# ACADEMIC REGULATIONS
# COURSE STRUCTURE
# AND
# DETAILED SYLLABUS

## COMPUTER SCIENCE AND ENGINEERING

## B.Tech Four Year Degree Course

(Applicable for the batches admitted from 2014-15)


## GUDLAVALLERU ENGINEERING COLLEGE

(An Autonomous Institute with Permanent Affiliation to JNTUK, Kakinada)

**Seshadri Rao Knowledge Village**

**GUDLAVALLERU - 521 356, Krishna District, Andhra Pradesh**

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## VISION & MISSION OF THE COLLEGE

**Vision**

To be a leading institution of engineering education and research, preparing students for leadership in their fields in a caring and challenging learning environment.

**Mission**

- To produce quality engineers by providing state-of-the-art engineering education.
- To attract and retain knowledgeable, creative, motivated and highly skilled individuals whose leadership and contributions uphold the college tenets of education, creativity, research and responsible public service.
- To develop faculty and resources to impart and disseminate knowledge and information to students and also to society that will enhance educational level, which in turn, will contribute to social and economic betterment of society.
- To provide an environment that values and encourages knowledge acquisition and academic freedom, making this a preferred institution for knowledge seekers.
- To provide quality assurance.
- To partner and collaborate with industry, government, and R and D institutes to develop new knowledge and sustainable technologies and serve as an engine for facilitating the nation's economic development.
- To impart personality development skills to students that will help them to succeed and lead.
- To instil in students the attitude, values and vision that will prepare them to lead lives of personal integrity and civic responsibility.
- To promote a campus environment that welcomes and makes students of all races, cultures and civilizations feel at home.
- Putting students face to face with industrial, governmental and societal challenges.

## VISION & MISSION OF THE DEPARTMENT

**Vision:**

To be a Centre of Excellence in computer science and engineering education and training to meet the challenging needs of the industry and society.

**Mission:**

- To impart quality education through well-designed curriculum in tune with the growing software needs of the industry.
- To serve our students by inculcating in them problem solving, leadership, teamwork skills and the value of commitment to quality, ethical behavior & respect for others.

- To foster industry-academia relationship for mutual benefit and growth.

## III. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- Identify, analyze, formulate and solve Computer Science and Engineering problems both independently and in a team environment by using the appropriate modern tools.
- Manage software projects with significant technical, legal, ethical, social, environmental and economic considerations.
- Demonstrate commitment and progress in lifelong learning, professional development, leadership and Communicate effectively with professional clients and the public.

## IV. PROGRAM OUTCOMES (POs)

- Apply knowledge of computing, mathematics, science and engineering fundamentals to the solve complex engineering problems.
- Formulate and analyze a problem, and define the computing requirements appropriate to its solution using basic principles of mathematics, science and computer engineering.
- Design, implement, and evaluate a computer based system, process, component, or software to meet the desired needs.
- Design and conduct experiments, perform analysis and interpretation of data and provide valid conclusions.
- Use current techniques, skills, and tools necessary for computing practice.
- Understand legal, health, security and social issues in Professional Engineering practice.
- Understand the impact of professional engineering solutions on environmental context and the need for sustainable development.
- Understand the professional and ethical responsibilities of an engineer.
- Function effectively as an individual, and as a team member / leader in accomplishing a common goal.
- Communicate effectively, make effective presentations and write and comprehend technical reports and publications.
- Learn and adopt new technologies, and use them effectively towards continued professional development throughout the life.
- Understand engineering and management principles and their application to manage projects in the software industry.

## V. ACADEMIC REGULATIONS

Applicable for the students of B.Tech from the Academic Year 2014-15.

### 1. UG – B.Tech Programs

The following B.Tech Programs are offered at present

i. Civil Engineering (CE)
ii. Electrical and Electronics Engineering (EEE)
iii. Mechanical Engineering (ME)
iv. Electronics and Communication Engineering (ECE)
v. Computer Science and Engineering (CSE)
vi. Information Technology (IT)

### 2. Duration of the Program

The duration of the program is four academic years consisting of eight semesters. However, a student is permitted to complete the course work of B.Tech program in the stipulated time frame of **EIGHT** years from the date of joining. Students admitted into third semester of B.Tech program directly, through Lateral Entry (LE), shall have to complete the course work of B.Tech program in the stipulated time frame of **SIX** years from the date of joining.

### 3. Minimum Instruction Days

Each semester consists of a minimum of ninety instruction days.

### 4. Program Credits

i) Each discipline of the B.Tech program is designed to have a total of 180 credits and the student shall have to complete the four year course work and earn all the **180** credits for the award of B.Tech Degree.

ii) Students joining the B.Tech program into the third semester directly through Lateral Entry (LE) Scheme shall have to complete the three year course work and earn **132** credits for the award of B.Tech degree.

### 5. Attendance Regulations

5.1 A student shall be eligible to appear for End Semester Examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

5.2 Condoning of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in each semester will be considered for genuine reasons such as medical grounds and participation in co-curricular and extra-curricular activities and shall be granted only after approval by a committee duly appointed by the college. The student should submit application for medical leave along with medical certificate from a registered medical practitioner within three days from reporting to the class work after the expiry of the Medical Leave. In case of participation in co-curricular and extra-curricular activities, either in the college or

other colleges, students must take prior written permission from HoD concerned and should also submit the certificate of participation from the organizer of the event within three days after the completion of the event. Only such cases will be considered for condoning attendance shortage.

5.3 A student shall be eligible to claim for condonation of attendance shortage for a maximum of two times during the four year (eight semesters) course work of regular B.Tech / three year (six semesters) course work of B.Tech, Lateral Entry.

5.4 A student will not be promoted to the next semester unless he satisfies the attendance requirement of the current semester. He may seek re-admission for that semester when offered next.

5.5 Shortage of Attendance below 65% in aggregate shall in *NO* case be condoned.

5.6 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

5.7 A fee stipulated by the college shall be payable towards condonation of attendance shortage.

5.8 A student is required to put up a minimum of 75% of attendance in the mandatory non-credit courses such as NSS and Games & Sports / Creative Arts.

5.9 A student whose shortage of attendance is condoned in the case of credit courses in that semester shall also be eligible for condoning shortage of attendance up to 10% in the case of mandatory non-credit courses also.

## 6. Examinations and Scheme of Evaluation

### 6.1 Theory Courses (3 Credits):

Each theory course shall be evaluated for a total of 100 marks, consisting of 40 marks for internal assessment and 60 marks for semester end examination.

***Internal Assessment:***

i) Out of 40 marks for internal assessment, 20 marks are for continuous assessment in the form of class tests and 20 marks are based on two mid-term examinations. The first mid-term examination shall be from the first three units of syllabus and second mid-term from the last three units of syllabus, conducted during the semester.

ii) Four class tests, two tests before first mid-term examination and the other two before second mid-term examination, each for 10 marks, with 45 minutes duration, are conducted in a semester and the average marks of the three best scored tests are scaled up for 20 marks and taken as marks for the continuous evaluation process.

iii) Each mid-term examination is conducted for 40 marks with two hours duration. Each mid-term examination consists of four questions, each for 10 marks. All the questions need to be answered. First question shall have 5 short questions, each of two marks or 10 objective questions each of one mark and the remaining three questions are of descriptive type, one from each unit of syllabus.

iv) Sum of the 75% marks of best scored mid-term examination and 25% marks of least scored mid-term examination are scaled down for 20 marks.

v) For the subjects such as Engineering Graphics, Engineering Drawing, Machine Drawing, Design & Drawing of R.C. structures, Steel structures, Irrigation structures, Estimation Cost and Valuation, Building Planning and Drawing etc., the distribution of 40 marks for internal evaluation shall be 20 marks for day-to-day work and 20 marks for internal tests (average of 2 tests) and 60 marks for semester end examination.

***External Assessment:***

i) Semester End Examination will have questions under Part-A and Part-B with three hours duration. **Part-A** is compulsory and consists of six 2 marks questions. **Part-B** consists of six questions, one question from each unit, out of which four questions are to be answered. All questions carry equal marks of 12 each.

ii) For subjects like Engineering Drawing / Engineering Graphics, Machine Drawing, Building Planning & Drawing, etc., the pattern of semester end examination is given along with the syllabus of respective subject.

**6.2 Theory Courses (2 Credits):**

Each theory course shall be evaluated for a total of 75 marks, consisting of 25 marks for internal assessment and 50 marks for semester end examination.

***Internal Assessment:***

i) Out of 25 marks for internal, 5 marks for assignments and 20 marks are based on two mid-term examinations.

ii) Two assignments, each for 10 marks, are evaluated in a semester and the average marks of two assignments are scaled down for 5 marks.

iii) Each mid-term examination is conducted for 40 marks with two hours duration. Each mid-term examination consists of four questions, each for 10 marks. All the questions need to be answered.

iv) Sum of the 75% marks of the best scored mid-term examination and 25% marks of the least scored mid-term examination are scaled down for 20 marks.

***External Assessment:***

i) Semester End Examination will have questions under Part-A and Part-B with three hours duration. **Part-A** is compulsory and consists of five 2 marks questions. **Part-B** consists of six questions, covering uniformly the entire syllabus, out of which four questions are to be answered. All questions carry equal marks of 10 each.

***Employability Skills:***

The distribution of marks shall be 25 marks for Internal Evaluation and 50 marks for the semester end examination. There shall be continuous evaluation by the internal subject teacher during the semester for 25 internal marks, of which 15 marks shall be for day-to-day performance and 10 marks shall be evaluated by conducting an internal test towards the end of semester.

Semester end examination shall be conducted by the teacher concerned and external examiner for 50 marks. The distribution of marks in the semester end examination will be:

| | |
|---|---|
| Questionnaire / data collection | : 10 marks, |
| Project Report | : 10 marks, |
| Presentation of the Project | : 15 marks and |
| Viva-voce | : 15 marks |

***MOOCs (Massive Open Online Courses):***

The evaluation procedures and award of grades in different MOOCs and equivalent letter grading of the college shall be prescribed for each MOOCs along with the notification of MOOCs.

**6.3 Laboratory Courses:**

i) For practical subjects the distribution shall be 25 marks for Internal Evaluation and 50 marks for the semester end examinations. There shall be continuous evaluation by the internal subject teacher during the semester for 25 internal marks of which 15 marks shall be for day-to-day performance (10 marks for day-to-day evaluation and 5 marks for Record) and 10 marks shall be evaluated by conducting an internal laboratory test towards the end of semester.

ii) Semester end examination shall be conducted by the teacher concerned and external examiner for 50 marks.

**6.4 Mandatory Non-Credit Courses:**

A student is required to take up two Non-Credit courses, viz. NSS and Sports & Games / Creative Arts, one in II year and the other in III year, either in the first semester or second semester. Marks are awarded based on the day-to-day participation and performance in the activities organized under each event. A student is required to score 40 marks out of 100 marks despite putting up a minimum of 75% attendance to be

declared satisfactory in each mandatory non-credit course. The B.Tech degree shall only be awarded if a student gets satisfactory grade in each of the two mandatory non-credit courses and besides acquiring 180 credits of the B.Tech degree course.

A student has to repeat the course if he does not get satisfactory grade in each non-credit course for getting the degree awarded.

**NSS**

There shall be internal valuation for 100 Marks, out of which 60 marks are for participation and involvement in day-to-day activities and 40 marks for participation and involvement in a three days NSS camp arranged during the semester.

**Sports and Games / Creative Arts**

There shall be two internal valuations, each for 50 marks, in the chosen activity, one in the middle of semester and the other towards the end of semester. Sum of the two valuations shall be taken as the final marks for 100.

**6.5 Industrial / Practical Training:**

Industrial / Practical training shall be evaluated for a total of 100 marks, consisting of 40 marks for internal assessment of day-to-day work and 60 marks for the assessment of the training report and viva-voce examination, conducted by a panel of examiners appointed by the college.

**6.6 Mini Project:**

Industrial / Practical training shall be evaluated for a total of 75 marks, consisting of 25 marks for internal assessment of day-to-day work and 50 marks for the assessment of the project report and viva-voce examination, conducted by a panel of examiners appointed by the college.

**6.7 Project Work:**

i) The final project work shall be carried out during the 8th semester and will be evaluated for 200 marks.

ii) Out of 200 marks, 80 marks shall be for Internal Evaluation and 120 marks for the assessment of project thesis and viva-voce examination.

iii) Each student needs to give two seminars on the topic of his project, and each seminar is evaluated for 40 marks by a committee consisting of the supervisor and a senior faculty of the department. The sum of the marks of two seminars is taken as internal marks for 80.

iv) The assessment of Project Thesis and Viva–Voce shall be conducted by the committee consisting of an External Examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of the fourth year second semester.

## 7. Criteria for Passing a Course and Award of Grades:

### 7.1 Criteria for Passing a Course:

i) A candidate shall be declared to have passed in individual theory/ drawing/ design course if he secures a minimum of 40% aggregate marks (internal & semester end examination marks put together), subject to securing a minimum of 35% marks in the semester end examination.

ii) A candidate shall be declared to have passed in individual laboratory/ project course if he secures a minimum of 50% aggregate marks (internal & semester end examination marks put together), subject to securing a minimum of 40% marks in the semester end examination.

iii) The candidate shall be declared to have passed in Employability Skills / Industrial / Practical Training / Mini Project / Porject Work if he secures 50% marks.

iv) On passing a course of a program, the student shall earn the credits as asigned to that course.

### 7.2 Method of Awarding Letter Grade and Grade Points for a Course:

A letter grade and grade points will be awarded to a student in each course based on his performance, as per the grading system given below.

| Theory / Drawing Course (%) | Laboratory / Employability Skills / Industrial / Practical Training/ Mini Project/ Project Work (%) | Grade Points | Letter Grade |
|---|---|---|---|
| ≥ 90 | ≥ 90 | 10 | O (Outstanding |
| ≥ 80 & < 90 | ≥ 80 & < 90 | 9 | A+ (Excellent) |
| ≥ 70 & < 80 | ≥ 70 & < 80 | 8 | A (Very Good) |
| ≥ 60 & < 70 | ≥ 60 & < 70 | 7 | B+ (Good) |
| ≥ 50 & < 60 | ≥ 50 & < 60 | 6 | B (Above Average) |
| ≥ 45 & < 50 | – | 5 | C (Average) |
| ≥ 40 & < 45 | – | 4 | P (Pass) |
| < 40 | < 50 | 0 | F (Fail) |

### 7.3 Calculation of Semester Grade Point Average (SGPA)* for semester:

The performance of each student at the end of the each semester is indicated in terms of SGPA. The SGPA is calculated as given below:

$$\textbf{SGPA} = \frac{\sum (CR \, X \, GP)}{\sum CR}$$

where CR = Credits of a course
GP = Grade Points awarded for a course

* SGPA is calculated for a candidate who passed all the courses in that semester.

### 7.4 Eligibility for Award of B.Tech Degree:

A student will be declared eligible for the award of the B.Tech. Degree if he fulfills the following academic regulations.

**i) 4 Year B.Tech Course:**

(a) Pursued a course of study for not less than four academic years and not more than eight academic years.

(b) Registered for **180** credits and secured **180** credits.

(c) Students, who fail to complete their Four years Course of study within Eight years or fail to acquire the **180** Credits for the award of the degree within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

**ii) 3 Year B.Tech Course under Lateral Entry:**

(a) Pursued a course of study for not less than three academic years and not more than six academic years.

(b) Registered for **132** credits and secured **132** credits.

(c) Students, who fail to complete their Three years Course of study within Six years or fail to acquire the **132** Credits for the award of the degree within six academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

### 7.5 Calculation of Cumulative Grade Point Average (CGPA) for Entire Program:

The CGPA is calculated as given below:

$$\textbf{CGPA} = \frac{\sum (CR \, X \, GP)}{\sum CR}$$

where CR = Credits of a course
GP = Grade points awarded for a course

### 7.6 Award of Division:

After satisfying the requirements prescribed for the completion of the program, the student shall be eligible for the award of B.Tech Degree and shall be placed in one of the following grades:

| CGPA | Class |
|---|---|
| ≥ 7.5 | First Class with Distinction |
| ≥ 6.5 & < 7.5 | First Class |
| ≥ 5.5 & < 6.5 | Second Class |
| < 5.5 | Pass Class |

### 7.7 Consolidated Grade Card

A consolidated grade card containing credits & grades obtained by the candidate will be issued after completion of the four year B.Tech program.

**8. Supplementary Examinations**

i) Supplementary examinations will be conducted twice in a year at the end of odd and even semesters.

ii) Semester end supplementary examinations shall be conducted till next regulation comes into force for that semester, after the conduct of the last set of regular examinations under the present regulation.

iii) Thereafter, supplementary examinations will be conducted in the equivalent courses as decided by the Board of Studies concerned.

iv) **Advanced Supplementary Examinations:** Candidate(s), who failed in theory / project work courses in 4th B.Tech 2nd Semester can appear for advanced supplementary examination conducted within one month after declaration of the revaluation results. However, those candidates who fail in these advanced supplementary examinations shall appear for subsequent examination along with regular candidates in the examinations conducted at the end of the respective semester.

**9. Conditions for Promotion**

i) A student shall be eligible for promotion to next Semester of B.Tech program, if he satisfies the conditions as stipulated in Regulation 5.

ii) The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in Regulation 5 for promotion into III Year I semester and IV year I semester.

**a) 4 Year B.Tech Program:**

i) A student shall be promoted from II year to III year only if he acquires the academic requirement of a minimum of 50% credits up to second year second semester as shown below.

1.Two regular and two supplementary examinations of I year I semester,
2.Two regular and one supplementary examinations of I year II semester,
3.One regular and one supplementary examinations of II year I semester
4.One regular examination of II year II semester,
irrespective of whether the candidate takes the examination or not.

ii) A student shall be promoted from III year to IV year only if he acquires the academic requirement of a minimum of 50% of credits upto third year second semester as shown below.

1. Three Regular and three supplementary examinations of I year I sem.,
2. Three Regular and two supplementary examinations of I year II sem.,
3.Two Regular and two supplementary examinations of II year I semester,
4.Two Regular and one supplementary examinations of II Year II semester,
5.One Regular and one supplementary examinations of III Year I semester,
6.One regular examination of III Year II semester,
irrespective of whether the candidate takes the examination or not.

**b) 3 Year B.Tech Program under Lateral Entry Scheme:**

i) A student shall be promoted from III to IV year only if he acquires the academic requirement of a minimum of 50% credits up to third year second semester as shown below.

1. Two regular and two supplementary examinations of II year I semester,
2. Two Regular and one supplementary examinations of II year II semester,
3. One regular and one supplementary examinations of III year I semester
4. One regular examination of III year II semester,

irrespective of whether the candidate takes the examination or not.

**10. Revaluation**

i) Students can submit the applications for revaluation, along with the prescribed fee receipt for revaluation of his answer script(s) of theory course(s) as per the notification issued by the Controller of Examinations.

ii) The Controller of Examinations shall arrange for revaluation of such answer script(s).

iii) An external examiner, other than the first examiner, shall revaluate the answer script(s).

iv) If the variation in marks of two evaluations is less than 15% of total marks, the best mark of two evaluations shall be taken into consideration.

v) If the variation in marks of two evaluations is more than 15% of total marks, there shall be third evaluation by an examiner other than the first two examiners. The best marks of two evaluations (which are nearer) shall be taken into consideration.

**11. Re-admission Criteria**

i) A candidate, who is detained in a semester due to lack of attendance has to obtain written permission from the Principal for readmission into the same semester after duly fulfilling the required norms stipulated by the college and by paying the required tuition fee and special fee in addition to paying an administrative fee of Rs.1,000/-.

ii) A candidate, who is not promoted either to III year or IV year due to lack of required credits can seek admission into III / IV year in subsequent years after obtaining the required credits as stipulated in regulation 9 by paying the required tuition fee and special fee in addition to paying an administrative fee of Rs. 1,000/-.

**12. Break in Study**

Student, who discontinues the studies for what-so-ever reason, can get readmission into appropriate semester of B.Tech program only with the prior permission of the Principal of the College, provided such candidate shall follow the transitory regulations applicable to the batch he joins. An administrative

fee of Rs.2,000/- per each year of break in study in addition to the prescribed tuition and special fees should be paid by the candidate to condone his break in study.

**13. Transitory Regulations**

A candidate, who is detained or discontinued in a semester, on readmission shall be required to do all the courses in the curriculum prescribed for the batch of students in which the student joins subsequently. However, exemption will be given to those candidates who have already passed such courses in the earlier semester(s) he was originally admitted into and substitute subjects are offered in place of them as decided by the Board of Studies. However, the decision of the Board of Studies will be final.

**a) Four Year B.Tech Regular course:**

**13.1** A student who is following JNTUK curriculum and detained due to shortage of attendance at the end of the first semester of first year shall join the autonomous batch of first year first semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with regular candidates of Autonomous stream and will be governed by the autonomous regulations.

**13.2** A student who is following JNTUK curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester of first year or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects will be offered in place of them as decided by the Board of Studies. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

**b) Three Year B.Tech program under Lateral Entry Scheme:**

**13.3** A student who is following JNTUK curriculum and detained due to

shortage of attendance at the end of the first semester of second year shall join the autonomous batch of second year first semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with Lateral Entry regular candidates of Autonomous stream and will be governed by the autonomous regulations.

**13.4** A student who is following JNTUK curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester of second year or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in place of them as decided by the Board of Studies. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

**c) Transfer candidates (from non-autonomous college affiliated to JNTUK):**

**13.5** A student who is following JNTUK curriculum, transferred from other college to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be the sum of the credits upto

previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

**d) Transfer candidates (from an autonomous college affiliated to JNTUK):**

**13.6** A student who has secured the required credits upto previous semesters as per the regulations of other autonomous institutions shall also be permitted to be transferred to this college. A student who is transferred from the other autonomous colleges to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies. The total number of credits to be secured for the award of the degree will be the sum of the credits upto previous semester as per the regulations of the college from which he is transferred and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

**14. Withholding of Results**

If the student has not paid the dues, if any, to the College or if any case of indiscipline is pending against him, the result of the student will be withheld. His degree will be withheld in such cases.

**15. Malpractices**

i) The Principal shall refer the cases of malpractices in internal assessment tests and semester end examinations to a malpractice enquiry committee constituted by him for the purpose. Such committee shall follow the approved levels of punishment. The Principal shall take necessary action against the erring students based on the recommendations of the committee.

ii) Any action by the candidate trying to get undue advantage in the performance or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder.

## DISCIPLINARY ACTION FOR MALPRACTICES/IMPROPER CONDUCT IN EXAMINATIONS

| | Nature of Malpractices / Improper conduct | Punishment |
|---|---|---|
| **If the candidate** | | |
| 1.a | Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination.) | Expulsion from the examination hall and cancellation of the performance in that subject only. |
| b | Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through Cell phones with any candidates or persons in or outside the exam hall in respect of any matter. | Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him. |
| 2. | Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester.<br>The hall ticket of the candidate shall be cancelled. |

| | | |
|---|---|---|
| 3. | Impersonates any other candidate in connection with the examination. | The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for the examinations of the remaining subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is registered against him. |
| 4. | Smuggles in the Answer book or takes out or arranges to send out the question paper during the examination or answer book during or after the examination. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. |
| 5. | Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks. | Cancellation of performance in that subject. |

| | | |
|---|---|---|
| 6. | Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in or around the examination hall or organises a walkout or instigates others to walkout or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the Officer-in-charge or any person on duty in or outside the examination hall of any of his relations or indulges in any other act of misconduct or mischief which results in damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the Officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination. | In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them. |
| 7. | Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. |
| 8. | Possess any lethal weapon or firearm in the examination hall. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat. |

| | | |
|---|---|---|
| 9 | If student of the college who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat.<br>Person(s) who do not belong to the college will be handed over to the police and a police case is registered against them. |
| 10. | Comes in a drunken condition to the examination hall. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. |
| 11. | Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny. | Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester examinations. |
| 12. | If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be referred to the Chief Superintendent of Examinations for future action towards suitable punishment. | |

iii) The involvement of the staff, who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents related to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and appropriate disciplinary action will be taken after thorough enquiry.

### 16. Other Matters

i) Physically challenged candidates who have availed additional examination time and a scribe during their Intermediate/EAMCET examinations will be given similar concessions on production of relevant proof/documents. Students who are suffering from contagious diseases are not allowed to appear either for internal or semester end examinations.

ii) The students who participated in coaching / tournaments held at State / National / International levels through University / Indian Olympic Association during semester end external examination period will be promoted to subsequent semesters as per the guidelines of University Grants Commission Letter No. F.1-5/88 (SPE/PES), dated 18-08-1994.

iii) The Principal shall deal in an appropriate manner with any academic problem which is not covered under these rules and regulations, in consultation with the Heads of the Departments and subsequently such actions shall be placed before the Academic Council for ratification. Any emergency modification of regulation, approved in the meetings of the Heads of the Departments shall be reported to the Academic Council for ratification.

### 17. General

i) The Academic Council may, from time to time, revise, amend or change the regulations, schemes of examination and /or syllabi.

ii) The academic regulations should be read as a whole for the purpose of any interpretation.

iii) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.

iv) Wherever the word he, him or his occurs, it will also include she, her and hers.

