COMPONENT TECHNOLOGIES 9

Java and CORBA - Interface Definition language- Object Request Broker - system object model - portable object adapter - CORBA services - CORBA component model - containers - application server - model driven architecture.

UNIT V NET BASED COMPONENT TECHNOLOGIES 9

COM - Distributed COM - Object reuse - interfaces and versioning - dispatch interfaces - connectable objects - OLE containers and servers - Active X controls - .NET components - assemblies - appdomains - contexts- reflection-remoting.

Total: 45

TEXT BOOKS

1. Clemens Szyperski, 'Component Software: Beyond Object-Oriented Programming', Pearson Education publishers, 2003.
2. 'Inside COM', Microsoft press, 2000.

REFERENCES

1. Ed Roman, 'Mastering Enterprise Java Beans', John Wiley & sons Inc., 1999
2. Mowbray, 'Inside CORBA', Pearson Education, 2003.
3. Feeze, 'Visual Basic Development guide for COM & COM+', BPB Publication, 2001.
4. Hortsamann, Cornell, 'CORE JAVA Vol-II Sun Press, 2002.

ITY 009	WEB DESIGN AND MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES

- To understand and effectively use the most current versions of HTML, XHTML, and CSS languages in order to produce basic Web pages.
- To understand and effectively use structure tags, format tags, hypertext links, graphics, image maps, tables, forms, and other concepts in the creation of Web pages.
- To evaluate the design and effectiveness of Web pages.
- To design attractive, dynamic, and effective Web sites.
- To announce and promote their Web sites efficiently.

UNIT I WEB PAGE AUTHORIZING FUNDAMENTALS 9

Introduction to Web Site Development -Markup Language and Site Development Essentials-XHTML Coding - Elements -Hyperlinks -Tables -Web Forms -Image Techniques -Frames -GUI HTML Editors- Introduction to Networking -TCP/IP Suite and Internet Addressing

UNIT II WEB LANGUAGES 9

JavaScript Introduction -Functions, Methods and Events -Program Flow -Object Model - Browser Objects -Language Objects -Interactive Forms -Cookies and JavaScript Security -Client-Side JavaScript Getting Started with Perl- Intro- Arrays - Matching and Substitution -Subroutines -References-Packages - Modules

UNIT III SERVICES, SERVERS, INTEGRITY 9

Windows 2000 DNS Server -Configuring DNS in Windows NT -NetBIOS - Managing WINS -Introduction to FTP -Virtual FTP Servers -FTP Access - Telnet -Xinetd -Web Applications -Perl and E-Commerce Web Servers -Web Servers and Gateways Web Server and Gateway Overview -Streaming Media Servers -Configuring a News Server -Optimizing Servers-Introduction to Security -SSL -Proxy Servers -Introduction to Fault Tolerance -Disaster Assessment and Recovery

UNIT IV DESIGN METHODOLOGY 9

Overview of Web Design Concepts -Web Project Management Fundamentals -Web Page Layout and Elements -Web Site Usability and Accessibility - Navigation Concepts -Web Graphics -Multimedia and The Web -Ethical and

Legal Issues in Web Development -XML and XHTML -Web Page Structure - Tables and Framesets -Cascading Style Sheets -Site Content and Metadata - Site

UNIT V DESIGN TECHNOLOGY

9

Development with Macromedia Dream weaver 8 - Advanced Features -Image Editing with Macromedia Fireworks 8-Multimedia with Macromedia Flash 8 - Timeline, Layers, Symbols and Buttons - Tweens - Movie Clips - Action script, Masks and Practical Uses -JavaScript and DHTML Fundamentals -Plus-ins and Java Applets -HTTP Servers and Web Applications -Databases -Web Site Publishing and Maintenance

Total: 45

TEXT BOOKS

1. L.Mohler, Flash 8 Graphics, 'Animation and Interactivity by James', Onword Press, Thomson Learning, 2006.
2. H. M. Deitel, P. J. Deitel and T. R. Nieto, 'How to program', PHI/Pearson Education Asia, 2000.
3. William Stallings, 'Data and Computer Communications', Pearson, 2007

REFERENCES

1. Chris Bates, 'Web Programming, building internet applications', 2nd edition, WILEY Dreamtech, 2004.
2. Jason Hunter and William Crawford, 'Java Servlet Programming', O'Reilly Pub1999.
3. Anders Miller, Michael Schwartzbach, 'An Introduction to XML and Web Technologies', Addison Wesley, 2006.

