CURRICULUM AND SYLLABI

REGULATIONS - 2016

(As approved by the 9th Academic Council)

MASTER OF COMPUTER APPLICATIONS (MCA)

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)
Rated with A Grade by National Assessment and Accreditation Council
Seethakathi Estate, G.S.T. Road, Vandalur, Chennai - 600 048
www.bsauniv.ac.in

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JULY 2016

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UNIVERSITY VISION AND MISSION

VISION

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

MISSION

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

VISION AND MISSION OF THE DEPARTMENT OF COMPUTER APPLICATIONS

VISION

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

MISSION

The Department of Computer Applications, endeavors

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

PROGRAMME EDUCATIONAL OBJECTIVES AND OUTCOMES

MASTER OF COMPUTER APPLICATIONS

PROGRAMME EDUCATIONAL OBJECTIVES:

PEO-1: To provide students with a solid foundation in mathematics and computing fundamentals required to analyze and solve computing problems and also to pursue research and higher studies.

PEO-2: To provide technical knowledge in various programming languages and train them to comprehend, analyze, design and create innovative computing solutions for real time problems.

PEO-3: To prepare the students for a prolific career in IT and inculcate an urge for self learning by providing an ambient environment to improve personality , excellence, leadership and spiritual values in all activities throughout the career.

PEO-4: To foster and provide a social environment which moulds the students to become professionally enriched with communication, technical and innovative skills to meet the dynamic needs of industry and society.

PROGRAMME OUTCOMES:

On completion of the programme the graduates will be able to

PO1: Apply the knowledge of computing fundamentals and mathematical concepts in computer programming.

PO2: Identify, formulate, analyze and implement mathematics and technical skills to solve real time problems.

PO3: Design and develop the software to meet out the customer and industry needs.

PO4: Pursue Research based and industry oriented projects to provide valid conclusions for complex problems.

PO5: Use latest software and tools for solving problems and satisfy the dynamic needs of industry and society.

PO6: Become a software professional with social responsibilities and ethical values.

PO7: Solve societal and environmentally sensitive problems in professional manner.

PO8: Demonstrate knowledge of professional and ethical responsibilities.

PO9: Function as individual member or leader of team and able to manage projects in the software development process.

PO10: Comprehend, write effective reports and communicate their innovations and idea in an effective way.

PO11: Adapt self-learning using their learning abilities.

PO12: Develop as Entrepreneur in the software domain through innovative approach and excel in placement activities.

PO13: Understand and apply foundations of software engineering practice and process within production constraints.

PO14: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

REGULATIONS – 2016
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 a 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, which is the apex body on all academic matters of this University

vi. **"Dean (Academic Affairs)"** means Dean (Academic Affairs) of B.S. Abdur Rahman University, who administers the academic matters.

vii. **"Dean (P.G. Studies)"** means Dean (P.G. Studies) of B.S. Abdur Rahman University who administers all P.G Programmes of the University in coordination with Dean (Academic Affairs)

viii. **"Dean (Student Affairs)"** means Dean (Student Affairs) of B.S. Abdur Rahman University, who looks after the welfare and discipline of the students.

ix. **"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. /M.C.A. / M.Sc.	Full Time & Part Time – Day / Evening / Weekends

2.2 Modes of Study

2.2.1 Full-time

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

2.2.2 A full time student, who has completed all non-project courses desiring to do the Project work in part-time mode for valid reasons, shall apply to the Dean (Academic Affairs) through the Head of the Department. 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

In this mode of study, the students are required to attend classes for the courses in the time slots selected by them, during the daytime (or) evenings (or) weekends.

2.3 Admission Requirements

2.3.1 Students for admission to the first semester of the Master's Degree Programme shall be required to have passed the appropriate degree examination of this University as specified in the Table shown for eligible entry qualifications for admission to P.G. programmes or any other degree examination of any University or authority accepted by this University as equivalent thereto.

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

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

2.3.4 Student eligible for admission to M.C.A under lateral entry scheme shall be required to have passed three year degree in B.Sc (Computer Science) / B.C.A / B.Sc (Information Technology)

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.C.A. (Part Time)	9	18
M.C.A. (Full Time) – (Lateral Entry)	4	8
M.C.A. (Part Time) – (Lateral Entry)	6	12
M.Sc. (Full Time)	4	8
M. Sc. (Part Time)	6	12

3.2 The PG. programmes consist of the following components as prescribed in the respective curriculum

i. Core courses
ii. General Elective courses
iii. Professional Elective courses
iv. Project work / thesis / dissertation
v. Laboratory Courses
vi. Case studies
vii. Seminars
viii. Mini Project
ix. Industrial Internship

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

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

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

ELIGIBLE ENTRY QUALIFICATIONS FOR ADMISSION TO P.G. PROGRAMMES

Sl. No.	Name of the Department	P.G. Programmes offered	Qualifications for admission
01	Civil Engineering	M. Tech. (Structural Engineering)	B.E / B. Tech. (Civil Engineering) / (Structural Engineering)
		M. Tech. (Construction Engineering and Project Management)	
02	Mechanical Engineering	M. Tech. (Manufacturing Engineering)	B.E. / B. Tech. (Mechanical / Auto / Manufacturing / Production / Industrial / Mechatronics / Metallurgy / Aerospace /Aeronautical / Material Science / Marine Engineering)
		M. Tech. (CAD/CAM)	
03	Polymer Engineering	M. Tech. (Polymer Technology)	B. E. / B. Tech. Mechanical / Production /Polymer Science or Engg or Tech / Rubber Tech / M.Sc (Polymer Sc./ Chemistry Appl. Chemistry)
04	Electrical and Electronics Engineering	M. Tech. (Power Systems Engg)	B.E / B.Tech (EEE / ECE / E&I / I&C / Electronics / Instrumentation)
		M. Tech. (Power Electronics & Drives)	B.E / B.Tech (EEE / ECE / E&I / I&C / Electronics / Instrumentation)
05	Electronics and Communication Engineering	M. Tech. (Communication Systems)	B.E / B.Tech (EEE/ ECE / E&I / I&C / Electronics / Instrumentation)
		M. Tech. (VLSI and Embedded Systems)	B.E. / B. Tech. (ECE / Electronics / E&I / I&C / EEE)
06	ECE Department jointly with Physics Dept.	M. Tech. (Optoelectronics and Laser Technology)	B.E. / B. Tech. (ECE / EEE / Electronics / EIE / ICE) M.Sc (Physics / Materials Science / Electronics / Photonics)
07	Electronics and Instrumentation Engineering	M. Tech. (Electronics and Instrumentation Engineering)	B.E. / B. Tech. (EIE / ICE / Electronics / ECE / EEE)

Sl. No.	Name of the Department	P.G. Programmes offered	Qualifications for admission
08	Computer Science and Engineering	M. Tech. (Computer Science and Engineering)	B.E. / B. Tech. (CSE / IT / ECE / EEE / EIE / ICE / Electronics / MCA)
		M. Tech. (Software Engineering)	B.E. / B. Tech. (CSE / IT) MCA
		M. Tech. (Network Security)	B.E. / B. Tech. (CSE / IT / ECE / EEE / EIE / ICE / Electronics / MCA)
		M. Tech. (Computer Science and Engineering with specialization in Big Data Analytics)	B.E. / B. Tech. (CSE / IT / ECE / EEE / EIE / ICE / Electronics / MCA)
09	Information Technology	M. Tech. (Information Technology)	B.E / B. Tech. (IT / CSE / ECE / EEE / EIE / ICE / Electronics) MCA
		M. Tech. (Information Security & Digital Forensics)	B.E / B. Tech. (IT / CSE / ECE / EEE / EIE / ICE / Electronics) MCA
10	Computer Applications	M.C.A.	Bachelor Degree in any discipline with Mathematics as one of the subjects (or) Mathematics at +2 level
		M.C.A. – (Lateral Entry)	B.Sc Computer Science / B.Sc Information Technology / B.C.A
		M. Tech. (Systems Engineering and Operations Research)	BE / B. Tech. (Any Branch) or M.Sc., (Maths / Physics / Statistics / CS / IT / SE) or M.C.A.
		M. Tech. (Data & Storage Management	BE / B. Tech. (Any Branch) or M.Sc., (Maths / Physics / Statistics / CS / IT / SE) or M.C.A.
11	Mathematics	M.Sc. (Actuarial Science)	Any Degree with Mathematics / Statistics as one of the subjects of study.
		M.Sc. Mathematics	B.Sc. (Mathematics)
12	Physics	M.Sc.(Physics)	B.Sc.(Physics / Applied Science / Electronics / Electronics Science / Electronics & Instrumentation)
		M.Sc. (Material Science)	B.Sc.(Physics / Applied Science / Electronics / Electronics

Sl. No.	Name of the Department	P.G. Programmes offered	Qualifications for admission
			Science / Electronics & Instrumentation)
13	Chemistry	M.Sc.(Chemistry)	B.Sc (Chemistry / Applied Science)
14	Life Sciences	M.Sc. Molecular Biology & Biochemistry	B.Sc. in any branch of Life Sciences
		M.Sc. Genetics	B.Sc. in any branch of Life Sciences
		M.Sc. Biotechnology	B.Sc. in any branch of Life Sciences
		M.Sc. Microbiology	B.Sc. in any branch of Life Sciences
		M.Sc. Bioscience	B.Sc. in any branch of Life Sciences
		M. Tech. Biotechnology	B. Tech. (Biotechnology / Chemical Engineering) / M.Sc. in any branch of Life Sciences

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

Programme	Minimum prescribed credits
M. Tech.	73
M.C.A.	120
M.Sc.	72

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 (or) 15 periods per semester
- One credit for one tutorial period per week
- One credit each for seminar/practical session/project of two or three periods per week
- One credit for two weeks of industrial internship
- One credit for 15 periods of lecture (can even be spread over a short span of time)

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

P.G. Programme	Full Time		Part Time	
	Non-project Semester	Project semester	Non-project Semester	Project semester
M. Tech.	9 to 28	12 to 28	6 to 12	12 to 28
M.C.A.	9 to 29	12 to 29	6 to 12	12 to 29
M.Sc.	9 to 25	12 to 20	6 to 12	12 to 20

3.9 The student may choose a course prescribed in the curriculum from any department depending on his / her convenient time slot. All attendance will be maintained course-wise only.

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

3.11 A student may be permitted by the Head of the Department to choose electives from other PG programmes either within the Department or from other Departments up to a maximum of nine credits during the period of his/her study, with the approval of the Head of the Departments offering such courses.

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

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

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

3.15 Project Work / Thesis / Dissertation

3.15.1 Project work / Thesis / Dissertation shall be carried out under the supervision of a Faculty member in the concerned Department.

3.15.2 A student may however, in certain cases, be permitted to work for the project in an Industrial/Research Organization, on the recommendation of the Head of the Department. In such cases, the project work shall be jointly supervised by a faculty of the Department and an Engineer /

Scientist from the organization and the student shall be instructed to meet the faculty periodically and to attend the review committee meetings for evaluating the progress.

3.15.3 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.

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

3.15.5 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.

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

4.0 CLASS ADVISOR AND FACULTY ADVISOR

4.1 Class Advisor

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

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

4.2Faculty Advisor

To help the students in planning their courses of study and for general counseling on the academic programme, the Head of the Department of the students will attach a certain number of students to a faculty member of the department who shall function as Faculty Advisor for the students throughout their period of study. Such Faculty Advisor shall offer advice to the students on academic and personal matters and guide the students in taking up courses for registration and enrolment every semester.

5.0 CLASS COMMITTEE

5.1 Every class of the PG Programme will have a Class Committee constituted by the Head of the Department as follows:

i. Teachers of all courses of the programme

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

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

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

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

5.2 The Class Committee shall be constituted by the respective Head of the Department of the students.

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

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

6.0 COURSE COMMITTEE

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

7.0 REGISTRATION AND ENROLMENT

7.1 For the first semester every student has to register for the courses within one week from the commencement of the semester

7.2 For the subsequent semesters registration for the courses will be done by the student one week before the last working day 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 Advisor for the choice of courses. The Registration form shall be filled in and signed by the student and the Faculty Advisor.

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

7.4 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 Advisor. Late enrolment will be permitted on payment of a prescribed fine up to two weeks from the date of commencement of the semester.

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

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

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

7.8 A student undergoing a full time PG Programme should have enrolled for all preceding semesters before registering for a particular semester

7.9 A student undergoing the P.G. programme in Part Time mode can choose not to register for any course in a particular semester with written approval from the head of the department. However the total duration for the completion of the programme shall not exceed the prescribed maximum number of semesters (vide clause 3.1)

8.0 TEMPORARY BREAK OF STUDY FROM THE PROGRAMME

A student may be permitted by the Dean (Academic Affairs) to avail temporary break of study from the programme up to a maximum of two semesters for reasons of ill health or other valid grounds. Such student has to rejoin only in the same semester from where he left. However the total duration for completion of the programme shall not exceed the prescribed maximum number of semesters (vide clause 3.1).

9.0 MINIMUM REQUIREMENTS TO REGISTER FOR PROJECT / THESIS / DISSERTATION

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

Programme	Minimum No. of credits to be earned to enroll for project semester
M. Tech. (Full time / Part time)	18
M.C.A. (Full time / Part time)	45
M.C.A. (Full time / Part time) – (Lateral Entry)	22
M.Sc.(Full time / Part time)	18

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

10.0 DISCIPLINE

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

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

11.0 ATTENDANCE

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

11.2 Ideally every student is expected to attend all classes and earn 100% attendance in the contact periods of every course, subject to a maximum relaxation of 25% for genuine reasons like on medical grounds, representing the University in approved events etc., to become eligible to appear for the semester-end examination in that course, failing which the student shall be awarded "I" grade in that course. If the course is a core course, the student should register for and repeat the course when it is offered next. If the course is an elective, either he/she can register and repeat the same elective or can register for a new elective.

11.3 The students of Full Time mode of study, who have not attended a single hour in all courses in a semester and awarded ‘I’ grade are not permitted

to write the examination and also not permitted move to next higher semester. Such students should repeat all the courses of the semester in the next Academic year.

12.0 SUMMER TERM COURSES

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

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

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

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

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

12.5 The summer term courses are not applicable for the students of Part Time mode.

13.0 ASSESSMENTS AND EXAMINATIONS

13.1 The following rule shall apply to all the PG programmes (M. Tech. / M.C.A. / M.Sc.)

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

13.2 There shall be one examination of three hours duration, at the end of the semester.

13.3 In one (or) two credit courses that are not spread over the entire semester, the evaluation will be conducted at the completion of the course itself. Anyhow approval for the same is to be obtained from the HoD and the

Dean of Academic Affairs.

13.4 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.

13.5 At the end of industrial internship, the student shall submit a certificate from the organization and also a brief report. The evaluation will be made based on this report and a Viva-Voce Examination, conducted internally by a Departmental Committee constituted by the Head of the Department.

14.0 WEIGHTAGES

14.1 The following shall be the weightages for different courses:

i) Lecture based course

Two continuous assessments50%

Semester-end examination50%

ii) Laboratory based courses

Laboratory work assessment75%

Semester-end examination25%

iii) Project work

Periodic reviews50%

Evaluation of Project Report by

External Examiner20%

Viva-Voce Examination30%

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

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

15.0 SUBSTITUTE EXAMINATION

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

15.2 A student who misses any assessment in a course shall apply in a prescribed form to the Dean (Academic Affairs) through the Head of the

department within a week from the date of missed assessment. However the substitute tests and examination for a course will be conducted within two weeks after the last day of the semester-end examinations.

16.0 COURSEWISE GRADING OF STUDENTS AND LETTER GRADES

16.1 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
W	-
I	-
AB	-

- Flexible range grading system will be adopted
- **“W”** denotes withdrawal from the course.
- **"I"** denotes inadequate attendance and hence prevention from semester-end examination
- **"U"** denotes unsuccessful performance in a course.
- **“AB”** denotes absent for the semester end examination

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

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

17.0 AWARD OF LETTER GRADE

17.1 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.

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

18.0 DECLARATION OF RESULTS

18.1 After finalization 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.

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

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

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

19.0 COURSE REPETITION AND ARREARS EXAMINATION

19.1 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.

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

19.3 A student who is awarded “U” or “AB” grade in a course will have the option of either to write semester end arrear examination at the end of the subsequent semesters, or to redo the course whenever the course is offered. Marks earned during the redo period in the continuous assessment for the course, will be used for grading along with the marks earned in the end-semester (re-do) examination.

19.4 If any student obtained “U” or “AB” grade, the marks earned during the

redo period for the continuous assessment for that course will be considered for further appearance as arrears.

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

20.0 GRADE SHEET

20.1 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.

20.2 The GPA will be calculated according to the formula

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

where n = number of courses

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 of time.

'I' and 'W' grades will be excluded for GPA calculations.

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

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

20.3.1 For students under full time mode of study

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

However, to be eligible for First Class with Distinction, a student should not have obtained U or I grade in any course during his/her study and should have completed the PG Programme within a minimum period covered by the minimum duration (clause 3.1) plus authorized break of study, if any (clause 8). To be eligible for First Class, a student should have passed the examination in all courses within the specified minimum number of semesters reckoned from his/her commencement of study plus two semesters. For this purpose, the authorized break of study will not be counted. The students who do not satisfy the above two conditions will be classified as second class. For the purpose of classification, the CGPA will be rounded to two decimal places. For the purpose of comparison of performance of students and ranking, CGPA will be considered up to three decimal places.

20.3.2 For students under part time mode of study

CGPA	Classification
8.50 and above, having completed all courses in first appearance	First class with Distinction
6.50 and above	First Class
All others	Second Class

For the purpose of classification, the CGPA will be rounded to two decimal places.

21.0 ELIGIBILITY FOR THE AWARD OF THE MASTERS DEGREE

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

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

ii) no disciplinary action is pending against him/her.