## VI. CURRICULAR COMPONENTS

| Sl.No. | Course Work - Subject Areas | Credits % |
|---|---|---|
| 1. | Humanities and Social Sciences (HSS) | 11 |
| 2. | Baisc Sciences (BS) | 12 |
| 3. | Engineering Sciences (ES) | 11 |
| 4. | Professional Subjects Core (PSC) | 43 |
| 5. | Professional Subjects Electives (PSE) | 8 |
| 6. | Open Subjects Electives (OSE) | 6 |
| 7. | Project / Industrial / Practical Training | 9 |
| 8. | Non-Credit Courses | 3 |

# COURSE STRUCTURE

# &

# SYLLABUS

# COURSE STRUCTURE

**I Year - I Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | Professional Communication – I | 3+1* | - | 3 |
| 2 | Mathematics – I | 3+1* | - | 3 |
| 3 | Mathematical Methods | 3+1* | - | 3 |
| 4 | Engineering Chemistry | 3+1* | - | 3 |
| 5 | Basic Electrical Engineering | 3+1* | - | 3 |
| 6 | Problem Solving Using C | 3+1* | - | 3 |
| 7 | Professional Communication Lab – I | - | 3 | 2 |
| 8 | Engineering Chemistry Lab | - | 3 | 2 |
| 9 | Programming Lab | - | 3 | 2 |
| | **Total** | **24** | **9** | **24** |

**I Year - II Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | Professional Communication – II | 3+1* | - | 3 |
| 2 | Mathematics – II | 3+1* | - | 3 |
| 3 | Engineering Physics | 3+1* | - | 3 |
| 4 | Environmental Studies | 3+1* | - | 3 |
| 5 | Basic Electronics | 3+1* | - | 3 |
| 6 | Engineering Drawing | 1 | 3 | 3 |
| 7 | Professional Communication Lab – II | - | 3 | 2 |
| 8 | Engineering Physics Lab | - | 3 | 2 |
| 9 | Basic Electrical and Electronics Lab | - | 3 | 2 |
| | **Total** | **24** | **12** | **24** |

* **Tutorial**

**II Year - I Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | Discrete Mathematical Structures | 3+1* | - | 3 |
| 2 | Managerial Economics and Financial Analysis | 3+1* | - | 3 |
| 3 | Digital Logic Design | 3+1* | - | 3 |
| 4 | Formal Languages and Automata Theory | 3+1* | - | 3 |
| 5 | Object Oriented Programming | 3+1* | - | 3 |
| 6 | Data Structures using C | 3+1* | - | 3 |
| 7 | Professional Ethics and Patents | 2 | - | 2 |
| 8 | Object Oriented Programming Lab | - | 3 | 2 |
| 9 | Data Structures Using C Lab | - | 3 | 2 |
| | **Total** | **26** | **6** | **24** |

**II Year - II Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | Probability & Statistics | 3+1* | - | 3 |
| 2 | Compiler Design | 3+1* | - | 3 |
| 3 | Advanced Data Structures | 3+1* | - | 3 |
| 4 | Computer Organization and Architecture | 3+1* | - | 3 |
| 5 | Computer Graphics | 3+1* | - | 3 |
| 6 | Operating Systems | 3+1* | - | 3 |
| 7 | Employability Skills | 1 | 2 | 2 |
| 8 | Advanced Data Structures Lab | - | 3 | 2 |
| 9 | Operating Systems and Compiler Design Lab | - | 3 | 2 |
| | **Total** | **25** | **8** | **24** |
| 10 | Sports and Games/Creative Arts (Mandatory Non-Credit Course) | - | 2 | - |

* **Tutorial**

**III Year - I Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | Database Management Systems | 3+1* | - | 3 |
| 2 | Computer Networks - I | 3+1* | - | 3 |
| 3 | Web Technologies | 3+1* | - | 3 |
| 4 | Object Oriented Analysis and Design | 3+1* | - | 3 |
| 5 | **Open Elective - I** (see the list of Open Electives) | 3+1* | - | 3 |
| 6 | Database Management Systems Lab | - | 3 | 2 |
| 7 | Case Tools Lab | - | 3 | 2 |
| 8 | Web Technologies Lab | - | 3 | 2 |
| | **Total** | **20** | **9** | **21** |

**III Year - II Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | Design and Analysis of Algorithms | 3+1* | - | 3 |
| 2 | Software Engineering | 3+1* | - | 3 |
| 3 | Computer Networks - II | 3+1* | - | 3 |
| 4 | **Elective – I**<br>i) Data Warehousing and Data Mining<br>ii) Micro Processors and Multi Core Systems<br>iii) Human Computer Interface<br>iv) Artificial Intelligence<br>(or)<br>Any other elective depending on industry needs | 3+1* | - | 3 |
| 5 | **Open Elective – II** (see the list of Open Electives) | 3+1* | - | 3 |
| 6 | Computer Networks Lab | - | 3 | 2 |
| 7 | Software Engineering Lab | - | 3 | 2 |
| 8 | Mini Project | - | 3 | 2 |
| | **Total** | **20** | **9** | **21** |
| 9 | NSS (Mandatory Non-Credit Course) | - | 2 | - |

* **Tutorial**

**IV Year - I Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | Information Security | 3+1* | - | 3 |
| 2 | Mobile Application Development | 3+1* | - | 3 |
| 3 | **Core Elective – II**<br>i) Digital Image Processing<br>ii) Advanced Computer Architecture<br>iii) Embedded Systems<br>iv) Bio-Informatics | 3+1* | - | 3 |
| 4 | **Core Elective – III**<br>i) Distributed Systems<br>ii) Parallel Computing<br>iii) Software Testing Methodologies<br>iv) Web Services | 3+1* | - | 3 |
| 5 | **Open Elective - III** (see the list of Open Electives) | 3+1* | - | 3 |
| 6 | Information Security Lab | - | 3 | 2 |
| 7 | Mobile Application Development Lab | - | 3 | 2 |
| 8 | Multi Media Application Development Lab | - | 3 | 2 |
| | **Total** | **20** | **9** | **21** |

**IV Year - II Semester**

| Sl. No. | Name of the Course / Laboratory | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|
| | | L | P | |
| 1 | **Elective – IV**<br>i) Distributed Data Bases<br>ii) Software Project Management<br>iii) Semantic Web<br>iv) Big Data | 3+1* | - | 3 |
| 2 | **Elective – V**<br>i) Machine Learing<br>ii) Cloud Computing<br>iii) Pattern Rcognition<br>iv) Wireless Networks | 3+1* | - | 3 |
| 3 | **Self Study Course** (see the list of Self Study Courses) | - | - | 2 |
| 4 | Industrial / Practical Training | - | - | 4 |
| 5 | Project Work | - | 9 | 9 |
| | **Total** | **8** | **9** | **21** |

* **Tutorial**

## Open Elective - I

| Sl. No. | Title of the Subject | Department Offering the Subject | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|---|
| | | | L | P | |
| 1 | Remote Sensing and GIS Techniques | CE | 3+1* | - | 3 |
| 2 | Elements of Civil Engineering (other than CE) | CE | 3+1* | - | 3 |
| 3 | Modeling and Simulation of Engineering Systems | EEE | 3+1* | - | 3 |
| 4 | Renewable Energy Sources | ME | 3+1* | - | 3 |
| 5 | Elements of Mechanical Engineering(other than ME) | ME | 3+1* | - | 3 |
| 6 | Computer Networks (other than CSE & IT) | CSE | 3+1* | - | 3 |
| 7 | Object Oriented Programming (other than CSE & IT) | CSE | 3+1* | - | 3 |
| 8 | Data Structures Using C (other than EEE,ECE,CSE&IT) | CSE | 3+1* | - | 3 |
| 9 | Cyber Laws | CSE | 3+1* | - | 3 |
| 10 | Open Source Software | IT | 3+1* | - | 3 |
| 11 | Fundamentals of Database Management Systems (other than CSE & IT) | IT | 3+1* | - | 3 |
| 12 | Fuzzy Mathematics | Maths | 3+1* | - | 3 |

* **Tutorial**

## Open Elective - II

| Sl. No. | Title of the Subject | Department Offering the Subject | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|---|
| | | | L | P | |
| 1 | Disaster Management | CE | 3+1* | - | 3 |
| 2 | Solid Waste Management (other than CE) | CE | 3+1* | - | 3 |
| 3 | Energy Audit, Conservation and Management | EEE | 3+1* | - | 3 |
| 4 | Material Science (other than ME) | ME | 3+1* | - | 3 |
| 5 | Automotive Electronics | ECE | 3+1* | - | 3 |
| 6 | Introduction to MP&MC (other than EEE, ECE, CSE & IT) | ECE | 3+1* | - | 3 |
| 7 | Cloud Computing (other than CSE & IT) | CSE | 3+1* | - | 3 |
| 8 | Web Technologies(other than CSE & IT) | CSE | 3+1* | - | 3 |
| 9 | Virtual Reality | CSE | 3+1* | - | 3 |
| 10 | Scripting Languages | IT | 3+1* | - | 3 |
| 11 | Big Data (other than CSE & IT) | IT | 3+1* | - | 3 |
| 12 | Multi-variate analysis and Special Functions | Maths | 3+1* | - | 3 |

* **Tutorial**

## Open Elective - III

| Sl. No. | Title of the Subject | Department Offering the Subject | No.of Periods per week | | No.of Credits |
|---|---|---|---|---|---|
| | | | L | P | |
| 1 | Building Services | CE | 3+1* | - | 3 |
| 2 | Modern Optimization Techniques | EEE | 3+1* | - | 3 |
| 3 | Electrical Power Utilization (other than EEE) | EEE | 3+1* | - | 3 |
| 4 | Robotics (other than ME) | ME | 3+1* | - | 3 |
| 5 | Assistive Technologies | ECE | 3+1* | - | 3 |
| 6 | Introduction to Embedded Systems (other than ECE, CSE & IT) | ECE | 3+1* | - | 3 |
| 7 | Social Networks | CSE | 3+1* | - | 3 |
| 8 | Mobile Application Development (other than CSE & IT) | CSE | 3+1* | - | 3 |
| 9 | Real-Time Systems | CSE | 3+1* | - | 3 |
| 10 | Network Management Systems | IT | 3+1* | - | 3 |
| 11 | Fundamentals of E-Commerce (other than CSE & IT) | IT | 3+1* | - | 3 |
| 12 | Statistical Methods using R Software | Maths | 3+1* | - | 3 |

* **Tutorial**

## Self Study Courses

| Sl. No. | Title of the Subject | Department Offering the Subject | No.of Credits |
|---|---|---|---|
| 1 | Global Positioning Systems | CE | 2 |
| 2 | Interior Design | CE | 2 |
| 3 | Electrical Safety Management | EEE | 2 |
| 4 | Green Engineering | ME | 2 |
| 5 | Managing Innovation & Entrepreneurship | ME | 2 |
| 6 | Internet of Things | ECE | 2 |
| 7 | Consumer Electronics | ECE | 2 |
| 8 | e-Waste Management | CSE | 2 |
| 9 | Management Information Systems | CSE | 2 |
| 10 | Information & Communication Technology | IT | 2 |
| 11 | Organizational Behaviour | MBA | 2 |
| 12 | MOOCs | – | 2 |

# SYLLABUS

## PROFESSIONAL COMMUNICATIONICS – I
## (Common to All Branches)

I Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To equip students for their present and future academic pursuits: to understand classroom lectures, read textbooks, do reference reading, participate in classroom discussions, and write assignments and examination answers.
- To develop in them the communication skills and social graces necessary for functioning effectively in the social and other situations in which they may be called upon to use English.

**Learning Outcomes:**

Students will be able to:

- Produce and process language for academic, professional and social life.
- Produce coherent spoken and written discourse of various kinds with attention to appropriate strategies and conventions of speaking and writing.

**Speaking, Listening, Intensive Reading and Grammar Practice**

**UNIT – I:**

- To transfer textual information to a table
- To introduce yourself
- To make polite conversations
- To comprehend subject-verb agreement

**UNIT – II:**

- To communicate well with your peers
- To express your views on a topic
- The present simple and present continuous tenses
- To write a text that has unity

**UNIT – III:**

**Extensive Reading**

**Simplified Classics from the series Great Stories in Easy English:**

- A Tale of Two Cities by Charles Dickens
- Treasure Island by R.L.Stevenson

**Vocabulary Builder: English in Contexts for students of Engineering and Technology'**

- GRE words 75 words
- Idioms 25
- Collocations 15
- One word substitutes 25

**Speaking, Listening, Intensive Reading and Grammar Practice**

**UNIT – IV:**

- To interact with your faculty members
- To express futurity
- To write a text that has cohesion
- To make your writing clutter-free

**UNIT – V:**

- To represent information in a diagram
- To make notes
- To offer your advice/suggestions
- To understand and use auxiliary verbs
- To write a letter to a company

**UNIT – VI:**

**Extensive Reading**

**Simplified Classics from the series *Great Stories in Easy English***

- *Tales from Shakespeare by Charles and Mary Lamb*

**Vocabulary Builder: English in Contexts for students of Engineering and Technology'**

- GRE words 75 words
- Idioms 25
- Words often confused 15
- Collocations 15
- One word substitutes 25
- Phrasal verbs 25

**Text Books:**

1. Samson, T. (2010). Innovate with English. Hyderabad : Foundation **Great Stories in Easy English Published by S.Chand & Company Limited:**
2. Treasure Island by R.L. Stevenson
3. Tales From Shakespeare by Charles and Mary Lamb
4. A Tale of Two Cities by Charles Dickens
5. Vocabulary Builder: English in Contexts for students of Engineering and Technology

**Reference Books:**


1. Comfort, J. and others (2012). *Speaking Effectively.* U.K: Cambridge University Press.
2. Murphy, Raymond. *Intermediate English Grammar.* Cambridge University Press.
3. Lewis, N.(2005 ).*Word Power Made Easy.U.K: Bloomsbury.*
4. McCarthy and O'Dell. F (2008).*Test Your English Vocabulary in Use:* Upper – Intermediate U.K: Cambridge University Press
5. O'Dell. F and McCarthy (2010).*English Collocations in Advanced Use.* New Delhi :Cambridge University Press
6. Cambridge IELTS Examination Papers. New Delhi :Cambridge University Press.
7. TOEFL Examination Papers.
8. BEC Examination Papers.

Hornby.A.S. (2010). *Oxford Advanced Learner's Dictionary*. New Delhi: Oxford University Press.


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## MATHEMATICS – I
## (Common to All Branches)
I Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To find the solutions of 1st and 2nd order Differential equations.
- To find the solutions of multiple integral problems using calculus and vector concepts.

**Learning Outcomes:**

Students will be able to

- apply 1st and 2nd order differential equations to various Engineering Problems.
- apply the techniques of partial differentiation to find maxima and minima of two variables.
- evaluate single and double integrals using various types of curves.
- apply the concepts of vector differentiation and integration to the surface and volume integrals.

**UNIT – I: Linear Differential Equations of first order**

Differential equations of first order – Exact – Equations reducible to Exact, Linear and Bernoulli.

Applications: Newton's law of cooling, law of natural growth and decay.

**UNIT – II: Linear Differential Equations of Second and higher order**

Linear differential equations of second and higher order with constant coefficients-Complete solution, Operator D, Rules for finding complementary function, Inverse operator for D, Rules for finding particular integral with Right hand side term of the type $e^{ax}$, Sin ax, cos ax, polynomials in x, $e^{ax}$ V(x), x.V(x). Applications: LCR circuits.

**UNIT – III: Partial Differentiation**

Introduction - Total derivative - Chain rule - Functional dependence – Jacobian. Application: Maxima and Minima of functions of two / three variables with or without constraints

**UNIT – IV: Multiple Integrals**

Introduction to Curve Tracing [Cartesian and Polar Curves]. Change of order of integration, Areas by double integrals, Volumes by triple integrals.

**UNIT – V: Vector Differentiation**

Vector Differentiation: Gradient- Divergence- Curl - Laplacian operator

**UNIT – VI: Vector Integration**

Line, surface and volume integrals. Integral theorems: Greens - Stokes - Gauss Divergence Theorems (Without proof) and related problems. Applications: Work done, flux across the surface.

**Text Books:**


1. B.S.Grewal, Higher Engineering Mathematics : 42nd edition, Khanna Publishers,2012, New Delhi.
2. Dr. T.K.V.Iyengar, Dr. B.Krishna Gandhi, S.Ranganatham and Dr.M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I : 11th edition, S. Chand Publishers, 2012, New Delhi.


**Reference Books:**


1. B.V.Ramana, Engineering Mathematics: 4th Edition, Tata McGraw Hill, 2009, New Delhi.
2. U.M.Swamy, A Text Book of Engineering Mathematics – I & II: 2nd Edition, Excel Books, 2011, New Delhi.
3. Erwin Kreyszig, Advanced Engineering Mathematics : 8th edition, Maitrey Printech Pvt. Ltd, 2009, Noida.


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# MATHEMATICAL METHODS
## (Common to ECE, CSE & IT)
I Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 + 1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand the various numerical techniques.
- To gain the knowledge of Laplace, z-transforms and their inverse transforms.

**Learning Outcomes:**

Students will be able to

- apply numerical techniques for solutions of Algebraic, transcendental and ordinary differential equations.
- transform ordinary function into Analytical function using Milne-Thompson Method.
- apply Laplace transforms to find the solutions of ordinary differential equations.
- apply Z–transforms to find solutions of difference equations.

**UNIT – I: Algebraic and Transcendental Equations**

Solution of Algebraic and Transcendental Equations- Introduction – Bisection Method – Method of False Position – Newton-Raphson Method.

**UNIT – II: Interpolation**

Interpolation- Introduction – Finite differences- Forward Differences –Back ward differences –Central differences – Symbolic relations – Newton formulae for interpolation – Lagranges interpolation.

**UNIT – III: Numerical Solutions Of Ordinary Differential Equations**

Solution by Taylors series – Euler and Modified Euler method – Picard method - $4^{th}$ order Runge-Kutta methods - Predictor and corrector method.

**UNIT – IV: Introduction To Complex Variables**

Continuity – Differentiability – Analyticity – Properties- Cauchy Riemann Equations in Cartesian and Polar coordinates. Harmonic functions and conjugates : Milne Thomson method.

**UNIT – V: Laplace Transforms and Inverse Laplace Transforms**

Laplace transforms of standard functions – Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac Delta function. Applications: Evaluation of Improper Integrals. Inverse Laplace transforms –Convolution theorem. Application: Solution of ordinary differential equations.

**UNIT – VI: Z-Transforms**

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems -Inverse z-transform using Partial fractions, Convolution theorem. Application: Solution of Difference equations by Z-transforms.

**Text Books:**


1. B.S.Grewal, Higher Engineering Mathematics : 42nd edition, Khanna Publishers, 2012, New Delhi.
2. Ravindranath. V, and Vijayalaxmi. A: 2nd edition, A Text Book on Mathematical Methods, Himalaya Publishing House, Bombay.


**Reference Books:**


1. Dr. T.K.V.Iyengar, Dr. B.Krishna Gandhi, S.Ranganatham and Dr.M.V.S.S.N.Prasad, Mathematical Methods : 6th edition, S. Chand Publications, 2011, New Delhi.
2. B.V.Ramana, Engineering Mathematics : 4th Edition, Tata McGraw Hill, 2009, New Delhi.
3. Erwin Kreyszig, Advanced Engineering Mathematics : 8th edition, Maitrey Printech Pvt. Ltd, 2009, Noida.

# ENGINEERING CHEMISTRY
## (Common to ECE, CSE & IT)
I Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 + 1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To impart the knowledge of chemical and solar energy.
- To familiarize with various types of polymers, fuels and lubricants and their applications in engineering.

**Learning Outcomes:**

Students will be able to

- apply various methods of water treatment.
- understand the applications of chemical and solar energy in various engineering aspects.
- apply various chemical methods to prevent corrosion of metals.
- understand the process to prepare synthetic polymers used for various applications.
- know the characteristic features of lubricants and their applications.
- understand the need of green synthesis.

**UNIT – I: Water and Its Treatment**

Introduction, Hardness of water, types of hardness, Degree of hardness, Determination of hardness by EDTA Method, Numerical Problems on hardness of water by EDTA method. Softening of hard water by Permutit and Ion Exchange Processes, Treatment of brackish water by reverse osmosis, Potable Water, General Outline of municipal water treatment (Sedimentation, Filtration and chlorination).

**UNIT – II: Energy Sources**

**Chemical Sources of Energy:** Galvanic Cell - Single electrode potential – Electro chemical series-Problems on electrode potential using Nernst equation - Hydrogen and Calomel reference electrodes and measurement of pH by glass electrode – Leclanche cell, Lead **-** Acid accumulator, Hydrogen-Oxygen fuel cell and Methanol Fuel cell.

**Solar Energy:** Introduction–Harnessing of solar energy – Applications of solar energy - Photovoltaic cells-Solar reflectors (Parabolic trough, Solar dish and Solar tower) and Solar water heater.

**UNIT – III: Corrosion and Its Prevention**

Dry & wet corrosion – Mechanism – Pilling and Bedworth Rule - Factors influencing the rate of corrosion (Temperature, pH, Humidity of environment and position of metal in Galvanic series) - Types of Corrosion (galvanic

corrosion, concentration cell corrosion, pitting corrosion and stress corrosion) - Sacrificial Anodic method, Impressed voltage method – Metallic coatings (galvanization and tinning methods).

**UNIT – IV: Polymers**

Definitions of Polymer and Polymerization, Degree of polymerization and Functionality - Classification of polymers, Types of Polymerisation– Addition, Condensation and Co-polymerizations –Plastics – Thermoplastics – Thermosetting plastics, - Biodegradable polymers (PHBV & PHA). Preparation, properties and uses of poly styrene, PVC, PTFE, Bakelite, Buna-S rubber, Buna-N rubber, Thiokol rubber.

**UNIT – V: Fuels & Lubricants**

**Fuels:** Classification of fuels, calorific value, LCV & HCV and determination of calorific value of a solid fuel using Bomb calorimeter, Problems based on calorific values, Fischer-Tropsch Method and Bergius Method for preparation of Synthetic Petrol.

**Lubricants:** Definition and explanation of Lubrication-Types of Lubricants-Definition and significance of Viscosity, Flash and Fire Point, Pour and Cloud Point, Aniline point of a lubricant. - Engineering applications of lubricants.

**UNIT – VI: Green Chemistry**

Introduction- Principles of Green Chemistry, Methods of Green synthesis (aqueous phase, supercritical fluid extraction, green solvents and microwave induced methods), IWM (Integrated Waste Management), ZWT (Zero Waste Technology) Engineering Applications.

**Text Books:**


1. Text book of Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company
2. Text book of Engineering Chemistry-II by Srinivasulu Doddaga, Ashima Srivastava, Roliverma. Parshva Publication.
3. Engineering Chemistry by Dr. Bharathi Kumari Yalamanchili,VGS Publication.


**Reference Books:**


1. A Text book of Engineering Chemistry by S.S.Dara. S.Chand&Company Ltd.
2. Engineering Chemistry by J.C.Kurisascose and J.Rajaram.Tata Mc Graw-Hill Publishing.
3. A Text book of Engineering Chemistry by Balaram Pani.Galgotia Publications.
4. A Text book of Engineering Chemistry by Shashi Chawla. Dhanpat Rai Publications.
5. Industrial Chemistry by O.P.Veeramani and A.K.Narula. Galgotia Publications.
6. Text book of Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company.

# BASIC ELECTRICAL ENGINEERING

I Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 + 1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To introduce the basic concepts of electrical circuits and network theorems.
- To familiarize with DC, AC and special machines and their applications.

**Learning Outcomes:**

Students will be able to

- apply the basic network laws and theorems for circuit analysis.
- describe the operation of the D.C/A.C machines.
- select appropriate DC/AC machines for real time applications.
- select appropriate special machines for computer applications.

**UNIT – I: Electrical Circuits**

Basic definitions, types of elements , types of sources, Ohm's Law, Kirchhoff's laws, series, parallel circuits, mesh and nodal analysis.

**Network Theorems**

Superposition, Reciprocity, Thevenins, Nortons and Maximum power transfer theorems.

(All the above topics are only elementary treatment and simple problems).

**UNIT – II: A.C Fundamentals**

Periodic wave forms (Determination of average, R.M.S and Form factor), concept of phase angle and phase difference, reactance and impedance, power factor, real, reactive and apparent powers..

(All the above topics are only elementary treatment and simple problems).

**UNIT – III: DC Machines**

Principle of operation of DC Generator – emf equation - types – Principle of operation of dc motors - types of DC Motors - Losses and torque equation – applications.

(All the above topics are only elementary treatment and simple problems).

**UNIT – IV: Transformers**

Principles of operation, Constructional Details, Losses, S.C and O.C tests, Efficiency and Regulation Calculations.

(All the above topics are only elementary treatment and simple problems).

**UNIT – V: Three Phase Induction Motor**

Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

**UNIT – VI : Special Machines and Applications**

Stepper motors - Construction, working principle, and applications , Brush less DC motor – construction, principle of operation and applications, A.C. and D.C servomotors, universal motors, applications.

(All the above topics are only elementary treatment and simple problems).

**Text Books :**

1. Basic Electrical Engineering by Vincent Deltoro, PHI, 2nd edition,
2. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah TMH, 2nd edition.
3. Special Electrical Machines by J. Gnanavadivel, J. Karthikeyan, S. Albert Alexander anuradha publisher, 2nd edition

**Reference Books :**

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI, 2nd edition.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications, 3rd edition.
3. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David, Irwin Pearson, 2nd edition.

## PROBLEM SOLVING USING C
## (Common to EEE, ECE, CSE & IT)

I Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To introduce the steps of problem solving.
- To emphasize the role of logical flow charts and pseudo code in problem solving on computers.
- To impart skills for solving problems using C.

**Learning Outcomes:**

Students will be able to

- develop logical flow charts for solving problems.
- develop pseudo code for solving problems.
- solve simple to moderate problems on computer using C.
- self-learn advanced features of C.
- self-learn for solving complex problems on computers.

**UNIT – I: Problem Solving Steps**

Understanding problem, Formulating a mathematical model, Solving the mathematical model, Developing algorithm, Representingalgorithm as pseudo code or logical flow chart, Coding, Testing and Debugging.

General form of a C program, C Tokens – Constants, Identifiers, Operators, Punctuation and Keywords.

Basic data types, Data modifiers, Variable declaration statement, Console I/O statements, Assignment statement and Order of evaluation. Simple problems such as evaluating formulae.

**UNIT – II: Control Statements**

Selection Statements –if-else, nested if, switch, nested switch and ? Operator; Control Statements – For loop, while loop and do while loop; Jump Statements – return, goto, break, exit() and continue.

Problem Solving – Exchanging the values of two variables, Summation of a set of numbers, Factorial Computation, Sine function computation, Generation of Fibonacci sequence, reversing digits of an integer, Base conversion and Character to number conversion, LCM and GCD computation, Generating prime numbers, Computing prime factors of an integer, Raising a number to a large power, Computing the $n^{th}$ Fibonacci number.

**UNIT – III: Arrays**

Declaring, initializing and accessing of one dimensional and two dimensional arrays and strings; and multidimensional arrays. Problem Solving – Computing mean, range and variance of a set of numbers, Array order reversal, Histogramming, Removal of duplicates from an ordered array, Partitioning an array, Finding $k^{th}$ smallest element and Longest monotone subsequence.

**UNIT – IV: Pointers and functions**

Pointers – Variables, Operators, Expressions and Multiple indirection.

Functions – General form of functions, Passing parameters by value and Passing parameters by address, Dynamic memory allocation functions, Pointers and arrays, Pointers and functions, recursive functions and String handling functions, Problem solving using functions.

**UNIT – V: Structures and Unions**

Structures -Definition, declaration, initialization of structures, accessing structure members, nested structures, arrays of structures, array within structures, structures and functions.

Unions - Bit-Fields and enumerations; Problem solving using structures, unions, Bit-fields and enumerations.

**UNIT – VI: Files**

File Handling- Text and binary files, commonly used C file system functions, File Processing Operations – inserting, deleting, searching and updating a record and displaying file contents. Random access files.

Problem solving – Billing at Checkout counter of a supermarket, Preparing consolidated attendance / marks statements, and Performing banking operations.

**Text Books:**


1. R G Dromey, How to Solve it by Computer, Prentice-Hall of India, 1999.
2. Jeri R Hanly and Elliot B Koffman, Problem Solving and Program Design in C, Seventh Edition, Pearson, 2014.
3. Herbert Schildt, C: The Complete Reference, Tata McGraw-Hill, 2008.


**Reference Books:**


1. C Programming, E Balaguruswamy, 3rd edition, TMH.
2. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.
3. Programming in C, Second Edition Pradip Dey and Manas Ghosh, OXFORD Higher Education.


* * *

## PROFESSIONAL COMMUNICATION LAB - I
## (Common to All Branches)

I Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To strengthen the oral communication skills of the learners for communicative functions;
- To hone their pronunciation;
- To build confidence in them to communicate effectively in English.

**Learning Outcomes:**

Students will be able to

- enhance their basic communication skills to interact with people around them;
- shed their inhibition and take part in different speaking activities;
- respond in several contexts using the expressions they will have learned;
- speak English with reasonably good pronunciation.

**UNIT – I:**

- Greeting others
- Taking leave
- Introducing
- Identifying and pronouncing vowel sounds

**UNIT – II:**

- Asking for information
- Giving information
- Identifying and pronouncing diphthongs

**UNIT – III:**

- Inviting
- Accepting and declining invitations
- Identifying and pronouncing consonants

**UNIT – IV:**

- Giving commands or instructions
- Requesting
- Using accent on the appropriate syllable
- Speak rhythmically

**UNIT – V:**

- Giving suggestions
- Expressing opinions
- Using different tones in connected speech

**Text Books:**

1. Strengthen your communications skills by Maruthi Publications

**Reference Books:**

1. Strengthen your steps by Maruthi Publications
2. Speak well by Orient Blackswan.
3. Jones, D. English Pronunciation Dictionary.

# ENGINEERING CHEMISTRY LAB
## (Common to ECE, CSE & IT)
I Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To practice the titrations of chemical analysis for determining the quality of water.
- To know the preparation of Bakelite.

**Learning Outcomes:**

Students will be able to

- apply various titrations required for water quality analysis.
- understand the preparation of resin.

**List of Experiments**

Introduction to Chemistry Lab (the teachers are expected to teach fundamentals like Primary, Secondary Standard Solutions , Normality, Molarity, Molality etc and laboratory ware used, error ,accuracy, precision, Theory of indicators, use of volumetric titrations.

