B.S.ABDUR RAHMAN
U N I V E R S I T Y
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.

M.Tech., (Data & Storage Management)
2 Years (4 Semesters) Degree Programme
Under Regulations 2009
(Updated Curriculum and Syllabi as on June 2012)

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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 programmeshall 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.

ELIGIBLE ENTRY QUALIFICATIONS FOR ADMISSION TO P.G. PROGRAMMES

Sl.No.	Name of the Department	P.G. Programmes offered	Qualifications for admission
01.	Civil Engineering	M.Tech. (Structural Engineering)	B.E / B.Tech. (Civil Engineering) / (Structural Engineering)
		M.Tech. (Construction Engineering and Project Management)	B.E. / B.Tech. (Civil Engineering) /(Structural Engineering)
02.	Mechanical Engineering	M.Tech. (CAD - CAM)	B.E. / B.Tech. (Mechanical / Auto /Manufacturing / Production / Industrial/Mechatronics / Metallurgy / Aerospace/Aeronautical / Material Science / Marine Engineering)
		M.Tech. (Manufacturing Engineering)	B.E. / B.Tech. (Mechanical / Auto / Manufacturing / Production / Industrial/Mechatronics / Metallurgy / Aerospace/Aeronautical / Material Science / Marine Engineering)
03.	Polymer Technology	M.Tech. (Polymer Technology)	B. E. / B. Tech. degree Mech./ Production / Polymer Science or Engg or Tech/Rubber Tech/ M.Sc(Polymer Sc./Chemistry Appl. Chemistry)
04.	Electrical and Electronics Engineering	M.Tech. (Power Systems Engg)	B.E/B.Tech (EEE/ECE/E&I/ I&C/ Electronics / Instrumentation)
		M.Tech. (Power Electronics & Drives)	B.E/B.Tech (EEE/ECE/E&I/ I&C/ Electronics/ Instrumentation)
05.	Electronics and Communication Engineering	M.Tech. (Communication Systems)	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
		M.Tech. (VLSI and Embedded Systems)	
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)	B.E. /B.Tech. (CSE/IT/ECE/EEE/EIE/ICE/ Electronics / MCA)
		M.Tech. (Software Engineering)	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.	Any degree. Must have studied Mathematics / Statistics /Computer oriented subject.
		M.Tech. (Systems Engineering and Operations Research)	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)

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 **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

$$GPA = \frac{\sum_i (Ci)(GPi)}{\sum_i Ci}$$

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.

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CURRICULUM
SEMESTER – I

SI NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	MA618	RESOURCE MANAGEMENT TECHNIQUES	3	1	0	4
2	CA641	ADVANCED DATABASE MANAGEMENT	3	0	0	3
3	CA642	COMPUTER HARDWARE AND INTERFACING	3	0	0	3
4	CA643	COMPUTER NETWORKS MANAGEMENT	3	0	0	3
5	CA644	STORAGE ARCHITECTURE AND MANAGEMENT	3	0	0	3
6	CA645	DISTRIBUTED OPERATING SYSTEMS	3	0	0	3
		LABORATORY				
7	CA646	ADVANCED DBMS LAB	0	0	3	2
8	CA647	STORAGE AND NETWORK LAB	0	0	3	2
					Total	**23**

SEMESTER – II

SI NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	CA648	DATABASE TUNING AND ADMINISTRATION	3	0	0	3
2	CA649	SYSTEM PERFORMANCE ENGINEERING	3	0	0	3
3	CA650	VIRTUALIZATION	3	0	0	3
4	CA651	OPTICAL SWITCHING TECHNOLOGIES	3	0	0	3
5		Elective – I	3	0	0	3
		LABORATORY				
7	CA652	VIRTUALIZATION LAB	0	0	3	2
8	CA653	DATABASE PERFORMANCE TUNING LAB	0	0	3	2
			Total			**19**

SEMESTER – III

SI NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	CA741	APPLICATION OF DATA IN BUSINESS MANAGEMENT	3	0	0	3
2		Elective-II	3	0	0	3
3		Elective-III	3	0	0	3
		LABORATORY				
5	CA742	Project Phase-I	0	0	12	*
			Total			**9**

SEMESTER – IV

SI NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	CA742	Project Phase – II	0	0	36	18
					TOTAL	**= 18 + *24**

*** Phase I credit 6 will be considered in Phase II**

ELECTIVES

SI NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	CAY201	Data mining and Ware Housing	3	0	0	3
2	CAY202	Fuzzy logic, Neural Networks and applications	3	0	0	3
3	CAY203	Mobile computing	3	0	0	3
4	CAY204	Design Patterns	3	0	0	3
5	CAY205	Cryptography and Data Security	3	0	0	3
6	CAY206	Real Time Systems	3	0	0	3
7	CAY207	Cloud computing	3	0	0	3
8	CAY208	Data Analysis	3	0	0	3
9	CAY209	Network Protocols	3	0	0	3
10	CAY210	Knowledge Management	3	0	0	3
11	CAY211	Context Modeling	3	0	0	3
12	CAY212	Grid Computing	3	0	0	3
13	CAY213	Enterprise computing	3	0	0	3
14	CAY214	Fundamentals of Mainframe Technology	3	0	0	3
15	CAY215	Software Metrics and Measurement	3	0	0	3

Eligibility Criteria / Entry Requirements

- BE/BTech (any branch) (Or) M.Sc. Maths/Physics/Statistics/CS/IT/ Software Engg) (Or) MCA

MA618 RESOURCE MANAGEMENT TECHNIQUES L T P C
3 1 0 4

OBJECTIVE

- To know how to solve LPP problems graphically and using simplex method
- To understand how to find the initial basic feasible solution by different methods, and to obtain the optimal solution based on MODI method
- To learn how to solve Integer Programming Problems using Gromory's constant and branch and bound technique
- To learn the different queueing models - (M/M/1):(∞ /FIFO), (M/M/1):(FIFO/ N/∞), (M/M/C):(FIFO/∞ /∞), (M/M/C):(FIFO/N/∞)

1. LINEAR PROGRAMMING MODELS 12

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

2. TRANSPORTATION AND ASSIGNMENT MODELS 12

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

3. INTEGER PROGRAMMING MODELS 12

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

4. SCHEDULING BY PERT AND CPM 12

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

5. QUEUEING MODELS 12

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

Total : 60

TEXT BOOK :

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

REFERENCES :

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

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

CA641	ADVANCED DATABASE MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the needs for and uses of database management systems
- To understand context, phases and techniques for designing and building database information systems
- To understand the components of a computerized database information system

UNIT I DATABASE MANAGEMENT 9

Relational data model-SQL- Database design- Entity-Relationship model- Relational normalization- Embedded SQL- Dynamic SQL- JDBC- ODBC.

UNIT II ADVANCED DATABASES 10

Object databases- Conceptual object data model- XML and Web Data- XML Schema- Distributed data bases- OLAP and Data Mining- ROLAP and MOLAP

UNIT III QUERY AND TRANSACTION PROCESSING 8

Query processing basics- Heuristic optimization – Cost, size estimation- Models of transactions- Architecture- Transaction processing in a centralized and distributed system – TP monitor.

UNIT IV IMPLEMENTING AND ISOLATION 9

Schedules- Concurrency control- Objects and semantic commutative- Locking- Crash, Abort and Media failure – Recovery- Atomic termination- Distributed deadlock- Global serialization- Replicated databases- Distributed transactions in real world.