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

22.0 POWER TO MODIFY

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

CURRICULUM & SYLLABI FOR MASTER OF COMPUTER APPLICATIONS

(SIX SEMESTERS / FULL TIME)

CURRICULUM

Sl. No.	Course Code	Course Title	L	T	P	C
		SEMESTER I				
1	MAC6185	Discrete mathematics	**3**	**1**	**0**	**4**
2	CAC6101	Programming in C and C++	**3**	**0**	**0**	**3**
3	CAC6102	Computer Organization	**3**	**0**	**0**	**3**
4	CAC6103	Database Management Systems	**3**	**0**	**0**	**3**
5	CAC6104	Computer Networks	**3**	**0**	**0**	**3**
6	CAC6105	C and C++ Programming Lab	**0**	**0**	**4**	**2**
7	CAC6106	DBMS Lab	**0**	**0**	**4**	**2**
						20
		SEMESTER II				
1	CAC6201	Computer Graphics and Multimedia Systems	**3**	**0**	**1**	**4**
2	CAC6202	Software Engineering	**3**	**0**	**0**	**3**
3	CAC6203	Data Structures and Design and Analysis of Algorithms	**3**	**0**	**0**	**3**
4	CAC6204	Operating Systems	**3**	**0**	**0**	**3**
5		Elective – 1	**3**	**0**	**0**	**3**
6	CAC6205	Data Structures and Algorithms Lab	**0**	**0**	**4**	**2**
7	CAC6206	Communication Skills Laboratory	**0**	**0**	**2**	**2**
8	CAC6206	Seminar	**0**	**0**	**0**	**1**
						21

Sl. No.	Course Code	Course Title	L	T	P	C
		SEMESTER III				
1	CAC7101	Object Oriented Analysis and Design	**3**	**0**	**0**	**3**
2	CAC7102	Internet and Java Programming	**3**	**0**	**0**	**3**
3	MAC6186	Resource Management Techniques	**3**	**1**	**0**	**4**
4		Elective – 2	**3**	**0**	**0**	**3**
5		Elective – 3	**3**	**0**	**0**	**3**
6		Elective – 4	**3**	**0**	**0**	**3**
7	CAC7103	Case tools Lab/OOAD Lab	**0**	**0**	**4**	**2**
8	CAC7104	Programming in JAVA	**0**	**0**	**4**	**2**
9	CAC7105	Programming Languages				**1**
						24
		SEMESTER IV				
1	CAC7201	Advanced Web Design and Development	**3**	**0**	**0**	**3**
2	CAC7202	XML and Web Services	**3**	**0**	**0**	**3**
3	CAC7203	Mobile Computing	**3**	**0**	**0**	**3**
4		Elective – 5	**3**	**0**	**0**	**3**
5		Elective – 6	**3**	**0**	**0**	**3**
6		Elective – 7	**3**	**0**	**0**	**3**
7	CAC7204	Web design and development Lab	**0**	**0**	**4**	**2**
8	CAC7205	XML and Web Services Lab	**0**	**0**	**4**	**2**
9	CAC7206	Soft Skills and Personality Development	**0**	**0**	**2**	**2**
						24

Sl. No.	Course Code	Course Title	L	T	P	C
		SEMESTER V				
1	CAC8101	Mobile Application Development	**3**	**0**	**0**	**3**
2	MSC8181	Essentials of management for computer professionals	**3**	**0**	**0**	**3**
3	CAC8102	Internet of Things	**3**	**0**	**0**	**3**
4		Elective – 8	**3**	**0**	**0**	**3**
5		Elective – 9	**3**	**0**	**0**	**3**
6	CAC8103	Mobile Application Development Lab	**0**	**0**	**4**	**2**
7	CAC8104	Mini Project	**0**	**0**	**4**	**2**
						19
		SEMESTER VI				
1	CAC8201	Project				**12**

LIST OF ELECTIVES

Sl. No.	Course Code	Course Title	L	T	P	C
		Semester II				
1	CACY001	Management Information System	**3**	**0**	**0**	**3**
2	CACY002	Accounting and Financial Management	**3**	**1**	**0**	**4**
3	CACY003	E-commerce	**3**	**0**	**0**	**3**
4	CACY004	Business Processes	**3**	**0**	**0**	**3**
		Semester III				
5	CACY005	Grid Computing	**3**	**0**	**0**	**3**
6	CACY006	Cloud computing	**3**	**0**	**0**	**3**
7	CACY007	Unix and Network Programming	**3**	**0**	**0**	**3**
8	CACY008	Multimedia systems and Algorithms	**3**	**0**	**0**	**3**
9	CACY009	Network Security	**3**	**0**	**0**	**3**
10	CACY010	Microprocessor and its applications	**3**	**0**	**0**	**3**
11	CACY011	TCP/IP Protocol Suite	**3**	**0**	**0**	**3**
12	MSCY181	Management functional areas and information Systems	**3**	**0**	**0**	**3**
13	CACY012	Adhoc Networks	**3**	**0**	**0**	**3**
		Semester IV				
14	CACY013	Digital Image Processing	**3**	**0**	**0**	**3**
15	CACY014	Probability and Statistics	**3**	**1**	**0**	**4**
16	CACY015	Software Quality Management	**3**	**0**	**0**	**3**
17	CACY016	Embedded Systems	**3**	**0**	**0**	**3**
18	CACY017	Business Intelligence	**3**	**0**	**0**	**3**
19	CACY018	Software Testing	**3**	**0**	**0**	**3**
20	CACY019	Content Management System	**3**	**0**	**0**	**3**
21	CACY020	Advanced Programming Techniques	**3**	**0**	**0**	**3**
22	CACY021	Information Storage and Management	**3**	**0**	**0**	**3**
23	CACY022	Semantic Web	**3**	**0**	**0**	**3**

Sl. No.	Course Code	Course Title	L	T	P	C
24	CACY023	Healthcare Analytics	**3**	**0**	**0**	**3**
25	CACY024	Python Programming	**3**	**0**	**0**	**3**
26	CACY025	Enterprise Resource Planning	**3**	**0**	**0**	**3**
27	CACY026	Software Project Management	**3**	**0**	**0**	**3**
28	CACY027	Data Mining and Data warehousing	**3**	**1**	**0**	**3**
		Semester V				
29	CACY028	Unix Internals	**3**	**0**	**0**	**3**
30	CACY029	Advanced Databases	**3**	**0**	**0**	**3**
31	CACY030	Software Quality Assurance	**3**	**0**	**0**	**3**
32	CACY031	Service Oriented Architecture	**3**	**1**	**0**	**3**
33	CACY032	C# and .NET Framework	**3**	**0**	**0**	**3**
34	CACY033	PHP Programming	**3**	**0**	**0**	**3**
35	CACY034	Online Computer Advertising	**3**	**0**	**0**	**3**
36	CACY035	Web Mining	**3**	**0**	**0**	**3**
37	CACY036	Digital marketing	**3**	**0**	**0**	**3**
38	CACY037	Big data and its Analytics	**3**	**0**	**0**	**3**
39	CACY038	Information Retrieval	**3**	**0**	**0**	**3**
40	CACY039	Social Media Analysis	**3**	**0**	**0**	**3**
41	CACY040	Human Computer Interaction	**3**	**0**	**0**	**3**
42	CACY041	Bio-Informatics	**3**	**0**	**0**	**3**

SEMESTER I

MAC6185 DISCRETE MATHEMATICS

L	T	P	C
3	1	0	4

OBJECTIVES:

- Acquire knowledge on Set theory, Logical connectives and normal forms.
- To familiarize students with applications of Formal language and Algebraic Theory to Computer Science problems
- Compute problems on Permutations and Combinations, Algebraic structures, logical connectives, truth tables, normal forms.
- Analyze and derive conclusion on Proofs by contradiction, kernal of homomorphism, Cosets and Lagrange's theorem, Normal subgroups, Rings and Fields

MODULE I FUNDAMENTAL STRUCTURES 12

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

MODULE II LOGIC 12

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

MODULE III COMBINATORICS 12

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

MODULE IV ALGEBRAIC STRUCTURES 12

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

MODULE V MORPHISMS ON ALGEBRAIC STRUCTURES 12

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

Total Hours: 60

REFERENCES:

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

OUTCOMES:

On completion of this course, students will be able to

- model Physical Problems to Mathematical problems
- solve modeled problems using set theory, connectives and Permutation and combinations.
- critique solution derived using proofs by contradictions, homomorphisms and groups, Normal subgroups, Rings and Fields.
- construct, organize and conclude problems on algebraic structures, logical connectives, normal forms.
- apply the acquired knowledge to solve problems on Finite state machines, deterministic and Non- deterministic finite state, Formal Languages, Classes of Grammars

CAC6101 PROGRAMMING IN C AND C++

L	T	P	C
3	0	0	3

OBJECTIVES:

- To gain experience about structured programming
- To understand various features in C
- Teach the syntax and semantics of C language as well as data types offered by the language.
- Develop the programming ability in students using the programming constructs Loop, functions, arrays, structures and unions.
- Identify and practice the object-oriented programming concepts and techniques
- Practice the use of C++ classes and class libraries
- Develop applications using Object Oriented Programming concepts

MODULE I INTRODUCTION TO C LANGUAGE 09

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

MODULE II ARRAYS, FUNCTIONS, STRUCTURES AND UNIONS 09

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

MODULE III POINTERS AND FILE MANAGEMENT 09

Pointers – Declaration, Accessing a variable, character strings, pointers to functions and structures - File Management in C – Dynamic Memory allocation

MODULE IV OBJECT RIENTEDCONCEPTS 09

Overview of C++-Classes and Objects-Friend Functions-Friend Classes-Inline function-Static Members – Arrays – Pointers – References - Dynamic Allocation - Function Overloading-constructor Overloading - Copy Constructors - Default Argument

MODULE V INHERITANCE AND EXCEPTION HANDLING 09

Operator Overloading-Member Operator Overloading-Overloading new and delete-Inheritance-Base Class-Access Control-Virtual Functions-Pure Virtual Functions-Templates-Generic Functions-Applying Generic Functions-Generic Classes-Exception Handling-C++ I/O Streams-File I/O

Total Hours: 45

TEXT BOOKS:

1. R.G.Dromey “How to Solve it by Computer”, PHI, 1998
2. E.Balagurusamy “Programming in ANSI C”, Tata McGraw Hill, 2004.
3. Robert Lafore. “Waite Groups OOP in Turbo C++”, Galgotia Publications, 2001.
4. Stanley, B.Lippman,JoveLagrie, “C++Primer”, 3rd Edition, Addison Wesley,1998.

OUTCOMES:

On completion of this course, students will be able to

- design, implement, test and debug programs using different data types, arrays, decision making statement and loops.
- solve simple, moderate, mathematical, logical and business problems in ‘C’.
- differentiate structure and union in the aspect of memory management.
- list the features of object-oriented programming language
- apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems using C++ language.

CAC6102 COMPUTER ORAGANISATION

L	T	P	C
3	0	0	3

OBJECTIVES

- To impart the knowledge in the field of digital electronics
- To impart knowledge about the various components of a computer and its internals.
- To design and realize the functionality of the computer hardware with basic gates and other components using combinational and sequential logic.
- To understand the importance of the hardware-software interface

MODULE I LOGIC CIRCUITS 09

Logic functions – synthesis of logic functions – Minimizations of logic - Synthesis with NAND and NOR gates - Implementation of Logic gates - Flip-flops – Registers and shift registers – counters – decoders – Multiplexers – PLDs – sequential circuits. Basic Structure of Computers: Functional Units - Basic operational concepts – Bus structures – performance – Multi processors and Multi computers: Functional Units – Basic operational concepts – Bus structures – performance – Multiprocessors and Multi computers – Historical Perspective.

MODULE II MACHINE INSTRUCTIONS AND PROGRAMS 09

Numbers, Arithmetic operations and characters – Memory locations and address, operations – instructions and instruction, sequencing – addressing modes - assembly language – basic input/output operations – subroutines – encoding of Machine instructions. Instructions – Assembly language –O/I operations – Registers and addressing – Instructions language – program flow control – I/O operations - logic instructions of 6300 and Intel Pentium.

MODULE III INPUT / OUTPUT ORGANIZATION 09

Accessing I/O Devices – Interrupts – direct memory access – buses 240-interface circuits – Standard I/O Interfaces.

MODULE IV MEMORY SYSTEM 09

Concepts – semiconductor RAM memories – Readonly memories – cache memories – performance considerations – virtual memories management requirements – secondary storage Arithmetic: Addition and subtraction of signel members – design of fast adders – multiplication of positive members – signed operand multiplication – fast multiplication – integer division – floating point numbers and operations.

MODULE V BASIC PROCESSING UNIT 09

Concepts – execution of a complete instruction – Multiple – Bus organization – hardware control – microprogrammed control. Pipelining: Concepts – Data hazards – instruction hazards – influence on Instruction sets - data path and control constructions – supers cal operation- ultra SPARC II – Performance considerations.

Total Hours: 45

TEXT BOOKS:

1. Hamacher C, Vranesic Z, and Zaky S. Computer Organization, 5th edition, McGraw – Hill, 2002.

REFERENCE BOOKS:

1. Stallings W, Computer Organization and Architecture, 6th edition. Parson Education, 2003.
2. Mano M.M. Computer System Architecture, 3rd edition. PHI, 1993.
3. Yarbrough JM, Digital Logic – Applications and Design, Thomas Lernig, 1997.
4. Heuring VP, and Jordan HF, Computer Systems Design and Architecture, Pearson

OUTCOMES

On completion of this course, students will be able to

- solve basic binary math operations using the computer.
- demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target computer.
- apply knowledge of the processor’s internal registers and operations by use of a PC based microprocessor simulator.
- write assembly language programs and run their program on the training boards.
- design electrical circuitry to the processor I/O ports in order to interface the processor to external devices.
- write assembly language programs and download the machine code that will provide solutions to the real - world control problems.

CAC6103 DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

- Provide an introduction to the management of database systems.
- Understand the fundamentals of relational systems including data models, database architectures and database manipulations.
- To teach how to construct simple and moderately advanced database queries using structured Query Language.
- To teach the concept of a database transaction, handling deadlocks, paging, concurrency control, backup and recovery systems.
- explore the origins of NoSQL databases and the characteristics that distinguish them from traditional relational database management systems.

MODULE I INTRODUCTION 09

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

MODULE II RELATIONAL DATABASES 09

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

MODULE III DATA STORAGE AND INDEXING 09

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

MODULE IV QUERY EVALUATION & OPTIMIZATION 09

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

MODULE V TRANSACTION MANAGEMENT 09

Transaction Concept-Static Implementation-Concurrency Control-Protocols-Deadlock Handling-Recovery Systems-Recovery with Concurrent Transactions - Shadow Paging-Buffer Management-Case Studies-Oracle-Microsoft SQL Server-NoSQL-Characteristics-major types of NoSQL databases-NoSQL Database-as-a-Service for Web and mobile applications

Total Hours: 45

TEXT BOOK:

1. Abraham Silberschatz, HentryF.Korth and S.Sudharssan, “Database System Concepts”, 4th Edition, Tata McGraw Hill, 2002.

REFERENCES:

2. Raghu Ramakrishnan & Johannes Gerhrke, “Data Base Management Systems”, McGraw Hill International Edition, 2000.

OUTCOMES:

On completion of this course, students will be able to

- describe the concepts of data storage and indexing, transaction management, query evaluations and optimization techniques.
- list the importance of DBMS and differentiate how DBMS is better than traditional File Processing Systems.
- analyze the basic structure of Database and recognize the different views of the database.
- formulate data retrieval queries in SQL for real time scenario.
- construct and normalize conceptual data models
- handle the deadlocks that occurs in the system.
- list the differences between a relational database and a non-relational (NoSQL) database

CAC6104 COMPUTER NETWORKS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To provide students with enough knowledge in networking, various types of networks and its applications.
- To describe the issues of data link protocols including encoding, framing, and error detection.
- To learn various switching and routing techniques
- To acquire essential knowledge about layer architecture of data communication.
- To learn the technologies of Software Defined Networking (SDN), Network Functions Virtualization (NFV)

MODULE I INTRODUCTION 09

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

MODULE II NETWORK FUNDAMENTALS 09

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

MODULE III NETWORK LAYER 09

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

MODULE IV TRANSPORT LAYER 09

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

MODULE V PRESENTATION LAYER and APPLICATIONS 09

Presentation formatting – Data compression – Cryptographic Algorithms: RSA - DES –– Applications – Domain Name Service – Email - SMTP – MIME – HTTP – SNMP-Introduction to Software Defined Networking(SDN) and Network Functions Virtualization(NFV)- SDN Fundamentals

Total Hours: 45

TEXT BOOK:

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

REFERENCES:

1. James F. Kurose and Keith W. Ross, “Computer Networking - A Top Down Approach featuring the Internet”, 1st Edition, Addison Wesley Publishing Company, 2001.
2. William Stallings, “Data and Computer Communications”, 5th Edition, PHI, 1997.
3. Andrew S. Tanenbaum, “Computer Networks”, Tata Mcgraw Hill, 3rd Edition, 2001.

OUTCOMES:

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

- identify and describe the layers of the OSI and TCP/IP.
- list the applications of network
- make effective use of networking topologies
- illustrate how networks work in practice
- identify the requirements for different network architecture
- evaluate the performance of each of the protocols.
- Summarize the features of an emerging paradigm software defined networking(SDN) in computer networking.

CAC6105 C AND C++ PROGRAMMING LAB

L	T	P	C
0	0	4	2

OBJECTIVES:

- Brief on Data Types, Operators, Statements, Loops, Functions, Array, Pointers, Structures.
- Make the students write programs using various programming constructs.
- Understand and solve logical & mathematical problems through C++ language.
- Design and develop solutions to intermediate level problems.
- Develop their skills in software development using a procedural language.
- Get programming skill in object oriented technology with the usage of C++.

List of Programs

1. **Display the following:**
   i. Floyd's triangle
   ii. Pascal Triangle
2. **Generate the following series of numbers:**
   i. Armstrong numbers between 1 to 100
   ii. Prime numbers between 1 to 50
   iii. Fibonacci series up to N numbers
3. **Manipulate the strings with following operations.**
   i. Concatenating two strings
   ii. Reversing the string
   iii. Finding the substring
   iv. Replacing a string
   v. Finding length of the string
4. **Find the summation of the following series:**
   i. Sine
   ii. Cosine
   iii. Exponential
5. **Create the sales report for M sales person and N products using two dimensional array.**
6. **Simulate following Banking operations using functions.**
   i. Deposit
   ii. Withdrawal
   iii. Balance Enquiry

7. **Implement using recursion**
   i. Find the solution of Towers of Hanoi problem using recursion.
   ii. Fibonacci number generation.
   iii. Factorial
8. **Generate Student mark sheets using structures.**
9. **Create a collection of books using arrays of structures and do the following:**
   i. Search a book with title and author name
   ii. Sorts the books on title.
10. **Programs using Constructor and Destructor.**
11. **Creation of classes and use of different types of functions.**
12. **Count the number of objects created for a class using static member function.**
13. **Write programs using function overloading and operator overloading.**
14. **Programs using inheritance.**
15. **Program using friend functions.**
16. **Program using virtual function.**
17. **Write a program using exception handling mechanism.**
18. **Programs using files.**
19. **Programs using function templates.**

OUTCOMES:

On completion of this course, students will be able to

- design and debug programs involving different data types, decision structures and loops.
- apply the in-built functions and customized functions for solving the problems.
- handle the exceptions that raise in the program.
- write, read and manipulate the data stored in files to deal with various real time problems
- work in a team to analyze engineering problems and develop C++programs for solving these problems.
- reuse the code and write the classes which work like built-in types

CAC6106 DBMS LAB

L	T	P	C
0	0	4	2

OBJECTIVES:

- Learn how to create tables which are fundamental storage blocks of data.
- Learn how to place constraints on data that is entered on tables to ensure data integrity.
- Learn how to add, change and remove data from tables.
- Learn how to select a subset of the data you want to see from the collection of tables and data.
- Learn how to combine table and group multiple rows of data in table.