ITY 010	WEB SERVICES	L T P C
		3 0 0 3

OBJECTIVES

- To learn the architecture of web services.
- To understand the XML Technology in depth.
- To learn the building block of web services along with implementation of XML in E-Business and Content Management.
- To enrich the knowledge of the web services with XML and Service oriented Architecture.

UNIT I WEB SERVICES TECHNOLOGIES 8

Introduction of Web services, Evolution and differences with Distributed computing, Overview - Architecture, WSDL, SOAP, UDDI, Transactions, Business Process Execution Language for Web Services, WS-Security

UNIT II XML TECHNOLOGY 9

XML - benefits - Advantages of XML over HTML, EDI, Databases - XML based standards - Structuring with schemas - DTD - XML Schemas - XML processing - DOM - SAX - presentation technologies - XSL - XFORMS - XHTML - Transformation - XSLT - XLINK - XPATH - XQuery

UNIT III SOAP 9

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

UNIT IV WEB 2.0 TECHNOLOGIES 9

Introduction to Ajax, Ajax Design Basics, JavaScript, Blogs, Wikis, and RSS feeds

UNIT V SOA FUNDAMENTALS 10

Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOA architecture, infrastructure services, Enterprise Service Bus (ESB), SOA Enterprise Software models.

Total:- 45

TEXT BOOKS

1. Frank. P. Coyle, XML, 'Web Services and The Data Revolution', Pearson Education, 2002.
2. Thomas Erl, 'Service-Oriented Architecture: Concepts, Technology, and Design', Prentice Hall Publication, 2005.
3. Ron Schmeltzer et al. 'XML and Web Services', 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. Sandy Carter, 'The New Language of Business: SOA & Web 2.0', IBM Press, 2007.
4. Ferguson, 'Web Services Platform Architecture: SOAP, WSDL, WS-Policy, WSAddressing, WS-BPEL, WS-Reliable Messaging, and More', Prentice Hall Publication, 2005

ITY 011	DESIGN PATTERNS	L T P C
		3 0 0 3

OBJECTIVES

- To learn how to apply design patterns and the methodologies in it.
- To learn how to apply advanced techniques using Design Patterns.
- To obtain a general reusable solution to a commonly occurring problem within a given context in software design.
- To design a template for how to solve a problem that can be used in many different situations.
- To develop a structural design patterns addressing concerns related to high-level structures of applications being developed.

UNIT I INTRODUCTION 9

History and origin of patterns - Applying Design Patterns - Prototyping - Testing.

UNIT II DESIGN PATTERNS 9

Kinds of pattern - Quality and elements - patterns and rules - Creativity and patterns - Creational patterns - Structural Patterns - Behavioral Patterns, Factory Patterns.

UNIT III FRAMEWORKS 9

State and Strategy of Patterns, Singleton, Composite, Functions and the Command Patterns, Adaptor, Proxy Patterns, Decorator Pattern - Pattern Frameworks and Algorithms.

UNIT IV CATALOGS 9

Pattern catalogs and writing patterns, Patterns and Case Study.

UNIT V ADVANCED PATTERNS 9

Anti-patterns - Case studies in UML and CORBA, Pattern Community

Total: 45

REFERENCES

1. Eric Gamma, Richard Helm, Ralph Johnson, John Vissides, Grady Booch, ' Design Patterns',2002.

M.Tech.Information Technology

2. Elements of Reusable 'Object-Oriented Software', Addison Wesley, 1995.
3. James W-Cooper, 'Java Design Patterns - A Tutorial', Addison Wesley 2000.
4. Craig Larman, 'Applying UML and Patterns: 'An Introduction to Object-Oriented Analysis and Design', and the Unified Process ', 2nd edition, Prentice Hall, 2001.
5. Thomas Mowbray and Raphel Malveaux, 'CORBA and Design Patterns', John Wiley, 1997.
6. William J Brown et al. 'Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis', John Wiley, 1998.