UNIT V DATABASE DESIGN ISSUES 9

Security- Encryption- Digital signatures- Authorization- Authentication RPC – Integrity- Consistency- Database tuning- Optimization and research issues.

Total=45

REFERENCES

1. Philip M. Lewis, Arthur Bernstein and Michael Kifer, " Databases and Transaction Processing: An Application Oriented Approach", Addison Wesley 2002.

2. R. Elmasri and S.B Navathe, " Fundamentals of Database Systems", 3rd edition, Addison Wesley, 2004.

3. Abraham Silberschatz, Henry. F.Korth and S. Sudharsan, " Database System Concepts", 4th edition, Tata McGraw Hill, 2004.

4. Raghu Ramakrishna and Johnannes Gehrke, " Database Management Systems", 3rd edition, TMH, 2003.

CA642 COMPUTER HARDWARE AND INTERFACING **L T P C**
3 0 0 3

COURSE OBJECTIVES

- To understand the modern CPU concepts
- To know CPU over clocking – over clocking requirements – over clocking the system – over clocking the Intel processors
- To know the functioning of different storage devices namely floppy drive, hard disk drive, CD ROM drive, DVD, decoder
- To learn about parallel port, signals and timing diagram
- To have a detailed outlook towards video adapters – graphic accelerators – 3D graphics accelerator issues
- To obtain knowledge on ISA, PCI and learn the working of plug and play devices

UNIT I CPU AND MEMORY 9

CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel's CPU – CPU over clocking – over clocking requirements – over clocking the system – over clocking the Intel processors – Essential memory concepts – memory organizations – memory packages – modules – logical memory organizations – memory considerations – memory types – memory techniques – selecting and installing memory.

UNIT II MOTHERBOARDS 9

Active motherboards – sockets and slots – Intel D850GB – Pentium4 mother board – expansion slots – form factor – upgrading a mother board – chipsets – north bridge – south bridge – CMOS – CMOS optimization tactics – configuring the standard CMOS setup – motherboard BIOS – POST – BIOS features – BIOS and Boot sequences – BIOS shortcomings and compatibility issues – power supplies and power management – concepts of switching regulation – potential power problems – power management.

UNIT III STORAGE DEVICES 9

The floppy drive – magnetic storage – magnetic recording principles – data and disk organization – floppy drive – hard drive – data organization and hard drive – sector layout – IDE drive standard and features – Hard drive electronics – CD-ROM drive – construction – CDROM electronics – DVD-ROM – DVD media – DVD drive and decoder.

UNIT IV I/O PERIPHERALS 9

Parallel port – signals and timing diagram – IEEE1284 modes – asynchronous communication - serial port signals – video adapters – graphic accelerators – 3D graphics accelerator issues – DirectX – mice – modems – keyboards – sound boards – audio bench marks.

UNIT V BUS ARCHITECTURE 9

Buses – Industry standard architecture (ISA), peripheral component Interconnect (PCI) – Accelerated Graphics port (AGP) – plug-and-play devices – SCSI concepts – USB architecture.

TOTAL:45

TEXTBOOK

1. Stephen J.Bigelow, “Trouble Shooting, maintaining and Repairing PCs”, Tata McGraw-Hill, New Delhi, 2001.

REFERENCES

1. Craig Zacker & John Rourke, “The complete reference:PC hardware”, Tata McGraw-Hill, New Delhi, 2001.
2. Mike Meyers, “Introduction to PC Hardware and Troubleshooting”, Tata McGraw-Hill, New Delhi, 2003.
3. B.Govindarajulu, “IBM PC and Clones hardware trouble shooting and maintenance”, Tata McGraw-Hill, New Delhi, 2002.

CA643 COMPUTER NETWORKS MANAGEMENT L T P C
3 0 0 3

COURSE OBJECTIVES:

- To learn about network architecture, error detection and reliable transmission
- To understand the basic concepts of LAN and its architecture, Bus / Tree / Ring / Star
- To gain knowledge on packet switching and forward, bridges and lan switches
- To understand the working of transport, presentation, application and network layer

UNIT I HIGH SPEED NETWORKS 9

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.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9

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 9

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 9

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

TEXT BOOKS:

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 Apcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 and 2, 2003.

CA644 STORAGE ARCHITECTURE AND MANAGEMENT **L T P C**
3 0 0 3

COURSE OBJECTIVES

- To brief the needs and uses of SAN and its components
- To learn about Fiber Channel, Optical Cables, Classes of service, Data Transport
- To understand about loop addressing, zoning and fiber channel products

UNIT I INTRODUCTION TO STORAGE AREA NETWORKS 9

SAN Overview - Components- the Importance of standards- How, and why, can we use a SAN - The problem- The requirements-Infrastructure simplifications-Information life cycle management- Using the SAN Compnents-storage-SAN connectivity-Higher level layers-Servers.

UNIT II FIBER CHANNEL INTERNALS 9

Fiber Chanel- SCSI legacy - FC Layers • Optical cables- Fiber in the SAN-Dark fiber • Classes of services- Fiber channel data movement- Byte encoding schemes- Running disparity- Data Transport • Flow Control- Addressing- World Wide name- Port address – 24 bit port address – Loop address- FICON address.

UNIT III TOPOLOGIES AND OTHER FABRIC SERVICE 9

Fiber Channel Topologies- point to point – Arbitrated loop- Switched fabric • Port types • Fiber channel arbitrated loop protocols- Fairness algorithm-Loop addressing • Fiber channel login- Port login- Process login- Fabric login • Fabric channel and fabric services • Routing machanism

UNIT IV ZONING 9

Hardware Zoning – one to one- one to many- many to many • Software zoning-Node WWN- Port WWN• LUN masking.

UNIT V FIBER CHANNEL PRODUCTS AND TECHNOLOGY 9

The environment- SAN devices-Bridges and gateways- Arbitrated loop hubs-Switches and directors- Multiprotocol routing- Multiplexers • Gigabit transport technology • SAN Management levels- Management features • SAN Multipathing software • Storage virtualization.

TOTAL 45

REFERENCES

1. http://www.redbooks.ibm.com/redbooks/pdfs/sg245470.pdf
2. http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00403562/c00403562.
3. EMC Corporation, Information Storage and Management, WileyIndia www.emc.com/resource-library/resource-library.esp

CA645 DISTRIBUTED OPERATING SYSTEMS

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- To study about the characterisation of distributed systems, resource sharing and the challenges involved.
- To learn about the types of network, its principles and protocols
- To understand about IPC, and how to remotely communicate between distributed objects
- To know about processes and threads, and also obtain knowledge on the various cryptographic algorithms and digital signatures.
- To gain knowledge on transactions, nested transactions, locks and transaction recovery

UNIT I **9**

Introduction to Distributed Systems: Distributed systems : Goals Hardware Concepts Software - design

UNIT II **9**

Communication distributed systems: Layered Protocol: ATM Networks client server model - remote procedure call – group communication.

UNIT III **9**

Synchronization: Clock synchronization - mutual exclusion - election atomic transactions - dead locks.

Process and Processors: Threads - System models processor allocation - scheduling fault tolerance - real time distributed systems.

UNIT IV **9**

Distributed file systems: File system design and implementation - trends in distributed file systems.