List of Exercises

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

Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory, etc

OUTCOMES:

On completion of this course, students will be able to

- apply iterative programming at database level.
- write programming blocks with conditional structure, assignment structure, loop structure, etc.
- use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc.
- implement cursors which would allow row wise access of data.
- use triggers which would allow you define pre and post actions when something change in the database tables.

SEMESTER II

		L	T	P	C
CAC6201	**COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS**	**3**	**0**	**1**	**4**

OBJECTIVES:

- develop an understanding and awareness of how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
- be familiar with various software programs used in the creation and implementation of multi-media (interactive, motion/animation, presentation, etc.).
- enable students to be practically sound in area of 2D, 3D and animation.
- develop real time multimedia applications with user friendly environment.

MODULE I INTRODUCTION 09

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

MODULE II 2D TRANSFORMATIONS 09

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

MODULE III 3D TRANSFORMATIONS 09

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

MODULE IV OVERVIEW OF MULTIMEDIA 09

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

MODULE V MULTIMEDIA SYSTEMS AND APPLICATIONS 09

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

Total Hours: 45

GRAPHICS AND MULTIMEDIA LAB:

1. Write a program for Line drawing using Bresenham Algorithm.
2. Write a program for Line drawing using DDA Line Drawing Algorithm.
3. Write a program for Circle Drawing using Bresenham Circle Drawing Algorithms.
4. Write a program for Line Clipping using Cohen-Sutherland Line clipping algorithm.
5. Write a program for 2D Transformations like Translations and Scaling and Rotations.
6. Write a program for 3D Transformations like Translations and Scaling and Rotations.
7. Write a program for 3D Projections like Parallel, Perspective
8. Create Frame by Frame Animations using multimedia authoring tools.
9. Develop a presentation for a product using techniques like Guide Layer, masking and onion Skin using authoring tools.
10. Create a JPEG image which demonstrates the various features of an image editing tool.

Use various software programs used in the creation and implementation of multi-media (interactive, motion/animation, presentation, etc.)

TEXT BOOKS:

1. Hearn D and Baker M.P, “Computer graphics – C Version”, 2nd Edition, Pearson Education, 2004 (unit 1, 2 &3)
2. Ralf Steinmetz, Klarasteinmetz, “Multimedia Computing, Communications and Applications”, Pearson education, 2004 (unit 4 & 5)

REFERENCES:

1. Siamon J. Gibbs and Dionysios C. Tsichritzis, “Multimedia programming”, Addison Wesley, 1995.
2. John Villamil, Casanova and LeonyFernanadez, Eliar, “Multimedia Graphics”, PHI, 1998.

OUTCOMES:

On completion of this course, students will be able to

- attain the complete knowledge in graphics & multimedia domain.
- show their proficiency while working with Graphics and multimedia software's and tools.
- create interactive graphics applications in C++ using one or more graphics application programming interfaces.
- design and develop a user friendly multimedia application.
- write programs that demonstrate 2D and 3D transformations

CAC6202 SOFTWARE ENGINEERING

L	T	P	C
3	0	0	3

OBJECTIVES:

- Assist the student in understanding the basic theory of software engineering
- Define software engineering and explain its importance
- Discuss the concepts of software products and software processes
- Solve problems in a team environment through effective use of written and oral communication skills.
- Practice the lifelong learning needed in order to keep current as new issues emerge.

MODULE I INTRODUCTION 09

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

MODULE II REQUIREMENT ANALYSIS 09

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

MODULE III SOFTWARE DESIGN 09

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

MODULE IV SOFTWARE TESTING 09

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

MODULE V SCM AND QUALITY ASSURANCE 09

Software Configuration And Management-Features-SCM Process-Software Quality Concepts – Quality Assurance – Software Review–Technical Reviews –

Formal Approach To Software Quality Assurance – Reliability – Quality Standards – Software Quality Assurance Plan.

Total Hours: 45

TEXT BOOK :

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

REFERENCES :

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

OUTCOMES:

On completion of this course, students will be able to

- apply foundations of software engineering practice and process within production constraints.
- analyze, design, verify, validate, implement, apply, and maintain software systems
- justify the importance of cost estimation, scheduling and reviewing the progress of the software.
- apply different testing and debugging techniques and analyze their effectiveness.
- sketch the software project management concepts like cost estimation, scheduling and reviewing the progress.
- demonstrate different testing and debugging techniques and analyzing their effectiveness.

CAC6203	DATA STRUCTURES AND DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- to learn about different kinds of data structures that are suited to different kinds of applications
- to manage huge amounts of data efficiently,
- to understand the suitable applications of tree and graph data structure

MODULE I LINEAR STRUCTURES 09

Abstract Data Types(ADT) – List ADT–array-based implementation–linked list implementation–cursor-based linked lists–doubly-linked lists–applications of lists– Stack ADT–Queue ADT– circular queue implementation– Applications of stack sand queues

MODULE II TREE STRUCTURES 09

Tree ADT - tree traversals–left child right sibling data structures for general trees –Binary Tree ADT - expression trees– applications of trees–binary search tree ADT– AVL trees–binary heaps

MODULE III HASHING AND SETS 09

Hashing – Separate chaining –open addressing–rehashing –extendible hashing – Disjoint Set ADT–dynamic equivalence problem–smart union algorithms– path compression–applications of Sets

MODULE IV GRAPHS AND THEIR APPLICATIONS 09

Definitions – Topological sort–breadth-first traversal- shortest-path algorithms–minimum spanning tree– Prim's and Kruskal's algorithms–Depth-first traversal–biconnectivity–Euler circuits–applications of graphs.

MODULE V ALGORITHM DESIGN AND ANALYSIS 09

Introduction to algorithm design techniques: Greedy algorithms, Divide and conquer, Dynamic programming, backtracking, branch and bound, Randomized algorithms– Introduction to algorithm analysis: asymptotic notations, recurrences–Introduction to NP-complete problems

Total Hours: 45

TEXT BOOK:

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

REFERENCES:

1. Robert Kruse & Clovis L. Tondo “Data Structures and Program Design in C”, Prentice Hall, 2nd edition, 1991.
2. Weiss “Data Structures and Algorithm Analysis in C”, Addison Wesley, 2nd Edition, 1997.
3. R.F.Gilberg, B.A.Forouzan, “Data Structures”, Second Edition, Thomson India Edition, 2005.
4. K.S.Easwarakumar, Object Oriented Data Structures using C++, Vikas
5. Publishing House pvt.Ltd., 2000.
6. SaraBaase and A.VanGelder, “Computer Algorithms”, Third Edition, Pearson Education, 2000.
7. T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", Second Edition, Prentice Hall of India Ltd, 2001.

OUTCOMES:

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

- compare and contrast various sorting and searching techniques
- apply suitable shortest path algorithm in appropriate applications
- manage the storage by using proper storage management technique
- Identify the strengths and weaknesses of different data structures
- choose the appropriate data structure and algorithm design method for a specified application.
- determine which algorithm or data structure to use in different scenarios

CAC6204 OPERATING SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

- Provide an overview of computer system and operating system
- Learn the scheduling mechanisms of operating systems
- Introduce the concepts of process management, memory management and storage management

MODULE I INTRODUCTION 07

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

MODULE II PROCESS MANAGEMENT 08

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

MODULE III PROCESS SYNCHRONIZATION 10

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

MODULE IV MEMORY MANAGEMENT 10

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

MODULE V I/O AND FILE SYSTEMS 10

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

Total Hours: 45

TEXT BOOK:

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

REFERENCES:

1. Milankovic M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, 1992.
2. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall of India, 2004.
3. H.M.Deitel, An Introduction to Operating Systems, 2nd Edition, Pearson Education, 2002.

OUTCOMES:

On completion of this course, students will be able to

- summarize the functions and objectives of operating systems
- evaluate the design issues associated with operating systems.
- compare and contrast scheduling mechanisms
- analyze the memory management issues.
- comprehend synchronization, deadlocks and multithreading.
- illustrate the file system structure.

CAC6205 DATA STRUCTURES AND ALGORITHMS LAB

L	T	P	C
0	0	4	2

OBJECTIVES:

- Introduce various algorithmic techniques to solve the problems
- study run-time efficiency of an algorithm
- design and implement operations on stacks, queues, trees and graphs
- design and implement algorithms for searching and sorting
- determine the Big-O of an algorithm

ALGORITHMS:

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

DATA STRUCTURES:

1. Represent the given sparse matrix using one dimensional array and linked list.
2. Create a Stack and do the following operations using arrays and linked lists
   (i) Push (ii) Pop (iii) Peep
3. Create a Queue and do the following operations using arrays and linked lists
   (i) Add (ii) Remove
4. Implement the operations on singly linked list, doubly linked list and circular linked list.
5. Create a binary search tree and do the following traversals
   (i) In-order (ii) Pre order (iii) Post order

6. Implement the following operations on a binary search tree.
   (i) Insert a node (ii) Delete a node
7. Sort the given list of numbers using heap and quick sort.
8. Perform the following operations in a given graph
   (i) Depth first search (ii) Breadth first search
9. Find the shortest path in a given graph using Dijkstra algorithm

OUTCOMES:

On completion of this course, students will be able to

- analyze the complexity of a given algorithm.
- apply various data structure such as stacks, queues, trees , linked list and graphs to solve various computing problems
- compare, contrast, and choose appropriate algorithmic design techniques to provide solution to the problem.
- develop program that implements kruskal's algorithm, prims, binary search, all types of sorting, greedy algorithm and backtracking technique.
- construct optimal binary search tree using dynamic programming technique.
- find the solution for the n-queens problem and implement traveling salesman problem using dynamic programming.

CAC6206 COMMUNICATION SKILLS LABORATORY

L	T	P	C
0	0	2	2

OBJECTIVES:

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

MODULE I LANGUAGE FUNDAMENTALS 03

Tenses, Subject – Verb Agreement, Correction of Errors.

MODULE II ORAL COMMUNICATION 10

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

MODULE III WRITTEN COMMUNICATION 06

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

MODULE IV LANGUAGE LABORATORY 06

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

Total Hours: 25

REFERENCES :

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

OUTCOMES:

On completion of this course, students will be able to

- organise ideas relevantly and coherently.
- engage in debates.
- participate in group discussions and face interviews.
- write project and technical reports.
- write formal letters and deliver oral presentations
- take part in social and professional communication.

CAC6207 SEMINAR TOPICS

L	T	P	C
0	0	0	1

The student gives presentation on topics like:

- Social Networking
- Mobile Computing
- E-Business
- Human-Computer Interaction
- Cloud Computing
- Web of things
- Big Data
- xMax Technology
- Text mining
- Soft computing
- Plagiarism detection techniques.
- Ethical Hacking
- Surface Computer
- X-internet
- 4G broadband

SEMESTER III

CAC7101 OBJECT ORIENTED ANALYSIS AND DESIGN

L	T	P	C
3	0	0	3

OBJECTIVES:

- Describe basics of Object orientation and development methodologies
- Make the students to draw UML and other notations of object oriented paradigm and describe them
- to use UML and design patterns and framework in the processes
- Do object-oriented software testing and quality assurance

MODULE I INTRODUCTION 09

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

MODULE II METHODOLOGY AND UML 09

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

MODULE III OBJECT ORIENTED ANALYSIS 09

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

MODULE IV OBJECT ORIENTED DESIGN 09

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

MODULE V SOFTWARE QUALITY 09

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

Total Hours: 45

TEXT BOOK :

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

REFERENCES:

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

OUTCOMES:

On completion of this course, students will be able to

- describe basics of object orientation and development methodologies
- draw UML and other notations used in object oriented paradigm
- identify and apply object-oriented patterns and framework.
- test object oriented software and assure the quality.
- construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.
- recognize the difference between various object relationships like inheritance, association, whole-part, and dependency relationships.

CAC7102 INTERNET AND JAVA PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

- learn basic internet concepts, fighting against spam, conferencing on the internet, planning and creating website.
- learn the fundamentals of Java and to introduce encapsulation, polymorphism, and the Java language mechanism (classes and objects) to implement it.
- develop Java computer programs that perform various problem-solving algorithms.
- develop the programming skills to use the object oriented programming methodology to produce quality computer based solutions to real problems.
- work with collection of API and develop fast programs.

MODULE I BASIC INTERNET CONCEPTS 08

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

MODULE II WORLD WIDE WEB 08

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

MODULE III JAVA FUNDAMENTALS 08

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

MODULE IV PACKAGES 12

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

MODULE V ADVANCED JAVA PROGRAMMING 09

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

Total Hours: 45

TEXT BOOKS:

1. Margaret Levine Young, “Internet and WWW”, 2nd Edition, Tata McGraw Hill, 2002. (Unit 1 & 2)
2. Herbert Schildt, The Complete Reference – Java 2 , 4th Edition, Tata McGraw Hill, 2001. (Unit 3, 4 & 5)

REFERENCES:

1. Keyur shah, “Gateway to Java Programmer Sun Certification”, Tata McGraw Hill 2002.
2. Deitel&Deitel, Java How to Program, Prentice Hall 1999.

OUTCOMES:

On completion of this course, students will be able to

- list the various applications of internet and able to create , maintain and block the website.
- identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- compare and contrast the interfaces and abstract classes.
- handle the exceptions and illustrate the life cycle of thread.
- update and retrieve the data from the databases using SQL
- develop distributed applications using RMI
- develop programs using the AWT packages and collection framework

MAC6186 RESOURCE MANAGEMENT TECHNIQUES

L	T	P	C
3	1	0	4

OBJECTIVES

- Constructing a mathematical representation of the problem under study.
- Deriving a solution using any of the appropriate mathematical models namely linear programming models, transportation and assignment models, integer programming models, scheduling by pert and cpm, queuing models.
- Analyze the alternatives and produce an optimal solution for the existing problem.

MODULE I LINEAR PROGRAMMING MODELS 12

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

MODULE II TRANSPORTATION AND ASSIGNMENT MODELS 12

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

MODULE III INTEGER PROGRAMMING MODELS 12

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

MODULE IV SCHEDULING BY PERT AND CPM 12

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

MODULE V QUEUEING MODELS 12

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

L : 45, T : 15 Total Hours: 60

TEXT BOOK:

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

REFERENCES:

1. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, “Operations Research”, Pearson Education, Asia, 2005.
2. Prem Kumar Gupta, D.S. Hira, “Operations Research”, S.Chand& Company Ltd, New Delhi, 3rd Edition, 2003.

OUTCOMES:

On completion of this course, students will be able to

- construct a real world problem into a mathematical problem.
- identify the appropriate model to solve the problem.
- explore the alternative models and justify on the selected model for representation.
- analyze and provide a optimal solution.
- construct the network and analyze the resources in network scheduling

CAC7103 CASE TOOLS LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES:

- learn the basics of OO analysis and design skills.
- be exposed to the UML design diagrams.
- learn to map design to code.
- be familiar with the various testing techniques

LIST OF EXERCISES

1. Design a UML diagram for Passport automation system.
2. Design a UML diagram for Stock Maintenance System.
3. Design a UML diagram for Online course reservation system.
4. Design a UML diagram for E-ticketing
5. Design a UML diagram for Library Management System
6. Design a UML diagram for Student Information System.
7. Design a UML diagram for Credit card processing.
8. Design a UML diagram for Exam Registration.
9. Design a UML diagram for e-book management system
10. Design a UML diagram for Recruitment system.

OUTCOMES*:*

At the end of the course, the student should be able to:

- design and implement projects using OO concepts.
- use the UML analysis and design diagrams.
- apply appropriate design patterns.
- create code from design.
- compare and contrast various testing techniques

CAC7104 PROGRAMMING IN JAVA

L	T	P	C
0	0	4	2

OBJECTIVES:

- to develop the programming skills using the object oriented programming
- methodology to produce quality computer based solutions to real problems.
- to utilize the advance features of Java technology.
- demonstrate the use of Application Programming Interface (API) and develop programs
- to develop good multithreaded programs

JAVA PROGRAMMING:

1. Program to illustrate the use of overloading and overriding.
2. Program to implement the concept of inheritance.
3. Program to illustrate the use of multi-threading.
4. Program to implement the concept of Interfaces and packages.
5. Generate the program using exceptions handling mechanism.
6. Implement the file operations.
7. Program using Applets.
8. Program to handle Mouse Events, Keyboard Events and work with GUI components.
9. Program using JDBC.

OUTCOMES:

On completion of this course, students will be able to

- apply basic control structures, arrays, looping statement and various class libraries in developing program.
- write Java programs using object-oriented programming techniques inheritance, polymorphism, interface, constructors and abstract class.
- create package for real time applications like bank transaction, employee processing etc.
- construct multithreaded programs and handle exceptions
- write programs using graphical user interface (GUI) components and various event handling methods.
- implement file operations and connect with database using JDBC.

CAC7105 PROGRAMMING LANGUAGES

L	T	P	C
0	0	0	1

OBJECTIVES:

- To gain experience about structured programming.
- To help students to understand the implementation of C language.
- To understand various features in C.
- To impart knowledge on object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems.

MODULE I FUNDAMENTALS OF C LANGUAGE 03

Structures of 'C' Programming-Character set-C Tokens- Keywords- Identifiers-Variables- Constant- Data Types-Comments-Types of operators.

MODULE II CONTROL STRUCTURES 03

Decision making structures-If, If-else, Nested If-else, Switch; Loop Control structures: While, Do while, for, Nested for loop.

MODULE III ARRAYS, FUNCTIONS AND POINTERS 03

Arrays – dynamic and multi-dimensional arrays- Basic types of function – Recursion –- Pointers – Declaration, Accessing a variable, character strings.