ITY 012	DATA WAREHOUSING AND DATA MINING	L T P C
		3 0 0 3

OBJECTIVES

- To understand the concepts of data warehousing and Architecture.
- To understand the data mining concepts and techniques.
- To be able to efficiently design and manage data storages using data warehousing, and data mining techniques.
- To understand the concept of Fuzzy logic and Genetic algorithm.
- To select and apply appropriate data mining techniques for different applications.

UNIT I **9**

Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining

UNIT II **9**

Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT III **9**

Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases.

UNIT IV **9**

Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods-Neural Networks, Genetic Algorithms, and Fuzzy Systems., Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorisation of methods, Partitioning methods, Outlier Analysis.

UNIT V

9

Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining.

Total : 45

TEXT BOOK

1. J. Han, M. Kamber, 'Data Mining: Concepts and Techniques', Harcourt India / Morgan Kauffman, 2001.

REFERENCES

1. Margaret H.Dunham, 'Data Mining: Introductory and Advanced Topics', Pearson Education 2004.
2. Sam Anahory, Dennis Murry, 'Data Warehousing in the real world', Pearson Education 2003.
3. David Hand, Heikki Manila, Padhraic Smyth, 'Principles of Data Mining', PHI 2004.
4. W.H.Inmon, 'Building the Data Warehouse', 3rd Edition, Wiley, 2003.
5. Alex Bazon, Stephen J.Smith, 'Data Warehousing, Data Mining & OLAP', McGraw-Hill Edition, 2001.
6. Paulraj Ponniah, 'Data Warehousing Fundamentals', Wiley-Interscience Publication, 2003.
7. Inmon W.H., 'Building the Data Warehouse', USA: John Wiley & Sons Inc. Third Edition, 2002.

ITY 013	WIRELESS MOBILE COMMUNICATION	L T P C
		3 0 0 3

OBJECTIVES

- To introduce the concepts of wireless / mobile communication using cellular environment.
- To make the students to know about the various modulation techniques, propagation methods, coding and multi access techniques used in the wireless communication.

UNIT I THE WIRELESS CHANNEL 10

Overview of wireless systems - Physical modeling for wireless channels - Time and Frequency coherence - Statistical channel models - Capacity of wireless Channel- Capacity of Flat Fading Channel -- Channel Distribution Information known - Channel Side Information at Receiver - Channel Side Information at Transmitter and Receiver - Capacity with Receiver diversity - Capacity comparisons - Capacity of Frequency Selective Fading channels.

UNIT II PERFORMANCE OF DIGITAL MODULATION OVER WIRELESS CHANNELS 7

Fading- Outage Probability- Average Probability of Error -- Combined Outage and Average Error Probability - Doppler Spread - Intersymbol Interference.

UNIT III DIVERSITY 9

Realization of Independent Fading Paths - Receiver Diversity - Selection Combining - Threshold Combining - Maximal-Ratio Combining - Equal - Gain Combining - Transmitter Diversity - Channel known at Transmitter - Channel unknown at Transmitter - The Alamouti Scheme.

UNIT IV MULTICARRIER MODULATION 10

Data Transmission using Multiple Carriers - Multicarrier Modulation with Overlapping Sub channels - Mitigation of Subcarrier Fading - Discrete Implementation of Multicarrier Modulation - Peak to average Power Ratio- Frequency and Timing offset - Case study IEEE 802.11a

UNIT V SPREAD SPECTRUM 9

Spread Spectrum Principles - Direct Sequence Spread Spectrum - Spreading Codes- Synchronization- RAKE receivers- Frequency Hopping Spread Spectrum - Multi-user DSSS Systems - Multi-user FHSS Systems.