1. Practice experiment-Determination of the amount of HCl using standard $Na_2CO_3$.
2. Determination of alkalinity of water sample.
3. Determination of acidity of water sample.
4. Determination of Ferrous iron by permanganometric method.
5. Determination of Ferric Iron using standard $K_2Cr_2O_7$ solution.
6. Determination of Total hardness of the water sample by EDTA method.
7. pH metric titrations - Determination of concentration of HCl using glass electrode.
8. Determination of pH of the water sample by using pH meter.
9. Determination of conductivity of the water sample by using conductivity meter.
10. Conductometric titrations between strong acid and strong base
11. Determination of turbidity of the water sample by using turbidity meter.
12. Estimation of total dissolved salts in water sample.
13. Preparation of Phenol - Formaldehyde resin.

**Lab Manual:**


1. Engineering chemistry laboratory manual &record By Srinivasulu. D Parshva publications.
2. Engineering Chemistry Lab Manual by Dr. K.Anji Reddy. Tulip publication.
3. Engineering Chemistry Lab Manual by Dr. Jyotsna Cherukuri. V.G.S publication.
4. K.Mukkanti (2009) Practical Engineering Chemistry, B.S. Publication.

## PROGRAMMING LAB
## (Common to EEE, ECE, CSE & IT)
I Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To familiarize with the discrete components of computers and networking components.
- To familiarize with usage of MS Office Tools.
- To provide the practice of solving problems on computer using C.

**Learning Outcomes:**

Students will be able to

- identify discrete components of computers and networking components and describe their functions.
- employ MS Office Tools for documentation and presentations and making computations.
- use computer for solving problems.

**Part- A**

**Exercise - 1: IT Workshop**

a) Identifying the discrete components of a computer and networking components
b) Demonstration of assembling a computer
c) Demonstrating installation of OS and applications

**Exercise - 2: IT Workshop**

a) Creating a document using MS Word
b) Creating a document using LaTeX

**Exercise - 3: IT Workshop**

a) Familiarizing with the usage and applications of MS Excel Using Excel.
b) Creating a presentation using MS Power point.

**Exercise - 4: IT Workshop**

Familiarizing with the Integrated Development Environment (IDE) for eveloping C programs

**Part – B**

**Exercise - 5: Write a C program for the following**

a) Calculate the area of triangle using the formula area = $(s\,(s-a)\,(s-b)(s-c))^{1/2}$ where $s= (a+b+c)/2$
b) Find the largest of three numbers using ternary operator.
c) Find the roots of a quadratic equation.

**Exercise - 6: Develop a C program for the following**

a) Read two integer operands and one operator form the user, perform the operation and then print the result. (Consider the operators +,-,*, /, % and use Switch Statement)
b) Check whether given number is Prime (or) not
c) Display first N natural numbers.
d) Calculate electricity bill for the consumed units – assume suitable constraints.
e) Find the sum of individual digits of a positive integer and find the reverse of the given number.

**Exercise - 7: Design a C program for the following**

a) Find the largest and smallest numbers in the array.
b) Search whether the given element is in the array.
c) Perform Addition, subtraction and multiplication of Matrices
d) Delete n Characters from a given position in a given string.
e) Illustrate at least five string handling functions.

**Exercise - 8: Implement a C program for the following**

a) Calculate mean, standard deviation and variance for a given set of values using functions
b) Sort a given set of numbers in ascending order using functions
c) Both recursive and non-recursive functions for the following
   i) To find the factorial of a given integer.
   ii) To find the GCD (greatest common divisor) of two given integers.
   iii) To generate Fibonacci sequence.

**Exercise - 9: Prepare a C program for the following**

a) To implement a structure to read and display the Name, date of Birth and salary of ten Employees.
b) To display the Name, Marks in five subjects and total marks of given number of students. (Using array of structures).
c) Functions to perform the following operations using Structure:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers

**Exercise - 10: Develop C program for the following**

a) Function to exchange (Swap) values of two integers using call by reference.
b) Illustrate the usage of dynamic memory management functions.
c) Develop a program to operations on a file.
d) To copy contents of one file to another.
e) To count the number of characters, words and lines in a file.

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## PROFESSIONAL COMMUNICATION - II
## (Common to All Branches)

I Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To equip students for their present and future academic pursuits: to understand classroom lectures, read textbooks, do reference reading, participate in classroom discussions, and write assignments and examination answers.
- To develop in them the communication skills and social graces necessary for functioning effectively in the social and other situations in which they may be called upon to use English.
- To prepare them to secure employment and to function successfully in their career.

**Learning Outcomes:**

Students will be able to:

- Produce and process language for academic, professional and social life.
- Produce coherent spoken and written discourse of various kinds with attention to appropriate strategies and conventions of writing.
- To take part in job interviews with confidence and competence.

**Speaking, Listening, Intensive Reading and Grammar Practice**

**UNIT – I:**

- To make effective telephone conversations
- To use the modal auxiliaries *can* and *could*
- To write persuasive letters
- To write a winning resume

**UNIT – II:**

- To effectively participate in an informal meeting
- To use articles and other determiners
- To get some practice in composing professional emails
- To plan a professional presentation

**UNIT – III:**

**Extensive Reading**

**Simplified Classics from the series Great Stories in Easy English:**

- *Oliver Twist by Charles Dickens*
- *Robinson Crusoe by Daniel Defoe*

**Vocabulary**

***'Vocabulary Builder: English in Contexts for students of Engineering and Technology'***

- GRE words 75 words
- Idioms 25
- Words often confused 15
- Collocations 15
- One word substitutes 25
- Phrasal verbs 25

**Speaking, Listening, Intensive Reading and Grammar Practice**

**UNIT – IV:**

- To effectively participate in an informal meeting
- To use passive voice
- To identify the structure of reader-oriented technical reports

**UNIT – V:**

- To use prepositions
- To use visual aids in a presentation

**UNIT – VI:**

**Extensive Reading**

***Simplified Classics from the series Great Stories in Easy English:***

- *Round the World in Eighty Days by Jules Verne*

**Vocabulary**

***'Vocabulary Builder: English in Contexts for students of Engineering and Technology'***

- GRE words 75 words
- Idioms 25
- Words often confused 15
- Collocations 15
- One word substitutes 25
- Phrasal verbs 25

**Text Books:**

1. Samson, T. (2010). *Innovate with English*. Hyderabad : Foundation

**Great Stories in Easy English Published by S.Chand & Company Limited:**

1. *Oliver Twist* by Charles Dickens
2. *Robinson Crusoe* by Daniel Defoe
3. *Round the World in Eighty Days* by Jules Verne
4. *Vocabulary Builder : English in Contexts for Students of Engineering and Technology*

**Reference Books:**


1. Comfort, J. and others (2012). *Speaking Effectively.* U.K: Cambridge University Press.
2. Murphy, Raymond. *Intermediate English Grammar.* Cambridge University Press.
3. Lewis, N.(2005 ).*Word Power Made Easy.U.K: Bloomsbury.*
4. McCarthy and O'Dell. F (2008).*Test Your English Vocabulary in Use: Advanced* U.K: Cambridge University Press.
5. O'Dell. F and McCarthy (2010).*English Collocations in Advanced Use.* New Delhi: Cambridge University Press
6. Cambridge IELTS Examination Papers. New Delhi :Cambridge University Press.
7. TOEFL Examination Papers.
8. BEC Examination Papers.
9. Hornby.A.S. (2010). *Oxford Advanced Learner's Dictionary*. New Delhi: Oxford University Press.


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## MATHEMATICS - II
## (Common to All Branches)
I Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To determine the eigenvalues and eigenvectors.
- To understand the concepts of Fourier Series and Fourier Transforms.
- To solve partial differential equations of 1st and 2nd order.

**Learning Outcomes:**

Students will be able to

- use the concepts of eigenvalues and eigenvectors in Engineering problems.
- apply to transform a function into Fourier Series and Fourier Integral form.
- apply 1st and 2nd order partial differential equations to Engineering Problems.

**UNIT – I: Matrices**

Rank of Matrix- Echelon form, Normal form – System of Linear equations – Consistency-Gauss elimination Method. Applications to electrical circuits [Finding the current in an electric circuit].

**UNIT – II: Eigenvalues & Eigenvectors**

Eigenvalues - Eigenvectors – Properties – Cayley Hamilton Theorem (without proof) - Inverse and powers of a matrix using Cayley Hamilton theorem, Quadratic forms- Reduction of quadratic form to canonical form by Orthogonal Transformation– Rank - index – signature.

Applications: Free vibration of a two mass system.

**UNIT – III: Fourier Series**

Fourier series: Determination of Fourier coefficients (without proof) – Fourier series – even and odd functions – Fourier series in an arbitrary interval– Half-range sine and cosine series.

**UNIT – IV: Fourier Transforms**

Fourier integral theorem (only statement) – Fourier transform – sine and cosine transforms – properties – inverse Fourier transforms – Finite Fourier transforms.

**UNIT – V: 1st order Partial Differential equations**

Formation of partial differential equations by eliminating arbitrary functions – solutions of quasi linear equations using Lagrange's method, solutions of non-linear equations by 4 strandard forms and Charpit's method.

**UNIT – VI: 2nd order Partial Differential equations**

Method of Separation of Variables. One dimensional Heat, Wave and Laplace equations.

**Text Books:**


1. B.S.Grewal, Higher Engineering Mathematics : 42nd edition, Khanna Publishers,2012 , New Delhi.
2. Dr. T.K.V.Iyengar, Dr. B.Krishna Gandhi, S.Ranganatham and Dr.M.V.S.S.N.Prasad, Engineering Mathematics – II : 6th edition, S.Chand Publications, 2012, New Delhi.


**Reference Books:**


1. Remote
1. B.V.Ramana, Mathematical Methods: 4th Edition, Tata McGraw Hill, 2009,New Delhi.
2. Ravindranath, V. and Vijayalaxmi, A. : 2nd edition, A Text Book on Mathematical Methods, Himalaya Publishing House,2012, Bombay.
3. Dean G. Duffy, Advanced engineering mathematics with MatLab, CRC Press
4. Erwin Kreyszig, Advanced Engineering Mathematics:8th edition,Maitrey Printech Pvt. Ltd, 2009, Noida.


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# ENGINEERING PHYSICS
## (Common to ECE, CSE & IT)
I Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 + 1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand principles of solid state materials for use in the engineering applications.

**Learning Outcomes:**

Students will be able to

- apply the principles of light for optical communication.
- Identify the appropriate solid state materials for engineering applications.
- apply Quantum mechanics to study the behavior of a particle.

**UNIT – I: Wave Optics**

**Interference:**

Introduction – Interference in thin films by reflection –Newton's rings.

**Diffraction:**

Introduction – Fraunhofer diffraction - Fraunhofer diffraction at single slit– Diffraction grating – Resolving power of a grating

**Polarization:** Introduction – Types of Polarization – Double refraction – Quarter wave plate and Half Wave plate.

**UNIT – II: Lasers & Fiber Optics**

**Lasers:**

Introduction – coherent sources – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients– Population inversion – Helium Neon laser – $Co_2$ laser – semi conductor lasers.

**Fiber Optics :**

Introduction, Principle of Optical Fiber - Total Internal Reflection, Conditions for Light to Propagate - Numerical Aperture and Acceptance Angle, Optical Fiber Construction, Types of Optical Fibers - Step Index Fibers and Graded Index Fibers, Advantages of Optical Fibers in Communications.

**UNIT – III: Introductory Solid State Physics**

**Crystal Structure**

Introduction, Basic Terms - Lattice, Basis, Crystal Structure,CoordinationNumber, Atomic Radius, Packing Fraction, Free Volume, LatticeParameters, Unit Cell and Primitive Cell, Crystal Systems and Bravais Lattices, Structure and Packing Fractions of Simple Cubic, Body Centered Cubic and Face Centered Cubic Crystal Structures.

**X-Ray Diffraction**

Crystal Planes, Directions and Miller Indices, Distance of Separation between successive hkl Planes - Inter Planar Spacing, Diffraction of X-Rays by Crystal Planes - Bragg's Law

**UNIT – IV: Essentials Of Materials Science**

**Magnetic Properties**: Magnetic permeability – Magnetization – Orgin or magnetic moment – Classification of Magnetic materials – Dir, para, Ferro, Hysteresis curve.

**Dielectric Properties**: Introduction – Dielectric constant – Electronic, ionic and orientational polarization – internal fields – Clausius –Mossotti equation

**Superconductivity**: General properties – Meissner effect – Type I and Type II superconductors – BCS Theory – Penetration depth – DC and AC Josephson effects (Qualitative). Applications of Super conductors.

**UNIT – V: Semiconductor**

Introduction – Intrinsic semiconductor and carrier concentration – Equation for conductivity – Extrinsic semiconductor and carrier concentration – Drift and diffusion – Einstein s equation – Hall Effect – direct & indirect band gap semiconductors

**UNIT – VI: Preliminary Quantum Mechanics & Solid State Physics**

**Preliminary Quantum Mechanics**:

Introduction to matter waves – Schrodinger Time Independent and Time Dependent wave equations – Particle in a box.

**Free Electron Theory and Band Theory (Solid State Physics):**

Classical free electron theory – electrical conductivity – Fermi energy (Qualitative) -Quantum free electron theory – Bloch theorem (qualitative) – Kronig – Penney model.

**Text Books:**

1. Engineering Physics by Mani Naidu, Pearson Publications Chennai
2. A text book of Engineering Physics by M.N. Avadhanulu & P.G.Kshirasagar (S. Chand publications).
3. Engineering Physics by Gaur and Gupta.
4. Optics – 5$^{th}$ Edition – Ghatak (TMH Publications)

**Reference Books:**

1. Solid state Physics by A.J. Dekker (Mc Millan India Ltd).
2. Engineering Physics b;y M.R. Srinivasan (New Age international publishers).
3. Fundamental of Physics by Resnick, Halliday and Walker.

## ENVIRONMENTAL STUDIES
## (Common to ECE, CSE & IT)
I Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 + 1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To know the multidisciplinary nature of Environment.
- To understand various measures of improvement & protection of Environment.

**Learning Outcomes:**

Students will be able to

- apply various mitigation measures to minimize environmental pollution.
- know the principles of Ecosystem.
- understand the various stages of Environmental Impact Assessment (EIA).

**UNIT – I: Ecology & Environment**

**Multidisciplinary Nature of Environmental Studies:**

Definition, Scope, Importance and public awareness of Environmental Studies - Concept of an Ecosystem – Components of an Ecosystem – Food Chain, Food Web, Ecological Pyramids – Energy flow – Bio-Geochemical Cycles – Ecological Succession – Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem.

**UNIT – II: Natural Resource**: **Classification and status**

**Water Resources**: Used and over utilization of surface & ground water – Conflicts over water – Big dams, Benefits and problems.

**Land Resource**: Land as a resource, Soil Erosion, Sources of Land degradation, Soil conservation practices – case studies.

**Forest Resources**:Use and over – Exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people – Case Studies related to deforestation.

**Food & Fodder Resources**: World food problems, changes caused by agriculture and overgrazing – effects of modern agriculture – fertilizer, pesticide related problems, water logging, Eutrophication, super pest, salinity, organic farming – Case studies.

**Mineral Resources**: Use and exploitation problems, environmental effects of extracting and using mineral resources – Case studies.

**Energy Resources**

**UNIT – III: Biodiversity and its conservation**

Introduction, Definition – genetic and ecosystem diversity – Biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, Aesthetic, option values and ecosystem service values – India as a mega diversity nation – Threats to biodiversity: habitat loss, poaching of wild life – man, wild life conflicts – Endangered and endemic species of India – conservation of biodiversity: In – situ and Ex-situ conservation of biodiversity.

**UNIT – IV: Environmental pollution**

Definition, cause, effects and control measures of

a) Air pollution b) Water pollution
c) Noise pollution d) Soil pollution
e) Environmental Impact Assessment (EIA) – Definition, Significance & Classification.

**UNIT – V: Waste Management**

Industrial solid waste – Municipal solid waste – Industrial waste waters – Solid waste – Biomedical waste – hazardous waste – e-waste – Green building – Green Development Mechanism – Carbon Credits – Carbon Trading.

**UNIT – VI: Social Issues and Environment**

Climate change: Global warming, Acid rains, Ozone layer depletion – case studies.

Sustainable development and unsustainability–Rain water harvesting, watershed management, water conservation–Environmental Ethics–environmental Law (Air, Water, Wild life, forest, Environmental protection act)

**Text Books:**

1. Environmental studies: Anubha Kaushik,C.P.Kaushik:New Age International Publishers
2. Society and Environment: Dr.Suresh K.Dhameja:S.K.Kataria and Sons
3. Environmental Studies: Benny Joseph:Tata Mc Graw-Hill Publishing Company Limited.

**Reference Books:**

1. A text of Environmental Studies: Shashi chawala:Tata Mc graw Hill Education Private Limited.
2. Environmental Science & Engineering: P.Anandan, R.Kumaravelan, Scitech Publications (India) Pvt. Ltd.
3. Environmental Studies by R. Rajagopalan 2nd Edition 2011, Oxford University Press.
4. Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.

# BASIC ELECTRONICS

I Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 + 1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the construction, characteristics and applications of various semiconductor devices.
- To introduce various electronic circuits and their operation.

**Learning Outcomes:**

Students will be able to

- distinguish the behavior of PN junction diode under forward bias and reverse bias conditions.
- select appropriate semiconductor devices for different electronic circuits
- analyze the rectifier circuits with and without filters.
- characterize the performance of BJT, FET & MOSFETs.
- design various amplifying devices.

**UNIT – I: Semiconductor Diode Characteristics**

Open-circuited P-N Junction, Current Components in a p-n diode, Diode Forward and Reverse currents, The Volt-ampere characteristic, Temperature Dependence of the V/I characteristic, Diode parameters- Resistance, Transition capacitance $C_T$, Diffusion Capacitance, Diode Specifications.

**UNIT – II: Special Semiconductor Devices**

Breakdown Diodes, Tunnel Diode, Varactor Diode,Photo Diode, LED,UJT,SCR (Characteristics only).

**UNIT – III : Rectifiers and Filters**

Diode as a Rectifier, Half wave, Full wave Bridge Rectifiers and comparison, Full wave rectifier with-inductor filter, Capacitor filter, L section and ð- section filters and comparison, Zener diode voltage regulator.

**UNIT – IV: Bipolar Junction Transistor**

Construction of a transistor, Transistor current components, Transistor Configurations- CB, CE and CC, Early Effect, Comparison of CB, CE and CC, Transistor operating regions, Typical Transistor Junction Voltages, Maximum Voltage Rating,Operating point, Bias Stability, Biasing techniques,Transistor as a switch,Transistor as an Amplifier

**UNIT – V: Field Effect Transistor**

Classification of FETs, Construction of JFET (p channel & n channel),Characteristics of FET, FET as a Voltage Variable Resistor (VVR),

Transfer characteristics, Comparison with BJT, Depletion typeMOSFETs, Enhancement type MOSFETs, CMOS.

**UNIT – VI: Feedback and Oscillator Circuits**

Feedback concept, Negative feedback amplifiers and their characteristics, Feedback connection types-Voltage series Feedback, Voltage shunt Feedback, Current series Feedback, Current shuntFeedback. Oscillator operation, Barkhausen criterion for oscillation, RC phase shift oscillator, Wien Bridge oscillator, General Form of Resonant Oscillator, Hartley oscillator, Colpitt's oscillator

**Text Books:**


1. Jacob Millman and Christos C Halkias, Electronic Devices and Circuits, 2nd Edition,TMH, 2002. (I ,II, III units)
2. Robert L Boylested and Louis Nashelsky, Electronic Devices and Circuit Theory, 8th Edition, PHI, 2003 (IV,V,VI-units)


**Reference Books:**


1. K.Rajarajeswari, B.Visvesvararao, K.Bhaskararamamurthy and P.Chalamrajupantulu- Electronic Devices and Circuits, 2nd Edition, Pearson Education
2. Theodore F Bogart Jr., Jeffrey S Beasley and Guillermo Rico, Electronic Devices and Circuits, 6th Edition, Pearson Education, 2004.
3. David A Bell, Electronic Devices and Circuits, 4th Edition, PHI, 2003
4. Floyd, Thomas, Electronic devices, Pearson Education, 5th Edition.
5. S. C. Sarkar, Electronic Devices and Circuits-1, The Millennium Edition, 2001.

## ENGINEERING DRAWING
## (Common to CSE & IT)
I Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 1 + 3 | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To highlight the significance of universal language of engineers.
- To visualize and represent the 3-D objects in 2-D planes and pictorial views. with proper dimensioning and scaling.

**Learning Outcomes:**

Student will be able to

- apply principles of drawing in representing dimensions of an object.
- construct polygons, scales and curves.
- draw projections of points, lines and planes.
- draw projections of solids in different positions.
- convert orthographic views into isometric views and vice-versa.

**UNIT – I: Introduction**

Geometrical Construction,

**Conic Sections**: Ellipse, parabola, hyperbola – general method.

**Scales:** Plane, Vernier and Diagonal Scales.

**UNIT – II: Orthographic Projections**

Introduction to Orthographic Projections; Projections of Points; Projections of Straight Lines parallel to both planes; Projections of Straight Lines-Parallel to one and inclined to other plane.

**UNIT – III: Projections of Straight Lines**

Projections of Straight Lines inclined to both planes, determination of true lengths, angle of inclinations and traces.

**UNIT – IV: Projections of Planes**

Regular Planes Perpendicular / Parallel to one Reference Plane and inclined to other Reference Plane; inclined to both the Reference Planes.

**UNIT – V: Projections of Solids**

Prisms, Cylinders, Pyramids and Cones with the axis inclined to one Plane.

**UNIT – VI: Transfermation of Projections**

Conversion of Isometric Views to Orthographic Views and Orthographic to Isometric Views.

**Semester End Examination Pattern:**

Semester end examination paper consists of eight questions out of which five questions are to be answered. All questions carry equal marks.

**Text Books:**

1. Engineering Drawing by N.D. Bhatt, Chariot Publications.
2. Engineering Drawing by K. Venugopal, V. Prabhu Raja, G. Sreekanjana, New Age International Publishers.

**Reference Books:**

1. Engineering Drawing by M.B. Shah and B.C. Rana, Pearson Publishers.
2. Engineering Drawing by Dhananjay A. Jolhe, Tata McGraw Hill Publishers.
3. Engineering Graphics for Degree by K.C. John, PHI Publishers.

## PROFESSIONAL COMMUNICATION LAB – II
## (Common to All Branches)

I Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To strengthen the oral communication skills of the learners for communicative functions at an advanced level;
- To train them in handling complex communication situation;
- To give them adequate practice for communication in professional situations like group discussions, presentations and interviews.

**Learning Outcomes:**

Student will be able to:

- enhance their oral communication skills to perform communicative functions;
- speak confidently in public and handle complex communication situation;
- face job interviews with confidence and competence.

**UNIT – I:**

- Body Language
- Know how body language is used in communication
- Interpret non-verbal symbols

**UNIT – II:**

- Dialogues
- Starting a conversation
- Useful functions
- Telephone Etiquette
- Making a small talk

**UNIT – III:**

- Presentation Skills
- Present information with confidence, clarity and conviction
- Use the language of presentations
- Evaluate presentations

**UNIT – IV:**

- Group Discussion
- Participate in a group discussion
- Expressing ideas logically
- Using appropriate language in group discussions

**UNIT – V:**

- Become aware of various types of interviews
- Be able to participate in interviews confidently

**UNIT – VI:**

- Debates
- Able to argue for or against something
- Able to participate in debates

**Text Books:**

1. Strengthen your communications skills by Maruthi Publications

**Reference Books**:

1. Strengthen your steps by Maruthi Publications
2. Speak well by Orient Blackswan.
3. Patnaik., Group Discussion and Interview Skills. by Foundation.

# ENGINEERING PHYSICS LAB
## (Common to ECE, CSE & IT)

I Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To understand Active and Passive Electronic Components.
- To measure magnetic field along the axis of circular coil.
- To learn waves and oscillations.
- To explore the nature of light.

**Learning Outcomes:**

Students will be able to

- calculate the time constant of RC circuit & Predict resonance frequency of LCR circuit.
- verify magnetic field along the axis of a circular coil.
- observe the regulatory nature of Zener diode & Identify energy gap of semiconductor.
- estimate rigidity modulus of a given wire.
- determine radius of curvature of a given Plano convex lens.

| S.N. | Name of the experiment- Aim |
|---|---|
| | **Electromagnetism and Electronics** |
| 1 | Study the variation of Magnetic field along the axis of a Solenoid coil using Stewart-Gee's Apparatus. |
| 2 | Draw the frequency response curves of LCR Series and Parallel circuits |
| 3 | Determine the time constant for a CR Circuit |
| 4 | Determine the Band Gap of a semiconductor using a PN junction diode. |
| 5 | Study of characteristic curves (I/V) of a Zener diode to determine its breakdown voltage. |
| 6 | Determine the rigidity modulus of given wire |
| 7 | Determine the radius of curvature of given planoconvex lens |
| 8 | Determine the thickness of thin objects by optical wedge method |
| 9 | Determine the velocity of sound in air by using volume resonator |
| 10 | Determine the wave length of Y1 and Y2 lines by diffraction grating normal incidence |

**Reference Books:**

(lab manuals, equipment user manuals, text books, data books, code books, etc.)


1. College lab manuals
2. Practical Physics for engineering students by Vijay Kumar & T. Radha Krishna.
3. Lab manual of Engineering Physics by Dr. Y.Aparna and Dr. K.Venkateswara Rao (VGS Books links, Vijayawada )

# BASIC ELECTRICAL AND ELECTRONICS LAB

I Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To familiarize with the verification procedures of network theorems and testing methods of Electrical machines.
- To provide hands on experience for operating various electronic devices.

**Course outcomes:**

Students will be able to

- apply Network theorems to analyze and design the electrical circuits.
- obtain performance characteristics of DC and AC machines.
- determine the behavior of Semiconductor devices under different operating conditions.
- select appropriate Semiconductor devices for suitable application.

**List of the Experiments:**

**Part - A**

**Any five of the following experiments are to be conducted:**

1. Verification of Kirchoff's Laws.
2. Verification of Superposition theorem.
3. Verification of maximum power transfer theorem.
4. Experimental verification of Thevenin's theorem.
5. Experimental verification of Norton's theorem.
6. OC & SC tests on Single-phase transformer.
7. Brake test on D.C. Shunt Motor.
8. Brake test on three phase Induction Motor.

**Part - B**

**Any five of the following experiments are to be conducted:**

1. Identification, Specifications, Testing of R, L, C components (Colour codes).
2. Study and operation of CRO.
3. PN Junction Diode characteristics.
4. Zener diode characteristics.
5. Rectifiers with and without filters (Halfwave & fullwave).
6. Transistor CE characteristics.
7. FET Characteristics.
8. SCR Characteristics.

## DISCRETE MATHEMATICAL STRUCTURES
## (Common to CSE & IT)
II Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To comprehend the structure of statements (and arguments) involving predicates and quantifiers.
- To understand the applications of graph theory to various practical problems.
- To know how to solve a recursive problem.

**Learning Outcomes:**

Students will be able to

- apply the concept of Mathematical logic in software development process.
- use the concept of Pigeon hole principle to derive the $\Omega(n \log n)$ lower bound.
- apply the concepts of group theory in robotics, computer vision & computer graphics.
- use the concepts of graph theory to provide solutions for routing applications in computer networks.
- apply the recurrence relation for analyzing recursive algorithms.

**UNIT - I: Mathematical Logic**

Propositional Calculus- statements and notations, connectives, truth tables, tautologies, equivalence of formulas, tautological implications, normal forms, theory of inference for statement calculus, consistency of premises, concept of quantifiers.

**UNIT - II: Relations & Functions**

**Relations-** properties of binary relations, equivalence, compatibility and partial order relations, hasse diagram functions**:** inverse, composite and recursive functions, pigeon hole principle and its application.

**UNIT - III: Algebraic Structures**

Algebraic systems and examples, general properties, semi group, monoid, groups, subgroups, lattice and properties.

**UNIT - IV: Graph Theory - I**(Theorems without proofs)

Concepts of graphs, sub graphs, multi graphs, matrix representation of graphs: adjacency matrices, incidence matrices, isomorphic graphs, paths and circuits, Eulerian graph.

**UNIT - V: Graph Theory - II**(Theorems without proofs)
Hamiltonian Graph, Planar Graphs, Trees- Spanning Trees, BFS, DFS, chromatic number of a graph.