UNIT V **9**

Shared Memory: Introduction - bus based multi processors ring based multiprocessors switched

multiprocessors - NUMA comparison of shared memory systems - Consistency models - page based distributed shared memory - shared variable distributed shared memory - object based distributed shared memory. Case studies : MACH and CHORUS.

TOTAL=45

Text Book:

1. Andrew S.Tanenbaum: Distributed Operating System, Prentice Hall International Inc. 1995.

CA 646	ADVANCED DBMS LAB	L	T	P	C
		0	0	3	2

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Write Relational and Logical Operators in SQL Query.
4. Implementation of SQL Join Statements.
5. Write a set operations and sub queries in Sql.
6. Create and manipulate various DB objects for a table.
7. Create views, partitions and locks for a particular DB.
8. Write PL/SQL procedure for an application using exception handling.
9. Write PL/SQL procedure for an application using cursors.
10. Write a DBMS program to prepare reports for an application using functions.
11. Write a PL/SQL block for transaction operations of a typical application using triggers.
12. Write a PL/SQL block for transaction operations of a typical application using package.
13. Design and develop an application using any front end and back end tool (make use of ERdiagram and DFD).
14. Design and develop an application using any front end and back end tool and generate the report using suitable technique.

    Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory, Railway reservation, Student data sheet, ATM management System etc

CA 647-	STORAGE AND NETWORK LAB	L	T	P	C
		0	0	3	2

1) Perform the steps to check the free space availability in the storage box.
2) Carry out the health checking procedure to get the storage box health status.
3) Create a host for the storage box.
4) Create a Vdisk (lun) under a HP SAN storage box.
5) Present a LUN to a specific host in the SAN Storage box.
6) Perform the steps to provide a shared LUN to a cluster server.
7) Un-present the LUN from the HOST.
8) Perform the steps to delete a Vdisk and host from storage.
9) Add new disk to a storage box.
10) Perform a manual backup in HPdata protector.
11) Schedule a full and incremental backup in HP data protector.

CA648 DATABASE TUNING AND ADMINISTRATION L T P C
0 0 3 2

COURSE OBJECTIVES

The main objective of this course is to accomplish several tasks which are considered to be the critical in terms of database administration.

UNIT I OVERVIEW OF PERFORMANCE TUNING AND TUNING TOOLS 9

Tuning phases-Tuning goals-Common tuning problems-Proactive tuning considerations during development-Tuning steps during production-Performance v/s safety trade-offs – Maintenance and tuning of alert log file-Background processes trace files-User trace files-Views, utilities and tools-dictionary and special views- dynamic troubleshooting and performance views-Troubleshooting and tuning-Collecting system wide statistics and Session related statistics-Oracle wait events-Statistics event views -Performance manager-DBA developed tools

UNIT II DATABASE CONFIGURATION AND I/O ISSUES 9

Oracle processes and files-Performance guidelines-Distributing files across devices-Tablespace usage-Diagnostics tools for checking I/O statistics-I/O statistics-File stripping-Tuning full table Scan operations-Checkpoints-Dynamic tools for tuning checkpoint performance- Redo log groups and members-Online redo log file configuration-Archive log file configuration-Diagnostic tools

UNIT III TUNING ROLLBACK SEGMENTS AND DETECTING LOCK CONTENTION 9

Rollback segments-Usage, activity, header activity, Growth of rollback segments-Tuning the manually managed rollback segments-Diagnostic tools-Diagnosing contention for manual rollback segments header-Sizing transaction rollback data-Using less rollback –Problems caused by small rollback segments-Automatic undo management in Oracle 9i-Tablespace for automatic undo management-Altering, Switching and dropping undo tablespace-Parameters-monitoring automatic undo management-Locking mechanisms-Types of locks-Causes of lock contention-Diagnostic rules for Monitoring locking activity.

UNIT IV APPLICATION TUNING AND SQL STATEMENT TUNING 9

Role of the DBA-Data storage structure –Selecting physical structure-Data access methods-Clusters-Cluster types-B-Tree indexes-Compressed indexes-

Bitmap indexes-Reverse key indexes-Index-Index-Organized Tables and Heap tables-IOT-Row overflow, dictionary views-Mapping table-Materialized views-Query rewrites-OLTP-System, Application, Requirement issues-Data warehouse-Hybrid systems Optimizer modes-Plan equivalence-Stored outlines-Enabling and disabling SQL trace-Managing statistics-Table, index, column- Histogram-Copying statistics between database

UNIT V TUNING THE OPERATING SYSTEM AND USING RESOURCE MANAGER 9

Operating system tuning-System architectures-Virtual and Physical memory-Paging and swapping-Tuning memory-Tuning I/O-CPU tuning –Process v/s Thread-Database Resource management concepts-Resource allocation methods-Administering database resource manager- Assigning the resource manager privilege-Creating DRM objects-Assigning Users to Consumer groups-Setting resource plan for instance-Changing consumer groups- DRM information-Current DRM settings.

TOTAL: 45

REFERENCE BOOKS:

1. Peter Kill Patrick, Shankar Raman, Jim Womack: Oracle performance Tuning fundamental Applications, production 1.0, July 2001.
2. Jason couchman, sudheer marisetti:OCP Oracle database: Fundamentals I, Exam 1z01, Mcgraw-hill.
3. Biju Thomas,bob bryla: Oracle DBA fundamentals I-study guide, Sybex publications.

CA649 SYSTEM PERFORMANCE ENGINEERING

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

Performance engineering takes a proactive approach to designing and building systems that meet stated performance requirements. This stands in sharp contrast to the reactive approach of "build it and then fix it". Performance engineering has evolved over the last 40 years as a collection of tools, techniques, methodologies, and best practices, all of which are the subject of this course.

UNIT – I **9**

Introduction to Performance Engineering- Measures of System Performance - Developing Performance Goals and Requirements- Methodologies for Successful Performance Projects-Graphical Descriptions of System Designs - Workload Characterization-

UNIT – II **9**

Understanding Software Performance - Relationships Among Performance Measures -Bottlenecks and System Capacity - Summarizing Measured Data-Conception of a Web-Based SPE Development Infrastructure- Performance and Robustness Engineering and the Role of Automated Software Development-

UNIT-III **9**

Performance Engineering of Component-Based Distributed Software Systems-Conflicts and Trade-Offs between Software Performance and Maintainability.-Performance Engineering on the Basis of Performance Service Levels.-Possibilities of Performance Modelling with UML- Origins of Software Performance Engineering: Highlights and Outstanding Problems- Performance Parameters and Context of Use.

UNIT-IV **9**

An Overview of Queueing Theory - Analytic Solution of Queueing Models - The Mechanics of Simulation - Confidence Intervals and Experimental Run Length –Performance Instrumentation - Design of Performance Experiments - Tools for the Performance Analyst.

UNIT-V **9**

Tips on Building Good Models - Distributions Used in Modeling and Load Testing-Validating a Performance Model- Presentation of Results - A Performance Engineering Case Study: Software Retrieval System.

REFERENCE BOOKS:

1. Performance Engineering of Software Systems (The Sei Series in Software Engineering) - Connie U. Smith
2. Performance by Design: Computer Capacity Planning By Example - Daniel A. Menasce
3. Capacity Planning for Web Services: Metrics, Models, and Methods - Daniel A. Menasce
4. Capacity Planning for Web Performance: Metrics, Models, and Methods - Daniel A. Menasce
5. Scaling for E-Business: Technologies, Models, Performance, and Capacity Planning - Daniel A. Menasce
6. Capacity Planning and Performance Modeling: From Mainframes to Client-Server Systems - Daniel A. Menasce.