Total: 45

REFERENCES

1. Andrea Goldsmith, 'Wireless Communications', Cambridge University Press, 2005
2. David Tse and Pramod Viswanath, 'Fundamentals of Wireless Communication', Cambridge University Press, 2005.
3. W.C.Y.Lee, 'Mobile Communication Engineering', Mc Graw Hill, 2000.
4. A.Paulraj, R.Nabar, D.Gore, 'Introduction to Space-Time Wireless Communication', Cambridge University Press, 2003.
5. T.S. Rappaport, 'Wireless Communications', Pearson Education, 2003.

OBJECTIVES

- To understand the classical cryptographic techniques and its security.
- To know the symmetric and public key cryptographic algorithms.
- To understand Authentication and various key distribution techniques.

UNIT I INTRODUCTION

9

Classical Cryptography-The Shift Cipher, The Substitution Cipher, The Affine Cipher Cryptanalysis-Cryptanalysis of the Affine Cipher, Cryptanalysis of the Substitution Cipher, Cryptanalysis of the Viennese Cipher, Shannon's Theory.

UNIT II SYMMETRIC CRYPTOGRAPHY

9

Block Cipher and the Advanced Encryption Standard-Substitution -Permutation Networks, Linear Cryptanalysis, Differential Cryptoanalysis, The Data Encryption Standard, The Advanced Encryption Standard, Modes of Operation, Cryptography Hash Function-Hash Function and Data Integrity, Security of Hash Function, Iterated Hash Functions, Message Authentication Codes.

UNIT III PUBLIC KEY CRYPTOGRAPHY

9

The RSA Cryptosystem and Factoring Integer- Introduction to Public -key Cryptography, Number theory, The RSA Cryptosystem, Other Attacks on RSA, The ELGamal Cryptosystem, Shanks' Algorithm, Finite Fields, Elliptic Curves over the Real, Elliptical Curves Modulo a Prime, Signature Scheme -Digital Signature Algorithm.

UNIT IV AUTHENTICATION AND HASH FUNCTION

9

Identification Scheme and Entity Attenuation-Challenge - and - Response in the Secret-key Setting, Challenge - and - Response in the Public key Setting, The Schnorr Identificataon Scheme, Key distribution-Diffie-Hellman Key, Predistribution, Unconditionally Secure key Predistribution, Key Agreement Scheme-Diffie-Hellman Key agreement, Public key infrastructure-PKI, Certificates, Trust Models.

UNIT V SECURITY

9

Secret Sharing Schemes-The Shamir Threshold Scheme, Access Structure and General Secret key sharing, Information Rate and Construction of Efficient

Schemes, Multicast Security and Copyright production-Multicast Security, Broadcast Encryption, Multicast Re-keying, Copyright Protection, Tracing Illegally Redistribution keys.

Total : 45

TEXT BOOK

1. Douglas R. Stinson, 'Cryptography Theory and Practice', Third Edition, Chapman & Hall/CRC, 2006

REFERENCES

1. Menges A. J , Oorschot P, Vanstone S.A,'Handbollk of Appliled Cryptography' CRC Press,1997.
2. William Stallings, 'Cryptography and Network Security: Principles and Practices', Third Edition, Pearson Education, 2006.Wenbo Mao, 'Modern Cryptography - Theory and Practice', Pearson Education, First Edition, 2006.

ITY 015	DIGITAL IMAGE PROCESSING	L T P C
		3 0 0 3

OBJECTIVES

- To give the student experience in modeling, solving and analyzing problems using linear programming.
- To study the theory, applications, and computer usage.
- By the end of the course the student should have developed the skills to consider real-world problems and determine whether or not linear programming is an appropriate modeling framework; develop linear programming models that consider the key elements of the real world problem; solve the models for their optimal solutions; interpret the models' solutions and infer solutions to the real-world problems.

UNIT I FUNDAMENTALS OF IMAGE PROCESSING 9

Introduction - Elements of visual perception, Steps in Image Processing Systems - Image Acquisition - Sampling and Quantization - Pixel Relationships - Colour Fundamentals and Models, File Formats. Introduction to the Mathematical tools.