**UNIT - VI: Recurrence Relation**
Recurrence relations- formulation, solving linear homogeneous recurrence relations by substitution, the method of characteristic roots, solving inhomogeneous recurrence relations

**Text Books:**

1. J.P.Trembley, R Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, New Delhi.
2. Mott, Kandel, Baker, Discrete Mathematics for Computer Scientists & Mathematicians, PHI, 2nd edition.
3. Rosen, Discrete Mathematics and its Application with combinatorics and graph theory, Tata McGraw Hill, New Delhi, 7th edition.


**Reference Books:**

1. S.Santha, Discrete Mathematics, Cengage publications.
2. J K Sharma, Discrete Mathematics, Macmillan Publications, 2nd edition.

## MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
## (Common to CSE & IT)

II Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- Learn about various types of business organizations
- Understand the demand for a particular product
- Study the various types of cost concepts
- Have an idea about the types of markets
- Make the students expertise in account principles and concepts
- Learn about capital and capital budgeting & ratio analysis

**Learning Outcomes:**

Students will be able to

- describe the various factors that influence demand of particular product and various methods to determine the pricing
- forecast the future demand using various tools & techniques
- access the minimum level of production that a firm should carry by using BEP and get aware of costs incurred in the production
- establish the suitable business organization with available resources
- analyze the projects by applying tools and techniques of capital budgeting to accept or reject the new projects in business.
- acquainted with the accounting principles that make the students expertise in maintaining accounting books and predict and analyze the Organization Financial Soundness.

**UNIT - I: Introduction to Managerial Economics**

Definition, nature and scope of managerial economics– relation of managerial economics with other disciplines, demand analysis- demand determinants, law of demand and its exceptions, significance & types of elasticity of demand. methods of demand forecasting.

**UNIT - II: Theory of Production and Cost Analysis**

**Production Function:** Isoquants and Isocosts, MRTS, least cost combination of inputs, cobb-douglas production function. production function, laws of returns, internal and external economies of scale.**Cost Analysis-** Cost concepts & BEP Analysis Break-Even Point (simple problems)

**UNIT - III: Introduction to Markets & Pricing strategies**

**Market structures:** types of competition, features of perfect competition, monopoly and monopolistic competition. price & output determination under perfect competition

**Pricing strategies:** methods of pricing, cost plus pricing, marginal cost pricing, sealed bid pricing, going rate pricing, limit pricing, market skimming pricing, penetration pricing, block pricing, bundling pricing, peak load pricing.

**UNIT - IV: Introduction to Business Organizations**

Characteristic features of business, features and evaluation of sole proprietorship, partnership, joint stock company, public enterprises and their types, phases of business cycle.

**UNIT - V: Introduction to accountancy**

Introduction to accountancy, types of accounts, ledgers, maintenance of ledgers & trial balance, introduction to final accounts, problems on trading , profit & loss account and balance sheet, problems with simple adjustments

**UNIT - VI: Ratio Analysis & Capital Budgeting**

**Ratio Analysis:** Introduction to financial analysis; analysis & interpretation of financial statements through liquidity ratios, profitability & solvency ratios, turnover ratios

**Capital budgeting:** Traditional methods of capital budgeting & discounted cash flow methods(simple problems)

**Text Books:**


1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.


**References:**


1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New Age International Space Publications.
6. Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.

# DIGITAL LOGIC DESIGN
**(Common to CSE & IT)**
II Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To learn minimization of logic functions.
- To familiarize with the design of digital logic circuits.

**Learning Outcomes:**

Students will be able to

- understand various methods for representing numbers.
- minimize the logic functions using appropriate methods.
- design combinational logic circuits.
- realize the switching functions using decoders, multiplexers.
- design registers and counters.

**UNIT - I: Number Systems**

Binary, Octal, Decimal, Hexadecimal number systems, conversion of numbers from one radix to another radix, r's, (r-1)'s complement, subtraction of unsigned numbers, signed binary numbers, weighted and non weighted codes.

**UNIT - II: Logic Gates and Boolean Algebra**

NOT, AND, OR, Universal Gates, Ex-Or and Ex-Nor Gates, Boolean Theorems, Complement and Dual, SOP, POS, two level realization of logic functions using universal gates, minimizations of logic functions (POS and SOP) using Boolean theorems, K-map (upto four variables), don't care conditions.

**UNIT - III: Combinational Logic Circuits - 1**

Design of half adder, full adder, half subtractor, full subtractor, ripple adders and subtractors, ripple adder / subtractor using 1's and 2's complement method, serial adder.

**UNIT - IV: Combinational Logic Circuits - 2**

Design of decoders, encoders, priority encoder, multiplexers, demultiplexers, higher order demultiplexers and multiplexers, realization of boolean functions using decoders, multiplexers, PROM , PAL and PLA.

**UNIT - V: Sequential Logic Circuits**

Classification of Sequential Circuits, Latch and Flip-Flop, RS- Latch Using NAND and NOR Gates, Truth Tables, RS,JK,T and D flip flops, truth and excitation tables, conversion of flip flops, flip flops with asynchronous inputs (Preset and Clear).

**UNIT - VI: Registers and Counters**

Design of registers, bidirectional shift registers, universal shift register, design of ripple counters, synchronous counters and variable modulus counters, ring counter, Johnson counter.

**Text Books:**

1. M. Morris Mano, Michael D Ciletti, Digital Design, PEA, 5th edition.
2. Roth, Fundamentals of Logic Design, Cengage, 5th edition.

**Reference Books:**

1. Kohavi, Jha, Switching and Finite Automata Theory, Cambridge, 3rd edition.
2. Leach, Malvino, Saha, Digital Logic Design, TMH.
3. R.P. Jain, Modern Digital Electronics, TMH.

# FORMAL LANGUAGES AND AUTOMATA THEORY

II Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To classify machines by their power to recognize languages and to solve problems in computing.
- To familiarize how to employ deterministic and non-deterministic machines.

**Learning Outcomes:**

Students will be able to

- design DFA's and NFA's for the regular languages.
- convert NFA to DFA and NFA with epsilon transitions to NFA without Epsilon transitions.
- construct regular expression for the given regular language.
- convert from FA to regular grammar and regular grammar to FA.
- design PDA's for the context free languages.
- design Turing machine for the phrase-structured languages.

**UNIT - I: Fundamentals**

Strings, alphabet, language, operations, finite state machine, finite automaton model, acceptance of strings and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and language recognizers.

**UNIT - II: Finite Automata**

NFA with å transitions - significance, acceptance of languages, equivalence between NFA with and without å transitions, NFA to DFA conversion, minimization of FSM, myhill Nerode theorem, equivalence between two FSM's, finite Automata with output-moore and melay machines, applications of FA.

**UNIT - III: Regular Languages**

Regular sets, regular expressions, identity rules, construction of finite Automata for a given regular expressions and its inter conversion, pumping lemma of regular sets, closure properties of regular sets (proofs not required),applications of regular languages.

**UNIT - IV: Grammar Formalism**

Chomsky hierarchy of languages**,** regular grammars - right linear and left linear grammars, equivalence between regular linear grammar and FA and its inter conversion, context free grammar, derivation trees, sentential forms, rightmost and leftmost derivation of strings.

**UNIT - V: Context Free Grammars**

Ambiguity in context free grammars, minimization of Context Free Grammars, chomsky normal form, greibach normal form, pumping Lemma for Context Free Languages. enumeration of Properties of CFL (proofs not required), applications of CFLs.

**Push down automata:** Push down automata, model of PDA, design of PDA, introduction to DCFL and DPDA, applications of PDA.

**UNIT - VI: Turing Machine**

Turing Machine, model, design of TM, types of Turing Machines (Proofs not required), computable functions, recursively enumerable languages, church's hypothesis.

**Computability Theory:** Decidability of problems, universal Turing Machine, undecidability of posts correspondence problem, turing reducibility, definition of P and NP problems, NP complete and NP hard problems.

**Text Books:**


1. John E.Hopcroft, Rajeev Motwani & Jeffrey D.Ullman J.D., "Introduction to Automata Theory Languages and Computation" - Pearson Education,3rd edition.
2. John C Martin, "Introduction to languages and the Theory of Computation" - McGraw Hill.


**Reference Books:**


1. Daniel I.A. Cohen, John Wiley, 'Introduction to languages and the Theory of Computation'.
2. Sipser, Thomson, Introduction to Theory of Computation, 2nd edition.
3. Lewis H.R. & Papdimitriou 'Elements of Theory of Computation' - C.H. Pearson / PHI.
4. Mishra and Chandrashekaran, 'Theory of computer science - Automata, Languages, and Computation', PHI, 2nd edition.

## OBJECT ORIENTED PROGRAMMING
**(Common to CSE & IT)**
II Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**
- To get acquainted with the concepts of object-oriented programming.
- To create GUI using AWT components

**Learning Outcomes:**

Students will be able to
- understand the programming constructs of JAVA.
- apply concepts of inheritance.
- implement interfaces and packages through JAVA.
- simulate the concept of multi threading.
- handle run time errors.
- design and implement an effective GUI for various applications.

**UNIT – I: Fundamentals of OOP and Java**

Need of OOP, Principles of OOP Languages, Procedural Languages vs OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features.
Java Programming constructs: variables, primitive data types, identifiers, keywords, literals, operators, arrays, type conversion and casting.

**UNIT – II: Class Fundamentals and Inheritance**

Class fundamentals, declaring objects, methods, constructors, this keyword, garbage collection, overloading methods and constructors, argument passing, recursion, access control.
**Inheritance-** Basics, types, using super keyword, method overriding, dynamic method dispatch, abstract classes, using final with inheritance, Object class, String class.

**UNIT – III: Interfaces and Packages**

**Interfaces:** Defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces and extending interfaces.
**Packages:** Defining, creating and accessing a package.

**UNIT – IV: Exception Handling and Multithreading**

**Exception Handling-** exception-handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, java's built-in exceptions, user-defined exception sub classes.

**MultiThreading-** differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

**UNIT – V: Applets and Event Handling**

**Applets-** Concepts of Applets, differences between applets and applications, life cycle of an applet, creating applets.

**Event Handling-** Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

**UNIT – VI: AWT**

The AWT class hierarchy, user interface components- label, button, checkbox, checkboxgroup, choice, list, scrollbar, menubar, layout managers –Flow, Border, Grid, Card, GridBag.

**Text Books:**


1. Herbert schildt, Java The complete reference, TMH, 7th edition.
2. Sachin Malhotra, Saurabh choudhary, Programming in JAVA, Oxford.


**Reference Books:**


1. Joyce Farrel, Ankit R.Bhavsar, JAVA for Beginners, Cengage Learning, 4th edition.
2. Y.Daniel Liang, Introduction to Java Programming, Pearson, 7th edition.
3. P.Radha Krishna, Object Oriented Programming Through Java, Universities Press.


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# DATA STRUCTURES USING C

II Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge of linear and non-linear data structures.
- To familiarize with different sorting and searching techniques.

**Learning Outcomes:**

Students will be able to

- implement single, circular and double linked list.
- implement stacks and queues using arrays and linked lists.
- implement various operations on binary trees.
- apply appropriate sorting and searching techniques for the given data.
- implement various operations on Graphs.

**UNIT – I: Linked lists**

**Introduction-** Concept of data structures, overview of data structures, implementation of data structures.

**Linked Lists-** Single linked list, Circularlinked list, Double linked list, Circular double linked list.

**UNIT – II: Stacks**

Representation using Arrays and Linked List, operations on stack, factorial calculation, evaluation of arithmetic expression.

**UNIT – III: Queues**

Representation using Arrays and Linked List, operations on queue, circular queue, queue using stack.

**UNIT - IV: Trees**

**Binary Trees:** Basic tree concepts, Properties, Representation of Binary Trees using Arrays and Linked List, Binary Tree Traversals, threaded binary tree.

**Binary search trees:** Basic concepts, BST operations: Search, insertion, deletion and traversals, Creation of binary search tree from in-order and pre (post)order traversals.

**UNIT - V: Sorting and Searching**

**Searching:** Linear Search, Binary Search, Fibonacci search.

**Sorting (Internal):** Basic concepts, Sorting by: insertion (Insertion sort), selection (selection sort), exchange (Bubble sort, quick sort), distribution (radix sort) and merging (merge sort).

**UNIT - VI: Graphs**

Basic concepts, representations of graphs, operations on graphs- vertex insertion, vertex deletion, find vertex, edge addition, edge deletion, graph traversals (BFS & DFS).

**Text Books:**

1. Debasis samanta, Classic Data Structures, PHI, 2nd edition, 2011.
2. Richard F, Gilberg, Forouzan, Data Structures, 2nd edition, Cengage.

**Reference Books:**

1. Seymour Lipschutz, Data Structure with C, TMH.
2. G. A. V. Pai, Data Structures and Algorithms, TMH, 2008.
3. Horowitz, Sahni, Anderson Freed, Fundamentals of Data Structure in C, University Press, 2nd edition.

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## PROFESSIONAL ETHICS AND PATENTS
## (Common to CE, CSE & IT)

II Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 2 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To understand the basic concepts of Ethics and Human values.
- To enable the students understand the role and importance of ethics in Engineering.
- To familiarize the rights and responsibilities of Engineers.
- To know the laws and protect author's rights.
- To understand the legal aspects present in intellectual property law.

**Learning Outcomes:**

Students will be able to

- comprehend different Moral Perspectives and enabling him to frame one's own Ethical standards.
- find solutions for issues related to growth with reference to absolute ethical tenets.
- resolve Professional/Moral Dilemmas and be able to guide productivity.
- analyze the likelihood of confusion in Trademark Claims.
- understand different forms of infringement of Intellectual Property Rights.
- recognize the relevant criteria for protecting Creativity.

**UNIT – I: Human Values**

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue -Value time – Co-operation – Commitment – Empathy – Self-confidence – Character.

Ethics- Types of Inquiry – Kohlberg's Theory – Gilligan's Argument – Heinz's Dilemma.

**UNIT – II: Engineers' Responsibilities and Rights**

Safety and Risk – Types of Risks – Voluntary vs. Involuntary Risk- Short Term vs Long Term Consequences - Expected Probability - Reversible Effects - Threshold Levels for Risk - Delayed vs Immediate. Risk Collegiality – Techniques for achieving Collegiality – Group / Team – Two Senses of Loyalty, Rights – Professional Responsibilities – Confidential and Proprietary information – Conflict of Interest – Conflict resolution – Self-interest.

**UNIT – III: Patent Law, Trade Marks and Copyrights**

Introduction – Rights and Limitations – Application process – Patent requirements – Ownership – Transfer – Infringement – Litigation – International Patent Law – Double Patenting – New development in Patent Law.

Trade Mark and Copyrights: Introduction – Registration Process – Transfer – Infringement – Dilution of Ownership – Imitation – Litigations.

**UNIT – IV: Cyber Law**

Introduction to Cyber Law – Cyber Crime and E-Commerce – Online Crime – Innovations and Inventions in Trade Related Intellectual Property Rights.

**Text Books:**


1. "Principia Ethica" by Goerge Edward Moore, Cambridge University Press, 11-Nov-1993, Cambridge.
2. "Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
3. Deborah E.Bouchoux: "Intellectual Property", Cengage Learning, New Delhi


**Reference Books:**


1. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi Publications.
2. R.Radha Krishnan, S.Balasubramanian: "Intellectual Property Rights",Excel Books, New Delhi.
3. Prabhuddha Ganguli: "Intellectual Property Rights" Tata Mc-Graw- Hill, New Delhi.


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## OBJECT ORIENTED PROGRAMMING LAB
**(Common to CSE & IT)**
II Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To gain hands on experience on concepts of object-oriented programming.
- To create GUI using AWT components

**Learning Outcomes:**

Students will be able to:

- Implement OOP concepts in JAVA.
- Implement exception handling and multi threading concepts.
- Design an applet for various applications.
- Design effective GUI using AWT components.

**List of Experiments:**

**Write Java Code to:**

**Exercise - I:**

1. Find the roots of the quadratic equation $ax^2 + bx + c=0$.
2. Display the Fibonacci sequence upto a given value.

**Exercise - II:**

3. Sort the given list of numbers.
4. Search for an element in a given list of elements using linear search.
5. Search for an element in a given list of elements using Binary search.

**Exercise - III:**

6. Perform addition of two matrices.
7. Perform multiplication of two matrices.

**Exercise - IV:**

8. Sort an array of strings.
9. Check whether given string is palindrome or not.

**Exercise - V:**

10. Illustrate the use of 'super' keyword.
11. Illustrate multiple inheritance.
12. Create an abstract class named shape, that contains an empty method named numberofsides(). Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method numberofsides(), that contains the number of sides in the given geometrical figure.

**Exercise - VI:**

13. Create three threads (by using **Thread** class and **Runnable** interface) where the First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
14. Create and access a user defined package where the package contains a class named CircleDemo, which inturn contains a method called circleArea() which takes radius of the circle as the parameter and returns the area of the circle.

**Implement the following using Applets:**

**Exercise - VII:**

15. Display the position of x and y co-ordinates of the cursor movement using mouse.
16. Handle keyboard events, which echoes keystrokes to the applet window and shows the status of each key event in the status bar.

**Exercise - VIII:**

17. Create a list of items and display the selected item of the list in a text field. Arrange these components by using Flow Layout control.
18. Arrange components by using Border Layout control.

**Exercise - IX:**

19. Create a simple arithmetic calculator

**Text Books:**


1. Herbert schildt, Java: the complete reference, TMH, 7th edition.
2. T. Budd, Understanding OOP with Java, pearson eduction, updated edition.


**Reference Books:**


1. J.Nino and F.A. Hosch, John wiley & sons, An Introduction to programming and OO design using Java, John wiley & sons.
2. Y. Daniel Liang, Introduction to Java programming, pearson education, 6th edition.
3. R.A. Johnson- Thomson, An introduction to Java programming and object oriented application development.
4. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 1, Fundamentals, Pearson Education, 7th edition.
5. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 2, Advanced Features, Pearson Education, 7th edition.
6. P. Radha Krishna, Object Oriented Programming through Java, University Press.

## DATA STRUCTURES USING C LAB

II Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To implement linked lists, stacks, queues and binary search trees.
- To implement searching and sorting algorithms.

**Learning Outcomes:**

Students will be able to

- demonstrate the implementation of linked lists.
- Implement stack and queue using arrays and linked lists.
- demonstrate applications of stack.
- demonstrate the implementation of binary search trees.
- implement different searching and sorting algorithms.

**List of Experiments:**

**Write a c program for the following**

**Exercise- I:**

1. Use functions to
   (i) Create a singly linked list.
   (ii) Insert an element into a singly linked list.
   (iii) Delete an element from a singly linked list.

**Exercise - II:**

2. To reverse elements of a single linked list.
3. Use functions to
   (i) Create a circular linked list.
   (ii) Insert an element into a circular linked list.
   (iii) Delete an element from a circular linked list.

**Exercise - III:**

4. Use functions to
   (i) Create a Doubly linked list.
   (ii) Insert an element into a doubly linked list.
   (iii) Delete an element from a doubly linked list.

**Exercise - IV:**

5. Implement stack (its operations) using arrays.
6. Implement stack (its operations) using Linked list

**Exercise - V:**

7. To evaluate postfix expression.
8. To Convert infix expression into postfix expression.

**Exercise - VI:**

9. Implement Queue (its operations) using arrays.
10. Implement Queue (its operations) using linked lists.

**Exercise - VII:**

11. To create a Binary Search Tree of integers, insert, delete and search integers into (from) Binary search tree.

**Exercise – VIII:**

12. Use recursive functions to traverse a binary search tree in preorder, inorder and postorder.

**Exercise - IX:**

13. Use both recursive and non recursive functions to perform Linear search for a Key value in a given list.
14. Use both recursive and non recursive functions to perform Binary search for a Key value in a given list.

**Exercise - X:**

15. Implement following techniques to sort a given list of integers in ascending order
    (i) Insertion sort
    (ii) Bubble sort
    (iii) Selection sort

**Exercise - XI:**

16. Implement following techniques to sort a given list of integers in ascending order.
    (i) Quick sort
    (ii) Merge sort

# PROBABILITY & STATISTICS

II Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To Learn the nature, properties, classification and manufacturing process of building materials and familiarize with various methods of masonry construction.
- To understand the concepts of probability and statistics.
- To know sampling theory and principles of hypothesis testing.
- To appreciate Queuing theory and models.

**Learning Outcomes:**

Students will be able to

- use the probability in different problems.
- utilize where the certain probability distributions would be appropriate.
- calculate confidence intervals for estimating population parameters.
- apply a range of statistical tests appropriately.
- examine correlation between variables and find the relation between them.
- solve the different queuing models.

**UNIT – I: Probability**

Probability: Axioms of Probability – addition, conditional, multiplication and Baye's theorem. (Without Proof) Random variables: Discrete and Continuous Random Variable - Distribution functions - Evaluation of mean and variance.

**UNIT-II: Standard Probability Distributions**

Discrete distributions: Binomial distribution-probability-mean, variance - Poisson distribution-probability-mean, variance - fitting of Poisson distribution. Continuous distributions: normal distribution-properties – Problems.

**UNIT-III: Sampling Distributions**

Population and sample-types of sampling-Sampling distribution of mean - Sampling distribution of sums and differences. Point and interval estimation, Confidence Interval for mean and proportions.

**UNIT – IV: Testing of Hypothesis (Large Samples)**

Null hypothesis-Alternative hypothesis-level of significance-degrees of freedom. Type I and Type II errors- One tail and two tailed tests - Testing of hypothesis concerning means and proportions

**UNIT – V: Testing of Hypothesis (Small Samples)**

t-test, F-test and test (independence of attributes and goodness of fit)

**UNIT – VI: Correlation, Regression and Queuing Theory**

Simple Correlation and regression. Queuing Theory M/M/1 model with finite and infinite Queue size and simple problems related to the evaluation of waiting time, length of the queue.

**Text Book:**


1. Dr. T. K. V. Iyengar, Dr. B. Krishna Gandhi, S. Ranganatham and Dr. M.V. S. S. N. Prasad, Probability and Statistics, S. Chand & Company Ltd.
2. Miller, John E. Freund, Probability and Statistics for Engineers, PHI.


**Reference Books:**


1. S.C. Gupta & V.K. Kapoor, Fundamentals of Mathematical Statistics, S.Chand & Company Ltd.
2. Trivedy, John Wiley, Probability, Statistics and Queuing theory applications for Comp. Sciences, 2nd edition.


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# COMPILER DESIGN

II Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize lexical analyzer and different parsers.
- To gain knowledge on various storage allocation strategies, code generation and code optimization techniques.

**Learning Outcomes:**

Students will be able to:

- design Lexical analyzer for the given language.
- design an appropriate parser for a language.
- understand symbol table organization for the languages.
- apply appropriate code optimization techniques to optimize intermediate code or target code.
- generate code from syntax tree and DAG.

**UNIT - I: Lexical analysis**

Overview of language processing, preprocessors, compiler, assembler, interpreters, linkers & loaders, phases of a compiler.

Lexical Analysis- Role of lexical analysis, lexical analysis vs parsing, token, patterns and lexemes, lexical errors, transition diagram for recognition of tokens, reserved words and identifiers.

**UNIT - II: Top-Down Parsing**

Syntax analysis, role of a parser, classification of parsing techniques, top down parsing, First and Follow, LL(1) Grammars, non-Recursive predictive parsing

**UNIT - III: Bottom-up Parsing**

Shift-Reduce parsing, operator precedence parsing, LR Parsers: construction of SLR, CLR (1), LALR Parsers.

**UNIT - IV: Semantic Analysis and Runtime Environment**

Semantic analysis, SDT, evaluation of semantic rules,

Symbol tables- Use of symbol tables, contents of symbol-table, operations on symbol tables, symbol table organization for block and non-block structured languages.

Runtime Environment- Storage organization- static, stack allocation, access to non-local data, heap management.

**UNIT - V: Intermediate code generation**

Intermediate code- Three address code, quadruples, triples, abstract syntax trees.

Machine independent code optimization- Common sub expression elimination, constant folding, copy propagation, dead code elimination, strength reduction,

loop optimization, procedure inlining, basic blocks, DAG Construction and its applications, Control Flow Graph.

**UNIT - VI: Code generation**

Code Generation- Issues in code generation, generic code generation, code generation from DAG.

Machine dependent code optimization: Peephole optimization, register allocation, instruction scheduling, inter procedural optimization.

**Text Books:**


1. Alfred V Aho, Monical S Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers, Principles Techniques and Tools, Pearson, 2nd edition, 2007.
2. V. Raghavan, Principles of compiler design, TMH, 2nd edition, 2011.


**Reference Books:**


1. Kenneth C Louden, Compiler construction, Principles and Practice, CENGAGE.
2. Yunlinsu, Implementations of Compiler, A new approach to Compilers including the algebraic methods, SPRINGER.
3. Jean-Paul Trembly, Paul G. Sorenson, The theory and practice of Compiler writing, McGraw-Hill.
4. Nandini Prasad, Principles of compiler design, 2nd edition, Elsevier.
5. http://www.nptel.iitm.ac.in/downloads /106108052/.

# ADVANCED DATA STRUCTURES

II Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To explore dictionaries, priority queue, balance trees and pattern matching algorithms.
- To gain knowledge of graph operations, graph algorithms and external sorting.

**Learning Outcomes:**

Students will be able to

- describe the sets, dictionaries and dictionary implementation techniques.
- implement priority queues.
- distinguish among AVL, splay, B and B+ trees.
- find shortest paths and minimum cost spanning tree of a graph.
- explain different Pattern matching, and external sorting techniques

**UNIT - I: Dictionaries**

Dictionaries, Hash Tables, Open Hashing, Closed Hashing (Rehashing Methods), Hashing Functions (Division Method, Multiplication Method, Universal Hashing), Hash Table Restructuring.

**UNIT - II: Priority Queues**

Binary Heaps- Create, Insert and Delete operations, Heap sort.
Binomial Queues- Insertion, Deletion, Lazy Binomial Queue.

**UNIT - III: Balanced Trees -1**

AVL Trees- Maximum Height of an AVL Tree, Insertions and Deletions.
Splay trees- Insertions and Deletions

**UNIT - IV: Balanced Trees-2**

B-Trees- Insertions and Deletions, $B^+$ Trees- Insertions and Deletions.

**UNIT - V: Graph algorithms**

Minimum-Cost Spanning Trees- Prim's Algorithm, Kruskal's Algorithm, single source shortest path algorithm, All Pairs Shortest Paths Problem: Floyd's Algorithm, Warshall's Algorithm.

**UNIT - VI: Pattern matching and Tries**

Pattern matching algorithms- Boyer –Moore algorithm, Knuth-Morris-Pratt algorithm, Digital search trees, binary trie, Compressed binary trie.
External Sorting- Multi-way merge, poly-phase merge.

**Text Books:**

1. Horowitz, Sahni, Fundamentals of DATA STRUCTURES in C, Anderson-freed, University Press 2nd edition.
2. Mark Allen Weiss, Data structures and Algorithm Analysis in C, Pearson, 2nd edition.

**Reference Books:**

1. Richard F Gilberg, Behrouz A Forouzan, Data Structures A Pseudocode Approach, Cengage.
2. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, Data Structures and Algorithms.
3. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tanenbaum, Data Structures using C and C++, 2nd edition.

# COMPUTER ORGANIZATION AND ARCHITECTURE

II Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with organizational aspects of memory, processor and I/O.

**Learning Outcomes:**

Students will be able to

- understand different types of instructions.
- differentiate micro-programmed and hard-wired control units.
- represent data in fixed and floating point formats.
- analyze the performance of the hierarchical organization of memory
- summarize different data transfer techniques.
- demonstrate the use of pipelining and multiprocessor.

**UNIT - I: Introduction**

Computer types, functional units, computer registres, register transfer language, register transfer bus and memory transfers, arithmetic, logic and shift micro-operations, arithmetic logic shift unit.

Instruction codes, computer instructions, instruction cycle.

Memory – reference instructions, input – output and interrupt, stack organization, instruction formats, addressing modes, RISC.