MODULE IV OBJECT ORIENTED CONCEPTS 03

Overview of C++-Classes and Objects-Overloading-Constructor-Inheritance-Default argument

MODULE V EXCEPTION HANDLING AND TEMPLATES 03

Exception Handling, Virtual Function-Templates- C++ I/O Streams-File I/O

Total Hours: 15

TEXT BOOKS:

1. K R Venugopal, S R Prasad, Mastering in C. Tata McGraw Hill Publishing Company Limited, 2nd reprint 2007.

REFERENCES:

1. Yeshwantkanetkar, Let us C, Sixth Edition, BPB Publication 2005
2. Herbert Schildt, Turbo C: The Complete Reference, Mc Graw-Hill,1998,ISBN: 9780078813467
3. HM Deitel and PJ Deitel “C++ How to Program”, Seventh Edition, 2010, Prentice Hall
4. E Balagurusamy, “Object oriented Programming with C++”, Third edition, 2006, Tata McGraw Hill

OUTCOMES

On completion of this course, students will be able to

- solve the given problem using the syntactical structures of C language
- develop, execute and document computerized solution for various problems using the features of C language
- develop programs using single and multi-dimensional arrays.
- apply inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems.
- handle the exception and work with files.

SEMESTER - IV

CAC7201	ADVANCED WEB DESIGN AND DEVELOPMENT	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To make use of the Internet related technologies.
- To analyse advantages and use of different types of CSS.
- To design static and interactive web pages by embedding Java Script code in HTML and Use Java Script to validate user input.
- To teach the importance of functional programming to improve web applications
- To Know how to embed media—such as audio or video—into a web page
- To apply the basics of PHP and connect with MySQL database.

MODULE I INTRODUCTION TO WWW 09

Introduction to Network, Internet and Intranet, Application and Services, Internet Addressing – IP, DNS, URL. Elements of Web – Web Page, Web Site, Web Client & Server. Web Languages – HTML/DHTML, JavaScript, PHP, XML.

MODULE II BUILDING WEB BASED APPLICATION USING HTML 09

Html Document Structure, Various HTML Tags – Document Tag, Text Formatting Tag, Link Tag, List Tag, Image Tag, Table Tag, Line Breaks, Frame, Frameset, HTML Forms.

MODULE III CASCADING STYLE SHEET 09

Introduction to Style sheet, Types of Style sheet, concept of class & ID, Different CSS Property-.Background Property- Font property- Text -Dimensions-Combinators- Borders-Margins-Padding-Box Model.

MODULE IV CLIENT-SIDE SCRIPTING LANGUAGE 09

Concept and types of Scripting language, Introduction to Javascript, How to develop Javascript, Operators, Conditional Structure & Looping Structure, Dialog Boxes, Arrays, User Define Function, Javascript Function keyword, Function Expression, Constructor, Self Invoking Functions, Built-in Functions (String, Math, Date, Array), Built-in Object (window, screen ,location, history, Navigator),DOM, Forms, Objects and its events- Functional Programming.

MODULE V PHP COMPONENTS 09

Introduction to PHP, Basic PHP syntax: PHP tags, PHP statements and whitespace, comments, Operators, Conditional and Looping Structure, User Define Functions, Arrays. GET and POST Methods. GD Library, Cookies, Session, Server Variables, Database Connectivity with MySQL, PHP My Admin, Regular Expression, PHP with OOP (Class, constructor, inheritance), PHP with AJAX – Introduction-Sending Email using PHP.

Total Hours: 45

TEXT BOOKS:

1. Developing Web Application, Wiley India Publication, Ralph Moseley, Wiley India, 2007.

REFERENCE BOOKS:

1. Beginning PHP5, Apache, Mysql Web Development, Wrox, Elizabeth Naramore, Michael K. Glass, 2005.
2. PHP Bible, Wiley Publication, Tim Converse, Joyce Park, 2002.
3. Web Enabled Commercial Application Development Using HTML, DHTML, PERL, Java Script, BPB Publications, Ivan Bayross, 2005.
4. Beginning Ajax, Wrox, Chris Ullman, Lucinda Dykes, 2007.
5. Beginning JavaScript 2nd Edition, Wrox, Nicholas C. Zakas, 2004.

OUTCOMES:

On completion of this course, students will be able to

- differentiate web and website and summarize the importance of web languages in the development of website.
- apply JavaScript, HTML and CSS3 effectively to create interactive and dynamic websites
- build web applications using PHP and submit the form using GET or POST method.
- create layout in websites using Div tags and incorporate pre-designed elements into them.
- develop server side code using PHP and able to connect and manipulate the MySQL database.

CAC7202 XML AND WEB SERVICES

L	T	P	C
3	0	0	3

OBJECTIVES:

- To describe the role of XML in enterprises.
- To teach the importance of various supporting technologies in XML.
- To describe the role of SOAP in building web services, the basics of the SOAP protocol, and the structure of a SOAP document.
- To impart knowledge on UDDI registries and WSDL in creating web-services clients.
- To cover the basics of XML, Schemas, WSDL, and Web Services concepts.

MODULE I INTRODUCTION 09

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

MODULE II XML TECHNOLOGY 09

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

MODULE III SOAP 09

Overview of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure– Intermediaries – Actors – Design Patterns and Faults – SOAP with Attachments.

MODULE IV WEB SERVICES 09

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

MODULE V XML SECURITY 09

Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents – XML In Practice.

Total Hours: 45

TEXT BOOK:

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

REFERENCES:

1. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, “Developing Java Web Services”, Wiley Publishing Inc., 2004.
2. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services”, Pearson Education, 2004.
3. McGovern, et al., “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2005.

OUTCOMES:

On completion of this course, students will be able to

- list the importance of XML
- differentiate the various technologies of XML and their working.
- assess the role played by SOAP and web services
- recognize the need for XML security.
- build effective XML documents.
- build DTD documents to validate XML.
- build Schema documents to validate XML.

CAC7203 MOBILE COMPUTING

L	T	P	C
3	0	0	3

OBJECTIVES:

- To describe the basics of wireless medium access, satellite system and broadcast systems.
- To explain the architectures and protocols of various wireless telecommunications systems (GSM, DECT, TETRA) and compare them.
- To outline the basics of satellite system
- To classify and discuss the various wireless LAN technologies like ieee 802.11, Bluetooth, etc., and identify the related research issues in wireless LAN.
- To illustrate the routing and transport issues in mobile networks and demonstrate the existing solutions
- To express wireless application layer protocol(WAP)

MODULE I INTRODUCTION 09

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

MODULE II WIRELESS NETWORKS 09

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

MODULE III MOBILE NETWORK LAYER 09

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

MODULE IV MOBILE TRANSPORT LAYER 09

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

MODULE V WAP 09

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

Total Hours: 45

TEXT BOOK :

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

REFERENCES :

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

OUTCOMES:

On completion of this course, students will be able to

- express the issues in wireless medium access control and illustrate existing solutions
- Illustrate the fundamentals of satellite system and broadcast system
- discuss the architectures and working principles of wireless telecommunications systems(GSM, DECT,TETRA)
- classify and discuss the various wireless LAN technologies like IEEE 802.11, Bluetooth, etc., and identify the related research issues in wireless LAN.
- identify the issues in mobile routing, transport and application layers and demonstrate the existing solutions

CAC7204 WEB DESIGN AND DEVELOPMENT LAB

L	T	P	C
0	0	4	2

OBJECTIVES:

- To provide the student with the fundamental knowledge and skills to become a proficient web programmer
- Impart the knowledge of developing static and dynamic web page using HTML, CSS and JavaScript.
- To learn how to perform validation using JavaScript
- To impart designing online application and access database using MYSQL

LIST OF LAB EXERCISES

1. Design the static web page using frames, links and tables for any application.
2. Creation of HTML pages using ordered list, unordered list , definition list and hotspots
3. Create webpage to embed audio and video.
4. Usage of internal and external CSS along with HTML pages
5. Develop web pages using Background property, Font property, Dimensions, Box model, Combinators and Borders in CSS
6. Client side Programming
    i. Java script for displaying date and comparing two dates
    ii. Form Validation including text field, radio buttons, check boxes, list box and other controls
    iii. Design a digital clock
    iv. Develop Simple calculator
7. Developing online applications such as shopping, railway/air/bus, education using HTML, CSS, Javascript and PHP
8. Develop programs using control structures and arrays in PHP
9. Any online application using PHP and submit the form using GET or POST method.
10. Database connectivity in PHP

OUTCOMES:

On completion of this course, students will be able to

- build XML data file and validate using DTD and XML schema
- design and development applications using XML ,DOM and DSO
- design and implementation of Web forms and Web services.
- to design static and dynamic web pages
- to solve problem related to web based applications

CAC7205 XML AND WEB SERVICES LAB

L	T	P	C
0	0	4	2

OBJECTIVES:

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

LAB EXCERCISES:

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

OUTCOMES:

On completion of this course, students will be able to

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

CAC7206	SOFT SKILLS AND PERSONALITY DEVELOPMENT	L	T	P	C
		0	0	2	1

OBJECTIVES:

- Attitude Control and Quick Personal Self Esteem Improvement
- Interview Motivation and Developing Personal Confidence using NLP
- Effective Answering and Maintaining Fluent Communication
- Positive Body Language
- Effective Resume Creation
- Leadership Skills, Team Player Skills and Career Plan to HR

MODULE I MOTIVATION 05

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

MODULE II LEADERSHIP SKILLS 04

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

MODULE III EFFECTIVE COMMUNICATION I 04

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

MODULE IV EFFECTIVE COMMUNICATION II 05

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

Total Hours: 18

REFERENCES :

1. Charles Faulkner and Steve Andreas, "NLP: The New Technology of Achievement", Harper Paperbacks publishers, 1996.
2. Sarvesh Gulati, "Corporate Soft Skills", Rupa and Co publishers.
3. P.K.Dutt, G.Rajeevan and C.L.N. Prakash, “A Course in Communication Skills”, Cambridge University Press, India 2007.

OUTCOMES:

On completion of this course, students will be able to

- understand the significance of soft skills in the working environment
- communicate effectively and present their concepts in a more confident manner.
- engage in debates and participate in group discussions.
- recognize the different leadership styles
- take part in social and professional communication.
- develop self-motivation, raised aspirations and belief in one's own abilities, defining and committing to achieving one's goals

SEMESTER V

CAC8101 MOBILE APPLICATION DEVELOPMENT

L	T	P	C
3	0	0	3

OBJECTIVES:

- To impart knowledge on mobile app paradigm, IOS components and services.
- To impart knowledge on controls and gestures , creating universal applications run on iPhone and iPad
- To teach how to Install and use appropriate tools for Android development, including IDE, device emulator, and profiling tools.
- Design and develop mobile app using android

MODULE I INTRODUCTION TO IOS 08

Why IOS-The mobile App paradigm-Introduction to Xcode-main characteristics of mobile apps - Differences between mobile apps and desktop apps- How iOS is tailored to a mobile platform -IOS components and services- IPhone architecture-COCOA touch classes-interface builder.

MODULE II APPLICATION DEVELOPMENT IN iPHONE 09

Controls and Gestures-Advance controllers Programming-Navigation based Application development- create Universal applications that run on both iPhone and iPad-Core Animation- Core Graphics APIs to do simple drawing- Handle touch events- Create and present editable tables of data – using UI TableView-accessing user photos and camera within an application.

MODULE III INTRODUCTION TO ANDROID ARCHITECTURE 09

Introduction- History- Features- Android Architecture-setting up Android Application Environment-SDK- Application Environment and Tools, Android SDK. Programming paradigms and Application Components – Activity-Manifest File- Content providers, Broadcast receivers, Services-Interacting with UI-Persisting data using SQLite-packaging and deployment

MODULE IV USER INTERFACE DESIGN 10

Views &View Groups, Views : Button, Text Field, Radio Button, Toggle Button, Checkbox, Spinner, Image View, Image switcher, Event Handling, Listeners, Layouts : Linear, Relative- List View- Grid View-Table View- Web View- Adapters-Menus, Action Bars, Notifications : Status, Toasts and Dialogs, Styles and

Themes, Creating Custom Widgets, Focus, Touch Mode, Screen Orientation. Designing for Tablets – Working with tablets: Developing for the Honeycomb and Ice Cream Sandwich platforms, Manipulating objects with drag and drop-Localization, Localization Strategies, Testing Localized Applications, Publishing Localized Applications-Data Access and Storage- SQLite Databases

MODULE V NATIVE CAPABILITIES AND TESTING 09

Android Media API: Playing audio/video, Media recording. Sensors - how sensors work, listening to sensor readings. Bluetooth. Maps & Location: Android Communications: GPS, Working with Location Manager, Working with Google Maps extensions, Maps via intent and Map Activity, Location based Services. Location Updates, location-based services (LBS), Location Providers- Testing and Commercializing Applications - Basics of Testing- Debugging using DDMS-getting your app on the app store

Total Hours: 45

TEXT BOOKS:

1. Professional Android 4 Development by Reto Meier, John Wiley and Sons, 2012.
2. Android in Action, Third Edition, by W. Frank Ableson, RobiSen, Chris King, C. Enrique Ortiz, 2012.

REFERENCES:

1. Android Application Development Cookbook, by Wei-Meng Lee, John Wiley and Sons, 2013.
2. Beginning Android 4, by Grant Allen, Apress, 2011.

OUTCOMES:

On completion of this course, students will be able to

- List the differences between mobile apps and desktop apps
- create Universal applications that run on both iPhone and iPad
- Handle touch events, work with Table View and access user photos and camera through an application.
- use the development tools in the Android development environment
- apply the Java programming language to build Android apps
- develop UI-rich apps using all the major UI components
- Implement the design using Android SDK
- Deploy mobile applications in Android and iPone marketplace for distribution

CAC7206	ESSENTIALS OF MANAGEMENT FOR COMPUTER PROFESSIONALS NT	L	T	P	C
		3	0	0	3

OBJECTIVES:

- learn various functions and principles of management
- apply planning techniques and decision making process in IT/ITES profession
- get acquainted with organizing and staffing activities applicable to computer profession
- know the art of directing and controlling in typical IT job environment
- derive inputs about individual and group behavior as well as organization dynamics
- learn the various functional areas of management
- get acquainted with information systems management

MODULE I BASICS OF MANAGEMENT: PLANNING AND ORGANIZING 07

Management: definition, functions, schools of thought/ contributions by experts, role of managers – Planning: definition, process, purpose, types – MBO – MBE – Decision making in IT environment: steps, types of decision – Organizing: meaning, organizational charts – Departmentation: objectives, bases, forming departments in IT enterprises – Centralization and decentralization – Delegation of authority

MODULE II STAFFING, DIRECTING AND CONTROLLING 08

Staffing: definition, sub-functions – Directing: leadership theories and styles – Motivation: concepts, types of motives, applications in software jobs – Communication: types, process, barriers to effective communication – Controlling: process, effective control, types, techniques

MODULE III INDIVIDUAL AND GROUP BEHAVIOUR 10

Personality types – Factors influencing personality – Perception: definition, process – Attitude: components, measurement in IT employees – Learning theories – Motivation theories, motivating software employees – Group behavior: reasons for group formation, types of group in IT organizations – Group decision making techniques – Power and Politics in Organization – Types of conflict and resolution methods in software organizations

MODULE IV ORGANIZATION SYSTEM AND DYNAMICS 05

Organizational culture, sub-culture, cross-culture/ international culture in software industry – Definition of QWL – Work stress: causes, effects & coping strategies – Organizational change in software environment: reasons, resistance & overcoming strategies

MODULE V FUNCTIONAL AREAS OF MANAGEMENT 09

Human resource management: functions - Roles of HR manager - Selection procedure – Types of production – Overview of production management functions – Broad functions of materials management - Purchasing procedure – Stock control methods – Concept of supply chain – Meaning of profit and loss account statement – Balance sheet – Types of costs – Break-even analysis – Marketing: concept, mix – Product life cycle - Stages of new product development – Pricing methods – Types of advertising media – Overview of personal selling process – Channel functions – Promotion methods – Enterprise Resource Planning

MODULE VI MANAGEMENT INFORMATION SYSTEM 06

Management Information System: definition, components – Information needs - Types of information – Systems concept – Elements of systems – Information gathering – Steps involved in system analysis and design – Tools – implementation

TOTAL: 45

REFERENCES

1. Harold Koontz & Heinz Weihrich “Essentials of Management”, Tata McGraw,Hill, 2008.
2. Stephen Robbins, "Organizational Behaviour", Prentice Hall of India, 2014
3. Prasad L.M, “ Principles of Management”, Sultan Chand & Sons , Edition 2006.
4. Tripathy P.C and Reddy P.N, “ Principles of Management”, Tata McGraw,Hill, 2010.
5. Aswathappa, "Organizational Behaviour", Himalya Publications, 2010
6. Fred Luthans, "Organizational Behaviour", McGrawHill, 2009.
7. Bhushan Y.K., “Fundamentals of Business Organization and Management”, Sultan Chand & Co., 2003

OUTCOMES:

After studying the course, the students would be able to:

- perform / adopt appropriate functions and principles of management in their jobs
- make decisions using suitable planning techniques in their activities
- organize the activities & carry out staffing functions in the job situations
- communicate effectively, motivate their subordinates and also exhibit right leadership style in their IT/ITES profession
- recognize individual, group and organization dynamics to demonstrate suitable behaviour in the job-routine
- use inputs on MIS to relate to functional areas of management

CAC8102 INTERNET OF THINGS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To understand the fundamentals of Internet of Things.
- To build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards.
- To apply the concept of Internet of Things in the real world scenario

MODULE I FUNDAMENTALS OF IOT 09

Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoTvs M2M.

MODULE II IOT DESIGN METHODOLOGY 09

IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

MODULE III BUILDING IOT WITH RASPBERRY PI 09

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services

MODULE IV BUILDING IOT WITH GALILEO/ARDUINO 09

Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks

MODULE V CASE STUDIES and ADVANCED TOPICS 09

Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for Iot – Data Analytics for IoT – Software & Management Tools for IoT

Total Hours:45

REFERENCES:

1. ArshdeepBahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, 2015.
2. Manoel Carlos Ramon, “Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers”, Apress, 2014.
3. Marco Schwartz, “Internet of Things with the Arduino Yun”, Packt Publishing, 2014.

OUTCOMES:

Upon the completion of the course the student should be able to

- Design a portable IoT using Arduino/ equivalent boards and relevant protocols.
- Develop web services to access/control IoT devices
- Deploy an IoT application and connect to the cloud
- Analyze applications of IoT in real time scenario
- Summarize the characteristics of IoT and differentiate physical and logical design.