UNIT II IMAGE ENHANCEMENT AND RESTORATION 9

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering - Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain - DFT, FFT, DCT, Smoothing and Sharpening filters - Homomorphic Filtering., Noise models, Constrained and Unconstrained restoration models.

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS 9

Detection of Discontinuities - Edge Operators - Edge Linking and Boundary Detection - Thresholding - Region Based Segmentation - Motion Segmentation, Feature Analysis and Extraction.

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS 9

Multi Resolution Analysis: Image Pyramids - Multi resolution expansion - Wavelet Transforms, Fast Wavelet transforms, Wavelet Packets. Image Compression: Fundamentals - Models - Elements of Information Theory - Error Free Compression - Lossy Compression - Compression Standards - JPEG/MPEG.

UNIT V APPLICATIONS OF IMAGE PROCESSING

9

Representation and Description, Image Recognition- Image Understanding
- Image Classification - Video Motion Analysis - Image Fusion - Steganography
- Colour Image Processing.

Total: 45

REFERENCES

1. Rafael C.Gonzalez and Richard E.Woods, 'Digital Image Processing', Third Edition, Pearson Education, 2008.
2. Anil K.Jain, 'Fundamentals of Digital Image Processing', Prentice-Hall India, 2007.
3. Milan Sonka, Vaclav Hlavac and Roger Boyle, 'Image Processing, Analysis and Machine Vision', Third Edition, Third Edition, Brooks Cole, 2008.
4. Madhuri A. Joshi, 'Digital Image Processing: An Algorithmic Approach', Prentice-Hall India, 2006.
5. Rafael C.Gonzalez, Richard E.Woods and Steven L. Eddins, 'Digital Image Processing Using MATLAB', First Edition, Pearson Education, 2004.

ITY 016	SOFTWARE METRICS	L T P C
		3 0 0 3

OBJECTIVES

- To be aware of Core metrics for product, quality, process.
- To familiarize with the concepts of Software quality and tools for quality metrics.
- To learn more about software reliability.
- To understand important concepts of complexity metrics and OO metrics.
- Students will be able to analyze and identify metrics for software project.

UNIT I MEASUREMENTS THEORY 9

Fundamentals of measurement - Measurements in Software Engineering - Scope of Software metrics - measurements theory - Goal based framework - Software Measurement validation.

UNIT II DATA COLLECTION AND ANALYSIS 9

Empirical investigation - Planning experiments - Software metrics data Collection - Analysis methods - statistical methods.

UNIT III PRODUCTS METRICS 9

Measurement of internet product attributes - size and structure - External product attributes - measurement of quality.

UNIT IV QUALITY METRICS 9

Software quality metrics - Product quality - Process quality - metrics for software maintenance - Case studies of Metrics program - Motorola - Hp and IBM.

UNIT V MANAGEMENT METRICS 9

Quality management models - Rayleigh Model - Problem Tracking report (PTR) model - Reliability growth model - model evaluation - Orthogonal classification.

Total: 45

REFERENCES:

1. Norman E - Fentar and Share Lawrence Pflieger, 'Software metrics', International Thomson Computer Press, 1997.

M.Tech.Information Technology

2. Stephen H.Kin, 'Metric and models in software quality engineering', Addison Wesley 1995.
3. William A. Florac and Areitor D. Carletow, 'Measuring Software Process', Addison - Wesley, 1995.

ITY 017	SOFTWARE REQUIREMENTS MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES

- To overview about the requirements engineering
- To learn requirements elicitation technique
- To know about analyzing the requirements
- To learn requirement validation technique
- Students will be able to elicit the requirement and to prepare the requirement specification documents

UNIT I REQUIREMENTS ENGINEERING OVERVIEW 9

Software Requirement Overview - Software Development Roles -Software Development Process Kernels - Commercial Life Cycle Model - Vision Development - Stakeholders Needs and Analysis - Stakeholder needs - Stakeholder activities.