**UNIT - II: Micro Programmed Control**

Control memory, address sequencing, design of control unit - Hard wired control, Micro programmed control.

**UNIT - III: Computer Arithmetic**

Data representation, fixed point, floating point, addition and subtraction, multiplication algorithms, division algorithms, floating – point arithmetic operations, decimal arithmetic operations.

**UNIT - IV: Memory**

Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.

**UNIT - V: Input-Output Organization**

Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP) Serial communication.

**UNIT - VI: Parallel Processing**

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline.

**Multi Processors:** Characteristics of multiprocessors, interconnection structures, inter processor arbitration, inter processor communication and synchronization, cache coherence.

**Text Books:**

1. M. Moris Mano, Computer Systems Architecture, Pearson/PHI, 3rd edition.

**Reference Books:**

1. Carl Hamacher, Zvonks Vranesic, Safea Zaky, Computer Organization, McGraw Hill, 5th edition.
2. William Stallings, Computer Organization and Architecture, Pearson/PHI, 6th edition.
3. John L. Hennessy and David A. Patterson, Computer Architecture a quantitative approach, Elsevier, 4th Edition.

# COMPUTER GRAPHICS

II Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with the functionalities of various graphics systems.

**Learning Outcomes:**

Students will be able to

- attain a conceptual model understanding of the underlying mathematical model for determining the set of pixels to turn on for displaying an object
- explain the functionalities of various display devices and visible surface detection methods.
- analyze the performance of different algorithms to draw different shapes.
- perform different transformations on objects.
- design raster animations.

**UNIT - I: Introduction**

Application of Computer Graphics, raster scan systems, random scan systems, raster scan display processors.

**Output primitives:** Points and lines, line drawing algorithms.

**UNIT - II: Filled Area Primitives**

Inside and outside tests, boundary-fill and flood-fill algorithms, Scan line polygon fill algorithm.

**2-D geometrical transforms**: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transformations.

**UNIT - III: 2-D Viewing**

The viewing pipeline, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland line clipping algorithm, Sutherland –Hodgeman polygon clipping algorithm.

**UNIT - IV: 3-D Geometric Transformations**

Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3D Viewing pipeline, clipping, projections ( Parallel and Perspective).

**UNIT - V: Visible Surface Detection Methods**

Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP tree methods, area sub-division and octree methods.

**UNIT - VI: Computer Animation**

Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

**Text Books:**


1. Donald Hearn, M.Pauline Baker, Computer Graphics *C* version, Pearson
2. Foley, VanDam, Feiner, Hughes, Computer Graphics Principles & practice, Pearson, 2nd edition.


**Reference Books:**


1. Rajesh K Maurya, Computer Graphics with Virtual Reality Systems, Wiley.
2. Peter, Shirley, Computer Graphics, CENGAGE.
3. Neuman , Sproul, Principles of Interactive Computer Graphics, TMH.
4. Frank Klawonn, Introduction to Computer Graphics, Using Java 2D and 3D, Springer.

# OPERATING SYSTEMS

II Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3+1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To introduce the basic concepts and functions of various operating systems
- To develop the concepts of process and memory management techniques
- To know the problems of deadlock and study the various avoidance mechanisms
- To understand the file systems and concurrent programming

**Learning Outcomes:**

Students will be able to

- outline the role and functions of Operating System.
- calculate various measures such as Average waiting time, Turn-around time used in CPU scheduling algorithms
- explain various Memory management schemes and describe the differences between Segmentation and Paging
- describe the files and directory structures and their implementations.
- summarize various disk scheduling algorithms

**UNIT - I: Introduction**

Operating system structure, Operating system goals, evolution of operating systems, operating system services, system calls.

**UNIT - II: Process Management**

Process, process state, process controls block (PCB), process scheduling-scheduling queues, schedulers, context switch, scheduling criteria, scheduling algorithms, operations on processes, inter process communication.

Multithreaded programming - benefits, multithreading models.

**UNIT - III: Memory Management Strategies**

Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

Virtual-Memory Management: Demand paging, page replacement, Allocation of frames, Thrashing.

**UNIT - IV: Deadlocks and Mass-storage structure**

Deadlocks- System model, deadlock characterization, methods for handling deadlocks, deadlock- prevention, avoidance, detection, recovery.

Mass-storage structure- Overview, Disk Scheduling, Disk Management, Swap-Space Management.

**UNIT - V: File system Interface**

Concept of a file, Access Methods, Directory structure, File system mounting, files sharing and protection.

**UNIT - VI: Synchronization**

The critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, monitors.

**Text Books:**


1. Abraham Silberschatz, Peter B, Galvin, Greg Gagne, Operating System Principles, John Wiley, 7th edition.
2. Stallings, Operating Systems - Internal and Design Principles, Pearson education, 6th edition–2005.


**Reference Books:**


1. D. M. Dhamdhere, Operating systems- A Concept based Approach, TMH, 2nd edition.
2. Andrew S Tanenbaum, Modern Operating Systems, PHI, 3rd edition.

## EMPLOYABILITY SKILLS
## (Common to CE, CSE & IT)

II Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 1+2 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives**:

- To equip the learners to gain employability skills and to have successful careers.
- To enable them to use English in different socio-cultural and professional contexts.
- To assist them to communicate their ideas relevantly and coherently in globalized contexts.

**Learnaing Outcomes:**

Students will be able to

- gain employment and function successfully in their careers.
- use English successfully in different socio-cultural and professional contexts
- communicate their ideas coherently in globalized situations.

**Syllabus**:

**Listening**:

- Listening Comprehension- 4 exercises
- Active Listening

**Reading**:

- Reading Comprehension – 4 Passages
- Book Review-Any Novel among the list prescribed by the Department
- Cloze Test

**Speaking**:

- Extempore
- One Act Plays
- Public Speaking
- Group Discussions
- Interpersonal skills
- Ad Making
- Poster presentation
- Mock Interviews
- Assertiveness

**Writing**:

- Information Transfer
- Report Writing
- Team building
- Paragraph Writing
- Project Work

**Vocabulary:**

- Business Vocabulary

**Short Films:**

- Creativity
- Leadership

**Books Recommended**:


1. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. Communication Skills by Leena Sen, Prentice-Hall of India, 2005.
3. Academic Writing- A Practical guide for students by Stephen Bailey, Rontledge Falmer, London & New York, 2004.
4. English Language Communication: A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai.
5. Body Language- Your Success Mantra by Dr. Shalini Verma, S. Chand, 2006.
6. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice, New Age International (P) Ltd., Publishers, New Delhi.
7. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup.
8. IELTS series with CDs by Cambridge University Press.
9. Technical Report Writing Today by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers, 2005.
10. Communication Skills for Engineers by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
11. Objective English by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007.
12. Cambridge Preparation for the TOEFL Test by Jolene Gear & Robert Gear, 4th Edition.


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# ADVANCED DATA STRUCTURES LAB

II Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To practice Dictionaries, priority queue, balance trees and pattern matching algorithms.
- To perform Graph operations and graph algorithms.

**Learning Outcomes:**

Students will be able to

- implement Dictionaries using Hashing.
- implement Binary heap and AVL tree operations.
- implement Graph operations and graph traversing techniques.
- implement Graph algorithms: Prim's, Kruskal's, Floyd's, Warshall's and Dijkstra's.
- implement Pattern matching algorithms: KMP and BMP.

**List of Experiments:**

Implement the following

1. Dictionary using Hashing (division method, multiplication method and universal hashing)
2. Insertion, deletion and search on AVL trees
3. Heap sort.
4. operations on graphs
   i. vertex insertion
   ii. Vertex deletion
   iii. finding vertex
   iv. Edge addition and deletion
5. Depth First Search for a graph with and without recursion.
6. Breadth First Search for a graph with and without recursion.
7. Prim's algorithm to generate a min-cost spanning tree.
8. Kruskal's algorithm to generate a min-cost spanning tree.
9. Dijkstra's algorithm to find single source shortest path in the graph.
10. Floyd's algorithm to find all pairs shortest path in the graph.
11. Warshall's algorithm to find all pairs shortest path in the graph.
12. Boyer-Moore algorithm for pattern matching.
13. Knuth-Morris-Pratt algorithm for pattern matching.

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## OPERATING SYSTEM AND COMPILER DESIGN LAB

II Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To familiarize with various scheduling algorithms and memory management techniques
- To implement various phases of a compiler.

**Learning Outcomes:**

Students will be able to

- implement various scheduling algorithms
- implement memory management technique
- implement analysis and synthesis phase of a compiler.
- implement lexical analyzer using LEX tool and parser using YACC tool.

**List of Experiments:**

1. Simulate the following CPU scheduling algorithms with and without Arrival Time
   a) FCFS b) SJF c ) Priority d) Round Robin
2. Simulate MVT and MFT
3. Simulate all page replacement algorithms
   a) FIFO b) LRU c) Optimal
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate the following disk scheduling algorithms
   a) FCFS b) SSTF c) SCAN d) C-SCAN
6. Implement DFA for the following regular languages
   a) A set of all strings which contains 'aa' as substring over {a,b}.
   b) A set of all strings which contains atleast one 'a' over {a,b}.
   c) A set of all strings which contain exactly 2 a's over the alphabet {a,b}.
   d) A set of all strings which contain 3 consecutive 0's over the alphabet {0,1}
   e) A set of all strings which accept all strings which are divisible by 3.
   f) A set of all strings which contain even number of a's and even number of b's over the alphabet {a,b}.

7. Implement a simulator for context free languages
   a) PDA for the language L= {wcw$^{r}$ wõ {0,1}*}.
   b) PDA for the language L={a$^{n}$b$^{n}$, n>=1}
8. Implement a simulator for phrase-structured languages
   a) TM to perform addition.
   b) TM to recognize equal number of a's and b's.
9. Design lexical analysis phase to recognize the tokens and removes the comment lines, removes the blank spaces.
10. Implement the lexical analyzer using lex tool.
11. Implement predictive parser for a given language.
12. Implement LALR bottom up parser for the given language.
13. Implement the syntax analyzer using YACC tool.

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# DATABASE MANAGEMENT SYSTEMS

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with the design, implementation and use of database management systems
- To gain knowledge of secured database transaction and recovery management.

**Learning Outcomes:**

Students will be able to

- understand the Advantages and Structure of DBMS.
- build Queries using SQL to retrieve required information from Database
- apply Normalization Techniques on given Database Design to avoid Anomalies
- understand Serializability- Recoverability of Transactions
- understand Concurrent – Executions of Transactions
- know Database Recovery and indexing Techniques

**UNIT - I: Introduction to Database**

Purpose of Database Systems, Data Models, Schema and instances, DBMS Architecture, Entity- Relationship Model- Attributes and Keys, Relationship Types, Weak Entity set, Strong Entity Set, Enhanced E–R Modeling- specialization and generalization, database design for banking enterprise, reduction to relational schemas

**UNIT - II: Relational Model & SQL**

Relational model concepts, constraints, relational algebra, SQL- DDL, DML, DCL, Set operations, Aggregate Functions, Null values, Nested queries, Defining different constraints on a table, Creating Views and Indices.

**UNIT - III: Database Design**

Functional Dependencies and Normalization for Relational Databases- Informal design guidelines for relation schemes, Functional dependencies, Normal forms- First, second and third normal forms, Boyce- Cod normal form, Multi valued & Join Dependencies, 4th & 5th Normal forms.

**UNIT - IV: Transaction Management**

Transaction Management**-** Transaction concept, ACID properties, schedules and recoverability, serializability of schedules

**UNIT - V: Concurrency Control**

Concurrency control- Concurrent execution of transactions, Lock-based protocols, Timestamp-based protocols, multiple granularities locking, Deadlock handling

**UNIT - VI: Crash Recovery & Indexing**

Failure classification, Different types of Recovery techniques- deferred update, immediate update, Shadow paging, Check points, media recovery,

**Indexing -** Order indices, Multi level indices, Dynamic Multilevel indices using B trees and B+- Trees.

**Text Books:**

1. Korth & Sudarshan, Database system concept, MH.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, MH.

**Reference Books:**

1. Peter Rob & C Coronel, Database Systems design, Implementation, and Management, 7th Edition.
2. Elmasri Navrate, Fundamentals of Database Systems, Pearson Education.
3. C.J.Date, Introduction to Database Systems, Pearson Education.

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# COMPUTER NETWORKS - I

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with the basics of data communication, various types of computer networks and topologies.
- To get exposed to the OSI and TCP/IP protocol suite.

**Learning Outcomes:**

Students will be able to

- defining the concept of local area networks, their topologies, protocols and applications.
- analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
- have a working knowledge of DDL and MAC protocols.
- specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols

**UNIT - I: Introduction**

Data Communication, components, data representation, data flow; **Networks-** distributed processing, network criteria, physical structures, network models, categories of network, inter connection of networks, **Protocols & standard layers-** protocols, standards, standard organization, internet standards**, The OSI models-** layered architecture, peer to peer process, encapsulation**, Layers in OSI model-** physical layer, data link layer, Network layer, transport layer, session layer , presentation layer , application layer , **TCP/IP protocol suite-** physical and data link layers, network layer, transport layer, application layer, **Addressing-** physical address, logical address, port address.

**UNIT - II: Physical layer and overview of PL Switching**

**Multiplexing -** Frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, **introduction to switching -** Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

**UNIT - III: Data Link Layer**

**Framing -** fixed size framing, variable size framing, , Flow control, Error control, **Error detection, Error correction -** block coding, linear block codes, **cyclic codes -** cyclic redundancy check, **Checksum -** idea, one's complement internet check sum, services provided to Network Layer, **Elementary Data link Layer**

**protocols -** Unrestricted Simplex protocol, Simplex Stop-and-Wait Protocol, Simplex protocol for Noisy Channel.

**UNIT - IV: Sliding Window Protocol**

One bit, Go back N, Selective Repeat-Stop and wait protocol , data link layer **HDLC:** configuration and transfer modes, frames, control field, **point to point protocol( PPP):** framing, transition phase.

**UNIT - V: Random Access**

ALOHA, career sense multiple access (CSMA), career sense multiple access with collision detection, career sense multiple access with collision avoidance, **Controlled Access -** Reservation, Polling, Token Passing.

**UNIT - VI: IEEE Standards**

Data link layer, physical layer, Manchester encoding, **Standard Ethernet-** MAC Sub Layer, physical layer, **IEEE - 802.11-** Architecture, MAC sub layer, frame structure. **Data Link Layer Switching-** Bridges, Local internet working Spanning tree bridges, remote bridges, switch virtual LANs.

**Text Books:**


1) Behrouz A Fourzan, “Data communications and networking”, TMH,4th edition.
2) Andrew S Tanenbaum, “Computer Networks”, Pearson, 4th edition.
3) Mayank Dave, “Computer Networks” , Cengage.


**Reference Books:**


1) http://nptel.iitm.ac.in/courses/Webcourse- contents/ IIT % 20Kharagpur/ Computer% 20networks/ New_index1.html
2) Larry L Peterson and Bruce S Davie, Computer networks, A system Approach, Elsevier, 5th edition.

# WEB TECHNOLOGIES

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To develop real time web applications.
- To get acquainted with skills for creating websites and web apps through learning various technologies like HTML, CSS, JavaScript, XML, Servlets, JSP and JDBC.

**Learning Outcomes:**

Students will be able to

- develop UI for web applications using markup languages.
- build dynamic web pages using Java Script .
- build web pages using XML.
- design and implement one or more Java servlets; test and debug the servlets; deploy the servlets.
- design and implement one or more Java Server Pages; test and debug the JSPs; deploy the JSPs.
- update and retrieve the data from the databases using JDBC-ODBC.

**UNIT - I: HTML & CSS**

**HTML -** Basic HTML Tags, Working with Lists, Tables, Forms, Frames, Images and Image maps.

**Cascading Style sheets-** CSS rules, Selectors, Types of CSS, CSS Properties for Styling Backgrounds, Text, Fonts, Links, Lists, Tables and Positioning.

**UNIT - II: Java Script**

Introduction to Java Script, Variables, Data types, Functions, Operators, Control flow statements, Objects in Java Script, Event Handling. DHTML with Java Script

**UNIT - III: XML**

Basic building blocks, Validating XML Documents using DTD and XML Schemas, XML DOM, XML Parsers- DOM and SAX, XSLT, using CSS with XML.

**UNIT - IV: Web Servers and Servlets**

Tomcat web server, Introduction to Servlets, Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters, The javax.servlet. http package, Using Cookies-Session Tracking.

**UNIT - V: JSP**

The Problem with Servlet. The Anatomy of a JSP Page, Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Declaring Variables

and Methods, Passing Control and Data between Pages, Sharing Session and Application Data.

**UNIT - VI: Database Access**

JDBC Drivers, Database Programming using JDBC, Studying Javax.sql.* package, accessing a database from a JSP Page and a Servlet page, introduction to struts.

**Text Books:**


1. Web Technologies, "Black book", Kogent Learning Solutions, Dreamtech press.
2. Chris Bates, "Web Programming: building internet applications", WILEY Dreamtech, 2nd edition.


**Reference Books:**


1. Uttam K Roy, "Web Technologies", Oxford.
2. John Duckett, "Beginning Web Programming".
3. Wang Thomson, "An Introduction to web design and Programming".
4. Robert W Sebesta, "Programming the World Wide Web", Pearson publications, Fourth edition.

## OBJECT ORIENTED ANALYSIS AND DESIGN
**(Common to CSE & IT)**
III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge of the Object Oriented analysis and design of a system from the requirements.
- To describe and choose an appropriate Design Pattern to refine the model.

**Learning Outcomes:**

Students will be able to

- apply the object oriented concepts and designs in software development.
- familiar with the UML diagrams and UML tools.
- create static conceptual models of the system to meet the user.
- create dynamic behavioral models of your system.
- utilize object oriented architectural and design patterns.
- describe and choose an appropriate Design Pattern to refine the model.

**UNIT - I: Object Oriented Analysis and Design**

Concepts, complexity of Software, structure of complex Systems, designing complex systems.

**Introduction to UML-** Importance of modeling, principles of modeling, object oriented modeling, Conceptual model of the UML, Architecture, and Software Development Life Cycle.

**UNIT - II: Structural Modeling**

Classes, Relationships, Class diagrams

**Advanced Structural Modeling-** Advanced classes, advanced relationships, Object Diagrams: Common modeling techniques, interfaces and packages.

**UNIT - III: Behavioral Modeling**

Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

**UNIT - IV: Advanced Behavioral Modeling**

Events and signals, state machines, state chart diagrams.

**UNIT - V: Architectural Modeling**

Components, Deployment, Component diagrams, Deployment diagrams, Common Modelling Techniques for Component and Deployment Diagrams. Case Study: The Unified Library application

**UNIT - VI: Introduction to Design patterns**

What Is a Design Pattern?, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern

**Text Books:**


1. Grady Booch, Object Oriented Analysis and Design with Applications-Pearson Education Asia, 2nd Edition.
2. Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.
3. Erich Gamma, Ralph Johnson, John Vlissides, Richard Helm,Design Patterns: Elements of Reusable Object-Oriented Software.


**Reference Books:**


1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.
3. B.Dathan, S.Ramnath,Oriented Analysis,Design and Implementation, Universities Press.
4. Wolfgang Pree, Patterns Patterns for Object-Oriented Software Development, Addison- Wesley/ACM Press, 1995.

*Open Elective - I*

## REMOTE SENSING AND GIS TECHNIQUES

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course objectives:**

- To introduce the students to the basic concepts and principles of various components of remote sensin.
- To provide an exposure to GIS and its practical applications in civil engineering.
- To demonstrate the process of remote sensing and theories related to EMR.
- To establish the interpretation of spatial data in various platforms.

**Learning Outcomes:**

Students will be able to

- identify various satellites, which are advantage for managing the resources available on earth.
- develop thematic maps with the help of raster and vector data.
- employ the analysis and interpretation techniques in the data models.
- apply the strategies of GIS in land information highway system.

**UNIT – I: EMR and Its Interaction with Atmosphere & Earth Material**

Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan-Boltzmann and Wien's Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

**UNIT – II: Platforms and Sensors**

Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and spaceborne TIR and microwave sensors.

**UNIT – III: Image Interpretation and Analysis**

Types of Data Products – types of image interpretation – basic elements of image interpretation - visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

**UNIT – IV: Geographic Information System**

Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS software's – Data type – Spatial and non-spatial (attribute) data – measurement scales – Data Base Management Systems(DBMS).

**UNIT – V: Data Entry, Stprage amd Analysis**

Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

**UNIT VI: RS and GIS Applications**

Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications, hydrology- flood zone delineation and mapping, groundwater prospects and recharge, reservoir storage estimation.

**Text Books:**


1. Remote sensing by Basudeb Bhatta, Oxford University Press.
2. Anji Reddy, M. (2001). Textbook of Remote Sensing and Geographical Information System. Second edn. BS Publications, Hyderabad.


**Reference Books:**


1. Remote sensing and its applications by LRA Narayana University Press 1999.
2. Basics of Remote Sensing & GIS by S.Kumar, Laxmi Publications.
3. Lo. C.P.and A.K.W.Yeung (2002). Concepts and Techniques of Geographic Information Systems. Prentice-Hall of India Pvt. Ltd., New Delhi. Pp:492.
4. Peter A.Burrough, Rachael A.McDonnell (2000). Principles of GIS. Oxford University Press.
5. Ian Heywood (2000). An Introduction to GIS. Pearson Education Asia


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*Open Elective - I*

## ELEMENTS OF CIVIL ENGINEERING
**(Other than CE)**

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand different methods of surveying for various applications.
- To familiarize with various types of building materials, structures and transport systems.

**Learning Outcomes:**

Students will be able to

- carry out simple land survey and prepare maps showing the existing details.
- find out area of irregular shaped plane areas.
- understand building plan, elevation and section.
- get acquainted with construction materials and transportation systems

**UNIT – I: Introduction**

Introduction, history of the civil engineering, sub – disciplines of civil engineering.

**UNIT – II: Surveying**

Introduction, divisions of surveying, classification of surveying, principles of surveying. Linear measurements and errors–introduction, methods of linear measurements, chaining instruments, types of error and correction. Compass surveying – introduction, angular measurement using compass, whole circle bearing and reduced bearing, fore bearing and back bearing. Traverse surveying – introduction, chain and compass traversing, closing error and adjustments. Leveling – introduction, types of leveling instruments, dumpy level, adjustment of level, leveling staff.

**UNIT – III: Building Materials and Construction**

**Materials:**Introduction to construction materials like ferrous and non ferrous metals, alloys, Stones, Bricks, Lime, Cement, Timber, Sand, Aggregates, Mortar, Concrete and bitumen.**Construction:**Types of building, different loads considered in building design, types of foundation in building, other developments and constructions of buildings.

**UNIT – IV: Fire and Earthquake Protection in Building**

Introduction, fire protection in building, structural and architectural safety requirements of resistive structures, fire resistive properties of building materials,

fire exit requirements, force and acceleration on building due to earthquake, building response characteristics, building drift.

**UNIT – V: Water Supply, Sanitary and Electrical Works in Building**

Introduction, water supply system, water supply layout of a building, house drainage, traps, electrical works in building.

**UNIT – VI: Highway Engineering**

Introduction, historical background of road or highway, classification of roads, pavements and roads, traffic control mechanism.

**Text Books:**

1. Elements of Civil Engineering Author: Mimi Das Saikia, Bhargab Mohan Das and Madan Mohan Das Publisher: PHI Learning Private Limited New Delhi.
2. Elements of Civil Engineering Author: Dr. R.K. Jain and Dr. P.P. Lodha Publisher: McGraw Hill Education, India Pvt. Ltd.
3. Surveying Vol. I Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain16th Edition Publisher: Laxmi Publication Delhi.
4. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.

**Reference Books:**

1. Surveying Theory and Practice (7th Edition) Author: James M Anderson and Edward M Mikhail Publisher: McGraw Hill Education, India Pvt. Ltd.
2. Surveying and Leveling Author: R. Subramanian Publisher: Oxford University.
3. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.
4. Civil Engg. Drawing Author: S. C. Rangwala Publisher: Charotar Pub. House Anand.

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*Open Elective - I*

## MODELING AND SIMULATION OF ENGINEERING SYSTEMS

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To Familiarize with programming skills in Equation Solving Software.
- To build Graphic user interface.

**Learning Outcomes:**

Students will be able to

- develop a Model of a Physical System.
- develop a systematic method to simulate engineering system and asses its performance.

**UNIT – I**: **Variables, scripts, and operations**

Getting Started, Scripts, Making Variables, Manipulating Variables, Basic Plotting

**UNIT – II: Visualization and programming**

Functions, Flow Control, Line Plots, Image/Surface Plots, Vectorization

**UNIT – III: Solving equations and curve fitting**

Linear Algebra, Polynomials, Optimization, Differentiation/Integration, Differential Equations

**UNIT – IV: Advanced methods**

Probability and Statistics, Data Structures, Images and Animation, Debugging, Online Resources

**UNIT – V: Symbolics, Simulink®, file I/O, building GUIs**

Symbolic Math, Simulink, File I/O, Graphical User Interfaces

**UNIT – VI:**

Examples on statistics, optimization, plots

**Text Books:**

1. "Getting started with MATLAB" by Rudra pratap, Oxford University, 2002.
2. MATLAB and SIMULINK for Engineers by Agam Kumar Tyagi,OUP 2011

**Reference Books:**

1. Spencer, R.L. and Ware, M (2008), Introduction to MAT Lab, Brigham Young Unviersity, available online, accessed, 7, 2008.
2. David F.Griffiths, October (2012) "An introduction to MAT Lab" the Unviersity of Dundee, available online, Acessed, October 2012..

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*Open Elective - I*

## RENEWABLE ENERGY SOURCES

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To study various types of non-conventional sources of energy and techniques used in exploiting solar, wind, tidal and geothermal sources of energy and bio-fuels.

**Learning Outcomes:**

Students will be able to

- analyze the significance of renewable energy.
- understand the principles of solar radiation and design the solar collectors.
- know the functioning of basic components of wind energy and understand the utilization of biomass in power generation.
- understand the working principles of geothermal, ocean, tidal and wave energy techniques.
- know the functioning of direct energy conversion techniques.

**UNIT – I:**

**Introduction:** Energy Sources and their availability, Role and potential of renewable source.

**Principles of Solar Radiation:** The solar constant, Solar Radiation outside the Earth's atmosphere, Solar Radiation at the Earth's surface, instruments for measuring solar radiation and sun shine, solar radiation data, solar radiation Geometry, solar radiation on titled surfaces with numerical problems.

**UNIT – II:**

**Solar Energy Storage and Applications:** Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications-solar heating/cooling technique, solar distillation, drying, photovoltaic energy conversion. Solar central power tower concept and solar Chimney

**UNIT – III:**

**Wind Energy:** Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

**Bio-Mass:** Bio fuels, Methods for obtaining energy from Biomass, Anaerobic/ aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects. Thermal gasification of Biomass.

**UNIT – IV:**

**Geothermal Energy:** Resources, types of wells, methods of harnessing the energy, potential in India.

**Ocean Energy:** OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles.

**Tidal and wave energy:** Potential and conversion techniques, Mini-hydel power plants and their economics.

**UNIT – V:**

**Direct Energy Conversion:** Need for DEC, limitations, principles of DEC. Thermo-electric Power – See-beck, Peltier, joule, Thomson effects, Thermo-electric Power generators, Figure of merit, Selection of materials, applications.

**UNIT – VI:**

**MHD power Generation:** Principles, dissociation and ionization, Hall Effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects.

**Fuel cells:** Principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

**Text Books:**

1. Tiwari and Ghosal, "Renewable energy resources", Narosa.
2. G.D. Rai, "Non-Conventional Energy Sources", Dhanpat Rai and Sons

**Reference Books:**

1. Twidell & Weir, "Renewable Energy Sources "
2. Sukhatme, "Solar Energy", Tata McGraw-Hill Education.
3. B.S Magal Frank Kreith & J.F Kreith, "Solar Power Engineering "
4. Frank Krieth & John F Kreider, "Principles of Solar Energy"

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*Open Elective - I*

## ELEMENTS OF MECHANCIAL ENGINEERING
### (Other than ME)

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objective:**

- To familiarize with the basic principles of Mechanical Engineering required in various fields of engineering.