CAC8103 MOBILE APPLICATION DEVELOPMENT LAB

L	T	P	C
0	0	4	2

OBJECTIVES:

- Understand the mobile programming aspects, design and implementation on android platforms.
- Develop mobile applications for the Android operating system using basic and advanced phone features.
- Deploy applications to the Android marketplace for distribution

List of Exercises: (Implementation using Android / IOS)

1. Display Hello World.
2. Add two Edit Text. When a number is entered in Edit Text 1, the square of that number should be displayed in Edit Text 2.
3. Add an Edit Text and a button. When the button is clicked, the text inputted in Edit Text should be retrieved and displayed back to the user.
4. Add two Edit Text and a button. When the button is clicked, the text inputted in Edit Text 1 should be retrieved and displayed in Edit Text 2.
5. Program a calculator.
6. Create a Module convertor for height.
7. Create a Module convertor for height and weight in the same application. Selection of height/weight can be done using a spinner.
8. Add a spinner. When the spinner is selected, there should be three options (e.g., android, java, testing). When you click on each option, it should go to another page containing some other components. Each of these pages should have a “back” button, which on pressing will take you back to the page with the spinner.
9. Create applications to include Action Bar, Menus, Dialogs and Notifications
10. Create a user login form and registration form. First time users have to register through the registration form and the details should be stored in the database. Then they can login using the login page.
11. Create a camera application, where you can click a picture and then save it as the wallpaper.
12. Create a media player which plays an mp3 song.
13. Create a media recorder which will record the sound.
14. Testing applications

OUTCOMES:

On completion of this course, students will be able to

- Describe the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT)) and learn how and when to apply the different components to develop a working system.
- Design, implement and deploy mobile applications using an appropriate software development environment.

CAC8104 MINI PROJECT

L	T	P	C
0	0	4	2

Develop the applications like:

1. Online railway reservation system
2. Payroll processing application
3. Hospital management system
4. Automating the banking process
5. Hotel Reservation system
6. Library management system
7. Attendance Management system
8. Text editor
9. Grocery Shopping
10. Create an E-Book of your choice

Software required:

Languages: C/C++/Java/JSDK/Web browser.

- Any front end tool (like VB, VC++, Developer 2000, Android SDK) etc
- Any backend tool (Oracle, MS-Access, SQL) etc.
- Open source software
- Framework (.Net)
- Any CASE tool

ELECTIVES

CACY001 MANAGEMENT INFORMATION SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To understand the basic principles of Computer based Information System support the management in the various arena in the business units.
- To get an insight into the various organizational structures, culture and power.
- To provide an understanding of the Information Systems (IS) management framework of E-business. To focus on best practices, tools and models to implement an effective management system.
- To provide insights on how to develop and implement enterprise-wide IT strategies, initiatives and programs.
- To explore MIS subsystems and technologies including hardware, software and networking.

MODULE I SYSTEM CONCEPTS 07

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

MODULE II ORGANIZATIONAL STRUCTURE 09

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

MODULE III STRUCTURE OF MIS 10

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

MODULE IV SYSTEM SUPPORT 10

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

organization – Transaction processing.

MODULE V DEVELOPMENT AND MANAGEMENT 09

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

Total Hours: 45

TEXT BOOK:

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

REFERENCES :

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

OUTCOMES:

On completion of this course, students will be able to

- describe the various components of Computer based Information system suitable for the business organization.
- compare, contrast, and choose appropriate hardware, software, database and networking suitable for the organizational Information system.
- Distinguish and analyze ethical problems that occur in business and society
- Apply leadership skills and competencies in business situations
- Illustrate how current technologies and decision-support tools can be utilized to the advantage of business operations.
- develop various types of Information system suitable for organizational levels and various functional units in the organization.

CACY002 ACCOUNTING AND FINANCIAL MANAGEMENT

L	T	P	C
3	1	0	4

OBJECTIVES:

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

MODULE I FINANCIAL ACCOUNTING 12

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

MODULE II COST ACCOUNTING 12

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

MODULE III MANAGEMENT ACCOUNTING 12

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

MODULE IV INVESTMENT DECISION 12

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

MODULE V FINANCING DECISION AND WORKING CAPITAL MANAGEMENT 12

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

Total Hours: 60

TEXTBOOKS:

1. S.N.Maheswari, “Financial and Management Accounting”, Sultan Chand & Sons, 2003.
2. I.M.Pandey, “Financial Management”, Vikas Publications, 4th Reprint, 2002.

REFERENCES:

1. S.P.Iyengar, “Cost and Management Accounting”, Sultan Chand & Co.
2. I.M.Pandey, “Elements of Management Accounting” Vikas Publishing House, 1999.

OUTCOMES:

On completion of this course, students will be able to

- prepare final accounts of a concern to find out the profit or loss
- List the objectives and functions of Financial Management
- analyze the firm by applying various ratios.
- Perform Computerized Accounting, Accounting Ratios Analysis, Funds Flow Analysis and Cash Flow Analysis
- analyze the factors affecting a capital structure, working capital and dividends.

CACY003 E - COMMERCE

L	T	P	C
3	0	0	3

OBJECTIVES:

The aim of this course is to make the students understand

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

MODULE I INTRODUCTION 06

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

MODULE II SECURITY TECHNOLOGIES 09

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

MODULE III ELECTRONIC PAYMENT METHODS 09

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

MODULE IV ELECTRONIC COMMERCE PROVIDERS 09

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

MODULE V ONLINE COMMERCE ENVIRONMENTS 12

Servers and Commercial Environments - Payment Methods - Server Market Orientation - Netscape Commerce Server - Microsoft Internet Servers - Digital Currencies -DigiCash-Using Ecash-Ecash Client Software and Implementation -

Smart Cards - The Chip - Electronic Data Interchange - Internet Strategies, Techniques and Tools.

Total Hours: 45

TEXT BOOK:

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

REFERENCES :

1. Jeffrey F.Rayport and Bernard J. Jaworski, “Introduction to E-Commerce”, 2nd Edition, Tata Mc-Graw Hill Pvt., Ltd., 2003.
2. Greenstein, “Electronic Commerce”, Tata Mc-Graw Hill Pvt., Ltd., 2000.

OUTCOMES:

On completion of this course, students will be able to

- understand E-Commerce concepts and terminology
- process management decisions that are involved in launching, operating and managing business activity on the World Wide Web.
- use critical thinking, problem-solving, and decision-making skills in evaluating e-commerce technologies;
- design (plan) a simple e-commerce web site;
- distinguish various electronics payment methods.

CACY004 BUSINESS PROCESSES

L	T	P	C
3	0	0	3

OBJECTIVES:

To develop a business process strategy to meet stakeholder needs.

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

MODULE I ORGANIZATIONAL STRUCTURE 09

Introduction – Nature of Organizations – Types of Business Organizations – Organizational Structures – Formalization – Departmentation – Span of Management – Organizational Relationships – Centralization – Organizational Culture – Forms and Outcomes – IT industry and Organizational Structures – Case Studies: Organizational Improvement - Case Studies.

MODULE II ORGANIZATIONAL OUTCOMES 09

Introduction – Nature of Power in Organizations – Outcomes of Power Relationships – Leadership – Decision Making – Communication – Organizations and Change- Structure and Management of Change in Indian Organizations – Organizational Environments – Inter-Organizational Relationships - Case Studies

MODULE III BUSINESS PROCESS RE-ENGINEERING (BPR) 09

Introduction – Emergence of BPR – What is BPR – Framework for Reengineering – Reengineering Methodology – Advantages – Success Factors – Failure Factors – Justifying Path to Reengineering – Planning Reengineering Projects – Setting Up for Reengineering – Information Analysis – Futuristic State Design and Validation - Case Studies

MODULE IV BPR AND IT INDUSTRY 09

Introduction – Integration of Business with Computers – Management Perceptions – Empowering People through IT – Managing Change – BPR Rediscovering Indian Paradigm – Case Studies.

MODULE V E-BUSINESS PROCESS 09

Introduction – Linking Business with Modern Technology – Trends driving E-Business – E-Business Patterns – New Era of Cross-functional Integrated Apps – Knowledge Management and Information Technology – Case studies.

Total Hours: 45

TEXTBOOKS :

1. Richard H.Hall, Organizations-Structures, Processes and Outcomes", Pearson Education, 2004.
2. M.S.Jayaramanet. Al, "Business Process Reengineering", Tata McGraw Hill Publications, 2001.
3. Ravi Kalakota and Marcia Robinson, "E-Business; Roadmap for Success; Pearson Education, 2000.

REFERENCES :

1. Gareth Jones, "Organizational Theory, Design and Change", Pearson Education, 4th Edition, 2004.
2. Dave Chaffey, "E-business and E-Commerce" Pearson Education, 2nd Edition, 2003.

OUTCOMES:

On completion of this course, students will be able to

- form the organizational structure
- improve leadership quality
- analyze, improve, design and develop processes to meet stakeholder needs
- align technology, organization, and facilities with the business process strategy and design
- apply their knowledge to manage projects effectively.
- identify, clarify and manage business benefits arising from process change.

CACY005 GRID COMPUTING

L	T	P	C
3	0	0	3

Objective:

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

MODULE I INTRODUCTION 09

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

MODULE II TYPES OF GRIDS 09

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

MODULE III ARCHITECTURE AND MANAGEMENT 09

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

MODULE IV NATIVE PROGRAMMING AND SOFTWARE APPLICATIONS 09

Desktop supercomputing – parallel computing – parallel programming paradigms – problems of current parallel programming paradigms – Desktop supercomputing programming paradigms – parallelizing existing applications -– Grid enabling software applications – Needs of the Grid users – methods of Grid deployment – Requirements for Grid enabling software – Grid enabling software applications.

MODULE V APPLICATIONS,SERVICES AND ENVIRONMENTS 09

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

Total Hours: 45

TEXT BOOK:

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

REFERENCES :

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

OUTCOMES:

On completion of this course, students will be able to

- summarize the key concepts of Grid computing.
- sketch the architecture of open grid services.
- list the needs of grid users and build computer grids.
- gain a basic knowledge of Data management and transfer in Grid environments and Resource management.
- prepare for any upcoming Grid deployments and be able to get started with a potentially available Grid setup.
- list the applications of grid computing

CACY006 CLOUD COMPUTING

L	T	P	C
3	0	0	3

OBJECTIVES

- To understand the current trend and basics of cloud computing.
- To learn cloud services from different providers.
- To understand the collaboration of cloud services.
- To expose various ways to collaborate the cloud service online.

MODULE I UNDERSTANDING CLOUD COMPUTING 09

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.

MODULE II DEVELOPING CLOUD SERVICES 09

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.

MODULE III CLOUD COMPUTING FOR EVERYONE 09

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.

MODULE IV USING CLOUD SERVICES 09

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.

MODULE V OTHER WAYS TO COLLABORATE ONLINE 09

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 Hours: 45

REFERENCES:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Kumar Saurabh, “Cloud Computing – Insights into New Era Infrastructure”, Wiley Indian Edition, 2011.
3. 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.

OUTCOMES:

On completion of this course, students will be able to

- Understand the systems, protocols to support cloud computing.
- Identify the architecture and infrastructure of cloud computing.
- Design applications by integrating cloud services.

CACY007 UNIX AND NETWORK PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

- Learn and get familiar with the UNIX operating system and UNIX process environment. The creation, communication and execution of process are studied with well defined examples through this course.
- Infer the inter-process communication between similar and different process through standard mechanisms such as pipes, message queue etc.,
- Provide a broad knowledge on client server communication using socket across a network for reliable network programming.

MODULE I INTRODUCTION & FILE SYSTEM 09

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

MODULE II PROCESSES 09

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

MODULE III INTERPROCESS COMMUNICATION 09

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

MODULE IV SOCKETS 09

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

MODULE V APPLICATIONS 09

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

Total Hours: 45

TEXT BOOKS :

1. W.Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 1999. (Unit 1,2 & 3)
2. W. Stevens, Bill Fenner, Andrew Rudoff, “Unix Network Programming”, Volume 1, The Sockets Networking API, 3rd Edition, Pearson education, Nov 2003. (unit 4 & 5)

REFERENCES :

1. MeetaGandhi,TilakShetty and Rajiv Shah – The ‘C’ Odyssey Unix –The open Boundless C ,1st Edition, BPB Publications 1992.

OUTCOMES:

On completion of this course, students will be able to

- attain the complete knowledge in network communication in UNIX platform.
- list the different types of networking and their functionality
- summarize the broad knowledge on network details of a system which is configured as UNIX supported components.
- develop a socket programming for effective client-server communication across a network.

CACY008 MULTIMEDIA SYSTEMS AND ALGORITHMS

L	T	P	C
3	0	0	3

OBJECTIVES

- learn the basic definitions of algorithmic complexity, and how to analyze the complexity of algorithms.
- learn basic algorithmic tools used to design efficient algorithms.
- learn how to design efficient algorithms and to recognize situations where this is not possible.
- understand the linear and non linear data structures available in solving problems
- know about the sorting and searching techniques and its efficiencies
- get a clear idea about the various algorithm design techniques
- Use the data structures and algorithms in real time applications
- analyze the efficiency of algorithm•

MODULE I INTRODUCTION 09

Definition - CD-ROM and multimedia-Multimedia applications: business - schools - homes - public places and virtual reality. Introduction to making of multimedia: hardware - software - creativity - and organization.

MODULE II MULTIMEDIA TOOLS 09

Macintosh and windows production platforms - 3-d modeling and animation - image-editing tools - sound editing tools - animation - video - and digital movie tools - linking multimedia objects - office suites - word processors - spread sheets - databases - presentation tools. Authoring tools - Card and Page-based authoring tools - Icon Based authoring tools - time based authoring tools - object oriented authoring tools - cross platform-authoring tools

MODULE III MULTIMEDIA AND THE INTERNET 09

Internet fundamentals: Internetworking – Connections – Internet services – The World Wide Web – Tools for the World Wide Web: Web serves – Web browsers – Web page makers and Site builders – Plug-ins and Delivery vehicles – Beyond HTML

MODULE IV ALGORITHM OVERVIEW 09

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

MODULE V 2D AND 3D TRANSFORMATIONS 09

Two dimensional transformations – Scaling and Rotations – Interactive Input methods – Polygons – Splines – Bezier Curves Window view port mapping transformation – 3D Concepts – Projections.

Total Hours: 45

TEXTBOOKS:

1. Multimedia: Making It Work – Tay Vaughan (Unit 1, Unit 2 and Unit 3)
2. Hearn D and Baker M.P, “Computer graphics – C Version”, 2nd Edition, Pearson Education, 2004 (Unit 4 and 5)

REFERENCE BOOKS:

1. Multimedia System Design – K. Andleigh and K. Thakkrar
2. Multimedia: Computing, Communication & Application – Ralf stein Metz and Klara Nahrstsedt
3. Advanced multimedia programming – Steve Rimmer
4. Multimedia Literacy – Fred T. Hofstetter MGHill

OUTCOMES:

On completion of this course, students will be able to

- Possess the knowledges of creativity skills with support of multimedia tools
- Gain hands – on experience in image, sound and video editing and in some aspects of multimedia authoring tools
- Design an interactive website for information services
- Analyze and evaluate various algorithms to draw geometrical shapes
- Attain the complete knowledge in graphics & multimedia domain
- Show their proficiency while working with Graphics and multimedia software and tools.

CACY009 NETWORK SECURITY

L	T	P	C
3	0	0	3

OBJECTIVE:

- to impart knowledge on building networks, network layer and software defined networking
- to understand how network security is conceptualized and carried out
- to analyze both early and contemporary threats to network security
- to articulate informed opinion about issues related to network security
- to appreciate the challenges of network security

MODULE I INTRODUCTION 09

Building a network-Network Architecture-Network fundamentals-Network layer Overview on Software Defined Networking.

MODULE II ATTACKS AND PUBLIC KEY ENCRYPTION 09

Attacks- Services-Mechanisms-Conventional Encryption , Classical And RSA - Elliptic Curve Cryptography - Number Theory Concepts

MODULE III MESSAGE AUTHENTICATION 09

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

MODULE IV NETWORK SECURITY PRACTICE 09

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

MODULE V SYSTEM SECURITY 09

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

Total Hours: 45

TEXT BOOK :

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

REFERENCES:

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

2. Man Young Rhee, “Internet Security”, Wiley, 2003.
3. Pfleeger&Pfleeger, “Security in Computing”, Pearson Education, 3rd Edition, 2003.

OUTCOMES:

On completion of this course, students will be able to

- master information security governance, and related legal and regulatory issues,
- master understanding external and internal threats to an organization
- summarize the basics of network security and attacks.
- compare various public and private key encryption algorithms.
- illustrate Message Authentication functions and protocols
- identify the virus and worms
- list the firewalls design principles

CACY010 MICROPROCESSORS AND APPLICATIONS

L	T	P	C
3	0	0	3

OBJECTIVES:

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

MODULE I INTRODUCTION TO 8085 MICRO PROCESSOR 09

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

MODULE II INTRODUCTION TO 8086 MICROPROCESSOR 09

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

MODULE III 8086 MICROPROCESSOR INTERFACING 09

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

MODULE IV 80386 AND PENTIUM MICRO PROCESSORS 09

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

MODULE V PERIPHERAL INTERFACING 09

Keyboard Display Interface-Hex key and display interface to 8085, 8279 Keyboard display controller chip- Printer Interface: LR 7040 Printer interface using 8295 printer controller-CRT controller interface: CRT Fundamentals, 8275 CRT Controller- Coprocessors.

Total Hours: 45

TEXT BOOK :

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

REFERENCES:

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

OUTCOMES:

On completion of this course, students will be able to

- identify different types of memory and describe how each is used
- list microprocessor instruction groups and classify machine instructions accordingly
- develop a program in assembly language for the INTEL 8085 and INTEL 8086.
- analyze (trace) the execution of assembly code programs
- design interfacing logic to connect external devices to microprocessor.
- design and develop a microprocessor based system for specific applications.

CACY011 TCP/IP PROTOCOL SUITE

L	T	P	C
3	0	0	3

OBJECTIVES:

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

MODULE I INTRODUCTION 10

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

MODULE II INTERNET PROTOCOL 10

Sub netting – Super netting – IP packets – Delivery – Routing – Routing model– Routing table – Datagram – Fragmentation – Checksum – IP Design – ARP – RARP – Internet control message protocol – Internet group management protocol.