UNIT II REQUIREMENTS ELICITATION 9

The Process of Requirements Elicitation - Requirements Elicitation Problems - Problems of Scope - Problems of Understanding - Problems of Volatility - Current Elicitation Techniques - Information Gathering - Requirements Expression and Analysis - Validation - An Elicitation Methodology Framework - A Requirements Elicitation Process Model - Methodology over Method - Integration of Techniques - Fact-Finding - Requirements Gathering - Evaluation and Rationalization - Prioritization - Integration and Validation.

UNIT III REQUIREMENTS ANALYSIS 9

Identification of Functional and Non Functional Requirements - Identification of Performance Requirements - Identification of safety Requirements - Analysis - Feasibility & Internal Compatibility of System Requirements - Definition of Human Requirements Baseline.

UNIT IV REQUIREMENTS DEVELOPMENT 9

Requirements Analysis - Requirements Documentation - Requirements Development Workflow - Fundamentals of Requirements Development - Requirements Attributes Guidelines Document - Supplementary Specification Document - Use Case Specification Document - Methods for Software Prototyping - Evolutionary Prototyping -Throwaway Prototyping.

UNIT V REQUIREMENTS VALIDATION

9

Validation Objectives - Analysis of Requirements Validation - Activities - Properties - Requirement Reviews - Requirements Testing - Case Tools For Requirements Engineering.

Total: 45

REFERENCES

1. Dean Leffingwell, Don Widrig, 'Managing Software Requirements, Second Addition: A Use Case Approach', Addison Wesley, 2003.
2. Karl Eugene Wiegers, 'Software Requirements', Microsoft Press, 1999.
3. Ian Graham,'Requirements Engineering and Rapid Development', Addison Wesley, 1998.
4. Ian Sommerville, Pete Sawyer, 'Requirements Engineering: A Good Practice Guide', John Wiley and sons, 2000.

ITY 018	SERVICE ORIENTED ARCHITECTURE	L T P C
		3 0 0 3

OBJECTIVES

- To gain understanding of the key components of SOA
- To learn service oriented analysis and design techniques
- To learn technology underlying the service design development and implementation
- To learn advanced concepts such as XML signature, security and WS-* specifications
- To know about various research issues and transaction processing
- To develop a Service Oriented Architecture(SOA) for any applications using web services

UNIT I **9**

Software Architecture - Types of IT Architecture - SOA - Evolution - Key components - perspective of SOA - Enterprise-wide SOA - Architecture - Enterprise Applications - Solution Architecture for enterprise application - Software platforms for enterprise Applications - Patterns for SOA - SOA programming models.

UNIT II **9**

Service-oriented Analysis and Design - Design of Activity, Data, Client and business process services - Technologies of SOA - SOAP - WSDL - JAX - WS - XML WS for .NET - Service integration with ESB - Scenario - Business case for SOA - stakeholder objectives - benefits of SPA - Cost Savings.

UNIT III **9**

SOA implementation and Governance - strategy - SOA development - SOA governance - trends in SOA - event-driven architecture - software as a service - SOA technologies - proof-of-concept - process orchestration - SOA best practices.

UNIT IV **9**

Meta data management - XML security - XML signature - XML Encryption - SAML - XACML - XKMS - WS-Security - Security in web service framework - advanced messaging

UNIT V

9

Transaction processing - paradigm - protocols and coordination - transaction specifications - SOA in mobile - research issues

Total: 45

REFERENCES

1. Shankar Kambhampaly, 'Service -Oriented Architecture for Enterprise Applications', Wiley India Pvt Ltd, 2008.
2. Eric Newcomer, Greg Lomow, 'Understanding SOA with Web Services', Pearson Education, 2007.
3. Mark O' Neill, et al., 'Web Services Security', Tata McGraw-Hill Edition, 2003.

ITY 019	USER INTERFACE DESIGN	L T P C
		3 0 0 3

OBJECTIVES

- To study the basic characteristics of graphics and web interfaces.
- To study the basics of Human Computer Interaction.
- To study the basics of WIMP interfaces.
- To study the multimedia interfaces for the web.
- To study the principles of evaluating interfaces.
- Students will be able to design and evaluate user interface screen.