**Learning Outcomes:**

Students will be able to

- understand the fundamentals of mechanical systems.
- understand and appreciate significance of mechanical engineering in different fields of engineering.

**UNIT – I: Simple stress and strains**

Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic Moduli & the relationship between them.

**UNIT – II: Power Transmission Devices**

Introduction to power transmission, belt, rope, chain and gear drives, couplings, clutches (Theoretical treatment only)

Power Transmission through Shafts: Introduction, Torsion of Circular Shafts, Torsion equation, Hollow Circular Shafts, Torsional Rigidity, Power Transmitted by the Shaft (simple Problems).

**UNIT – III: Basic Manufacturing Methods**

Principles of casting , green sand moulds , Advantages and applications of casting ; Principles of gas welding and arc welding, Soldering and Brazing ; Hot working – hot rolling , Cold working – cold rolling ;

**UNIT – IV: Basics of Machine Tools and Engineering Materials**

**Basics of Machine Tools:** Description of basic machine tools- Lathe – operations – turning, threading, taper turning and drilling ;

**Engineering Materials** : Classification of engineering material, Composition of cast iron and carbon steels on Iron-Carbon diagram and their mechanical properties. Alloy steels and their application

**UNIT – V: IC Engines**

Introduction , Main components of IC engines , working of 4-stroke petrol engine and diesel engine , working of 2- stroke petrol engine and diesel engine , differences between petrol and diesel engines, differences between 4- stroke and 2- stroke engines. (Theoretical treatment only)

**Steam Boilers**: Function, classification, differences between water and fire tube boilers, mountings and accessories with their functions, construction and working of cochran, vertical, Lancashire and Babcock & Wilcox boiler (Theoretical treatment only).

**UNIT – VI:**

**Power Plants**: Introduction, working principle of steam and gas turbine power plant, working of hydraulic turbines and pumps (Theoretical treatment only).

**Refrigeration & Air conditioning**: Definition – COP, Unit of Refrigeration, Applications of refrigeration system, vapour compression refrigeration system , simple layout of summer and winter air conditioning system (Theoretical treatment only).

**Text Books:**

1. Elements of Mechanical Engineering – R.K.Rajput, Lakmi Pub., Delhi.
2. Elements of Mechanical Engineering – D.S.Kumar, S.K. Kataria and Sons

**Reference Books:**

1. Elements of Mechanical Engineering – K.R.Golala Krishnan, S.Gopala Krishnana, S.C.Sharma, Subhas Stores.
2. Elements of Mechanical Engineering – S.Tryambaka Murthy, I.K. International publishing house pvt. Ltd.

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*Open Elective - I*

## COMPUTER NETWORKS
**(Other than CSE & IT)**

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with different transmission media.
- To gain knowledge of various protocols used for efficient transmission of data over network.

**Learning Outcomes:**

Students will be able to

- understand basic network topologies.
- choose appropriate transmission media for establishing a network.
- differentiate various data link layer protocols.
- choose appropriate routing algorithm suitable for the network for an organization.
- differentiate various transport layer protocols.
- analyze the type of network used in an organization.

**UNIT – I: Introduction**

OSI, TCP/IP, Examples of Networks: Novel Networks, Arpanet, Internet, Network Topologies, Classification of networks: LAN, MAN, WAN.

**UNIT – II: Physical Layer**

Transmission media- copper, twisted pair, wireless, switching and encoding asynchronous communications, Narrow band, broad band ISDN.

**UNIT – III: Data link layer & Medium Access sub layer**

**Data link layer:** Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Data link layer in HDLC, Slip, and PPP.

**Medium Access sub layer:** ALOHA, Carrier sense multiple access. IEEE 802.x Standards, wireless LANs. Bridges

**UNIT – IV: Network Layer**

Virtual circuit and Datagram subnets, Routing algorithms- shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing, congestion control algorithms.

**UNIT –V: Transport Layer**

Transport Services, TCP, SCTP and UDP protocols.

**UNIT – VI: Application Layer**

Domain name system, SNMP, Electronic Mail, WWW

**Text Books:**

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/ PHI
2. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.

**Refence Books:**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

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*Open Elective - I*

## OBJECT ORIENTED PROGRAMMING
**(Other than CSE & IT)**

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To get acquainted with the concepts of object-oriented programming.
- To create GUI using AWT components

**Learning Outcomes:**

Students will be able to

- understand the programming constructs of JAVA.
- apply concepts of inheritance.
- implement interfaces and packages through JAVA.
- simulate the concept of multi threading.
- handle run time errors.
- design and implement an effective GUI for various applications.

**UNIT – I: Fundamentals of OOP and Java**

Need of OOP, Principles of OOP Languages, Procedural Languages vs OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features.

Java Programming constructs: variables, primitive data types, identifiers, keywords, literals, operators, arrays, type conversion and casting,

**UNIT – II: Class Fundamentals and Inheritance**

Class fundamentals, declaring objects, methods, constructors, this keyword, garbage collection, overloading methods and constructors, argument passing, recursion, access control.

**Inheritance-** Basics, types, using super keyword, method overriding, dynamic method dispatch, abstract classes, using final with inheritance, object class, string class.

**UNIT – III: Interfaces and Packages**

**Interfaces:** Defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

**Packages:** Defining, creating and accessing a package.

**UNIT – IV: Exception Handling and Multithreading**

**Exception Handling-** exception-handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, java's built-in exceptions, user-defined exception sub classes.

**MultiThreading-** differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

**UNIT – V: Applets and Event Handling**

**Applets-** Concepts of Applets, differences between applets and applications, life cycle of an applet, creating applets.

**Event Handling-** Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

**UNIT – VI: AWT**

The AWT class hierarchy, user interface components- label, button, checkbox, checkboxgroup, choice, list, scrollbar, menubar, layout managers –Flow, Border, Grid, Card, GridBag.

**Text Books:**


1. Herbert schildt, Java The complete reference, TMH, 7th edition.
2. Sachin Malhotra, Saurabh choudhary, Programming in JAVA, Oxford.


**Reference Books:**


1. Joyce Farrel, Ankit R.Bhavsar, JAVA for Beginners, Cengage Learning, 4th edition.
2. Y.Daniel Liang, Introduction to Java Programming, Pearson, 7th edition.
3. P.Radha Krishna, Object Oriented Programming Through Java, Universities Press.


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*Open Elective - I*

## DATA STRUCTURES USING C
### (Other than EEE, ECE, CSE & IT)

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge of linear and non-linear data structures.
- To familiarize with different sorting and searching techniques.

**Learning Outcomes:**

Students will be able to

- implement single, circular and double linked list.
- implement stacks and queues using arrays and linked lists.
- implement various operations on binary trees.
- apply appropriate sorting and searching techniques for the given data.
- implement various operations on Graphs.

**UNIT – I: Linked lists**

**Introduction-** Concept of data structures, overview of data structures, implementation of data structures.

**Linked Lists-** Single linked list, Circularlinked list, Double linked list, Circular double linked list.

**UNIT – II: Stacks**

Representation using Arrays and Linked List, operations on stack, factorial calculation, evaluation of arithmetic expression.

**UNIT – III: Queues**

Representation using Arrays and Linked List, operations on queue, circular queue, queue using stack.

**UNIT - IV: Trees**

**Binary Trees:** Basic tree concepts, Properties, Representation of Binary Trees using Arrays and Linked List, Binary Tree Traversals, threaded binary tree.

**Binary search trees:** Basic concepts, BST operations: Search, insertion, deletion and traversals, Creation of binary search tree from in-order and pre (post)order traversals.

**UNIT - V: Sorting and Searching**

**Searching:** Linear Search, Binary Search, Fibonacci search.

**Sorting (Internal):** Basic concepts, Sorting by: insertion (Insertion sort), selection (selection sort), exchange (Bubble sort, quick sort), distribution (radix sort) and merging (merge sort).

**UNIT - VI: Graphs**

Basic concepts, representations of graphs, operations on graphs- vertex insertion, vertex deletion, find vertex, edge addition, edge deletion, graph traversals (BFS & DFS).

**Text Books:**


1. Debasis samanta, Classic Data Structures, PHI, 2nd edition, 2011.
2. Richard F, Gilberg , Forouzan, Data Structures, 2nd edition, , Cengage.


**Reference Books:**


1. Seymour Lipschutz, Data Structure with C, TMH.
2. G. A. V. Pai, Data Structures and Algorithms, TMH, 2008.
3. Horowitz, Sahni, Anderson Freed, Fundamentals of Data Structure in C, University Press, 2nd edition.


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*Open Elective - I*

## CYBER LAWS

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To expose the need of cyber laws to prosecute cybercrimes in the society.
- To understand the IT ACT 2000 for Cyber Crime and Cyber Justice.
- To introduce the Criminal Activities based on Internet.
- To familiarize various Licensing Issues Authorities for Digital Signatures.

**Learning Outcomes:**

Student will be able to

- outline the pros and cons of Internet.
- operate on Confidential data in a precautious manner.
- demonstrate about the Criminal Justice in India and its Implications.
- define the Cyber Consumers under the consumer Protection Act.
- devise the legal framework for Confidential Information.
- outline e-commerce issue for copyright protection and Defend Personal Data from being hacked.

**UNIT – I: The IT Act, 2000- A Ccritique**

Crimes in this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce?, Forgetting the Line between Cognizable and Non - Cognizable Offences, Arrest for "About to Commit" an Offence Under the IT Act, A Tribute to Draco, Arrest But No Punishment.

**UNIT – II: Cyber Crime and Criminal Justice**

Penalties, Adjudication and Appeals Under the IT Act, 2000: Concept of Cyber Crime and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber fraud and Cyber Cheating, Virus on Internet Defarmation, Harassment and E- mail Abuse

**UNIT – III: Cyber Pornography**

Cyber Pornography, Other IT Offences, Monetary Penalties, Adjudication and Appeals Under IT Act 2000, Network Service Providers, Jurisdiction and Cyber Crimes, Nature of Cyber Criminality Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications.

**UNIT – IV: Digital Signatures, Certifying Authorities and e-Governance**

Introduction to Digital Signatures, Certifying Authorities and Liability in the Event of Digital Signature compromise, E - Governance in the India. A Warming to

Babudom, Are Cyber Consumers Covered under the Consumer Protection act, Goods and Services, Consumer Complaint Defect in Goods and Deficiency in Services Restrictive and Unfair Trade Practices

**UNIT – V: Traditional Computer Crime**

Early Hacker and Theft of Components Traditional problems, Recognizing and Defining Computer Crime, Phreakers: Yesterday's Hackers, Hacking, Computers as Commodities, Theft of intellectual Property

**UNIT – VI: Web Based Criminal Activity**

Interference with Lawful Use of Computers, Malware, DoS (Denial of Service) and DDoS (Distributed Denial of Service) Attacks, Spam ,Ransomware and Kidnapping of Information, Theft of Information, Data Manipulation, and Web Encroachment Online Gambling Online Fraud, Securities Fraud and stock Manipulation, Ancillary crimes

**Text Books:**

1. Vivek Sood, " Cyber Law Simplefied", Tata McGraw Hill.
2. Marjie T. Britz, "Computer Forensics and Cyber Crime", Pearson

**Reference Book:**

1. Cyber Laws Texts and Cases, Ferrera, CENGAGE.

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*Open Elective - I*

## OPEN SOURCE SOFTWARE

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand the opportunities for open source software in the global market.
- To familiarize the different steps in implementing the open source.

**Learning Outcomes:**

Students will be able to

- analyze the open source software need and applications.
- explain LINUX operating systems concepts.
- work with MySQL database.
- design and develop a web application using PHP.

**UNIT – I: Introduction**

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources–Application of Open Sources.

**UNIT – II: LINUX**

LINUX Introduction – General Overview – Kernel Mode and user mode , Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux.

**UNIT – III: Introduction to MySQL**

MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time

**UNIT – IV: Working with MySQL**

Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

**UNIT – V: Open Source Programming Languages**

PHP- Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage

**UNIT – VI: PHP and SQL**

PHP and SQL database –PHP and LDAP – PHP Connectivity – Sending and receiving E-mails –Debugging and error handling – Security – Templates.

**Text Books:**

1. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications,2003.
2. Steve Suchring, “MySQL Bible”, John Wiley, 2002

**Reference Books:**

1. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2002.
1. Steven Holzner, “PHP: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
3. Vikram Vaswani, “MYSQL: The Complete Reference”, 2nd Edition, Tata McGraw –Hill Publishing Company Limited, Indian Reprint 2009.

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*Open Elective - I*

## FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS
**(Other than CSE & IT)**

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives**

- To introduce the database management systems and applications, Database System Architectures.
- To expose E- R Modeling and Design.
- To explain Relational Data Model and Relational Algebra.
- To demonstrate Structured Query Language and apply different operations on Database.
- To explain Transaction management.

**Learning Outcomes:**

Students will be able to

- develop Conceptual(ER- modeling) and Logical models specified requirements of data base.
- describe the basics of SQL. Can construct tables and answer queries using SQL.
- perform Schema refinement.
- interpret the basic issues of transaction processing.

**UNIT – I: Introduction to Database**

Purpose of Database Systems Vs File System, Data Models, Schema and instances, DBMS Architecture, E- R Model- Attributes and Keys, Relationship Types, Weak Entity set, Strong Entity Set.
(Practice: Execute DDL, DML, DCL and TCL Commands. )

**UNIT – II: Enhanced E–R Modeling**

Specialization and Generalization, Database design for Banking Enterprise, Relational model concepts, constraints.
(Practice:. Execute basic SELECT operations.)

**UNIT – III:SQL**

DDL, DML, DCL, Set operations, Aggregate Functions, Null values, Nested queries. Defining different constraints on a table, apply joins on tables, Creating Views and Indices.
(Practice: Execute a single line and group functions for a table, set operations on various Relations.)

**UNIT – IV: Database Bottom Up Design**

Functional Dependencies and Normalization for Relational Databases: Informal design guidelines for relation schemes, Functional dependencies,
(Practice: Execute Orderby, Groupby clause on various Relations)

**UNIT – V: Normal forms**

First, second and third normal forms, Boyce- Cod normal form, Multi valued & Join Dependencies, 4th & 5th Normal forms.
(Practice: Implement the following Integrity Constraints
a. Primary Key b. Foreign Key c. Unique d. Not NULL and Check. )

**UNIT – VI: Transaction Management**

Transaction concept, ACID properties, Concurrent execution of transactions
(Practice: Execute Nested Queries)

**Text Books**


1. Korth & Sudarshan *Database system concept*, TMH.
2. Raghu Ramakrishnan, Johannes Gehrke *Database Management Systems,* TMH


**Reference Books**


1. Peter Rob & C Coronel *Database Systems design, Implementation, and Management*, 7th Edition.
2. Elmasri Navrate *Fundamentals of Database Systems* , Pearson Education.
3. C.J.Date *Introduction to Database Systems,* Pearson Education.


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*Open Elective - I*

## FUZZY MATHEMATICS

III Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To know the fundamentals of fuzzy algebra.
- To know the basic definitions of fuzzy theory.
- To know the applications of fuzzy Technology.

**Learning Outcomes:**

Students will be able to

- understand the fundamentals of fuzzy algebra.
- apply fuzzy logic.

**UNIT – I:**

Introduction – Fuzzy subsets – Lattices and Boolean Algebras – L fuzzy sets.

**UNIT – II:**

Operations on fuzzy - $\alpha$ levels sets – properties of fuzzy subsets of a set. Sections 1.1-1.10.

**UNIT – III:**

Algebraic product and sum of two fuzzy subsets – properties satisfied by addition and product – Cartesian product of fuzzy subsets. Sections 1.11 -1.13.

**UNIT – IV:**

Introduction – Algebra of fuzzy relations – logic – connectives. Sections 2.1-2.4.

**UNIT – V:**

Some more connectives – introduction – fuzzy subgroup – homomorphic image and Pre-image of subgroupoid. Sections 2.5,3.1-3.3.

**UNIT – VI:**

Fuzzy invariant subgroups - fuzzy subrings. Section 3.4 and 3.5.

**Text Books:**

1. Recommended Text S.Nanda and N.R.Das "Fuzzy Mathematical concepts, Narosa Publishing House, New Delhi.

**Reference Books:**

1. Fuzzy Logic with Engineering Applications, Second Edition, Wiley Publications, Timothy J.Ross.
2. Fuzzy Set Theory and Its Applications, Fourth Edition,Yes Dee Publishing Pvt. Ltd., Springer, H.-J. Zimmermann.

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## DATABASE MANAGEMENT SYSTEMS LAB
**(Common to CSE & IT)**
III Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To provide a strong foundation in database concepts and groom them into well-informed database application developers.

**Learning Outcomes:**

Students will be able to

- design and implement a database schema for a given problem-domain
- normalize a database
- implement the Pl/SQL programming for a given problem
- implement the triggers
- implement Assertions
- implement the E-R diagrams

**List of Experiments:**

1. Execute DDL, DML, DCL and TCL Commands.
2. Execute Orderby, Groupby form of Select Command on various Relations.
3. Execute a single line and group (Aggregate) functions for a table.
4. Implement the following Integrity Constraints
   a. Primary Key
   b. Foreign Key
   c. Unique
   d. Not NULL and Check.
5. Execute Sub Queries and Co-Related Nested Queries.
6. Perform the following join operations
   a. Natural
   b. Equi
   c. Theta
   d. Outer
7. Creating Views
8. Implement the query in SQL for a)insertion b)retrieval c) updation d)deletion
9. Writing Assertion
10. Write PL/SQL procedure for an application using exception handling.
11. Write a PL/SQL block for transaction operations of a typical application using triggers.
12. 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.**

# CASE TOOLS LAB

III Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To create the Object Oriented design of a system from the requirements model in terms of a low-level and high-level architecture

**Learning Outcomes:**

Students will be able to

- Create a requirement model using UML class notations and use case based statements of user requirements.
- Design structural diagrams for a case study.
- Design behavioral models for a case study.
- Design database for a case study.
- Design refine design pattern to refine the system.

**List of Experiments:**

**Develop the below UML diagrams, analysis document and Database Design for a given list of case studies:**

a. Use Case Diagram.
b. Class Diagram.
c. Sequence Diagram.
d. Collaboration Diagram.
e. State Diagram
f. Activity Diagram.
g. Component Diagram
h. Deployment Diagram.
i. Test Design.

**List of Case Studies:**

1. ATM application.
2. Library management system.
3. Railway reservation system.
4. Banking system.
5. Hospital management system.
6. On line bookshop application.
7. On line auction system.

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## WEB TECHNOLOGIES LAB

III Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To familiarize students with designing web pages using markup languages
- To demonstrate designing dynamic web pages using Javascript and servlets/jsp.

**Learining Outcomes:**

Students will be able to

- to design web pages using html and style sheets.
- to design dynamic web pages using servlets/JSP.
- connect and access a database using JDBC.

**List of Experiments:**

1. Design the following static web pages required for an online book store web site.
   i. Home Page
   ii. Login Page
   iii. Catalogue Page
2. Design the following static web pages required for an online book store web site.
   i) Registration Page
   ii) Cart Page
3. Design a web page using CSS which includes the following:
   i. Use different font styles
   ii. Set a background image for both the page and single elements on the page.
   iii. Control the repetition of the image with the background - repeat property.
   iv. Define styles for links
   v. Working with layers
   vi. Adding a Customized cursor
4. (i) Write JavaScript to validate the fields of the login page.
   (ii) Write JavaScript to validate the fields of the Registration page (use Regular Expression for validating email ID)
5. Write an XML file which will display the Book information which includes the following:Title of the book, Author Name, ISBN number, Publisher

name, Edition & Price. Validate the above document using DTD and XML Schema (use XML editors like Stylus Studio or XML Altova).

6. Install Tomcat Web server and access the web pages (LOGIN and Registration pages) by using the URL (ex: http://localhost:4040/projectname/filename.html )
   Create a servlet which displays Hello message (ex: Hello Your name) by reading from an HTML form. (Use request.getParameter() method )
7. Read the user id and passwords entered in the Login form (exp.1) and authenticate with the values (user id and passwords) available in the cookies.
8. Read the user id and passwords entered in the Login form (exp.1) and authenticate with the values (user id and passwords) use init-parameters to do this.
9. Write a java program/servlet/ JSP to connect to the database and extract data from the tables and display them.
10. Write a JSP to insert the details of the 3 or 4 users who register with the registration page and store the details in to the database and validate the user login form.
11. Write a JSP to insert books with details into a data base and retrieve them using search form.
12. Implement sharing data between pages in JSP using session object.

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# DESIGN AND ANALYSIS OF ALGORITHMS
## (Common to CSE & IT)
III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- Analyze the asymptotic performance of algorithms.
- Apply efficient algorithmic design paradigms.

**Learning Outcomes:**

Students will be able to

- analyze the time and space complexity of an algorithm.
- perform union and find operations on disjoint sets.
- find bi-connected components of a graph.
- identify algorithm design technique to solve problems.

**UNIT - I: Introduction**

Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space and Time complexity, Asymptotic Notation- Big oh, Omega, Theta and Little oh notations.

**UNIT - II: Disjoint sets & Divide and conquer**

Disjoint Sets - disjoint set operations, union and find algorithms, bi-connected components.

Divide and conquer - General method, applications-Binary search, Quick sort, Merge sort.

**UNIT - III: Greedy method**

General method, applications- knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees.

**UNIT - IV: Dynamic Programming**

General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, Travelling sales person problem

**UNIT - V: Backtracking**

General method, applications-n queens problem, sum of subsets problem, graph-coloring, Hamiltonian cycle.

**UNIT - VI: Branch and Bound**

General method, applications - Travelling sales person problem,0/1 knapsack problem- LC BB, FIFO BB solutions.

**Text Books:**

1. Ellis Horowitz,Satraj Sahni and Rajasekharam,Fundamentals of Computer Algorithms, Galgotia publications pvt. Ltd.
2. Aho, Ullman and Hopcroft,Design and Analysis of algorithms, Pearson education.

**Reference Books:**

1. T.H.Cormen,C.E.Leiserson, Introduction to Algorithms, PHI Pvt. Ltd./ Pearson Education, 2nd edition.
2. Allen Weiss, Data structures and Algorithm Analysis in C++, Pearson education, 2nd edition,
3. M.T.Goodrich,R.Tomassia,John wiley and sons, Algorithm Design: Foundations, Analysis and Internet examples.
4. Steven S .Skiena, The algorithm Design Manual, 2nd edition, Springer.

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# SOFTWARE ENGINEERING
## (Common to CSE & IT)
III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- Illustrate basic taxonomy and terminology of the software engineering
- Plan and monitor the control aspects of project.

**Learning Outcomes:**

Students will be able to

- explore the basic concepts of software engineering.
- choose appropriate life cycle model for a project.
- implement the phases of the traditional software development process.
- design various test cases for a software product.
- analyze different architectural views.

**UNIT - I: Introduction to Software Engineering**

The evolving role of software, Changing Nature of Software, Software myths.
**The software problem:** Cost, schedule and quality, Scale and change.

**UNIT - II: Software Process**

Process and project, component software process, Software development process models: Waterfall model, prototyping, iterative development, relational unified process, Extreme programming and agile process.

**UNIT - III: Planning, analysis and specification of a software project**

**Planning a software project:** Effort, Cost and Duration estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan.
**Software requirement analysis and specification:** Value of good SRS, requirement process, requirement specification, functional specifications with use-cases.

**UNIT - IV: Software Architecture**

Role of software architecture, architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures.

**UNIT - V: Design**

Design concepts, function-oriented design, object oriented design, detailed design, verification and validation, metrics for design.

**UNIT - VI: Coding and Unit testing**

Programming principles and guidelines, testing concepts, testing process, black-box testing, white-box testing, and metrics for testing.

**Text Books:**

1. Pankaj Jalote, A Concise introduction to software engineering (undergraduate topics in computer science), Springer International Edition.
2. Roger S. Pressman, Software Engineering, TMH , 3rd edition & 7th edition.

**Reference Books:**

1. Pankaj Jalote, Wiley, Software Engineering, A Precise approach.
2. W S Jawadekar, Software Engineering principles and practice, TMH.
3. Sommerville, Software Engineering, Pearson, 8th edition.
4. R Fairley, Software Engineering concepts, TMH.

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# COMPUTER NETWORKS - II

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- Familiarity with the basic routing protocols and congestion control protocols of network layer/Transport layer, and how they can be used to assist in network design and implementation.
- Identify the different types of Netwoklayer protocols and Application layer protocols.

**Learning Outcomes:**

Students will be able to

- analyze, specify and design the topological and routing strategies for an IP based networking infrastructure
- have a working knowledge of IP datagram and other protocols in internet socket programming.
- analyzing why networks need security and control, what errors might occur, and how to control network errors.
- differentiating the various types of networks (wired, wireless, mobile and sensor Networks).

**UNIT - I: Network layer**

Network Layer design issues: store-and forward packet switching, services provided transport layers, implementation connection less services, implementation connection oriented services, comparison of virtual –circuit and datagram subnets Routing Algorithm –shortest path routing, flooding, distance vector routing, link state routing, Hierarchical routing, Broadcast routing, Multicasting routing, routing for mobiles Hosts, routing in Adhoc networks, **congestion control algorithms**-Load shedding, Congestion control in Data gram Subnet.

**UNIT - II: IPV4 Address**

Address space, notations, classful addressing, classless addressing network addressing translation(NAT), **IPV6 Address** structure address space, **IPV4** datagram, Fragmentation, checksum, options, **IPV6** datagram Advantages, packet format, extension Headers.

**UNIT - III: Process to process delivery, UDP & TCP**

Client / server paradigm, multiplexing and demultiplexing, connectionless versus connection oriented services,

**UDP:** Well known ports for UDP, user data gram, check sum, UDP operation, and uses of UDP

**TCP:** TCP services, TCP features, segment, A TCP connection, Flow control, error control, congestion control.

**UNIT - IV: Congestion control**

Open loop congestion control, closed loop congestion control, Congestion control in TCP, frame relay, QUALITY OF SERVICE: flow characteristics, flow classes TECHNIQUES TO IMPROVE QOS: scheduling, traffic shaping, resource reservation, admission control, Application layer: DNS, Email, and www.

**UNIT - V: Emerging trends in Computer Networks**

Motivation for mobile computing- protocol Stack, issues in Mobile Computing environment, mobility issues in mobile computing, data dissemination, security issues in mobile networks

**UNIT - VI: Mobile Adhoc Networks**

Applications of Adhoc networks, challenges and issues in MANETS, MAC layer issues, routing protocols in MANET, Adhoc networks security, Wireless sensors networks- WSN functioning, WSN Characteristics, sensor network operation, sensor Architecture- cluster management;

**Text Books :**

1) Behrouz A Fourzan, Data communications and networking,TMH, 4th edition
2) Andrew S Tanenbaum,Computer networks, Pearson,4th edition.
3) Mayank Dave, Cengage, Computer networks.

**Reference Books:**

1) http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Computer%20networks/New_index1.html.
2) http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Computer%20networks/New_index1.html.
3) Larry L Peterson and Bruce S Davie, Computer networks, A system Approach, Elsevier 5th edition.

*Elective - I*

## DATA WAREHOUSING AND DATA MINING

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand the concepts of data mining, data warehouse, OLAP and OLTP
- To know preprocessing techniques, Mining Association Rules for various types such as single, multi-level and multi-dimensional etc.,
- To understand the types of data and various methods for classification, clustering.

**Learning Outcomes:**

Students will be able to

- explain the role, fundamentals, and functionalities of data mining systems.
- illustrate the major issues of multi-dimensional data models.
- describe different data preprocessing technique.
- list the rules of single, multi-level and multi-dimensional association rules from transactional databases
- describe various classification methods
- summarize various types of clustering techniques

**UNIT - I: Introduction**

Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

**UNIT - II: Data Warehouse and OLAP**

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology

**UNIT - III: Data Preprocessing**

Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**UNIT - IV: Mining Association Rules in Large Databases**

Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses

**UNIT - V: Classification and Prediction**

Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Other Classification Methods, Prediction, Classifier Accuracy.