MODULE III TRANSMISSION CONTROL PROTOCOL 08

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

MODULE IV APPLICATION LAYER AND CLIENT SERVER MODEL 08

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

MODULE V APPLICATION PROTOCOLS 09

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

Total Hours: 45

TEXT BOOK :

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

REFERENCE :

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

OUTCOMES:

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

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

CACY012 ADHOC NETWORKS

L	T	P	C
3	0	0	3

OBJECTIVES:

- Understand the fundamental concepts of infrastructureless wireless network
- Learn and analyze the different types of ad hoc routing protocols.
- Impart knowledge on Providing QoS in Ad Hoc Wireless Networks

MODULE I INTRODUCTION 09

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

MODULE II ADHOC ROUTING PROTOCOLS 09

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

MODULE III MULTICASTROUTING IN ADHOC NETWORKS 09

Introduction - Issues in Designing a Multicast Routing Protocol - Operation of Multicast Routing Protocols - An Architecture Reference Model for Multicast Routing Protocols -Classifications of Multicast Routing Protocols - Tree-Based Multicast Routing Protocols- Mesh-Based Multicast Routing Protocols Summary of Tree-and Mesh-Based Protocols - Energy-Efficient Multicasting - Multicasting with Quality of Service Guarantees - Application-Dependent Multicast Routing - Comparisons of Multicast Routing Protocols

MODULE IV TRANSPORT LAYER, SECURITY PROTOCOLS 09

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

MODULE V QoS AND ENERGY MANAGEMENT 09

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

Total Hours: 45

TEXT BOOK :

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

REFERENCES:

1. C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR, 2001.
2. Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000.

OUTCOMES:

At the end of this course students will be able to

- evaluate the performance of different ad hoc routing protocols
- analyze the issues in designing routing and transport protocols
- compare and contrast various routing, transport and security protocols.
- list the issues and challenges in Providing QoS in Ad Hoc Wireless network.
- classify the QoS solutions and energy management schemes

CACY013 DIGITAL IMAGE PROCESSING

L	T	P	C
3	0	0	3

OBJECTIVES:

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

MODULE I DIGITAL IMAGE FUNDAMENTALS 09

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

MODULE II IMAGE ENHANCEMENT & RESTORATION 09

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

MODULE III IMAGE COMPRESSION & SEGMENTATION 09

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

MODULE IV REPRESENTATION AND DESCRIPTION 09

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

MODULE V OBJECT RECOGNITION AND INTERPRETATION 09

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

Total Hours: 45

TEXT BOOK:

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

REFERENCES:

1. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
2. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.

OUTCOMES:

On completion of this course, students will be able to

- describe how digital images are represented,
- manipulate, encode and process, with emphasis on algorithm design, implementation and performance evaluation.
- analyze various techniques and mention the strength and weakness.
- develop small programs to perform image processing tasks.
- understand the design & specification of multi-dimensional digital filters for image processing applications
- gain proficiency in using simulation and design software tools, such as those found in Matlab

CACY014 PROBABILITY AND STATISTICS

L	T	P	C
3	1	0	4

OBJECTIVES:

- Knowledge about the basic concepts of one dimensional and two dimensional Random Variables.
- Knowledge on various probability axioms and theorems, probability distributions.
- To apply Estimation theory, Correlation, Regression and testing of hypothesis for real life problems.
- To enable the students to apply the concepts of multivariate normal distribution and principle components analysis and evaluate on the results

MODULE I ONE DIMENSIONAL RANDOM VARIABLES 12

Random variables - Probability function – Moments – Moment generating functions and their properties – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions – Functions of a Random Variable.

MODULE II TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and Conditional distributions – Functions of two dimensional random variables – Regression Curve – Correlation.

MODULE III ESTIMATION THEORY 12

Unbiased Estimators – Method of Moments – Maximum Likelihood Estimation - Curve fitting by Principle of least squares – Regression Lines.

MODULE IV TESTING OF HYPOTHESES 12

Sampling distributions - Type I and Type II errors - Testsbased on Normal, t, Chi-Square and F distributions for testing of mean, variance and proportions – Tests for Independence of attributes and Goodness of fit.

MODULE V MULTIVARIATE ANALYSIS 12

Random Vectors and Matrices - Mean vectors and Covariance matrices - Multivariate Normal density and its properties - Principal components Population principal components - Principal components from standardized variables.

Total Hours: 60

REFERENCES:

1. Jay L. Devore, “Probability and Statistics for Engineering and the Sciences”, Thomson and Duxbury, 2002.
2. Richard Johnson. “Miller & Freund’s Probability and Statistics for Engineer”, Prentice – Hall, Seventh Edition, 2007.
3. Richard A. Johnson and Dean W. Wichern, “Applied Multivariate Statistical Analysis”, Pearson Education, Asia, Fifth Edition, 2002.
4. Gupta S.C. and Kapoor V.K. “Fundamentals of Mathematical Statistics”, Sultan and Sons, 2001.
5. Dallas E Johnson, “Applied Multivariate Methods for Data Analysis”, Thomson and Duxbury press, 1998.

OUTCOMES:

On completion of this course, students will be able to

- apply fundamental concepts in Exploratory data analysis
- demonstrate an understanding of the basic concepts of probability and random variables
- analyze and choose among the probability distributions for application to a specific real life problem
- apply inferential methods relating to the means of Normal Distributions.
- demonstrate an appreciation of one—way analysis of variance (ANOVA)
- interpret and analyze data that may be displayed in a two—way table

CACY015 SOFTWARE QUALITY MANAGEMENT

L	T	P	C
3	0	0	3

OBJECTIVES:

- To understand the fundamental concepts of software quality management.
- To acquire the knowledge in quality analysis tools and techniques.
- To have the exposure on software quality assurance, quality measures and quality control.
- To introduce philosophies and strategies to quality related issues

MODULE I INTRODUCTION 09

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

MODULE II CONFIGURATION MANAGEMENT 09

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

MODULE III SOFTWARE STANDARDS AND INSPECTION 09

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

MODULE IV TESTING AND MANAGING SOFTWARE QUALITY 09

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

MODULE V DEFECT PREVENTION 09

Principles of software defect prevention - Process changes for defect prevention - Defect prevention considerations - Managements role - Framework for software

process change - Managing resistance to software process change - Case studies.

Total Hours: 45

TEXT BOOK :

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

REFERENCES :

1. TsumS.Chow, Software Quality Assurance a Practical Approach, IEEE Computer Society press, 1985.
2. Richard E. Fairley, Software Engineering - A Practitioner's approach, McGraw Hill, 1982.

OUTCOMES:

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

- describe the various practices available to manage a software system.
- understand software quality management problems, general solutions, technologies and standards.
- compare and contrast product quality and process quality.
- apply product and process quality control techniques.
- define, implement, and apply software (process) metrics apply software quality management to software and software development processes

CACY016 EMBEDDED SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To provide a clear understanding on the basic concepts, building blocks for Embedded System
- To teach the fundamentals of processes and scheduling policies.
- To teach how to program embedded systems in assembly language and C
- To introduce on Embedded Process development Environment

MODULE I EMBEDDED COMPUTING 09

Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.

MODULE II MEMORY AND INPUT / OUTPUT MANAGEMENT 09

Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupts handling.

MODULE III PROCESSES AND OPERATING SYSTEMS 09

Multiple tasks and processes – Context switching – Scheduling policies – Inter process communication mechanisms – Performance issues.

MODULE IV EMBEDDED SOFTWARE 09

Programming embedded systems in assembly and C – Meeting real time constraints –Multi-state systems and function sequences. Embedded software development tools –Emulators and debuggers.

MODULE V EMBEDDED SYSTEM DEVELOPMENT 09

Design issues and techniques – Case studies – Complete design of example embedded systems.

Total Hours: 45

TEXT BOOKS

1. Wayne Wolf, “Computers as Components: Principles of Embedded Computer System Design”, Elsevier, 2006.
2. Michael J. Pont, “Embedded C”, Pearson Education , 2007.

REFERENCES:

1. Steve Heath, “Embedded System Design”, Elsevier, 2005.
2. Muhammed Ali Mazidi, Janice GillispieMazidi and Rolin D. McKinlay, “The 8051Microcontroller and Embedded Systems”, Pearson Education, Second edition, 2007.

OUTCOMES:

On completion of this course, students will be able to

- get exposure with different families and architectures of Embedded System tools such as Microcontrollers, DSPs, FPGAs etc.
- analyze real-time scheduling algorithms and identify design flaws
- design any embedded system (h/ w or s/w or both) based on any of the above tools
- become highly proficient in Embedded Software particularly in real-time programming with Industry standard RTOS such as VxWorks and RT Linux.

CACY017 BUSINESS INTELLIGENCE

L	T	P	C
3	0	0	3

OBJECTIVES:

- To give an overview of business and project planning.
- To introduce and explain the complexity of business intelligence decision support projects
- To present a step-by-step guide for the entire Business Intelligence project life cycle
- To impart knowledge of a complete development lifecycle including activities, deliverables, roles, risks, responsibilities, Do's and Don'ts, entry and exit criteria for a successful Business Intelligence (BI) decision support implementation.

MODULE I STAGES AND STEPS 09

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

MODULE II ENTERPRISE INFRASTRUCTURE EVALUATION 09

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

MODULE III PROJECT PLANNING 09

Project Planning – Managing, Defining, Planning the BI Project - Project Planning Activities – Deliverables Roles and Risks - Project Requirements Definition – General Business and Project-Specific Requirements – TheInterviewing Process – Project Requirements and Deliverables – Roles and Risks involved - Data Analysis – Business-Focused Data Analysis – Top-Down Logical Data Modeling – Bottom-Up Source Data Analysis - Data Cleansing, Activities, Deliverables,

Roles and Risks - Application Prototyping– Purposes, Best Practices, Types – Building Successful Prototypes – Applications, Deliverables, Roles and Risks – Meta Data Repository Analysis.

MODULE IV DATABASE DESIGN 09

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

MODULE V APPLICATION DEVELOPMENT 09

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

Total Hours: 45

TEXT BOOK:

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

REFERENCE:

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

OUTCOMES:

On completion of this course, students will be able to

- describe the infrastructure components of BI decision support system.
- build prototype for developing a successful project
- evaluate enterprise infrastructure
- define, compare and implement physical and logical database design
- determine number of resources required, type of resources in terms of both technical and human and could be able to recognize the components that impairs the success of BI decision support application.

CACY018 SOFTWARE TESTING

L	T	P	C
3	0	0	3

OBJECTIVES

- Fundamentals of testing
- Role of Testing in Software Development Lifecycle
- Various techniques of testing
- Tools for testing.

MODULE I FUNDAMENTALS OF TESTING 09

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

MODULE II ROLE OF TESTING IN SDLC 09

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

MODULE III APPROACHES TO TESTING 09

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

MODULE IV TEST ORGANIZATION 09

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

MODULE V TESTING TOOLS 09

Automation of Test Execution, Requirement tracker, High Level Review Types of test Tools: Tools for test management and Control, Test Specification, Static

Testing, Dynamic Testing, Non functional testing.

Total Hours: 45

REFERENCES:

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

OUTCOMES

On completion of this course, students will be able to

- recognize the need for testing
- review various software development models like Waterfall Models, Spiral Model, W Model and V Model
- perform various testing like black box testing, white box testing, gray box testing and Experience Based Testing
- describe the various testing techniques
- work with various test tools
- apply the testing techniques in commercial environment

CACY019 CONTENT MANAGEMENT SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES

- To impart knowledge in installing CMS and how CMS differ from website builder
- Provide knowledge on the core modules, using Smarty to build templates with own functionality
- To train the students in using an open source content management (CMS) tool – Joomla!, A powerful and robust tool.

MODULE I **09**

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

MODULE II **09**

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

MODULE III **09**

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

MODULE IV **09**

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

MODULE V **09**

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

Total Hours: 45

TEXT BOOKS:

1. CMS Made simple 1.5, Sofia Hauschildt, 2010
2. Joomla! 1.5: A User's Guide – Barrie M. North Second Edition, Prentice Hall.

OUTCOMES:

On completion of this course, students will be able to

- install CMS made simple (CMSMS), Converting other website templates to work with CMSMS
- add a e-commerce functionality and a discussion of users and permissions.
- develop a successful website powered by Joomla
- list the advanced use of CMS
- incorporate components , modules, plug-ins and languages.

CACY020 ADVANCED PROGRAMMING TECHNIQUES

L	T	P	C
3	0	0	3

OBJECTIVES:

- Comprehend the concepts of C and C++
- Obtain the knowledge on advanced Java programming concepts like interface, threads, Swings etc.
- Apply java programming concepts in writing network programs
- Apply and analyze issues in enterprise applications development.

MODULE I **9**

Fundamentals of C Programming – Control Statements – String - Arrays - Functions - Pointers - Structures - File Structures - File Handling.

MODULE II **09**

C++ Overview - Functions and Variables - Classes in C++ - Operator Overloading - Storage Management - Inheritance - Polymorphism - Exceptions- Templates.

MODULE III **09**

JAVA FUNDAMENTALS : Java I/O streaming – filter and pipe streams – Byte Code interpretation - Threading –Swing - Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming Services – CORBA programming Models - JAR file creation.

MODULE IV MULTI-TIER APPLICATION DEVELOPMENT **09**

Server side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication - JDBC – Applications on databases – Multimedia streaming applications – Java Media Framework.

MODULE V ENTERPRISE APPLICATIONS **09**

Server Side Component Architecture – Introduction to J2EE – Session Beans– Entity Beans – Persistent Entity Beans .

Total Hours: 45

TEXT BOOKS:

1. Elliotte Rusty Harold, “ Java Network Programming”, O’Reilly publishers, 2000.

2. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley & Sons Inc., 1999.
3. Hortsmann& Cornell, “CORE JAVA 2 ADVANCED FEATURES, VOL II”, Pearson Education, 2002.

REFERENCES:

1. Web reference: http://java.sun.com.
2. Patrick Naughton, “COMPLETE REFERENCE: JAVA2”, Tata McGraw-Hill, 2003.

OUTCOMES:

On completion of this course, students will be able to

- apply the basic and advanced concepts of programming languages such as C, C++ and Java in developing application.
- connect the java application with backend database and manipulate the data stored in the database.
- invoke and execute the methods of the remote object using RMI
- summarize various Enterprise JavaBean (EJB) concepts including entity beans, session beans, bean managed persistence (BMP), and container managed persistence (CMP)
- perform database queries and updates using JDBC.

CACY021 INFORMATION AND STORAGE MANAGEMENT

L	T	P	C
3	0	0	3

OBJECTIVES

- Describe and apply storage technologies
- Identify leading storage technologies that provide cost-effective IT solutions for medium to large scale businesses and data centers
- Describe important storage technologies' features such as availability, replication, scalability and performance
- Discuss the types of storage virtualization
- Understand logical and physical components of a storage infrastructure

MODULE I INTRODUCTION TO STORAGE TECHNOLOGY 09

Data creation and The value of data to a business, Information Life cycle, Challenges in data storage and data management, Solutions available for data storage, Core elements of a Data Center infrastructure, role of each element in supporting business activities.

MODULE II STORAGE SYSTEMS ARCHITECTURE 09

Hardware and software components of the host environment, Key protocols **-** Physical --logical components of a connectivity environment -Major physical components- logical constructs of a physical disk- access characteristics- performance Implications- Concept of RAID and its components, Different RAID levels -high-level architecture and working of an intelligent storage system

MODULE III INTRODUCTION TO NETWORKED STORAGE 09

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfill the need, Understand the appropriateness of the different networked storage options for different application environments.

MODULE IV MONITORING & MANAGING DATA CENTER 09

Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identification of single points of failure in a storage infrastructure - solutions to mitigate these failures-Architecture of backup/recovery -recovery topologies-replication technologies-ensuring information availability and business continuity-Remote replication technologies-providing disaster recovery-

business continuity capabilities-Key areas to monitor in a data center -Key metrics to monitor storage infrastructure.

MODULE V SECURING STORAGE AND STORAGE VIRTUALIZATION 09

Information Security, Critical security attributes for information systems, Storage security domains, Analyze the common threats in each domain. Storage Virtualization: Forms, Configurations and Challenges. Types of Storage Virtualization: Block-level and File-Level.

Total Hours: 45

REFERENCES

1. G.Somasundaram, AlokShrivastava, EMC Education Series, " Information Storage and Management", Wiley, Publishing Inc., 2011.
2. Robert Spalding, "Storage Networks: The Complete Reference",TataMcGrawHill,Osborne, 2003.
3. Marc Farley, "Building Storage Networks",TataMcGraw Hill, Osborne. 2001.
4. MeetaGupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002

OUTCOMES

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

- have a general knowledge of the different types of storage media for digital data.
- understand computer terminology as it applies to data storage.
- differentiate between different types of data storage systems.
- select different data storage types appropriate for various GIS system data.
- recognize the differences between the data in a GIS system and the real world it represents.
- recognize the importance of data design in a GIS system.

CACY022 SEMANTIC WEB

L	T	P	C
3	0	0	3

OBJECTIVES

- understand the need of semantic web in web services
- know the methods to discover, classify and build ontology for more reasonable results in searching
- build and implement a small ontology that is semantically descriptive of chosen problem domain
- implement applications that can access, use and manipulate the ontology

MODULE I INTRODUCTION 09

Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies –Contrasting Semantic with Conventional Technologies –Semantic Modeling - Potential of semantic web solutions and challenges of adoption

MODULE II ONTOLOGICAL ENGINEERING 09

Ontologies – Taxonomies –Topic Maps – Classifying Ontologies – Terminological aspects: concepts, terms, relations between them – Complex Objects – Subclasses and Sub-properties definitions – Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

MODULE III STRUCTURING AND DESCRIBING WEB RESOURCES 09

Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing - RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS Modeling for Combinations and Patterns- Transitivity

MODULE IV WEB ONTOLOGY LANGUAGE 09

OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – Owl Logic.

MODULE V SEMANTIC WEB TOOLS AND APPLICATIONS 09

Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Wikis - Semantic Web Services – Modeling and aggregating social network data - Ontological representation of social relationships, Aggregating and reasoning with social network data

Total Hours: 45

REFERENCE BOOKS:

1. Michael C.Daconta, Leo J. Obart and Kevin J Smith, “Semantic Web – A guide to the future of XML, Web Services and Knowledge Management”,Wiley Publishers, 2003. Liyang Yu, “A Developer's Guide to the Semantic Web”, Springer, First Edition, 2011
2. John Hebeler, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez, “Semantic Web Programming”,Wiley, First Edition, 2009.
3. Grigoris Antoniou, Frank van Harmelen, “A Semantic Web Primer”, Second Edition (Cooperative Information Systems) (Hardcover), MIT Press, 2008
4. Robert M. Colomb, “Ontology and the Semantic Web”, Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOS Press, 2007.
5. Dean Allemang and James Hendler, “Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL, Morgan Kaufmann”, Second Edition, 2011.
6. Michael C. Daconta, Leo J. Obrst and Kevin T. Smith, “The Semantic Web: A Guide to the Future of XML,Web Services, and Knowledge Management”,Wiley, First Edition 2003

OUTCOMES:

On completion of this course, students will be able to

- comprehend the semantic web basics and sketch the architecture diagram of semantic web.
- identify the component technologies of the Semantic Web and explain their roles.
- represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology
- illustrate the semantic relationships among these data elements using Resource Description Framework (RDF)

- List the limitations of semantic web technologies and aware of the services it can and cannot deliver
- discover the capabilities and limitations of semantic web technology for social networks

CACY023 HEALTHCARE ANALYTICS

L	T	P	C
3	0	0	3

OBJECTIVES

- to know about creating and maintaining health care information systems
- to understand the basic concepts of health care system.
- to understand IT governance and assessment of health care information system

MODULE I INTRODUCTION 09

Introduction to health care information – Health care data quality – Health care information regulations, laws and standards.