CA650	VIRTUALIZATION	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To know the need and trend of data center virtualization
- To know the computing virtualization tools, techniques and applications
- To know the impact of virtualization in cloud computing

UNIT I INTRODUCTION TO VIRTUAL MACHINES 9

V Mware Infrastructure Components- Using this Document- Starting and Stopping the VMware Infrastructure Components- ESX Server- Virtual Center Server- VI Client- VI Web Access- VMware Service Console.

UNIT II USING THE VI CLIENT 9

About the VI Client- Menu Bar- Pop-Up Menus-Console Menu-Navigation Bar -Inventory View Tabs- Toolbar- Status Bar, Recent Tasks, and Triggered Alarms- Panel Sections- Sorting and Filtering Lists-Using Custom Attributes-Selecting and Viewing Objects- Managing Virtual Center Modules.

UNIT III SYSTEM CONFIGURATION 9

Host Configuration for ESX Server and Virtual Center- Virtual Center Configuration- Configuring Virtual Center Communication- Virtual Machine Configuration- Working with Active Sessions- About SNMP and VMware Infrastructure- Using SNMP with Virtual Center Server- Using SNMP with ESX Server 3- Configuring SNMP Management Client Software- Configuring SNMP Security for ESX Server 3-SNMP Diagnostics-Using SNMP with Guest Operating Systems- Managing the VI Client Inventory.

UNIT IV VIRTUAL MACHINE SYSTEM ADMINISTRATION 9

Managing Users, Groups, Permissions, and Roles- Access Elements-Access Rules-Hierarchical Inheritance-Multiple Permission Settings-Tasks Requiring Settings on Multiple Objects –Users, Groups, Permissions, Roles, Creating Roles, Cloning Roles, Editing Roles, Removing Roles, Renaming Roles, Access Permissions, Assigning Access Permissions, Adjusting the Search List in Large Domains, Changing Access Permissions, Removing Access Permissions.

UNIT V VIRTUAL MACHINE MONITORING AND PERFORMANCE 9

Setting Up and Monitoring Performance Statistics and Resource- Managing Tasks, Events, and Alarms.Collection – Java Native Interface – Basic Emulation – High-Performance Emulation – Case Study: The Jikes Research Virtual Machine.

TOTAL: 45

REFERENCES:

1. www.vmware.com/pdf/vi3_35/esx.../vi3_35_25_admin_guide.pdf
2. www.vmware.com/pdf/server_admin_manual.pdf

CA651 OPTICAL SWITCHING TECHNOLOGIES

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

This course is intended to provide an overview of advanced optical network technologies and standards. It will cover how the present telecommunications and data networks are evolving to cater to future requirement and services. It will give the students a good insight into the way the Optical Networks are designed and implemented.

UNIT I ACCESS NETWORKS 9

Network architecture overview - today's access networks - future Access networks - optical access network architecture - application area – Passive optical networks- Broadcast Select PON – WRPON - Case study – SUCCESS HPON- Network topology – Media access control protocol – Scheduling algorithm- Ethernet based passive optical networks –QoS.

UNIT II VIRTUAL TOPOLOGY DESIGN 9

Design problem – design heuristics – topology reconfiguration due to traffic changes- Network management- Protection concepts in Ring Networks, Mesh Networks- Handling node failures- Combined SONET/WDM network design – Regular virtual topologies – Shuffle net – Implementation in broadcast select network

UNIT III OPTICAL INTERNET NETWORKS 9

Optical Circuit switching- Optical Burst switching- Optical packet switching – MPLS in WDM Networks -Types MPLS Nodes – Multi protocol lambda switching – MPLS and Optical TE similarities – IP, MPLS and Optical control planes –LSP routing.

UNIT IV OPTICAL SWITCHING 9

Free-space optical switching – multistage optical interconnection networks- back plane optical interconnects, optical memory for switching – logic functionality – nonlinear fiber couplers, photonic switch architectures based on TDM, WDM, OCX, ATM

UNIT V WAVELENGTH- CONVERTIBLE NETWORKS 9

Routing in convertible networks – Performance Evaluation – Network with sparse wavelength conversion – Converter Placement problem – Converter

problem – Rerouting - Benefits and Issues, Light path Migration, Rerouting Schemes, Algorithms- AG, MWPG

TOTAL: 45

REFERENCES:

1. C.Siva Rama Murthy and Mohan Gurusamy, “WDM Optical Networks – Concepts, Design and Algorithms”, Prentice Hall of India Pvt. Ltd, New Delhi – 2002.
2. Uyless Black, “Optical Network: Third Generation Transport System”, Pearson Education, Ist edition,2002.
3. Hussein T.Mouftah and Jaafar M.H.Elmirghani, “Photonic Switching Technology – Systems and Networks”, IEEE Press, New York -10016-5997, ISBN – 0-7803- 4707-2.
4. Rajiv Ramaswamy and Kumar N.Sivarajan, “Optical Networks – A Practical Persepctive”, Morgan Kauffman, 2004
5. Bahaa E.A. Saleh, Malvin Carl Teich, “Fundamentals of Photonics” Wiley Interscience; 1st edition, 2002. http://www.wdm.stanford.edu/ snrc-access/

CA652	VIRTUALIZATION LAB	L	T	P	C
		0	0	3	2

Configuration of ESXi and ESX

- Module 1: Installing and Using VMware vCenter Server Install and configure vCenter Server, and use the VMware vSphere Client to manage vCenter Server inventory hierarchies
- Module 2: Networking

  Configuration of vNetwork standard and distributed switches, network connections, and port groups
- Module 3: Storage

  Storage management technologies
- Module 4: Virtual Machines

  Deploy virtual machines using templates, VMware vCenter Converter, Guided Consolidation. Modifying, managing, and migrating virtual machines
- Module 5: Access Control

  Controlling user access through roles and permissions
- Module 6: Resource Monitoring

  Workload assessment, monitoring using vCenter Server
- Module 7: Scalability

  VMware VMotion, migrations

  Setup of resource pools and VMware Distributed Resource Scheduler cluster
- Module 8: High Availability and Data Protection

  Setup of a VMware High Availability cluster

  Backup and recovery of virtual machines using VMware Data Recovery
- Module 9: Configuration Management

  Patching using vCenter Update Manager
- Module 10: Installing ESX

  Installation of ESX

CA653	DATABASE PERFORMANCE TUNING LAB	L	T	P	C
		0	0	3	2

1. Creating and installing DBA Server.
2. Write a procedure how to configure and manage the oracle instance.
3. Create a user, group.
4. Provide a Table space to the newly created user, group.
5. Creation of table space with various privileges
6. Create a redo-log file; resize the redo-log file.
7. Provide a privilege to existing user, increase the size of the existing table space.
8. Remove a user, group, revoke privileges, and decrease the size of the table size.
9. Performance tuning procedures.
10. Perform table space back-up and log back-up.
11. Procedure to perform server back-up.

CA741 APPLICATION OF DATA IN BUSINESS MANAGEMENT L T P C
3 0 0 3

COURSE OBJECTIVE

- The objectives of this course are to learn the relationship between corporation and customer, to increase the profit by customer lifetime value through customer satisfaction and royalty.