**UNIT - VI: Cluster Analysis Introduction**

Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods,

**Text Books:**

1. Jiawei han & micheline kamber, "Data Mining Concepts and Techniques", harcourt india.
2. Pang-ning tan, Michael Steinbach, Vipin Kumar "Introduction to Data Mining", pearson

**Reference books:**

1. Margaret h dunham, "Data Mining Introductory and Advanced Topics", pearson education.
2. Sam anahory & dennis murray, "Data Warehousing in the Real World", pearson education, asia.
3. Paulraj Ponnaiah, "Data Warehousing Fundamentals", Wiley student edition.

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*Elective - I*

## MICRO PROCESSORS AND MULTI CORE SYSTEMS

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the students with architecture of 8086 microprocessor
- To introduce the assembly language programming concepts of 8086 processor
- To expose the students to various interfacing devices with 8086 using 8255.

**Learning Outcomes:**

Students will be able to

- understand the architecture and instruction set of 8086 microprocessor and 8051 micro controller.
- design and develop various interfacing circuits with 8086 using 8255.
- understand the concepts of interrupt mechanism and serial communication

**UNIT- I: 8086 MicroProcessor**

Introduction 8086 Processor, Architecture-Functional diagram, Register Organization, Memory Segmentation, Physical memory organization, signal descriptions of 8086- common function signals.

**UNIT - II: Instruction Sets and Addressing Modes**

Instruction formats, Instruction sets, Addressing modes, Minimum and Maximum mode signals, Timing diagrams.

**UNIT - III: Assembly Language Programming of 8086**

Assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

**UNIT- IV: Basic Peripherals and their Interfacing-I**

8255 PPI various modes of operation and interfacing to 8086. Interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

**UNIT - V: Basic Peripherals and their Interfacing-II**

Keyboard/Display Controller-8279, Memory interfacing to 8086, Interfacing DMA controller 8257 to 8086.

**UNIT - VI: Interrupt Structure & Serial Communication**

Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Interfacing Interrupt Controller 8259, Serial communication standards, Serial data transfer schemes,8251 USART architecture and interfacing.

**Text Books:**

1. D. V. Hall, Microprocessors and Interfacing, TMGH.2'1 edition 2006.
2. Brey, The Intel Microprocessors 8086- Pentium processor, PHI

**Reference Books:**

1. Triebel & Singh, The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware &Applications, PHI.
2. Yu-Chang Liu &Glenn A Gibson,Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design,PHI.
3. Badri Ram,Advanced Microprocessors and Interfacing,TMH.

*Elective - I*

## HUMAN COMPUTER INTERFACE

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
- Recognize the range of approaches, techniques, tools and methods available to them when designing useful and usable technology.

**Learning Outcomes:**

Students will be able to

- ability to Explain the human and computer components functions regarding interaction with computer
- demonstrate Understanding of Interaction between the human and computer components.
- evaluate user interface designs by performing usability studies (observations) with human subjects
- select an effective style for a specific application.
- choose appropriate widgets, tools and windows for a GUI.
- solve certain interface design problems.

**UNIT - I: Introduction**

Importance of user Interface – definition, importance of good design, Benefits of good design, a brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

**UNIT - II: Design Process**

Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

**UNIT- III: Screen Designing**

Design goals, organizing screen elements, ordering of screen data and content, Visually pleasing composition, focus and emphasis , Presentation information , information retrieval on web – statistical graphics, Technological consideration in interface design.

**UNIT - IV: Windows**

Navigation schemes , selection of devices based and screen based controls.

**UNIT - V: Components**

Text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

**UNIT - VI: Software Tools**

Specification methods, interface – Building Tools. Interaction Devices – speech recognition digitization and generation – image and video displays – drivers.

**Text Books:**


1. Wilbert O Galitz ,The essential guide to user interface design, , Wiley DreamaTech.
2. Ben Shneidermann, Designing the user interface. 3rd Edition, Pearson Education Asia.


**Reference Books**:


1. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, ,Human – Computer Interaction, Pearson.
2. Rogers, Sharps, Prece, Interaction Design , Wiley Dreamtech.
3. Soren Lauesen, User Interface Design, Pearson Education.


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*Elective - I*

## ARTIFICIAL INTELLIGENCE

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the concepts of AI for representation of knowledge and problem solving.

**Learning Outcomes:**

Students will be able to

- analyze different problem solving and game playing techniques.
- compare different approaches to represent knowledge.
- analyze expert systems and their applications.
- apply probability theory for real world problems.

**UNIT - I : Introduction to artificial intelligence**

Introduction, history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, current trends in AI.

**UNIT - II: Problem solving and game playing**

**Problem solving:** state-space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening a*, problem reduction, constraint satisfaction.
**Game playing:** Introduction, game playing, alpha-beta pruning, two-player perfect information games.

**UNIT - III: Logic Concepts**

Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution in proportional logic, predicate logic.

**UNIT - IV: Knowledge representation**

Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames. Advanced knowledge representation techniques: Introduction, conceptual dependency theory script structure, semantic web.

**UNIT - V: Expert system and applications**

Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools.

**UNIT - VI: Uncertainty measure**

Introduction, probability theory, Bayesian belief networks, certainty factor theory, Dempster-Shafer theory.

**Text Books:**

1. Elaine Rich & Kevin Knight, 'Artificial Intelligence', Tata McGraw Hill Edition, 2nd Edition.
2. Stuart J. Russell,Artificial Intelligence: A Modern Approach,2nd Edition.

**Reference Books:**

1. Patrick Henry Winston, 'Artificial Intelligence', Pearson Education.
2. Russel and Norvig, 'Artificial Intelligence', Pearson Education/ PHI.

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*Open Elective - II*

## DISASTER MANAGEMENT

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To learn about disaster occurrence, strategies and remedial measures.

**Learning Outcomes:**

Students will be able to

- explain the aspects of disaster management and adopt remedial measures.
- access the impact of hazards on structures.
- explain the vulnerability conditions.
- adopt the rehabilitation procedures.

**UNIT – I: Introduction**

Concept of Disaster Management. Types of Disasters. Disaster mitigating agencies and their organizational structure at different levels.

**UNIT – II: Overview of Disaster Situations in India**

Vulnerability of profile of India and Vulnerability mapping including disaster – pone areas, communities, places. Disaster preparedness – ways and means; skills and strategies; rescue, relief reconstruction. Case Studies: Lessons and Experiences from Various Important Disasters in India

**UNIT – III: Flood and Drought Disaster**

Raising flood damage, assessing flood risk, flood hazard assessment, flood impact assessment, flood risk reduction options. Drought and development, relief management and prevention, drought mitigation and management- integrating technology and people.

**UNIT – IV: Landslide and Earthquake Disaster**

Land slide hazards zonation mapping and geo environmental problems associated with the occurrence of landslides. The use of electrical resistivity method in the study of landslide. Studies in rock mass classification and land slide management in a part of Garwal-Himalaya, India. Causes and effects of earth quakes. Secondary effects. Criteria for earthquake resistant design.

**UNIT – V: Cyclone and Fire Disaster**

Cyclone occurrence and hazards. Cyclone resistant house for coastal areas. Disaster resistant construction role of insurance sector. Types of fire. Fire safety and fire fighting method, fire detectors , fire extinguishers.

**UNIT – VI: Rehabilitation**

Rehabilitation programmes, Management of Relief Camp, information systems & decision making tools

**Text Books:**


1. Disaster Management, RB Singh (Ed), Rawat Publications, 2000.
2. Disaster Management Future Challenges and Opportunities, jagbir singh, I.K international publishing house


**Reference Books:**


1. Natural Hazards in the Urban habitat by Iyengar, CBRI, Tata McGraw Hill
2. Natural Disaster management, Jon Ingleton (Ed), Tulor Rose, 1999
3. Anthropology of Disaster management, Sachindra Narayan, Gyan Publishing house, 2000.


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*Open Elective - II*

## SOLID WASTE MANAGEMENT
**(Other than CE)**
III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To learn about Solid Waste management
- To describe the collection, treatment and disposal methods of Solid waste

**Learning Outcomes:**

Students will be able to

- identify the types and sources of solid waste, and its characteristics.
- employ the treatment and disposal methods of solid waste.
- apply the concepts of solid waste management.

**UNIT – I: Introduction**

Definition of solid waste, garbage, rubbish-Sources and Types of solid wastes-Municipal waste, industrial waste, plastic waste, electronic waste, bio-medical waste and hazardous waste - Characteristics of Solid Wastes: Physical, chemical and biological characteristics- Problems due to improper disposal of solid waste.

**UNIT – II: Functional Elements of Solid Waste Management**

Waste generation and handling at source-onsite storage-Collection of solid wastes-Collection methods and services-storage of solid waste- guidelines for collection route layout.

**UNIT – III: Transfer and Transport of Wastes**

Transfer station-types of vehicles used for transportation of solid waste-Processing and segregation of the solid waste- various methods of material segregation.

**UNIT – IV: Processing and Transformation of Solid Wastes**

Recycling and recovery principles of waste management- Composting: definition-methods of composting-advantages of composting- Incineration: definition-methods of incineration advantages and disadvantages of incineration.

**UNIT – V: Treatment and Disposal of Solid Waste**

Volume reduction, Open dumping, land filling techniques, Landfills: classification-Design and Operation of landfills, Land Farming, Deep well injection.

**UNIT – VI: Waste Minimization**

Introduction to waste minimization, waste minimization techniques-5R (refuse, reduce, reuse, recover, recycle), municipal waste minimization, industrial waste minimization.

**Text Books:**

1. Solid and hazardous waste management by M.N.Rao and Razia sultana, BS publications
2. Environmental Engineering by Howard S.Peavy, Donald R.Rowe and George Tchobanognous

**Refence Books:**

1. Integrated Solid Waste Management by Tchobanognous.
2. Environmental engineering by Y.Anjaneyulu, B.S publication.
3. Environmental Pollution Control Engineering by C.S. Rao; Wiley Eastern Ltd., New Delhi.
4. Environmental engineering by Gerad Kiley, Tata Mc Graw Hill

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*Open Elective - II*

## ENERGY AUDIT, CONSERVATION AND MANAGEMENT

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To introduce the basic concepts of Energy Auditing and Management.
- To familiarize the various Techniques of Electrical Energy Conservation.

**Learning Outcomes:**

Students will be able to

- understand the Process of Energy Audit of Industries.
- apply the concepts of Energy management for Efficient Energy Utilization and Conservation.
- identify a suitable method for Energy Conservation of various electric devices.
- analyze the benefits of energy conservation from the Economic aspects.

**UNIT - I: Basic Principles of Energy Audit**

Energy audit- definitions, concept , types of audit, energy index, cost index ,pie charts, Sankey diagrams, load profiles, Energy conservation schemes- Energy audit of industries- energy saving potential, energy audit of process industry, thermal power station, building energy audit.

**UNIT - II: Energy Management**

Principles of energy management, organizing energy management program, initiating, planning,controlling, promoting, monitoring, reporting- Energy manger, Qualities and functions, language, Questionnaire – check list for top management.

**UNIT - III: Energy Efficient Motors**

Energy efficient motors , factors affecting efficiency, loss distribution , constructional details, characteristics - variable speed , variable duty cycle systems, RMS hp-voltage variation-voltage unbalance- over motoring- motor energy audit.

**UNIT - IV: Power Factor Improvement**

Power factor – methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on power factor, power factor motor controllers

**UNIT - V: Lighting and Energy Instruments**

Good lighting system design andpractice, lighting control ,lighting energy audit – Energy. Instruments- wattmeter, data loggers, thermocouples, pyrometers, lux meters, tongue testers, application of PLC's.

**UNIT - VI: Economic Aspects and Analysis**

Economics Analysis-Depreciation Methods, time value of money, rate of return , present worth method , replacement analysis, life cycle costing analysis- Energy efficient motors- calculation of simple payback method, net present worth method- Power factor correction, lighting - Applications of life cycle costing analysis, return on investment .

**Text Books:**


1. Energy management by W.R. Murphy AND G. Mckay Butter worth, Heinemann publications.
2. Energy management by Paul o' Callaghan, Mc-graw Hill Book company-1st edition, 1998


**Reference Books:**


1. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd-2nd edition,1995.
2. Energy management hand book by W.C.Turner, John wiley and sons.
3. Energy management and good lighting practice: fuel efficiency- booklet12-EEO


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*Open Elective - II*

## MATERIAL SCIENCE
### (Other than ME)
III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- Familiarise with the crystallography of materials and their properties i.e. Mechanical, Electrical and Optical and their field of applications.

**Learning Outcomes:**

Students will be able to

- understand of contemporary issues relevant to Crystal Structures.
- identify the defects in crystals and understand the mechanisms of plastic deformation.
- draw Equilibrium/phase diagrams.
- understand Mechanical, Electrical, Optical properties of Materials.

**UNIT - I: Crystal Structure**

Introduction, Space lattice, Unit cell, Lattice parameters, Bravis lattices, Structure and packing fractions of simple cubic, Body centred cubic, Face centred cubic crystals. Directions and planes in crystals, miller indices, Diffraction of X-rays by crystal planes, Bragg's law.

**UNIT - II: Plastic Deformation**

Plastic deformation of single crystals. Deformation by slip, CRSS for slip, Deformation of single crystal. Deformation by twinning, Stacking faults, hot working, and cold working. Recovery, recrystallization and grain growth. Grain size, Halt-Petch equation. Dislocations, types, Burgers' Vector, Dislocation movement by climb and cross slip.

**UNIT - III: Equilibrium Diagrams and Phase Transformation**

Solid solutions, Hume-Rothery's rules, Intermediate compounds, Phase diagrams, Gibb's phase rule, Equilibrium diagram of a binary system. Applications of phase transformations, Iron –carbon equilibrium diagram.

**UNIT - IV: Mechanical properties**

Tensile stress-strain diagrams, proof stress, yield stress diagrams, modules of elasticity. Hardness Testing: -Rockwell, Brinell and Vickers. Impact , toughness, Charpy V-Notch, fracture, ductile, brittle, Griffith criteria for brittle failure, creep, creep mechanisms, fatigue-mechanism-factors to improve fatigue resistance.

**UNIT - V: Electrical Properties of Materials**

Electronic conductivity, free electron theory, Super conductivity, Magnetic properties, Dia, para, ferro, ferri magnetism. Soft and hard magnetic materials.

**UNIT - VI: Optical Properties**

Optical properties of materials. Reflection, Refraction, Absorption and transmission of electromagnetic radiation in solids Polymerization, classification of polymers. Uses of polymers.

**Text Books:**


1. Materials Science and Engineering by V.Raghavan, Prentice Hall of India, Fifth edition.
2. Mechanical Metallurgy – GE Dieter., Mechanical metallurgy, 1988, edition, McGraw-Hill.
3. Material science and Engineering an introduction William D. callister, David G. Rethwisch.


**References Books:**


1. Essentials of Material Science by A.G.Guy, McGraw-Hill(1976).
2. Material Science for Engineers – Schakleford.


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*Open Elective - II*

## AUTOMOTIVE ELECTRONICS

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with the electronic systems inside automotive vehicle.
- To know the advanced safety systems

**Learning Outcomes**

Students will be able to

- broad understanding of automotive technology
- knowledge in operating principles and performance of various subsystems of automotive systems.
- understand the operation of microcomputer systems.
- acquire knowledge in automotive sensors and control systems.
- develop communications & navigation/routing in automotive telematics

**UNIT - I: Automotive Fundamentals**

Use of electronics in the automobile, evolution of automotive electronics, the automobile physical configuration, evolution of electronics in the automobile, survey of major automotive systems, engine control or electronic control unit, ignition system

**UNIT - II: Electronics Fundamentals**

Semiconductor devices- diodes, rectifier circuit, transistors, field effect transistors; transistor amplifiers, use of feedback in op amps, summing mode amplifier, analog computers, digital circuits- binary number system, combinational- Basic logic gates, multiplexer (IC 74151), 3 to8 decoder (IC74138) , sequential- flip flops, decade counters(IC 7490).

**UNIT - III: Automotive Micro-Computer System**

Microcomputer fundamentals-digital versus analog computers, basic computer block diagram, microcomputer operations, CPU registers, accumulator registers, condition code register-branching; microprocessor architecture, memory-ROM, RAM; I/O parallel interface, digital to analog converter and analog to digital converters with block diagram, microcomputer application in automotive systems.

**UNIT - IV: Basics of Electronics Engine Control**

Motivation for electronic engine control, exhaust emissions, fuel economy, concept of an electronic engine control system, engine functions and control, electronic fuel control configuration, electronic ignition with sensors.

**UNIT - V: Sensors and Actuators**

Introduction; Basic sensor arrangement; Types of Sensors such as oxygen sensors, Crank angle position sensors, fuel Metering/vehicle speed sensors and detonation sensors, altitude sensors, flow Sensors, throttle position sensors, solenoids, stepper motors, relays. Actuators – Fuel Metering Actuator, Fuel Injector, Ignition Actuator

**UNIT - VI: Future Automotive Electronic Systems**

Telematics, Safety: Collision Avoidance Radar warning System with block diagram, speech synthesis, sensor multiplexing, control signal multiplexing with block diagram, fiber optics inside the car, automotive internal navigation system, GPS navigation system, voice recognition cell phone dialling, advanced cruise control system.

**Text Books:**


1. William B. Ribbens, "Understanding Automotive Electronics", 6th Edition, SAMS/Elsevier Publishing (UNIT I to VI).
2. Robert Bosch Gambh, "Automotive Electrics Automotive Electronics Systems and Components", 5th edition, John Wiley& Sons Ltd., 2007.


**Reference Books:**


1. Ronald K Jurgen, "Automotive Electronics Handbook", 2nd Edition, McGraw-Hill,1999.
2. G. Meyer, J. Valldorf and W. Gessner, "Advanced Microsystems for Automotive Applications", Springer, 2009.
3. Robert Bosch, "Automotive Hand Book" SAE, 5th Edition, 2000.


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*Open Elective - II*

## INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS
## (Other than EEE, ECE, CSE & IT)

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives**

- To familiarize the students with architecture of 8086 microprocessor and 8051 microcontroller.
- To introduce the assembly language programming concepts of 8086 processor.
- To expose the students to various interfacing devices with 8086 using 8255.
- To introduce the concepts of interrupt mechanism and serial communication standards.

**Learning Outcomes:**

Students will be able to

- understand the architecture and instruction set of 8086 Microprocessor and 8051 micro controller.
- design and develop various interfacing circuits with 8086 using 8255.
- understand the concepts of interrupt mechanism and serial communication.
- develop 8051 based different kinds of applications.

**UNIT - I** : **8086 Microprocessor**

Introduction 8086 Processor, Architecture-Functional diagram, Register Organization, Memory Segmentation, Physical memory organization, signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams.

**UNIT - II**: **Instruction Set and Assembly Language Programming of 8086**

Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

**UNIT - III**: **Basic Peripherals and Their Interfacing**

8255 PPI various modes of operation and interfacing to 8086. Interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter, Keyboard/Display Controller-8279,

Memory interfacing to 8086, Interfacing DMA controller 8257 to 8086

**UNIT - IV**: **Interrupt Structure and Serial Communication**

Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Interfacing Interrupt Controller 8259, Serial communication standards, Serial data transfer schemes,8251 USART architecture and interfacing, RS- 232, IEEE-4-88, Prototyping and trouble shooting.

**UNIT - V**: **Introduction to 8051 Microcontroller**

Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, Interrupts, timer/ Counter and serial communication.

**UNIT - VI**: **Interfacing and Applications of 8051**

Interfacing 8051 to LED's, Push button, Relays and latch Connections, Keyboard Interfacing, Interfacing Seven segment display, ADC and DAC Interfacing

**Text Books**:

1. D. V. Hall' "Microprocessors and Interfacing", TMGH.2'1 edition 2006.(I to IV Units).
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontrollers and Embedded Systems", Pearson, 2nd Ed.(IV to VI Units)

Reference Books:

1. Barry B.Brey, "The Intel Microprocessors", PHI, 7th Edition 2006.
2. Liu and GA Gibson, "Micro Computer System 8086/8088 Family Architecture. Programming and Design", PHI, 2nd Ed.,
3. Kenneth. J. Ayala, "The 8051 Microcontroller", 3rd Edition, Cengage Learning, 2010.

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*Open Elective - II*

## CLOUD COMPUTING
**(Other than CSE & IT)**
III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**
- To understand Virtualization, Virtual Machine and different models of VM.
- To familiarize Cloud computing architecture and its security aspects.

**Learning Outcomes**

Students will be able to
- know about basics of cloud computing.
- cloud computing and its services available today.
- distinguish Virtualization and Virtual Machine and its need, Types of Virtualization.
- understand how to provide security for the cloud .
- understand disaster recovery and disaster management.
- design a Cloud for an Enterprise.

**UNIT – I: Cloud computing**

Introduction, what it is and what it isn't, from collaborations to cloud- a short history of cloud computing, the network is the computer- How cloud computing works, companies in the cloud- Cloud computing today.

**UNIT – II: Ready for Computing in the cloud**

The pros and cons of Cloud Computing, Developing Cloud Services- Why Develop Web-Based Applications?, The Pros and Cons of Cloud Service Development, Types of Cloud Service Development, Discovering Cloud Services Development services and Tools.

**UNIT – III: Virtulization**

Virtualization for cloud, Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

**UNIT – IV: Security**

Data Security, Data Control Encrypt Everything, Regulatory and Standards compliances, Network Security, Firewall rules, Network Intrusion detection, Host Security, System Hardening, Antivirus Protection, Host Intrusion detection, Data segmentation, Credential Management.

**UNIT – V: Disaster**

What is Disaster, Disaster Recovery Planning, The Recovery Point objective, The Recovery Time Objective, Disasters in the Cloud, Backups and data retention, Geographic redundancy, Organizational redundancy, Disaster Management, Monitoring, Load Balancer Recovery, Application server recovery, Database Recovery.

**UNIT – VI: Defining Clouds for the Enterprise**

Storage-as-a-Service, Database-as-a- Service, Information-as-a-Service, Process-as-a-Service, Application-as-a- Service, Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service Infrastructure-as- a-Service.

**Text Books:**

1. Michael Miller, Cloud Computing – Web Based Applications That change the way you work and Collaborate Online –Person Education.
2. George Reese Cloud Application Architectures, Ist Edition O'Reilly Media.

**Reference Books:**

1. David S. Linthicum, Cloud Computing and SOA Convergence in your Enterprise : A Step-by-Step Guide- Addison-Wesley Professional.
2. Kai Hwang, Geoffery C.Fox, Jack J, Dongarra, Distributed & Cloud Computing From Parallel Processing to the Internet of Things.

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*Open Elective - II*

## WEB TECHNOLOGIES
**(Other than CSE & IT)**
III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**
- To develop real time web applications.
- To get acquainted with skills for creating websites and web apps through learning various technologies like HTML, CSS, JavaScript, XML, Servlets, JSP and JDBC.

**Learning Outcomes:**
Students will be able to
- develop UI for web applications using markup languages.
- build dynamic web pages using Java Script .
- build web pages using XML.
- design and implement one or more Java servlets; test and debug the servlets; deploy the servlets.
- design and implement one or more Java Server Pages; test and debug the JSPs; deploy the JSPs.
- update and retrieve the data from the databases using JDBC-ODBC.

**UNIT - I: HTML & CSS**
**HTML-** Basic HTML Tags, Working with Lists, Tables, Forms, Frames, Images and Image maps.
**Cascading Style sheets-** CSS rules, Selectors, Types of CSS, CSS Properties for Styling Backgrounds, Text, Fonts, Links, Lists, Tables and Positioning.

**UNIT - II: Java Script**
Introduction to Java Script, Variables, Data types, Functions, Operators, Control flow statements, Objects in Java Script, Event Handling. DHTML with Java Script

**UNIT - III: XML**
Basic building blocks, Validating XML Documents using DTD and XML Schemas, XML DOM, XML Parsers- DOM and SAX, XSLT, using CSS with XML.

**UNIT - IV: Web Servers and Servlets**
Tomcat web server, Introduction to Servlets, Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters, The javax.servlet HTTP package, Using Cookies-Session Tracking.

**UNIT - V: JSP**

The Problem with Servlet. The Anatomy of a JSP Page, Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Declaring Variables and Methods, Passing Control and Data between Pages, Sharing Session and Application Data.

**UNIT - VI: Database Access**

JDBC Drivers, Database Programming using JDBC, Studying Javax.sql.* package, accessing a database from a JSP Page and a Servlet page, introduction to struts.

**Text Books:**


1. Web Technologies, "Black book", Kogent Learning Solutions, Dreamtech press.
2. Chris Bates, "Web Programming: building internet applications", WILEY Dreamtech, 2nd edition.


**Reference Books:**


1. Uttam K Roy, "Web Technologies", Oxford.
2. John Duckett, "Beginning Web Programming".
3. Wang Thomson, "An Introduction to web design and Programming".
4. Robert W Sebesta, "Programming the World Wide Web", Pearson publications, Fourth edition.


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*Open Elective - II*

## VIRTUAL REALITY

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To Understand key elements of virtual Reality with the components in VR systems.
- To gain knowledge of various input and output devices required for interacting in virtual world along with rendering and modeling.

**Learning Outcomes:**

Students will be able to

- identify basic elements of virtual Reality with the components in VR systems
- describe various input and output devices required for interacting in virtual world along with rendering and modeling.
- differentiate various types of modeling,
- apply the concepts of Virtual Reality for an application.

**UNIT – I: Introduction**

The three I's of virtual reality, commercial VR technology and the five classic components of a VR system

**UNIT – II: Input Devices**

Trackers, Navigation, and Gesture Interfaces- Three-dimensional position trackers, Navigation and manipulation, interfaces and gesture interfaces.

**UNIT – III: Output Devices**

Graphics displays, sound displays & haptic feedback.

**UNIT – IV: Modeling**

Geometric modeling, kinematics modeling, physical modeling, behavior modeling, model Management.

**UNIT – V: Human Factors**

Methodology and terminology, user performance studies, VR health and safety issues.

**UNIT – VI: Applications**

Medical applications, military applications, robotics applications.

**Text Books:**

1. Virtual Reality Systems, John Vince, Pearson Education.
2. Virtual Reality Technology, Second Edition, Gregory C. Burdea & Philippe Coiffet, John Wiley & Sons, Inc.,

**Reference Books:**

1. Understanding Virtual Reality, interface, Application and Design, William R.Sherman, Alan Craig, Elsevier (Morgan Kaufmann).

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*Open Elective - II*

## SCRIPTING LANGUAGES

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge of various scripting languages.
- To familiar with development of web application using scripting languages.

**Learning Outcomes:**

Students will be able to

- employ JavaScript as a general purpose web-based client-side scripting language.
- utilize both XML and PHP to develop interactive web applications.
- describe and apply files concepts in traditional web applications.
- utilize PERL to solve a wide range of text processing problems.

**UNIT – I: Advanced Java Script**

Java Script Events, Objects, DHTML, DOM and Forms, Introduction to AJAX

**UNIT – II: XML**

XML Introduction and Overview, XML Syntax, XML Namespaces, Document Type Definitions (DTDs), XML Schemas, Parsing XML,X Path and XML Transformation

**UNIT – III: Python**

Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples –Dictionaries – Conditionals and Loops

**UNIT – IV: Files**

Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP –Execution Environment.

**UNIT – V: Introduction to PERL**

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines

**UNIT – VI: Working with PERL**

Packages and Modules- Working with Files –Data Manipulation.

**Text Books:**

1. Web Technologies , Uttam Roy, OXFORD University press.
2. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications,2003.

**Reference Books:**

1. Wesley J. Chun, “Core Phython Programming”, Prentice Hall, 2001.
2. Martin C. Brown, “Perl: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

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*Open Elective - II*

## BIG DATA
## (Other than CSE & IT)
III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the fundamental concepts of cloud for laying a strong foundation of Apache Hadoop (Big data framework).
- To gain knowledge of HDFS file system, MapReduce frameworks and relevant tools.