MODULE II HEALTH CARE INFORMATION SYSTEMS 09

History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support.

MODULE III INFORMATION TECHNOLOGY 09

Information architecture and technologies that support health care information systems – Health care information system standards – Security of health care information systems.

MODULE IV MANAGEMENT OF IT CHALLENGES 09

Organizing information technology services – IT alignment and strategic planning – IT governance and management.

MODULE V IT INITIATIVES 09

Management's role in major IT initiatives – Assessing and achieving value in health care information systems. Case study

Total Hours: 45

TEXT BOOKS:

1. Karen A Wager, Frances Wickham Lee, John P Glaser, " Managing Health Care Information Systems: A Practical Approach for Health Care Executives", John Wiley, 2 nd edition 2009.

2. Marion J. Ball, Charlotte Weaver, Joan Kiel ,"Healthcare Information Management Systems: Cases, Strategies, and Solutions", Springer, 2010, 3 rd edition
3. Rudi Van De Velde and Patrice Degoulet, "Clinical Information Sytems: A Componenet based approach", Springer 2005.

REFERENCE BOOKS

1. Kevin Beaver, Healthcare Information Systems, Second edition Best Practices, CRC Press, 2002
2. Marion J. Ball Healthcare Information Management Systems: A Practical Guide Springer-Verlag GmbH, 1995

OUTCOMES:

On completion of this course, students will be able to

- Identify, Analyze the computing requirements of a problem and Solve them using computing principles.
- Design and Evaluate a computer based system, components and process to meet the specific needs of applications.
- Use current techniques and tools necessary for complex computing practices.
- Use suitable architecture or platform on design and implementation with respect to performance
- Develop and integrate effectively system based components into user environment.
- Apply the understanding of management principles with computing knowledge to manage the projects in multidisciplinary environments.

CACY024 PYTHON PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES

- establish proficiency in fundamentals of writing Python scripts
- learn the concepts of file I/O and handling of errors and exceptions
- discover the features of python structures and flow control
- use and manipulate several core data structures: Lists, Dictionaries, Tuples, and Strings.

MODULE I INTRODUCTION TO PYTHON 09

Python Overview- Environment Setup- Basic Syntax- Python Identifiers- Reserved Words- Lines and Indentation- Comments- Variable Types- Basic Operators- Decision Making-Loops.

MODULE II BUILT IN FUNCTIONS 09

Python - Numbers – Math Functions-Strings - Special Operators- Formatting Operator- Built-in String Methods- Lists –List operations and Functions- Tuples – Basic Tuple operations and Functions -Dictionary –Adding-updating-Deleting-Built in Functions and Methods.

MODULE III DATE AND TIME FUNCTIONS 09

Date & Time – Getting current Time-Formatted Time-Time Tuple-Time Module-Calendar Module- Functions –Defining Functions-Calling Functions-Types of Function Arguments- Anonymous Functions-Modules - import Statement-Namespaces and Scoping.

MODULE IV FILES AND EXCEPTIONS 09

Files I/O -Printing to the Screen- Reading Keyboard Input- Opening and Closing Files- Reading and Writing Files- Renaming and Deleting Files- Directories in Python- Exceptions-Except Clause.

MODULE V ADVANCED PHYTHON 09

Advanced Python - Classes/Objects - Creating Classes and Instance Objects - Built-In Class Attributes- Class Inheritance- Overloading Methods- -Reg Expressions - Regular Expression Modifiers and Patterns- Database Access - Sending Email .

Total Hours: 45

TEXTBOOKS

1. Vernon L. Ceder ," The Quick Python Book “, 2nd Edition, Manning Publications, Jan 2010.
2. Python In A Day: Learn The Basics, Learn It Quick, Start Coding Fast (In A Day Books) (Volume 1) by Richard Wagstaff
3. Python Programming: An Introduction to Computer Science– December, 2003 by John Zelle

OUTCOMES

On Completion of the course the students will be able to

- List the string and math built in functions.
- Handle the file-system with python scripts
- Classify and Design functions, modules and classes.
- Demonstrate the use of the built-in data structures 'list' and 'dictionary'.
- Perform file operations like open, create ,read, write and close the file.
- Create class, inherit the class, overload the methods and handle regular expressions.

CACY025 ENTERPRISE RESOURCE PLANNING

L	T	P	C
3	0	0	3

OBJECTIVES:

- To describe the concept of ERP and the ERP model
- To explain how ERP is used to integrate business processes and analyze a process
- To impart the key technological considerations and infrastructure concerns in ERP implementation
- To describe project organizational considerations define the project management tools and resources needed to implement an ERP system

MODULE I INTRODUCTION TO ERP 09

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

MODULE II BUSINESS MODELLING FOR ERP 09

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

MODULE III ERP AND THE COMPETITIVE ADVANTAGE 09

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

MODULE IV COMMERCIAL ERP PACKAGE 09

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

MODULE V ARCHITECTURE 09

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

Total Hours: 45

TEXT BOOK:

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

REFERENCE:

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

OUTCOMES:

On completion of this course, students will be able to

- List the steps and activities in the ERP life cycle;
- articulate the challenges associated with post-implementation and management of ERP systems.
- evaluate the progress of an ongoing ERP implementation project.
- apply modern software including Oracle ERP system to plan and manage resources in organizations.
- examine systematically the planning mechanisms in an enterprise
- identify all components in an ERP system and the relationships among the components;

CACY026 SOFTWARE PROJECT MANAGEMENT

L	T	P	C
3	0	0	3

OBJECTIVES:

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

MODULE I INTRODUCTION 09

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

MODULE II DOMAIN PROCESSES 09

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

MODULE III SOFTWARE DEVELOPMENT 09

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

MODULE IV SCHEDULING ACTIVITIES 09

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

MODULE V QUALITY ASSURANCE 09

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study.

Total Hours: 45

TEXT BOOK :

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

REFERENCES :

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

OUTCOMES:

On completion of this course, students will be able to

- gain Knowledge to develop Quality Software Products.
- plan, organize and manage the various resources effectively to achieve.
- specific target in a software organization.
- list the tasks and activities involved in the software development.
- differentiate PERT and CPM in project management.
- handle Software projects effectively

CACY027 DATA MINING AND DATA WAREHOUSING

L	T	P	C
3	01	0	3

OBJECTIVES:

- Provide an overview of data mining and warehousing.
- Introduce data mining techniques
- Offer adequate knowledge to work with data warehouse
- Learn the techniques that can be applied to numerous applications

MODULE I: INTRODUCTION **09**

Databases - Data Mining Functionalities - Steps In Data Mining Process - Architecture of a Typical Data Mining Systems – Classification of Data Mining Systems - Overview of Data Mining Techniques. Data Preprocessing: Data Cleaning – Integration – Reduction – Transformation and Discretization.

MODULE II: ASSOCIATION RULES **09**

Mining Frequent Patterns, Associations and Correlations: Basic Concepts – Frequent Itemset Mining Methods. Classification and Prediction: Issues Regarding Classification and Prediction-Classification by Decision Tree Induction-Bayesian Classification-Other Classification Methods-Prediction

MODULE III: CLUSTERING **09**

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

MODULE IV: DATA WAREHOUSING **09**

Data Warehouse: Basic Concepts – Data Warehouse Modeling – Data Warehouse Design and Usage – Data Warehouse Implementation.

MODULE V: APPLICATIONS **09**

Social Impacts of Data Mining - Data Mining for Financial Data, Retail and Telecommunications, Science and Engineering, Mining WWW, Mining Text Database – Mining Spatial Databases – Tools - An Introduction to DB Miner - Case Studies

Total Hours: 45

TEXT BOOK :

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

REFERENCES :

1. Alex Berson,Stephen J. Smith, “Data Warehousing, Data Mining,& OLAP”, Tata McGraw- Hill, 2004.
2. UsamaM.Fayyad, Gregory Piatetsky - Shapiro, Padhrai Smyth and RamasamyUthurusamy, "Advances In Knowledge Discovery and Data Mining", The M.I.T Press, 1996.
3. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
4. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

OUTCOMES:

On completion of this course students will be able to:

- recognize the key areas and issues in data mining
- make more effective use of data stored in databases.
- apply association rules, clustering and classification techniques to the dataset to demonstrate some interesting rules or predict interesting pattern from that.
- compare database and data warehouse.
- manage the data mining development process in an individual or team context
- plan, design and deploy the necessary data mining technologies to support a software system

CACY028 UNIX INTERNALS

L	T	P	C
3	0	0	3

OBJECTIVES:

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

MODULE I INTRODUCTION TO UNIX 09

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

MODULE II FILE SYSTEMS 09

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

MODULE III PROCESSES 09

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

MODULE IV MEMORY MANAGEMENT 09

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

MODULE V INTERPROCESS COMMUNICATION 09

Process Tracing – System V IPC – Network Communications - Sockets – Problem of Multiprocessor Systems – Solution with Master and Slave Processors – Semaphores – Distributed Unix Systems – Satellite Processors-– Newcastle connection – Transparent distributed file systems – System Calls.

Total Hours: 45

TEXT BOOK :

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

REFERENCES :

1. Goodheart B., Cox.J., The Magic Garden Explained, Prentice Hall India, 1994.
2. Leffler S.J., Mckusick M.K., Karels M.J and Quarterman J.S., The Design and Implementation of the 4.3 BSD Unix Operating System. Addison Wesley, 1998.

OUTCOMES:

On completion of this course, students will be able to

- work with the basic functioning of UNIX operating systems.
- write shell programming and convert path name to an INODE.
- analyze the buffers and kernel representation, to understand the UNIX system structure and system calls .
- compare the various memory management techniques like Swapping , Segmentation and Demand Paging.

CACY029 ADVANCED DATABASES

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OBJECTIVES:

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

MODULE I RELATIONAL DATABASES 09

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

MODULE II OBJECT ORIENTED DATABASES 09

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

MODULE III EMERGING SYSTEMS 09

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

MODULE IV CURRENT ISSUES 09

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

MODULE V DATABASE DESIGN ISSUES 09

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

Total Hours: 45

TEXT BOOK :

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

REFERENCES :

1. Gary W. Hanson and James V. Hanson, Database Management and Design, Prentice Hall of India Pvt Ltd, 1999.
2. Alex Benson, Stephen Smith and Kurt Thearling, Building Data Mining Applications for CRM, Tata McGraw-Hill, 2000.

OUTCOMES:

On completion of this course, students will be able to

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

CACY030 SOFTWARE QUALITY ASSURANCE

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OBJECTIVES:

- To understand the fundamental concepts of quality assurance, SQA activities and SQA metrics.
- To get an insight into the various quality control tools.
- To explore the guidelines prescribed by the various quality standards like CMMI.
- To investigate the techniques and tools for Software testing.

MODULE I CONCEPTS 09

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

MODULE II SOFTWARE ENGINEERING CONCEPTS 09

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

MODULE III QUALITY ASSURANCE MODELS 09

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

MODULE IV SOFTWARE QUALITY ASSURANCE RELATED TOPICS 09

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

MODULE V FUTURE TRENDS 09

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

Total Hours: 45

TEXT BOOK :

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

REFERENCES:

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

OUTCOMES:

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

- apply software quality control tools.
- identify the software quality attributes and explore the quality standards.
- apply software testing techniques and identify the inputs and deliverables of testing.
- evaluate how new technologies impact software quality assurance and the system’s development life cycle.

CACY031 SERVICE ORIENTED ARCHITECTURE

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OBJECTIVES:

- To gain understanding of the basic principles of service orientation
- To learn service oriented analysis techniques
- To interpret technology underlying the service design
- To learn advanced concepts such as service composition, orchestration and Choreography
- To know about various WS specification standards
- To introduce the fundamentals and issues relating to Service Oriented Architecture
- To bring out the importance of service orientation and web services.

MODULE I INTRODUCTION 09

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

MODULE II SERVICE LAYER 09

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

MODULE III SERVICE ORIENTED ANALYSIS AND DESIGN 09

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

MODULE IV TECHNOLOGIES AND DESIGN FOR SOA 09

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

MODULE V SERVICE DESIGN AND SECURITY 09

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

Total Hours: 45

TEXT BOOK:

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

REFERENCES:

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

OUTCOMES:

On completion of this course, students will be able to

- recall the principles of service orientation.
- differentiate service composition, orchestration and Choreography.
- develop ASP.NET web services.
- apply the tools and technique for Service Oriented Architecture.
- build an SOA platform supported by J2EE and .NET

CACY032 C# AND .NET FRAMEWORKS

L	T	P	C
3	0	0	3

LEARNING OBJECTIVES:

- Teach the fundamental skills that are required to design and develop object-oriented applications
- Train the students to program in C# and develop .NET applications using C#.
- Access data using ADO.NET
- Utilize XML in the .NET environment to create Web Service-based applications and components

MODULE I INTRODUCTION TO C# 09

Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

MODULE II OBJECT ORIENTED ASPECTS OF C# 09

Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

MODULE III APPLICATION DEVELOPMENT ON .NET 09

Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.

MODULE IV WEB BASED APPLICATION DEVELOPMENT ON .NET 09

Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

MODULE V CLR AND .NET FRAMEWORK 09

Assemblies, Versoning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in .NET

Total Hours: 45

TEXT BOOKS:

1. S. ThamaraiSelvi and R. Murugesan “A Textbook on C# “, Pearson Education, 2003.
2. Stephen C. Perry “ Core C# and .NET”, Pearson Education, 2006.

REFERENCES:

1. Jesse Liberty, “Programming C#”, Second Edition, O’Reilly Press, 2002.
2. Robinson et al, “Professional C#”, Fifth Edition, Wrox Press, 2002.
3. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw Hill, 2004.
4. Andrew Troelsen, “C# and the .NET Platform”, A! Press, 2003.
5. Thuan Thai and Hoang Q. Lam, “.NET Framework Essentials”, Second Edition, O’Reilly, 2002.

OUTCOMES:

On completion of this course, students will be able to

- List the major elements of the .NET frame work
- Analyze the basic structure of a C# application
- design, run and debug simple C# console applications
- implement methods, classes, encapsulation, constructors, overloading, inheritance and polymorphism to develop C# programs
- Design and develop windows and web based applications on .NET
- Access data from database with ADO.NET

CACY033 PHP PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

- to learn how to build good web applications using PHP language.
- to install PHP and work with arrays and regular experiment.
- to handle the exceptions and file operations.

MODULE I INTRODUCTION TO PHP 09

PHP installation and Introduction, Syntax, Variables-Data types- Operators and expressions-Decisions and Loops-Function- Arrays with attributes-Creating and String- String related Library functions- Regular Expression.

MODULE II ADVANCED PHP 09

Introduction to OOPS- Class- methods- Constructors and Destructors, Access Modifiers-Inheritance-Abstract class-Interface-Error and Exceptional Handling-File Handling-PHP date and time.

MODULE III PHP FORMS AND IMAGES 09

Form Handling –PHP Interactive Forms-PHP GET & POST-Form Validation-PHP Form sanitization-PHP Form URL/E-mail –Basics of Computer Graphics-Creating Image-Manipulating Image-Using Text in Image-Watermarks to Image

MODULE IV PHP WITH MYSQL AND CMS 09

Database Basics-My SQL Create-database operation-Executing Query-Joins-Order By-Group By-Advantages of a CMS, Different types of CMS, Examples , Drupal -- Installation – Content Management, Structure – Site Building – Modules – Theming.

MODULE V PHP APPLICATION FRAMEWORKS 09

Web Development Frameworks – Introduction – Yii – Model View Controller –Yii PHP framework– PHP XML Parsers-PHP XML Expat-PHP XML DOM-PHP Mail.

Total Hours: 45

TEXT BOOK:

1. Kevin Tatroe, Peter MacIntyre,RasmusLerdorf, “Programming PHP”, Creating Dynamic Web Pages, O'Reilly Media, 3rd Edition, 2013.

REFERENCES:

1. http://php.net
2. http://www.tutorialspoint.com/php/index.html

OUTCOMES:

On completion of this course, students will be able to

- Design a web project to use real-time processing capabilities to interact with a database.
- test and debug a php application
- apply the Model View controller pattern for web applications
- pass information from client browser to web server for transaction processing
- able to send email directly from a script
- work with Yii , a high-performance PHP framework for developing Web 2.0 applications.

CACY034 ONLINE COMPUTER ADVERTISING

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3	0	0	3

OBJECTIVES

- provide an understanding of the Internet as an advertising and the process of selling an online ad program
- know the trends and issues concerning the current and evolving forms of Internet-based advertising and brand communication media;
- provide an overview of the processes and elements considered in the Conceptualizing and production of integrated brand communication campaigns
- Learn how online ads are priced and delivered, along with key measurement metrics

MODULE I ONLINE ADVERTISING 09

Internet advertising- Definition-Advantage-Players in the Internet advertising Industry-Online A d models-Advertising via email-web-testing-buttons-text links-sponsorships-push technology-Interstitials-screensavers-bookmarks-cursors-Undervalued web space

MODULE II TARGETING APPROACHES 09

A Unique Element in Online Advertising-Demographic Targeting -Contextual Targeting-Behavioral Targeting-Geographic Targeting -Affinity Targeting -Purchase-Based Category Targeting-Key Considerations in Online Targeting -Direct Email-Banner advertising-Mini-page-Direct response piece-Loyalty programs-coupons-free samples-trials-contests and games

MODULE III DISPLAY ADVERTISEMENT ONLINE 09

Standard Online Advertising Formats-Creative Factors That Influence Display Advertising -Effectiveness-Rich Media Advertising on Broadband-Online Video AdvertisingOnline Advertising Reach and Frequency Concepts-Strategies for Managing Online Reach and Frequency- Frequency of Online Advertising-Reach and Site Visiting-Winning Strategies in Online Advertising -Generate Leads and Acquire Customers-Generate Brand Preference to Stimulate Sales -Brand Growth, Rewards, and Loyalty

MODULE IV WEB MEASUREMENT 09

Terminology –Log Analysis-Web measurement Tools-Problems with Web measurement -Ad Management-Ad Management for Publishers –Advertisers –

Targeting –Content and context-Registration Information-Database Mining-Profiling and Personalization-Pricing Online Ads-Pricing Models-Trends in pricing

MODULE V BUYING AND SELLING ONLINE ADS 09

Buying Online Ads-Determine campaign goals-Site selection process –Paying for Media buys-Pricing for buys-Allocating campaign budget -Selling Online Advertising-Preparing site's infrastructure-Monitoring and measuring traffic-Ad modelsAd management-Auditing-Media kit- selling strategies-Sales Staff

Total Hours: 45

Text Books

1. Joe Plummer, Steve Rappaport, Taddy Hall, and Robert Barocci, The Online Advertising Playbook, John Wiley & Sons, Inc. (Hoboken, New Jersey), 2007
2. RobbinZeff and Brad Aronson (ZA book from here on), *Advertising on the Internet,* 2nd edition, John Wiley & Sons, Inc. (New York, NY), 1999.