UNIT I CUSTOMER RELATIONSHIP MARKETING

Customer Relationship Marketing - Mass Marketing – One to one marketing - customer databases and databases marketing, data warehouses and data mining

UNIT II COMPONENTS OF MODERN MARKETING

Components of Modern Marketing - Information system – Internal Records System – order to payment cycle – sales Information system – Marketing Intelligence system.

UNIT III MARKETING RESEARCH SYSTEM

Marketing research system - Suppliers of marketing research, marketing research process, research approaches – cyber dialogue,

UNIT IV MARKETING DECISION SUPPORT SYSTEM

Marketing decision support system - Decision models used by marketing measurement – Quantitative tools used in marketing decision support system.

UNIT V FORECASTING

Forecasting and demand measurement - Fine stage model of the cosumer buying process – supply chain management

TEXT BOOK

1. Marketing management, Eleventh edition by Philip Kotler, Pearson Education

REFERENCE BOOK

1. Marketing Engineers by Lilien and Rangaswamy
2. E – Marketing, Judy strauss – PHI 2 New Delhi, 3rd edition
3. Marketing management, Rajan Saxena, Tata Mc Graw hill, 2nd edition

ELECTIVES

CAY201 DATA MINING AND WARE HOUSING L T P C

3 0 0 3

OBJECTIVE:

- Enable students to understand and implement classical algorithms in data mining and data warehousing.
- Students will learn how to analyze the data, identify the problems, and choose the relevant algorithms to apply.
- Be able to efficiently design and manage data storages using data warehousing OLAP and data mining techniques.
- Select and apply appropriate data mining techniques for different applications

UNIT I INTRODUCTION 9

Relation to Statistics, Databases, Machine Learning - Taxonomy of Data Mining Tasks - Steps in Data Mining Process - Overview of Data Mining Techniques.

UNIT II VISUALIZATION AND STATISTICAL PERSPECTIVES 9

Visualization - Dimension Reduction Techniques - Data Summarization Methods - Statistical Perspective -Probabilistic - Deterministic Models - Clustering - Regression Analysis - Time Series Analysis - Bayesian Learning.

UNIT III PREDICTIVE MODELING 9

Predictive Modeling - Classification - Decision Trees - Patterns - Association Rules - Algorithms.

UNIT IV DATA WAREHOUSING 9

Design - Dimensional Modeling - Meta Data - Performance Issues and Indexing -VLDB Issues - Development Life Cycle - Merits.

UNIT V APPLICATIONS 9

Tools – Applications in Strategic Planning, Human Resource and Operational Management - Case Studies.

Total = 45

REFERENCES

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

2. Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, and Bob Becker, "The Data Warehouse Lifecycle Toolkit 2nd Edition, Wiley - Kimball Group, January, 2008.

3. Jiawei Han and Micheline Kamber, ?Data Mining Concepts and Techniques", 2nd Edition, The Morgan Kaufmann Publishers, March, 2006.

4. Mehmed Kantardzic ?Data Mining – Concepts, Models, Methods And Algorithms 1st Edition, Wiley-IEEE Press, October, 2002.

5. Sean Kelly, "Data Warehousing In Action", 1st Edition, John Wiley & Sons Inc., 1997.

CAY202 FUZZY LOGIC, NEURAL NETWORKS AND APPLICATIONS

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- Develop in students the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
- Explore the functional components of neural network classifiers or controllers, and the functional components of fuzzy logic classifiers or controllers.
- Develop and implement a basic trainable neural network or a fuzzy logic system for a typical control, computing application or biomedical application.
- To provide adequate knowledge about feedback neural networks
- To teach about the concept of fuzziness involved in various systems.
- To provide adéquate knowledge about fuzzy set theory.

UNIT I INTRODUCTION TO NEURAL NETWORKS 9

Biological neural - Neural processing - Supervised and unsupervised learning - Neural network learning rules. Single layer perception - discrete and continuous perception - multi layer feed forward network – Back propagation Networks - feedback networks - Training Algorithms.

UNIT II UNSUPERVISED NETWORKS 9

Unsupervised Learning – Competitive Learning Networks – Kohonen self organising networks – Learning Vector Quantization – Hebbian Learning – Hopfield Network – Content Addressable Nature – Binary Hopfield Network – Continuous Hopfield Network

UNIT III ASSOCIATIVE MEMEORIES AND SOM 9

Bidirectional Associative Memory – Principle Component Analysis. Auto associative memories - Bidirectional Associative memory (BAM) - Self Organization Maps (SOM) and ART1.

UNIT IV FUZZY LOGIC 9

Fuzzy sets - Fuzzy Rules: Extension Principle, fuzzy measures - fuzzy relations - fuzzy functions-Fuzzy Reasoning.

UNIT V FUZZY SYSTEMS AND APPLICATIONS 9

Representation of fuzzy knowledge - fuzzy inference systems- Mamdani Model – Sugeno Model – Tsukamoto Model– Fuzzy decision making – Multi Objective Decision Making – Fuzzy Classification– Fuzzy Control Methods – Application.

TOTAL = 45

REFERENCES

1. Jang J S R Sun C T and Mizutani E, “Neuro Fuzzy and Soft computing”, Pearson Education, (Singapore), 2004.
2. S Rajasekaran and G A Vijayalakshmi Pai, “Neural networks Fuzzy logics and Genetic algorithms”, Prentice Hall of India, 2004
3. Derong Liu , “Advances in Neural Networks--ISNN 2007”, Springer, 2007
4. Timothy J Ross, “Fuzzy Logic Engineering Applications”, John Wiley and Sons, 2004
5. James A. Anderson, “An Introduction to Neural Networks”, Prentice Hall, 2002

CAY203 MOBILE COMPUTING L T P C

3 0 0 3

COURSE OBJECTIVES

- To impart fundamental concepts in the area of mobile computing, to provide a computer systems perspective on the converging areas of wireless networking, embedded systems, and software, and to introduce selected topics of current research interest in the field.
- Learn the basics of networking theory.
- Learn networking concepts relevant to modern wireless systems.
- Learn emerging mobile computing ideas and best practices.
- Learn new cloud computing ideas, and how it they relate to mobile computing.
- Get hands-on knowledge practice with mobile computing and cloud services.

UNIT I INTRODUCTION 9

Computing Paradigms – Mobile Computing – Pervasive Computing – Distributed Computing – Mobile Computing Architecture –Types of Wireless Networks – Wireless Communication Technology – Signal Encoding – Spread Spectrum Technology – Wireless Medium Access Control

UNIT II WIRELESS NETWORKING SYSTEM 9

Cellular Networks – 2G - 3G - CDMA and GSM Architecture – Handoff – Security Satellite System – GPRS.

UNIT III WLAN STANDARDS 8

Wireless LAN Technology – Architecture and Standards – Bluetooth Technology –Wireless ATM - PAN.

UNIT IV NETWORK ISSUES 9

Ad hoc Network – Characteristics – Performance Issues – Routing Protocols in Mobile and Wireless Networks – Table Driven Routing, On-Demand Routing Protocols – Mobile IP and Mobile Transport layers.

UNIT V APPLICATION ISSUES 10

Concepts for working with wireless applications. WAP – WML - Mobile database – Content Management – Data synchronization Protocols – SyncML, SMIL – Network Simulators NS2, Glomosim – Case Study.