UNIT I INTRODUCTION 8

Human-Computer Interface - Characteristics Of Graphics Interface -Direct Manipulation Graphical System - Web User Interface -Popularity -Characteristic & Principles.

UNIT II HUMAN COMPUTER INTERACTION 7

User Interface Design Process - Obstacles -Usability -Human Characteristics In Design - Human Interaction Speed -Business Functions -Requirement Analysis - Direct - Indirect Methods - Basic Business Functions - Design Standards - General Design Principles - Conceptual Model Design - Conceptual Model Mock-Ups.

UNIT III WINDOWS 12

Characteristics- Components- Presentation Styles- Types- Managements- Organizations- Operations- Web Systems- System Timings - Device- Based Controls Characteristics- Screen - Based Controls -- Human Consideration In Screen Design - Structures Of Menus - Functions Of Menus- Contents Of Menu- Formatting - Phrasing The Menu - Selecting Menu Choice- Navigating Menus- Graphical Menus. Operate Control - Text Boxes- Selection Control- Combination Control- Custom Control- Presentation Control.

UNIT IV MULTIMEDIA 9

Text For Web Pages - Effective Feedback- Guidance & Assistance- Internationalization- Accessibility- Icons- Image- Multimedia - Coloring.

UNIT V EVALUATION

9

Conceptual Model Evaluation - Design Standards Evaluation - Detailed User Interface Design Evaluation.

Total: 45

TEXT BOOKS

1. Wilbent. O. Galitz, 'The Essential Guide to User Interface Design', John Wiley& Sons, 2001.
2. Deborah Mayhew, 'The Usability Engineering Lifecycle', Morgan Kaufmann, 1999
3. Ben Shneiderman, 'Design the User Interface', Pearson Education, 1998.

REFERENCES

1. Alan Cooper, 'The Essential Of User Interface Design', Wiley - Dream Tech Ltd., 2002.
2. Sharp, Rogers, Preece, 'Interaction Design', Wiley India Edition, 2007.

ITY 020	HIGH SPEED NETWORKS	L T P C
		3 0 0 3

OBJECTIVES

- To get an introduction about ATM and Frame relay.
- To provide an up-to-date survey of developments in High Speed Networks.
- To enable the students to know techniques involved to support real-time traffic and congestion control.
- To provide the different levels of Quality of Service (QoS) to different applications.
- Students will be able to design high speed networks with Quality of Services.

UNIT I HIGH SPEED NETWORKS 8

Frame Relay Networks - Asynchronous transfer mode - ATM Protocol Architecture, ATM logical Connection, ATM Cell - ATM Service Categories - AAL. High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel - Wireless LAN's: applications, requirements - Architecture of 802.11

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 8

Queuing Analysis- Queuing Models - Single Server Queues - Effects of Congestion - Congestion Control - Traffic Management - Congestion Control in Packet Switching Networks - Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL 12

TCP Flow control - TCP Congestion Control - Retransmission - Timer Management -Exponential RTO backoff - KARN's Algorithm - Window management - Performance of TCP over ATM. Traffic and Congestion control in ATM - Requirements - Attributes - Traffic Management Frame work, Traffic Control - ABR traffic Management - ABR rate control, RM cell formats, ABR Capacity allocations - GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9

Integrated Services Architecture -Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ - Random Early Detection, Differentiated Services.

UNIT V PROTOCOLS FOR QOS SUPPORT 8

RSVP - Goals & Characteristics, Data Flow, RSVP operations, Protocol

Mechanisms - Multiprotocol Label Switching - Operations, Label Stacking,
Protocol details - RTP - Protocol Architecture, Data Transfer Protocol, RTCP.

Total: 45

TEXTBOOK

1. William Stallings, 'High Speed Networks And Internet', Pearson Education, Second Edition, 2002.

REFERENCES

1. Warland & Pravin Varaiya, 'High Performance Communication Networks', Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. Irvan Pepelnjk, Jim Guichard and Jeff Aparcar, 'MPLS and VPN architecture', Cisco Press, Volume 1 and 2, 2003.