OUTCOMES

Students who complete this course will be able to

- explore and discuss the important issues in the Internet brand communications in general and advertising.
- develop, promote, and manage Internet-based integrated communication campaigns
- list the problems with web measurement
- Identify the steps involved in digital campaign planning

CACY035 WEB MINING

L	T	P	C
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OBJECTIVES:

- To provide students with a sound basis in Web data mining tasks and techniques.
- To ensure that students are able to implement and to use some of the important Web mining algorithms.
- To evaluate Web Mining techniques in their workplace.

MODULE I INTRODUCTION TO WEB INTELLIGENCE 09

Historical Perspective - Towards Intelligent Web - Knowledge Web Mining- Building Better Web sites using Intelligent Technologies - Benefits of Intelligent Web

MODULEII WEB USAGE MINING 09

Introduction to Web Mining- Web usage Mining - Web Log Processing -Analyzing Web Logs- Web Usage Mining Applications

MODULE III WEB CONTENT MINING 09

Introduction- Data Collections - Search Engines - Robot Exclusion - - Personalization of Web Content - Multimedia Information Retrieval

MODULE IV WEB STRUCTURE MINING 09

Introduction - Modeling Web Topology - Other Approaches to Studying the Web-Link Structure

MODULE V WEB MINING APPLICATIONS 09

Data integration for e-commerce - Web personalization - Web content and structure mining- Web data warehousing - Review of tools, applications, and systems

Total Hours: 45

TEXTBOOKS:

1. Data Mining Techniques for Marketing, Sales, and Customer Relationship Management, Third Edition, by Michael Berry and Gordon Linoff, John Wiley, 2011

2. Data Mining: Practical Machine Learning Tools and Techniques, by Ian Witten and Eibe Frank, 3rd Ed., Morgan Kaufmann, 2011
3. Web Data Mining: Exploring Hyperlinks, Content, and Usage Data, by Bing Liu, 2nd Edition, , Springer, 2011
4. Building an Intelligent Web: Theory & Practice, R. Akerkar& P. Lingras; Jones & Bartlett, 2007.
5. Mining the Web, Discovering Knowledge from Hypertext Data, Soumen Chakrabarti, Morgan Kaufmann Publishers, 2003

OUTCOMES:

Students who complete this course will be able to

- index search engines and rank web documents.
- Identify the different components of a page that can be used for mining.
- conduct business intelligence from online resources.
- apply Web Mining strategies and algorithms in their workplace or research careers.
- analyze social media data using appropriate web mining techniques
- modify an existing search engine to make it personalized.

CACY036 DIGITAL MARKETING

L	T	P	C
3	0	0	3

OBJECTIVES

- to learn how to take a systematic approach to develop a Digital Marketing strategies
- to designing an online marketing strategy integrated with overall marketing objectives
- to learn to use email marketing as an effective marketing channel
- to learn all the essentials of mobile marketing

MODULE 1 DIGITAL MARKETING BASICS 08

introduction to marketing-digital marketing and its principles-digital marketing wins over traditional marketing- CPR, CPM, PPC, CPC, SEO, SEM-UNDERSTANDING various Social channels- Digital Marketing Process-Increasing Visibility- Visitors Engagement-- Bringing Targeted Traffic- Converting Traffic into Leads- Retention -Performance Evaluation.

MODULE II BUILDING WEBSITE AND SEARCH ENGINE OPTIMIZATION 10

Internet- web – websites-domain names-web server- web hosting- Planning and conceptualizing a website- Building website using CMS in class-SEO-SERP-Google Keyword Planner tool- Google Operator- Content optimization & planning- On page Optimization- Off page Optimization-Local SEO- Google Webmaster Tools

MODULE III ONLINE DISPLAY ADVERTISING AND ECOMMERCE MARKETING 09

Online advertising-display advertising**-** Banner ads- Rich Media ads- Pop ups and Pop under ads- Contextual advertising- Payment Modules- Online advertising platforms- Ecommerce- Top Ecommerce websites- Ecommerce scenario in India- marketing strategy- Mobile Marketing and Social Media- Using tools to create mobile websites- Content Marketing on mobile- SMS marketing-Uploading mobile app in Android and iOS

MODULE IV CONTENT MARKETING 09

Content Marketing- steps in strategy building process- Optimizing content for search engines- authority blog- monetizing authority blog- unique ways to write magnetic headlines- Case study on content marketing.

MODULE V ONLINE REPUTATION MANAGEMENT 09

Online reputation management- ORM scenario- Online reputation management Commandments- positive brand image online- tools for monitoring online reputation- overcome negative online reputation-Case Study

Total Hours : 45

REFERENCES:

1. Wayne L.Winston, Marketing Analytics: Data driven techniques and Microsoft Excel
2. Calvin Jones : The best digital marketing campaigns in the world , Mastering The Art of Customer Engagement
3. Jan Zimmerman – Social media marketing all in one for dummies
4. Leon G.Schiffman –Consumer Behavior
5. Chaffey Et Al E marketing Excellence: Planning and Optimizing your digital marketing , 4Ed
6. Alan CharlesworthDigital Marketing: A Practical Approach

OUTCOMES:

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

- List the advantages of digital marketing over traditional marketing.
- Summarize how they can use digital marketing is used to increase sales and grow their business
- Work with digital marketing tool kit
- Become familiar with the elements of the digital marketing plan
- reach online target market and develop basic digital marketing objectives
- collect, process, and analyze consumer data to make informed marketing decisions
- develop marketing strategies based on product, price, place and promotion objectives.

CACY037 BIG DATA AND ITS ANALYTICS

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OBJECTIVES

- bring together several key technologies used in manipulating, storing, and analyzing big data.
- Make the student understand details of Hadoop.
- introduce tools that provide SQL-like access to unstructured data.

MODULE I INTRODUCTION TO BIG DATA 09

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

MODULE II BIG DATA TECHNOLOGIES 09

Hadoop's Parallel World – Data discovery – Open source technology for Big Data Analytics – cloud and Big Data –Predictive Analytics – Mobile Business Intelligence and Big Data – Crowd Sourcing Analytics – Inter- and Trans-Firewall Analytics - Information Management.

MODULE III PROCESSING BIG DATA 09

Integrating disparate data stores - Mapping data to the programming framework - Connecting and extracting data from storage - Transforming data for processing - Subdividing data in preparation for Hadoop Map Reduce.

MODULE IV HADOOP MAP REDUCE 08

Employing Hadoop Map Reduce - Creating the components of Hadoop Map Reduce jobs - Distributing data processing across server farms –Executing Hadoop Map Reduce jobs - Monitoring the progress of job flows - The Building Blocks of Hadoop Map Reduce - Distinguishing Hadoop daemons - Investigating the Hadoop Distributed File System Selecting appropriate execution modes: local, pseudo-distributed, fully distributed.

MODULE V ADVANCED ANALYTICS PLATFORM 10

Real-Time Architecture – Orchestration and Synthesis Using Analytics Engines – Discovery using Data at Rest – Implementation of Big Data Analytics – Big Data Convergence – Analytics Business Maturity Model- Installing and Running Pig – Comparison with Databases – Pig Latin – User- Define Functions – Data Processing Operators – Installing and Running Hive – Hive QL – Tables.

Total Hours : 45

REFERENCES:

1. Michael Minelli, Michehe Chambers, “Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today’s Business”, 1st Edition, AmbigaDhiraj, Wiely CIO Series, 2013.
2. ArvindSathi, “Big Data Analytics: Disruptive Technologies for Changing the Game”, 1st Edition, IBM Corporation, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, 1st Edition, Wiley and SAS Business Series, 2012.
4. Tom White, “Hadoop: The Definitive Guide”, 3rd Edition, O’reilly, 2012.

OUTCOMES:

On Completion of the course the students will be able to

- categorize and Summarize Big Data and its importance.
- manage Big Data and analyze Big Data.
- apply tools and techniques to analyze Big Data.
- Analyze the big data analytic techniques for useful business applications.
- Work with big data platform

CACY038 INFORMATION RETRIEVAL

L	T	P	C
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OBJECTIVES:

- Learn the information retrieval models.
- Be familiar with Web Search Engine.
- expose to Link Analysis.
- Understand Hadoop and Map Reduce.
- Learn document text mining techniques. .

MODULE I INTRODUCTION 09

Introduction -History of IR- Components of IR – Issues –Open source Search engine Frameworks – The impact of the web on IR – The role of artificial intelligence (AI) in IR – IR Versus Web Search – Components of a Search engine-Characterizing the web.

MODULE II INFORMATION RETRIEVAL 09

Boolean and vector-space retrieval models- Term weighting – TF-IDF weighting-cosine similarity – Preprocessing – Inverted indices – efficient processing with sparse vectors – Language Model based IR – Probabilistic IR –Latent Semantic Indexing – Relevance feedback and query expansion.

MODULE III WEB SEARCH ENGINE – INTRODUCTION AND CRAWLING 09

Web search overview, web structure, the user, paid placement, search engine optimization/ spam. Web size measurement – search engine optimization/spam – Web Search Architectures – crawling – meta-crawlers- Focused Crawling – web indexes –- Near-duplicate detection – Index Compression – XML retrieval.

MODULE IV WEB SEARCH – LINK ANALYSIS AND SPECIALIZED SEARCH 09

Link Analysis –hubs and authorities – Page Rank and HITS algorithms - Searching and Ranking – Relevance Scoring and ranking for Web – Similarity – Hadoop& Map Reduce – Evaluation – Personalized search – Collaborative filtering and content-based recommendation of documents and products – handling “invisible” Web – Snippet generation, Summarization, Question Answering, Cross- Lingual Retrieval.

MODULE V DOCUMENT TEXT MINING 09

Information filtering; organization and relevance feedback – Text Mining -Text classification and clustering – Categorization algorithms: naive Bayes; decision trees; and nearest neighbor – Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM).

Total Hours: 45

TEXT BOOKS:

1. C. Manning, P. Raghavan, and H. Schütze, Introduction to Information Retrieval , Cambridge University Press, 2008.
2. Ricardo Baeza -Yates and BerthierRibeiro – Neto, Modern Information Retrieval: The Concepts and Technology behind Search 2nd Edition, ACM Press Books 2011.
3. Bruce Croft, Donald Metzler and Trevor Strohman, Search Engines: Information Retrieval in Practice, 1st Edition Addison Wesley, 2009.
4. Mark Levene, An Introduction to Search Engines and Web Navigation, 2nd Edition Wiley, 2010.

REFERENCES:

1. Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.
2. OphirFrieder “Information Retrieval: Algorithms and Heuristics: The Information Retrieval Series “, 2nd Edition, Springer, 2004.
3. Manu Konchady, “Building Search Applications: Lucene, Ling Pipe”, and First Edition, Gate Mustru Publishing, 2008

OUTCOMES:

On Completion of the course the students will be able to

- Apply information retrieval models.
- Design Web Search Engine.
- Use Link Analysis.
- Use Hadoop and Map Reduce.
- Apply document text mining techniques.

CACY039 SOCIAL MEDIA ANALYSI

L	T	P	C
3	0	0	3

OBJECTIVES:

- give an overview of social networks and its importance.
- understand the social network concepts and various methods of analysis.
- expose and train on various tools and techniques for analyzing and visualizing social media networks.

MODULE I INTRODUCTION TO SOCIAL NETWORKS and SNA 08

Connected World – Networks: Actors, Relations and Attributes - Networks as Information Maps - Networks as Conduits – Leaders and Followers – Psychological foundations of social networks – Basic building Blocks – Brief history of Social Network Analysis.

MODULE II NETWORK CONCEPTS 08

Individual Members of the Network – Sociological Questions about Relationships – Whole Social Networks- Distributions – Multiplexity – Roles and Positions – Network Segmentation – Graph Theory – Notations for Social Network Data

MODULE III SOCIAL NETWORK ANALYSIS FUNDAMENTALS 09

Points, Lines and Density – Centrality and Centralization – Components, Cores and Cliques – Positions, Roles and Clusters – Dimensions and Displays.

MODULE IV METHODS OF SOCIAL NETWORK ANALYSIS 10

Graphs – Matrices – Relationship Measures – Centrality and Prestiges – Cliques – Structural Equivalence – Visual Displays – Book models – Network Position Measures – Logit Models – Affiliation networks – Lattices- Levels of Analysis

MODULE V TOOLS AND TECHNOLOGIES 10

Twitter Analytics – Facebook Analytics – Google+ Analytics – Google+ Ripples – R for Social Network Analysis – Pajek – Network Visualization Tools – Analyzing Social Media Networks with NodeXL.

Total Hours: 45

REFERENCES:

1. Charles Kadushin, “Understanding Social Networks: Theories, Concepts, and Findings”, Oxford University Press, USA, 2011.

2. David Knoke, Song Yang, “Social Network Analysis”, 2nd Edition, SAGE Publications, 2007.
3. Christina Prell , “Social Network Analysis: History, Theory and Methodology”, 1st Edition, SAGE Publications Ltd, 2012.

OUTCOMES:

On Completion of the course the students will be able to

- understand the theories and concepts of social networks.
- analyze the social networks by applying various methods of analysis, tools and techniques.
- Use advanced network analysis software to generate visualizations and perform empirical investigations of network data.
- Plan and execute network analytical computations

CACY040 HUMAN COMPUTER INTERACTION

L	T	P	C
3	0	0	3

OBJECTIVES

- Determine the need for computers and evaluate the use of computers,
- identify the stages in software engineering that need to be modified for effectiveness of interacting with computers,
- discover the various models that can be used for designing systems, evaluate the design techniques by applying the apt statistical approach, and design dialogue for representation to computers

MODULE I DESIGN PROCESS 09

Introduction : Importance of user Interface – definition, importance of good design. Benefits of good design. Need for Interaction – Models –– Paradigms – Designing of Interactive systems – Usability –– Interaction design basics – Complexity of design Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds

MODULE II DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS 09

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, - Principles of user interface. Design rules – maximum usability – Principles – Standards and guidelines – design patterns –

MODULE III Software tools AND Components 09

Programming Tools – Windowing systems – Interaction tool kit –Evaluation techniques – evaluation design – Evaluating implementations – Observational Methods ,text and messages, Icons– Multimedia, colors, uses problems, choosing colors.

MODULE IV MODELS 09

Universal design principles – Multimodal systems – User Support – Presentation and Implementation Issues – types – requirements – approaches – Cognitive model – Hierarchical model – Linguistic model – physical and device models – Socio-technical models – Communication and Collaboration models – Task models – Task analysis and design

MODULE V EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI 09

Basic Design structure – Single independent variable – multiple independent variable – factorial design – split-plot design – random errors – experimental procedure – Statistical analysis – T tests – Analysis of Variance test – Regression – Chi-Square test – Survey – Probabilistic sampling – Non-probabilistic sampling – developing survey questions

Total Hours: 45

TEXT BOOKS:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Human Computer Interaction, 3rd Edition Prentice Hall, 2004.
2. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, Research Methods in Human Computer Interaction, Wiley, 2010. REFERENCE:.
3. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.

REFERENCES

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL EALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech, 3. User Interface Design, SorenLauesen , Pearson Education.

OUTCOMES

On completion of this course, students will be able to

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

CACY041 BIO-INFORMATICS

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OBJECTIVES:

The aim of the course is to

- improve the programming skills of the student
- let the students know the recent evolution in biological science.

MODULE I INTRODUCTION 09

Introduction to molecular biology – the genetic material – gene structure – protein structure – chemical bonds – molecular biology tools – genomic information content

MODULE II ALIGNMENTS 09

Data searches – simple alignments – gaps – scoring matrices – dynamic programming – global and local alignments – database searches – multiple sequence alignments Patterns for substitutions – estimating substitution numbers – evolutionary rates – molecular clocks – evolution in organelles

MODULE III PHYLOGENETICS 09

Phylogenetics – history and advantages – phylogenetic trees – distance matrix methods – maximum likelihood approaches – multiple sequence alignments – Parsimony – ancestral sequences – strategies for faster searches – consensus trees – tree confidence – comparison of phylogenetic methods – molecular phylogenies

MODULE IV GENR STRUCTURE 09

Genomics – prokaryotic genomes: prokaryotic gene structure – GC content – genedensity – eukaryotic genomes: gene structure – open reading frames – GC content – gene expression – transposition – repeated elements – gene density

MODULE V PROTIENS AND PREDICTION 09

Amino acids – polypeptide composition – secondary structure – tertiary and quaternary structure – algorithms for modeling protein folding – structure prediction – predicting RNA secondary structures Proteomics – protein classification – experimental techniques – inhibitors and drug designing and screening – NMR structures – empirical methods and prediction techniques – post-translational modification prediction

Total Hours : 45

TEXT BOOK:

1. D. E. Krane and M. L. Raymer, “Fundamental concepts of Bioinformatics”, Pearson Education, 2003.

REFERENCES:

1. Arthur M. Lesk, “Introduction to Bioinformatics”, Second Edition, Oxford University Press, 2005.
2. T. K. Attwood, D. J. Parry-Smith, and S. Phukan, “Introduction to Bioinformatics”, Pearson Education, 1999.
3. Vittal R. Srinivas, “Bioinformatics – A Modern Approach”, Prentice-Hall of India Pvt.Ltd., 2005.

OUTCOMES:

On completion of this course, students will be able to

- develop bioinformatics tools with programming skills.
- apply computational based solutions for biological perspectives.
- pursue higher education in this field.
- practice life-long learning of applied biological science.