TOTAL = 45

REFERENCES:

1. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007.
2. Asoke K. Talukder and Roopa R. Yavagal, “mobile Computing”, TMH, New Delhi, 2005.
3. Jochen Schiller, “Mobile Communications”, Pearson Education Asia, 2005.
4. William Stalling, “Wireless Communication and Networking”, Pearson Education Asia, 2002.
5. Anna Hac, “Mobile Telecommunication Protocols for Data Networks”, John Wiley & Son, Ltd, 2003.
6. Mark Beaulieu, “Wireless Internetworking Applications and Architecture”, Addison Wesley, New York, 2002.

CAY204	DESIGN PATTERNS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To know the basic of design patterns and prototyping
- To know the types of patterns, quality and elements of patterns
- Understand the concepts of pattern frame works and Algorithms
- To provide adéquate knowledge about pattern catalog and Anti pattern
- To understand the concept of UML and CORBA

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 Pattern, 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. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, “Design patterns: Elements of Reusable object-oriented software”, Addison-Wesley, 1995.

2. James W- Cooper, Addison-Wesley, “Java Design Patterns – A Tutorial”, 2000.

3. Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and the unified process”, Second Edition, Prentice Hall, 2001.

4. Thomas Mowbray and Raphel Malveaux, "CORBA and Design Patterns", John Wiley, 1997.

5. William J Brown et al., "Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis", John Wiley, 1998.

CAY205 CRYPTOGRAPHY AND DATA SECURITY

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- Describe the fundamentals of trusted networks.
- Describe the concepts and principles of cryptography.
- Describe the implementation of digital signatures.
- Designed to provide the foundation knowledge to network administrators and security professionals
- Designed to provide network administrators and security architects with an awareness of security-related issues and the essential skills they need to implement security in a given network.

UNIT I OVERVIEW OF CRYPTOGRAPHY 9

Information security and cryptography - Background on functions - Basic terminology and concepts - Symmetric-key encryption - Stream ciphers - Feedback shift registers – Stream ciphers based on LFSRs - Block ciphers - – DES, FEAL, IDEA, SAFER, RC5.

UNIT II AUTHENTICATION 9

Authentication Protocols—Principles - Authentication Protocols—The Real World - Authentication Framework for Public-Key Cryptography.

UNIT III FORMAL APPROACHES TO SECURITY ESTABLISHMENT 9

Formal and Strong Security Definitions for Public-Key Cryptosystems – Provably Secure and Efficient Public- Key Cryptosystems. - Formal Methods for Authentication Protocols Analysis.

UNIT IV CRYPTOGRAPHIC PROTOCOLS 9

Zero Knowledge Protocols- Basic definitions – Zero knowledge properties – Proof or Argument - Protocols with Two sided error – Round Efficiency – Non interactive Zero knowledge.

UNIT V IMPLEMENTATION 9

SEAL, RC5, IDEA, FEAL, SAFER - using API‘s.

Total = 45

REFERENCES:

1. Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone, “Hand book of Applied Cryptography”, 5th Edition, CRC-Press, 2001.
2. Wenbo Mao, “Modern Cryptography Theory & Practice”, 2nd Edition, Pearson Education, 2007.
3. Atul Kahate, “Cryptography and Network Security”, 2nd Edition, Tata McGraw Hill, 2005.
4. Tom St Denis, Simon Johnson, “Cryptography for Developers”, 1st Edition, Syngress, 2007.

CAY206	REAL TIME SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

The objective of this course is to bring students into the position to analyze and (partially) design real-time systems,

- explain and apply the fundamental concepts and terminology of real-time systems;
- explain and address the fundamental problems of real-time systems;
- analyze real-time systems designs;
- design a real-time system (at least partially); and
- Identify and assess the relevant literature and research trends of real-time systems.

UNIT I INTRODUCTION 8

Real Time Systems - Embedded Systems, Pervasive Computing - Information Access Devices - Smart Cards - Embedded Controllers - Hardware Fundamentals- Typical Real Time Applications -Hard Versus Soft Real-Time Systems

UNIT II REAL TIME OPERATING SYSTEM 8

Overview-Task Management- Processes, Threads, Interrupts, Events – Inter Process Communication-Memory Management –Time Management.

UNIT III REAL TIME SCEDULING 9

Commonly used approaches to Hard Real Time Scheduling - Clock driver scheduling - Priority driver scheduling of periodic tasks - Scheduling Aperiodic & Sporadic jobs in priority driver system - Resources & Resource Access Control (RAC) - Multiprocessor

Scheduling & RAC - Scheduling flexible computation & tasks with temporal distance constraints.

UNIT IV REAL TIME COMMUNICATIONS 10

Wireless connectivity - Blue Tooth - Other Short Range Protocols - Wireless Application Environment - Service - Discovery – Middleware.

UNIT V REAL TIME SYSTEM DESIGN 10

Requirements analysis-Decomposition of a system- Test of a decomposition-Detailed design and implementation-Real time architecture projects.

TOTAL=45

REFERENCES

1. Jane W.S.Liu, “Real Time Systems”, Second Edition, Pearson Education, 2000.
2. Albert M.K. Cheng, Real-Time Systems: Scheduling, Analysis, and Verification, John Wiley and Sons, 2003.
3. Douglass B.P., Real-Time Design Patterns: Robust Scalable Architecture for Real-Time Systems, Addison Wesley, 2002.
4. R.J.A. Buhr, D.L.Bailey, “An Introduction to Real-Time Systems”, Prentice-Hall International, 1999.
5. Qing L., and Yao C. Real-time Concepts for Embedded Systems, San Francisco: CMP Books, 2003.
6. Hermann Kopetz, “Real-time Systems: Design Principles for Distributed Embedded Applications”, Springer, 1997.

CAY 207	CLOUD COMPUTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the emerging area of "cloud computing" and how it relates to traditional models of computing.
- To understand and be able to articulate key concepts, including its functional abstraction, the use of distributed storage, and the scheduling of data-local jobs.
- To gain competence in Ajax as a vehicle for delivering highly-interactive Web applications

UNIT I UNDERSTANDING CLOUD COMPUTING 9

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 DEVELOPING CLOUD SERVICES 9

Web-Based Application – Pros and Cons of Cloud Service Department – 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 CLOUD COMPUTING FOR EVERYONE 9

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 USING CLOUD SERVICES 9

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 OTHER WAYS TO COLLABORATE ONLINE 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

REFERENCE BOOKS:

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 foron-Demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited July 2008.

CAY208	DATA ANALYSIS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To provides a pragmatic introduction to data analysis concepts.Following the completion of this course, students will be able to:
- Understand key data analysis concepts
- Read and interpret Entity Relationship Diagrams
- Explain the forms of normalisation

UNIT I **9**

Modern data analytic tools, Statistical concepts: Sampling distributions, resampling, statistical inference, prediction error

UNIT II **9**

Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics

UNIT III **9**

Rule induction: rule learning as search, learning first order rules, evaluating quality of rules, ILP systems at work

UNIT IV **9**

Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods

UNIT V **9**

Visualization: Visual data analysis techniques, interaction techniques; Systems and applications: Diversity of IDA applications.

TOTAL = 45

REFERENCES:

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer (2007) Glenn J. Myatt, Making Sense of Data, John Wiley & S

CAY209	NETWORK PROTOCOLS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- Know which protocols are part of the TCP/IP protocol suite
- Understand how each protocol fits into the Internet Protocol Stack and the OSI Model
- Understand how the protocols relate to one another
- Be able to describe the function and operaton of each protocol
- Understand the syntax and semantics of the various PDUs for each protocol.

UNIT I INTRODUCTION 9

ISO OSI Layer Architecture, TCP/IP Layer Architecture, Functions of Network layer, General Classification of routing, Routing in telephone networks, Dynamic Non hierarchical Routing (DNHR), Trunk status map routing (TSMR), real-time network routing (RTNR), Distance vector routing, Link state routing, Hierarchical routing.

UNIT II INTERNET ROUTING PROTOCOLS 9

Interior protocol : Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Bellman Ford Distance Vector Routing. Exterior Routing Protocols: Exterior Gateway Protocol (EGP) and Border Gateway Protocol (BGP). Multicast Routing: Pros and cons of Multicast and Multiple Unicast Routing, Distance Vector Multicast Routing Protocol (DVMRP), Multicast Open Shortest Path First (MOSPF), MBONE, Core Based Tree Routing.

UNIT III ROUTING IN OPTICAL WDM NETWORKS 9

Classification of RWA algorithms, RWA algorithms, Fairness and Admission Control, Distributed Control Protocols, Permanent Routing and Wavelength Requirements, Wavelength Rerouting- Benefits and Issues, Lightpath Migration, Rerouting Schemes, Algorithms- AG, MWPG.

UNIT IV MOBILE - IP NETWORKS 9

Macro-mobility Protocols, Micro-mobility protocol: Tunnel based : Hierarchical Mobile IP, Intra domain Mobility Management, Routing based: Cellular IP, Handoff Wireless Access Internet Infrastructure (HAWAII).

UNIT V MOBILE AD –HOC NETWORKS 9

Internet-based mobile ad-hoc networking communication strategies, Routing algorithms – Proactive routing: destination sequenced Distance Vector Routing (DSDV), Reactive routing: Dynamic Source Routing (DSR), Ad hoc On-Demand Distance Vector Routing (AODV), Hybrid Routing: Zone Based Routing (ZRP).

TOTAL: 45

REFERENCES:

1. William Stallings, = High speed networks and Internets Performance and Quality of Service', IInd Edition, Pearson Education Asia. Reprint India 2002
2. M. Steen Strub, = Routing in Communication network, Prentice –Hall International, Newyork,1995.
3. S. Keshav, =An engineering approach to computer networking' Addison Wesley 1999.
4. William Stallings, =High speed Networks TCP/IP and ATM Design Principles, Prentice- Hall, New York, 1995
5. C.E Perkins, =Ad Hoc Networking', Addison – Wesley, 2001
6. Ian F. Akyildiz, Jiang Xie and Shantidev Mohanty, ? A Survey of mobility Management in Next generation All IP- Based Wireless Systems?, IEEE Wireless Communications Aug.2004, pp 16-27.
7. A.T Campbell et al., ? Comparison of IP Micromobility Protocols,? IEEE Wireless Communications Feb.2002, pp 72-82.
8. C.Siva Rama Murthy and Mohan Gurusamy, ? WDM Optical Networks – Concepts, Design and Algorithms?, Prentice Hall of India Pvt. Ltd, New Delhi –2002.

CAY210 KNOWLEDGE MANAGEMENT L T P C
3 0 0 3

COURSE OBJECTIVES

- Understand the fundamental concepts in the study of knowledge and its creation, acquisition, representation, dissemination, use and re-use, and management.
- Appreciate the role and use of knowledge in organizations and institutions, and the typical obstacles that KM aims to overcome.
- Know the core concepts, methods, techniques, and tools for computer support of knowledge management.
- Understand how to apply and integrate appropriate components and functions of various knowledge management systems.
- Be prepared for further study in knowledge generation, engineering, and transfer, and in the representation, organization, and exchange of knowledge.
- Critically evaluate current trends in knowledge management and their manifestation in business and industry.

UNIT I INTRODUCTION 9

The value of Knowledge – Knowledge Engineering Basics – Knowledge Economy – The task and Organizational content – Knowledge Management – Knowledge Management Ontology.

UNIT II KNOWLEDGE MODELS 9

Knowledge Model Components – Template Knowledge Models –Reflective Knowledge Models– Knowledge Model Construction – types of Knowledge Models.

UNIT III TECHNIQUES OF KNOWLEDGE MANAGEMENT 8

Knowledge Elicitation techniques – Modeling communication aspects – Knowledge Management and Organizational learning.

UNIT IV KNOWLEDGE SYSTEM IMPLEMENTATION 11

Case Studies – Designing Knowledge Systems – Knowledge Codification – Testing and Deployment – Knowledge Transfer and Knowledge Sharing – Knowledge system implementation.

UNIT V ADVANCED KNOWLEDGE MANAGEMENT 8

Advanced Knowledge Modeling – Value Networks – Business models for knowledge economy – UML Notations – Project Management.

TOTAL = 45

REFERENCES:

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, “Knowledge Engineering and Management”, Universities Press, 2001.
2. Elias M. Awad, Hassan M. Ghaziri, “Knowledge Management”, Pearson Education, 2004.
3. Michael Stankosky, “Creating the discipline of Management”, Butterworth - Heinemann, 2005.
4. Tiwana, “Knowledge Management Toolkit”, Second Edition, Pearson Education, 2003.

CAY211 CONTEXT MODELLING L T P C
3 0 0 3

COURSE OBJECTIVES

- To know the types of context models and its application
- Understand the fundamental concepts of Ontology Engineering and Semantic web languages
- To know the concepts of XML & XML schema ,
- Be able to describe the graphic moels and object oriented models in real time applications
- To know the context model approaches and architecture.

UNIT I INTRODUCTION 9

Ubiquitous computing – Define context –Types of context -Enumeration based – Role Based Context aware computing and applications – Core capabilities for context awareness – Types of context aware applications – Developing context aware applications – Middleware support Contextual services-Actuator service- Example – Context toolkit – Providing location context.

UNIT II ONTOLOGY 9

Basic concepts – Ontology Engineering – Advanced topics – Standard upper ontology - Ontology level – Semantic web – Semantic web languages – XML & XML schema, RDF & RDF schema – DAML + OIL – OWL – SPARQL - Role of ontology – Semantic markup – Semantic web services – Open issues.

UNIT III CONTEXT MODEL APPROACHES 9

Requirements for context model – Key Value Models - Markup Scheme Models - Graphical Models - Object Oriented Models - Logic Based Models.

UNIT IV CONTEXT MODEL ARCHITECTURES 9

Context Broker Architecture CoBrA -Service-Oriented Context-Aware Middleware SOCAM Standard Ontology for ubiquitous and pervasive applications SOUPA – Ontology based Generic context management model GCoM.

UNIT V APPLICATIONS 9

Office and Meeting Tools - The Active Badge System -The Parc Tab System –

Applications from Georgia Institute of Technology - (Tourist) Guides - Cyberguide – GUIDE - Smart Sight Tourist Assistant - Frameworks supporting Context-Aware Applications - Stick-e Notes framework.

Total: 45

REFERENCES:

1. Dragan Gasevic, Dragan Djuric, Vladan Devedzic, Bran Selic ,Model Driven Architecture and ontology development, Springer- Verlag Berlin Heidelberg 2006.
2. Frank Adestein, Sandeep K.S. Gupta, Golden G. Richard III, Loren Schwiebert.
3. Fundamentals of Mobile and Pervasive Computing, Tata McGraw-Hill Publishing Company Limited, Edition 2005.
4. Philip Moore, Bin Hu and Jizheng Wan, Smart-Context: A context Ontology for Pervasive Mobile Computing, 2007.
5. F.Van Harmelen et al. “Owl Web Ontology Language Reference”, http://www.w3.org/TR/owl-ref/
6. http://www.it.kth.se/edu/Ph.D/LocationAware/aware.vt98.html

CAY212	GRID COMPUTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- Understand the need for and evolution of Grids in the context of processor- and data-intensive applications
- be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery
- be able to design and implement Grid computing applications using Globus or similar toolkits
- be able to justify the applicability, or non-applicability, of Grid technologies for a specific application

UNIT I INTRODUCTION **9**

Introduction to grid computing – Definition – Scope of Grid Computing- Applications of grid computing organizations and their roles.

UNIT II GRID COMPUTING INITIATIVES **9**

Grid Computing Analogy – Grid Computing road map-Grid Computing anatomy – Next generation of Grid computing initiatives–Merging the Grid services architecture with Web services architecture

UNIT III GRID COMPUTING TECHNOLOGIES **9**

OGSA – Sample use cases that drive the OGSA platform components – OGSI and WSRF– OGSA Basic Services – Security standards for grid computing.

UNIT IV GRID SCHEDULING AND HIGH LEVEL SERVICES **9**

Actions in grid scheduling-Resource Management- Resource Brokers-Resource Reservations- Existing grid scheduling systems-MDS-NWS-High level grid services- OGSI.NET middleware Solution - Mobile OGSI.NET.

UNIT V GRID COMPUTING TOOL KIT **9**

Globus Toolkit –Architecture –GRAM-MDS-GSI-GridFTP-GT Programming model –A sample grid service implementations.

TOTAL: 45

REFERENCES:

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, PHI, PTR, Jan 2004.
2. The Grid 2: Blueprint for a New Computing Infrastructure by Ian Foster and Carl Kesselman, Morgan Kaufmann Nov 2003.
3. Paul Barry, “Grid Computing for Developers” Linux Journal , March 2006.
4. Ahmar Abbas, “Grid Computing A Practical Guide to technology and Applications” Charles River media , 2003.
5. Silva V., Grid Computing For Developers, Charles River Media, 2005.
6. D.Janaki Raman “Grid Computing, A research Monograph”, TataMcGraw Hill, 2005.

CAY213 ENTERPRISE COMPUTING L T P C
3 0 0 3

OBJECTIVES:

1. Course will cover the computing background for large-scale enterprise computing
2. The course describes how to build multi-tier distributed applications, specifically addressing web access, business logic, data access, and applications supporting Enterprise Service technologies.
3. To learn about ERP which helps to improve the organization performance.
4. The course describes how to build multi-tier distributed applications, specifically addressing web access, business logic, data access, and applications supporting Enterprise Service technologies.
5. To learn about the factors helps in developing ERP systems
6. To study about SOA in SAP .

UNIT-1 SAP AND ENTERPRISE COMPUTING 9

Enterprise Perspective: An Overview, Features of ERP, MIS Integration, ERP drivers, Trends in ERP, ERP in India, Major ERP Packages-Business processes-SCM-accounting and finance-Evolution of information sytems-software and hardware- The SAP approach to Enterprise software-SAP ERP operations.

UNIT-2 SAP R/3 ARCHITECTURE 9

Manufacturing roots of ERP- Management Inputs- ERP software SAP and R/3- Directions in ERP – SAP R/3 software implementation- ERP for midsized companies-best for breed approaches

UNIT-3 SAP APPLICATIONS 9

Understanding SAP composite applications-User friendly SAP- taking order in SAP R/3 – discount pricing- integration of sales and accounting-CRM- core CRM activities- SAPS CRM software- benefits of CRM.

UNIT – 4 PROCESSING MODELS-SAP 9

Flowcharting process models – extensions of process mapping –event process chain diagrams-Evaluating process improvement- ERP workflow tools- ERP system costs-implementation tools-B2B e-commerce –Net weaver tools-Accessing ERP systems over the internetXML-RFID.

UNIT – V INTEROPERABILITY AND MULTITIER ENTERPRISE COMPUTING **9**

Enterprise Computing Challenges-Understanding web services-Service Oriented Architecture in SAP- Enterprise Application Integration, Interoperability between various computing technologies - The Role of SAP NetWeaver- SAP NetWeaver Components -SAP Tools for Developers.

Total : 45

TEXT BOOKS:

1. Alexis, Leon (Ist Edition, 2000). ERP Demystified. Tata McGraw Hill.
2. Garg, V.K. and Venket, Krishna, N.K., (Ist edition, 1997). ERP Concepts and Practices, PHI Publications.
3. Langenalter, A. Gary (1st Edition, 2000). Enterprise Resources Planning and Beyond. St. Lucie Press, USA.
4. Ellen Monk, Bret Wagner, “Concepts in ERP”, Cengage Learning, 2nd Edition.
5. Nancy Muir and Ian Kimbell, “Discover SAP”, 2nd Edition

CAY214 FUNDAMENTALS OF MAINFRAME TECHNOLOGY

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- To understand understand the basic concepts of mainframe computers including their usage and architecture
- To understand the fundamentals of a common mainframe operating system
- To Understand typical mainframe workloads and its major areas of application
- To Understand the issues relating to system administration and application programming of mainframe computers

UNIT I NEW MAINFRAME **9**

Mainframe concepts – an evolving architecture - mainframe computer users – factor Contributing to mainframe use- mainframe workloads.

UNIT II CAPACITY **9**

Capacity – elements of a system required for capacity – few server Vs Many server – Service level agreement – managing the system to the SLA – architecture, running work and capacity – several servers on one physical machine – parallel sysplex and its measurements.

UNIT III SCALABILITY, INTEGRITY AND SECURITY **9**

Introduction to scalability – scalability concepts – scalability implementation on IBM system – Integrity – security – introduction to availability – Inhibitors to availability –Redundancy - Z/ OS elements for availability – Disaster recovery.

UNIT IV ACCESSING LARGE AMOUNT OF DATA **9**

Introduction – Channel subsystem – control unit – DASD CKD architecture and DASD subsystem – multiple allegiance/Parallel Access volumes – database and data sharing - Data placement and management.

UNIT V SYSTEM MANAGEMENT AND AUTONOMIC COMPUTING **9**

Introduction – system data – configuration management – operating management – performance management – problem management – introduction to autonomic computing – self healing – self protecting – self optimizing.

TOTAL = 45

REFERENCES:

1. Mike Ebbers, Frank Byrne, Pilar Gonzalez Adrados, Rodney Martin and Jon Veilleux "Redbook – Introduction to Mainframe – Large Scale Commercial Computing". First Edition December 2006, IBM Corp.

2. Lydia Parziale, Edi Lopes Aives, Klaus Egeler, Clive Jordan "Introduction to the New Mainframe : Z/VM Basics", November 26, 2007, IBM Redbooks.

CAY 215 SOFTWARE METRICS AND MEASUREMENT L T P C
3 0 0 3

COURSE OBJECTIVES

- To Understand the basic metrics and measurement theory and terminology
- To Identify internal and external customers who need software metrics information
- To Select software metrics based on goals
- To Design and tailor the selected metrics to match the information needs

UNIT I MEASUREMENTS THEORY 9

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

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.
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.