**Learning Outcomes:**

Students will be able to

- describe the fundamentals of Bigdata and cloud architectures.
- utilize HDFS file structure and MapReduce frameworks to solve complex problems.
- know how to analyze data using UNIX tools and Hadoop.
- understand how to develop environment for analyzing Bigdata.
- understand how to use mapper and reducer functions

**UNIT - I: Introduction to Big Data**

What is Big Data, Why Big Data is Important, Meet Hadoop- data, Data Storage and Analysis, Comparison with other systems, Grid Computing, a brief history of Hadoop, Apache Hadoop and the Hadoop Eco System.

**UNIT - II: MapReduce**

Analyzing data with unix tools, Analyzing data with hadoop, Java MapReduce classes (new API), Data flow, combiner functions, Running a distributed MapReduce Job.

**UNIT - III: Hadoop Distributed File System**

HDFS concepts, Command line interface to HDFS, Hadoop File systems, Interfaces, Java Interface to Hadoop, Anatomy of a file read, and write, Replica placement and Coherency Model

**UNIT - IV: Developing a MapReduce Application**

Setting up the development environment, Managing configuration, Writing a unit test with MRUnit, Running a job in local job runner, Running on a cluster, Launching a job.

**UNIT - V: MapReduce Working-I**

Classic MapReduce, Job submission, Job Initialization, Task Assignment, Task execution, Progress and status updates

**UNIT - VI: MapReduce Working-II**

Job Completion, Shuffle and sort on Map and reducer side, Configuration tuning, MapReduce Types, Input formats, Output formats .

**Text Books:**


1. Tom White, Hadoop,"The Definitive Guide", 3rd Edition, O'Reilly Publications, 2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, "Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH,2012.


**Reference Book:**


1. Frank J.Ohlhorst, "Big Data Analytics: Turning Big Data Into Big Money",2nd Edition, TMH,2012.


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*Open Elective - II*

## MULTI-VARIATE ANALYSIS AND SPECIAL FUNCTIONS

III Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand the multivariate analysis concepts.
- To know special functions.

**Learning Outcomes:**

Students will be able to

- to analyze the multivariate data using dependence techniques.
- to apply interdependence techniques.

**UNIT – I: Introduction**

Nature of multivariate analysis – classifying multivariate techniques - Analysis of dependence.

**UNIT – II: Analysis**

Analysis of inter dependence - influence of measurement scales.

**UNIT – III: Analysis of Dependence**

Multiple regression analysis – Discriminant analysis – Multivariate Analysis of variance (MANOVA)

**UNIT – IV: Analysis of inter Dependence**

Factor Analysis – Cluster analysis – Multidimensional scaling.

**UNIT – V: Legendre Functions**

Legendre Polynomials. Properties, Rodrigue's formula, Recurrence Relations and orthoganality.

**UNIT – VI: Bessel Functions**

Solution of Bessel's equation, Properties, Recurrence Relations, orthoganality.

**Text Books:**


1. Richard Arnold Johnson, Dean W. Wichern, Applied Multivariate Statistical Analysis, Pearson Prentice Hall, 2007.
2. William G.Zikmund, Business Research Methods 7th Edition, Cengage Learning.
3. Tabachnick B., Fidell, L using multivariate statistics, 5th Edition, Pearson Education, Inc 2007.
4. J.N.Sharma, R.K.Gupta, Special Functions, Krishna Prakashan Media (p) Ltd., Meerut.


**Reference Books:**


1. Yang, K, Trewn, J. Multivariate Statistical Methods in Quality Management Mc Graw-Hill.
2. Larry C. Andrew, Special Functions of Mathematics for Engineers, SPIE Press, 1992.


* * *

# COMPUTER NETWORKS LAB

III Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To understand the functionalities of various layers of OSI model.
- To familiarize the security issues of networks.

**Learning Outcomes:**

Students will be able to

- have a working knowledge of Data link layer framing and error detection methods.
- analyze, specify and design the topological and routing strategies for an IP based networking infrastructure.
- understand the basic concepts of network security concepts including encryption and decryption.

**List of Experiments:**

1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Implement hierarchal routing algorithm.
7. Implement substitution and transposition cipher methods.
8. Using RSA algorithm Encrypt a text data and Decrypt the same.
9. Implement error detecting techniques.

* * *

## SOFTWARE ENGINEERING LAB

III Year – II Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To facilitate the students to develop a preliminary yet practical understanding of software development process and tools.

**Learning Outcomes:**

Students will be able to

- describe the requirements unambiguously with some suitable formal description method and prepare SRS for the given problem.
- use strategic methods such as COCOMO and FP for calculating the effort required for developing the software.
- analyze the risk involved in completing the project and prepare RMMM plan for the project.
- develop Time-line chart and project table using PERT or CPM project scheduling methods.
- draw E-R diagrams, DFD, CFD and structured charts for the project.
- design test cases based on requirements and design for the given project.
- prepare Version control and change control for software configuration items

**List of Experiments:**

**Take any real time problem and do the following experiments:**

1. Do the Requirement Analysis and Prepare SRS.
2. Using COCOMO model estimate effort.
3. Calculate effort using FP oriented estimation model.
4. Analyze the Risk related to the project and prepare RMMM plan.
5. Develop Time-line chart and project table using PERT or CPM project scheduling methods.
6. Draw E-R diagrams, DFD, CFD and structured charts for the project.
7. Design of Test cases based on requirements and design.
8. Prepare FTR.
9. Prepare Version control and change control for software configuration items.

* * *

# INFORMATION SECURITY

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 + 1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with various aspects of information security.

**Learning Outcomes:**

Students will be able to

- analyze various concepts of security over networks.
- differentiate various cryptographic techniques such as conventional and modern encryption techniques.
- discuss various public key algorithms such as RSA and digital signature algorithm and special authentication techniques and various key management rules.
- apply Security mechanisms for special security for e-mails by using PGP software and Secure/MIME techniques.
- apply Security mechanisms for IP level security and web level security mechanisms.
- analyze how to give system security by using various firewalls and learn how to detect intrusion techniques.

**UNIT - I: Introduction**

Security Attacks, Security Services- Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability, Security Mechanisms, A model for Internetwork security.

Non Cryptographic protocol vulnerabilities- DoS, DDoS, Session hijacking and Spoofing.

Software vulnerabilities- Phishing, Buffer overflow, Format String Attacks, SQL injection.

**UNIT - II: Secret key cryptography**

Conventional encryption principles, conventional encryption algorithms, cipher block modes of operation, key distribution approaches of message authentication, secure hash functions and HMAC.

**UNIT - III: Public key cryptography**

Public key cryptography principles, public key cryptography algorithms, digital signatures, Certificate Authority and key management- Kerberos, X.509 Directory Authentication Service.

**UNIT - IV: Authentication applications & introduction to IP security**

Email privacy- Pretty Good Privacy (PGP) and S/MIME.

IP Security Overview- IP Security Architecture, Authentication Header, Encapsulating Security Payload.

**UNIT - V: IP security**

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

**UNIT - VI: System security**

Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

**Text Books:**


1. William Stallings, Cryptography and network Security, Principles and practice, Fifth edition, PHI/Pearson.
2. William Stallings, Network Security Essentials (Applications and Standards), Pearson Education.


**Reference Books:**


1. Eric Maiwald , Fundamentals of Network Security, Dreamtech press.
2. Ryan Russel, Dan Kaminsky, et al., Hack Proofing your network, Wiley Dreamtech.
3. Whitman, Thomson , Principles of Information Security.
4. Buchmann, Introduction to Cryptography, Springer.

# MOBILE APPLICATION DEVELOPMENT

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course objectives:**

- To prepare students with skills and knowledge of Mobile application development using J2ME Technology.
- Understand the Android OS architecture and able to develop the applications for mobile devices.

**Learning outcomes:**

Students will be able to

- configure a J2ME environment for development.
- plan, design of j2me applications.
- access and work with database under the j2me.
- reproduce the installation of the Android Eclipse SKD.
- implement the user interface for android applications.
- use best design practices for mobile development, designing applications for performance and responsiveness and also implement communication between the mobile devices.

**UNIT -I: J2ME Overview & Architecture**

**J2ME Overview**: Inside J2ME, How J2ME Is Organized, J2ME and Wireless Devices, What J2ME Isn't, Other Java Platforms for Small Computing Devices.

**J2ME Architecture and Development Environment:** J2ME Architecture ,Small Computing Device Requirements, Run-Time Environment, MIDlet Programming .Java Language for J2ME ,J2ME Software Development Kits ,Hello World J2ME Style Multiple MIDlets in a MIDlet Suite ,J2ME Wireless Toolkit.

**UNIT - II: Event Processing & Canvas**

**Commands, Items, and Event Processing:** J2ME User Interfaces ,Display Class ,The Palm OS Emulator ,Command Class ,Item Class ,Exception Handling .High-Level Display: Screens :Screen Class , Alert Class, Form Class ,Item Class ,List Class, Text Box Class, Ticker Class.

**Canvas**: The Canvas, User Interactions Graphics, Clipping Regions, Animation

**UNIT - III: Database concepts**

**Record Management System:** Record Storage ,Writing and Reading Records, Writing and Reading Mixed Data Types ,Record Enumeration ,Sorting Records, Searching Records ,Record Listener.

**J2ME Database Concepts:** Data, Databases, Database Schema, Overview of the JDBC Process, Database Connection.

**UNIT - IV: Introduction to Android**

Installation and configuration of android, starting an android application project: components, debugging with eclipse. Application design: the screen layout and Main.xml file, components ids, controls, creating and configuring android Emulator, communication with emulator.

**UNIT - V: User Interface**

**controls and user interface:** radio buttons, radio group ,the spinner, data picker, buttons, array adapter .

**view class:** combining graphics with a touch listener ,canvas, bitmap, paint ,motion event.

**UNIT - VI: Android Applications**

working with images :display images ,using images stored on android devices ,image view, working with text files,working with data tables, using sqlite ,using xml for data exchange, cursor, content values ,XML PUL Parser, XML Resource parser.

**Client -server applications:** socket, server socket ,HTTPURL connection ,URL.

**Text Books:**


1. James Keogh J2ME: The Complete Reference,McGraw-Hill/Osborne.
2. James C Sheusi Android Application development for java programmers, Cengage Learning.


**Reference Books:**


1. John W. Muchow, Core J2ME Technology by Prentice Hall PTR; 1st edition.
2. Michael juntao yuan, Enterprise J2ME : developing mobile java applications pearson Education ,2004.
3. Ray Richpater, Beginning java ME platform, après,2009.
4. Wallace Jackson, Android apps for absolute Beginners Apress.
5. Wei-meng lee,wiley Begining android 4 application development.
6. Ziguord Mednieks, Laired Dornin, G.Blake Meike &Masumi Nakameera, Programming android, Orelly.

*Elective - II*

## DIGITAL IMAGE PROCESSING
**(Common to CSE & IT)**
IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**
- To gain the knowledge in various image processing techniques.

**Learning Outcomes:**
Students will be able to
- understand the fundamentals of image processing.
- use appropriate image enhancement technique to improve the quality of an image.
- select an appropriate color model for an application.
- apply suitable image segmentation technique for an application.
- analyze various image compression techniques.
- apply morphological operations to modify the structure of an image.

**UNIT - I: Introduction**
Digital image processing, Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system, Image sensing and Acquisition, sampling and quantization, basic relationships between pixels.

**UNIT - II: Image enhancement in the spatial domain**
Introduction, Basic gray-level transformations, histogram processing, enhancement using arithmetic and logic operators, Basics of spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods.

**UNIT - III: Color Image Processing**
Introduction, Color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, color image smoothing and sharpening, color segmentation.

**UNIT - IV: Image Compression**
Fundamentals, image compression models, error-free compression, lossy predictive coding.

**UNIT - V: Morphological Image Processing**
Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms.

**UNIT - VI: Image Segmentation**

Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation.

**Text Books:**

1. Rafael C.Gonzalez, Richard E.Woods, Digital Image Processing, Second Edition, Pearson Education/PHI.

**Reference Books:**

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, Image Processing, Analysis, and Machine Vision, Thomson Learning, Second Edition.
2. Adrian Low, Computer Vision and Image Processing, B.S.Publications, Second Edition.
3. William K. Prat, Digital Image Processing, Wily Third Edition.
4. B. Chanda, D. Datta Majumder, Digital Image Processing and Analysis, Prentice Hall of India, 2003.

*Elective - II*

## ADVANCED COMPUTER ARCHITECTURE

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge of multi-processors and multi-computers.
- To familiarize with the concepts to increase the performance of the system.

**Learning Outcomes:**

Students will be able to

- analyze the effect of multi processors and multi computers on the performance of the system.
- apply appropriate techniques to achieve parallelism at instruction level.
- analyze different techniques to increase the cache performance.
- differentiate between CISC and RISC Architectures.
- understand shared memory based architectures.
- explain about flow control strategies and multicast routing algorithms.

**UNIT - I: Parallel Computer**

The state of Computing- Evolution of Computer Architecture, System Attributes to performance, Multiprocessors and Multi Computers-Shared and Distributed Memory Multiprocessors.

**UNIT – II: Memory Hierarchy Design**

Introduction, optimization of Cache Performance-Small and Simple First level Caches to Reduce hit time, Way Prediction to reduce hit time, pipelined caches to increase Cache Bandwidth, Nonblocking Caches to increase Cache Bandwidth, Virtual Memory and Virtual Machines-Protection Via Virtual Memory, Protection via Virtual machines.

**UNIT – III : Processor Architectures**

Design space of processors, Instruction set Architectures, Characteristics of typical CISC and RISC Architecture, Hierarchical Memory Technology, Inclusion, Coherence and Locality.

**UNIT - IV: Instruction level parallelism (ILP)**

Over coming data hazards, reducing branch costs, high performance instruction delivery, hardware based speculation, limitation of ILP, ILP software approach, compiler techniques, static branch protection, VLIW approach, H.W support for more ILP at compile time, H.W verses S.W Solutions.

**UNIT – V: Thread level parallelism**

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading. VSIMD and MIMD computer organizations - implementation models. control processors and processing nodes

**UNIT – VI : Cache Coherence and message passing Mechanisms**

Cache coherence problem, snoopy Bus protocols, Directory based protocols, message passing Mechanisms: Message Routing schemes, dead lock virtual channels, flow control strategies, multicast routing algorithms.

**Text Books:**


1. KAI HWANG & Naresh Jotwani “advanced computer architecture- parallelism, scalability , programmability” 2nd edition MC GrawHill publishing.
2. HENNESSY PATTERSON “computer architecture – a quantitative approach” 5th edition , ELSEVIER.

*Elective - II*

## EMBEDDED SYSTEMS

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge on basic quantitative principles of embedded system design and performance measurements.
- To study about different embedded firmware and RTOS concepts.

**Learning Outcomes:**

Students will be able to

- know the design concepts of different embedded systems.
- know the embedded system components and firmware.
- learn about the techniques of the task communication and RTOS concepts.
- design principles of RTOS Based Embedded System Design.

**UNIT - I: Introduction to Embedded Systems**

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

**UNIT - II: Typical Embedded System**

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory selection for Embedded Systems, Processor selection for embedded system.

**UNIT - III: Embedded Firmware**

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware design approaches and Development languages.

**UNIT - IV: Embedded communication interface**

Communication Interface: Onboard and External Communication Interfaces, Serial/ Parallel Communication – Serial communication protocols -RS232 standard – RS485 –Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C).

**UNIT - V: RTOS Based Embedded System Design**

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

**UNIT - VI: Task Communication**

Task Synchronization, Task communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

**Text Books:**

1. Shibu K.V, Introduction to Embedded Systems - Mc Graw Hill.
2. Raj Kamal, Embedded Systems - TMH.

**Reference Books:**

1. Frank Vahid, Tony Givargis, Embedded System Design - John Wiley.
2. Lyla, Embedded Systems –Pearson, 2013.
3. David E. Simon, An Embedded Software Primer - Pearson Education.

*Elective - II*

## BIO-INFORMATICS

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To know the importance of Bioinformatics for computational learning.
- To understand basic biological databases, algorithms for proteomics and genomics analysis.
- To learn the Bioinformatics packages to solve the biological problems.

**Learning Outcomes:**

Students will be able to

- the differences between genomics and proteomics.
- to solve the biological problems using computational approach.
- to perform data sequence search.

**UNIT - I: Introduction and DNA Sequence analysis**

Introduction to Bioinformatics- History of bioinformatics. Role of bioinformatics in biological sciences, Scope of bioinformatics, The Central dogma, DNA and Protein

**UNIT - II: Applications**

Genetic code, Sequencing, Biological sequence/structure, Genome Projects, Pattern recognition an prediction, Folding problem, Sequence Analysis, Homology and Analogy.

**UNIT - III: Data Bases in Bioinformatics**

Protein Information Resources- Biological databases, Primary sequence databases, Protein Sequence databases, Secondary databases, Protein pattern databases, and Structure Classification databases.

**UNIT - IV: Genome Information Resources**

DNA sequence databases, specialized genomic resources

**UNIT - V: Alignment Techniques**

Pair wise alignment techniques- Database searching, Alphabets and complexity, Algorithm and programs, Comparing two sequences, sub-sequences, Identity and similarity, The Dotplot, Local and global similarity, different alignment techniques, Dynamic Programming, Pair wise database searching.

**UNIT - VI: Database Searching and Analysis Packages**

Secondary database searching- Importance and need of secondary database searches, secondary database structure and building a sequence search protocol

Analysis Packages- Analysis package structure, commercial databases, commercial Software

**Text Book:**

1. S. P. T. K Attwood & D J Parry-Smith, Introduction to Bioinformatics: Pearson Education Publications.
2. M. L. R. DanE K rane, Wright State University, Fundamental concepts of Bioinformatics.

**Reference Books:**

1. C. N. Jean-Michel Claveriw, Bioinformatics- A Beginner's Guide: WILEY DreamTech -2003.
2. S. M. D. Leon, Sequence Analysis in A Nutshell, 1 ed.: O'REILLY -2003.

**Web Resources:**

1. Gauravreshu 24/01/2011). Bioinformatics for better tomorrow. Available:
2. BakedMediacom. 24/01/2011). Human Genone Project-3d animation. Available:
3. M. M.-. Berkely 24/01/2011). Bioinfomatics. Available: http://academicearth.org/lectures/bioinformatics.

*Elective - III*

## DISTRIBUTED SYSTEMS

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with the concepts of distributed computing systems.

**Learning Outcomes:**

Students will be able to

- understand the concepts of Distributed Systems.
- implement different types of architectures in System Models.
- design an API by using TCP and UDC.
- design issues of RMI.
- implement Thread and its Synchronization.
- analyze the working of various algorithms used to achieve synchronization.

**UNIT - I: Characterization of Distributed Systems**

Introduction, Examples of Distributed Systems, Resource Sharing and the Web Challenges.

**UNIT - II: System Models**

Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models-Interaction Model, Failure Model, Security Model.

**UNIT - III: Inter-process Communication**

Introduction, The API for the Internet Protocols- The Characteristics of Inter process Communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; group Communication- IP Multicast-an implementation of group communication, Reliability and Ordering of Multicast.

**UNIT - IV: Distributed Objects and Remote Invocation**

Introduction, Communication between Distributed Objects- Object Models, Distributed Object Model, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

**UNIT - V: Operating System Support**

Introduction, the Operating System Layer, Protection, Processes and Threads- Address Space, Creation of a New Process, Threads.

**UNIT - VI: Coordination and Agreement**

Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication. Transactions & Replications: Introduction, System Model and Group Communication, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication-Introduction, Passive (Primary) Replication, Active Replication..

**Text Books:**

1. Andrew S. Tanenbaum, Distributed Operating Systems.
2. George Coulouris, Jean Dollimore, Tim Kindberg, Distributed Systems Concepts and Design – 2nd edition.

**Reference Books:**

1. Andrew S. Tanenbaum, Maarten Van Steen - Distributed Systems principles and paradigms.

*Elective - III*

## PARALLEL COMPUTING

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with the architecture of Parallel Computing.
- To gain knowledge of various algorithms suitable for Parallel Computing.

**Learning Outcomes:**

Students will be able to

- understand the classification of various classes of sequential algorithms.
- analyze various algorithms used in parallel processors and Array Processors.
- compare the performance of various algorithms used in SIMD and MIMD machines

**UNIT - I: Introduction**

Computational demand in various application areas, advent of parallel processing, terminology-pipelining, Data parallelism and control parallelism-Amdahl's law. Basic parallel random access Machine Algorithms-definitions of P, NP and NP-Hard, NP-complete classes of sequential algorithms: NC-class for parallel algorithms.

**UNIT - II: Scheduling**

Organizational features of Processor Arrays, Multi processor and multi-computers. Mapping and scheduling aspects of algorithms. Coffman-graham scheduling algorithm for parallel processors

**UNIT - III: Parallel Algorithms**

Elementary Parallel algorithms on SIMD and MIMD machines, Analysis of these algorithms. Matrix Multiplication algorithms on SIMD and MIMD models.

**UNIT - IV: Fast Fourier Transform Algorithms**

Implementation on Hyper cube architectures, Solving linear file-system of equations, parallelizing aspects of sequential methods back substitution and Tri diagonal.

**UNIT - V: Array Processors**

Array processors, 2D-Mesh processor and Hypercube Processor Array.
Sorting: Parallel sorting methods, Odd-even transposition sorting on processor arrays, Parallel Quick-sort on Multi processors. Hyper Quick sort on hypercube multi computers, merge sort on shuffle-exchange ID.

**UNIT - VI: Searching**

Parallel search operations, Ellis algorithm, Manber and lander's Algorithms for dictionary operations. Parallel algorithms for Graph searching, All Pairs shortest paths and Minimum cost spanning tree.

**Text Books:**

1. Michel J. Quinn, Parallel computing theory and practice.
2. Guy E. Blelloch, Programming Parallel Algorithms, Communications of the ACM.

*Elective - III*

## SOFTWARE TESTING METHODOLOGIES
**(Common to CSE & IT)**
IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To provide knowledge on different software testing methodologies and show how these methods detect bugs in the software.

**Learning Outcomes:**

Students will be able to

- Gain knowledge on purpose of testing, taxonomy of bugs and consequence of bugs.
- Apply path testing on any given program and uncover bugs present in the program.
- Understand the need for transaction flow testing and study various transaction flow testing techniques.
- Understand the need for data flow testing and study different data flow testing strategies.
- Gain knowledge on domain and interface testing and able to differentiate between nice and ugly domains.
- Gain knowledge on path products, regular expressions, reduction procedure and its applications and learn how regular expressions can be used for flow anomaly detection.
- Understand decision tables and KV charts and learn how these help in specification testing.

**UNIT – I: Introduction**

Purpose of testing, Dichotomies, model for testing. Consequences of bugs, taxonomy of bugs

**UNIT – II: Flow graphs and Path testing**

Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**UNIT – III: Transaction and data flow testing**

Transaction Flow Testing: Transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, applications of dataflow testing.

**UNIT – IV: Domain Testing**

Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability

**UNIT – V: Paths, Path products and Regular expressions**

Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

**UNIT – VI: Logic Based Testing**

Overview, decision tables, path expressions, kv charts, specifications.

**Text Books:**

1. Baris Beizer, Dreamtech, Software testing techniques - second edition.
2. Dr.K.V.K.K.Prasad, Software Testing Tools, Dreamtech.

**Reference Books:**

1. Brian Marick, The craft of software testing - Pearson Education.
2. Software Testing Techniques – SPD (Oreille).
3. Edward Kit, Software Testing in the Real World , Pearson.
4. Perry, John Wiley, Effective methods of Software Testing.
5. Meyers, John Wiley, Art of Software Testing .

*Elective - III*

## WEB SERVICES

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge about various Web services available and their architectures.
- Use WSDL tools, SOAP and UDDI architecture models in designing web service applications.

**Learning Outcomes:**

Students will be able to

- differentiate various distributed computing technologies.
- develop simple web service enabled applications.
- develop web service applications using WSDL tools.
- use SOAP and UDDI architectures in designing Web service applications.
- use XML encryption and XML digital signature methods for providing security to the web service enabled applications .

**UNIT - I: Evolution and Emergence of web services**

Evolution of distributed computing, Core distributed computing technologies-client/ server, CORBA, JAVA RMI, MicroSoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of web services and Service Oriented Architecture(SOA).

**UNIT - II: Introduction to web services**

Web services architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services, developing web services enabled applications.

**UNIT - III: Describing web services**

WSDL, WSDL in the world of web services, web services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL tools, limitations of WSDL.

**UNIT - IV: Core fundamentals of SOAP**

SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security, Developing web services using SOAP:- Building SOAP web services, developing SOAP web services using java, limitations of SOAP.

**UNIT - V: Discovering web services**

Services discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI Registries and their uses, programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Operations on UDDI Registry: publishing, searching, deleting information in a UDDI registry, limitations of UDDI.

**UNIT - VI: Web services Interoperability**

Means of ensuring interoperability, overview of .NET and J2EE. Web services security:-XML Security frame work, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents.

**Text books:**


1. Developing java web services, R.Nagappan, R.Skoczylas, R.P.sriganesh,Wiley India.
2. Java web services Architectures, Mc Goven, Tyagi,Stevens,Mathew,Elsevier.
3. XML, Web services and the data revolution , F.P.Coyle, Pearson Education.
4. Developing enterprise web services, S.chatterjee, J.webber, Pearson Education.


**Reference Books:**


1. Building web services with java, 2nd edition, S.Graham and others, pearson Education.
2. 2. Java web services, D.A.Chappell & T.Jewell, O'Reilly, SPD.
3. McGovern,et al., "Java web services Architecture", Morgan Kaufmann Publishers,2005.
4. J2EE web services, Richard Monson-Haefel, Pearson Education.

*Open Elective - III*

## BUILDING SERVICES

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To introduce the concepts of basic services and its applications.
- To equip students with the required information and technologies of building services.
- Application of this knowledge in architectural design project.
- Evolving understanding in students to choose appropriate systems and integrate the same in their design projects.

**Learning Outcomes:**

Students will be able to

- understand the measures to be taken while planning for sanitation and installation of various sanitary units.
- identify the minimizing and disposal techniques of waste and garbage.
- evaluate the illumination strategies by consuming less energy resources.
- acquaint with distribution of electricity to all units of the project.
- provide fire protection units at service points.

**UNIT - I: Water Supply**

Tapping of water, Storage and distribution of water in premises, Pipes, piping network, specials, materials, joinery, installation of network both open and concealed, all appurtenances required for installations e.g. taps, faucets, mixing units, valves, flushing cisterns, flushing valves and other fittings.

**UNIT - II: Drainage and Sanitation**

Study of sanitary fittings with reference to use, materials and functions, traps and their uses, classification of traps as per use and shape, pipes and piping systems, specials, vent and anti-siphonage systems, jointing and installations, storm water and roof drainage systems and their installations, underground drainage systems with application of ventilation, self cleansing velocity, laying of drains to required gradients and testing of drains, disposal of sewage within the premises using septic tanks, effluent treatment plants, their function and layouts.

**UNIT - III: Room Acoustics**

Key terms & Concepts, Introduction, Acoustic principles, Sound power and pressure levels, Sound pressure level, absorption of sound, Reverberation time,

Transmission of sound. Sound pressure level in a plant room, out door sound pressure level, Sound pressure level in intermediate space, noise rating, Data requirement, output data.

**UNIT - IV: Lighting and Ventilation**

Indoor lighting- natural and artificial, systems of lighting such as direct, indirect, diffused, applications of lighting systems with reference to levels of illumination for various uses and lumen method calculations, light fittings/ luminaries-All types of energy efficient lamps, optic fiber, led etc. Ventilation - Introduction, Ventilation requirements, Natural and Mechanical systems, Removal of heat gains Psychrometric cycles, Ventilation rate measurement, Material for ventilation duct work.

**UNIT - V: Electrification**

Introduction to generation and distribution of electric power in urban areas, substations for small schemes in industrial units, electrical system installations in a building from the supply mains to individual outlet points, including meter board, distribution board and layout of points with load calculations, electrical wiring systems for small and large installations including different material specification electrical control and safety devices- switches, fuse, circuit breakers, earthing, lightning conductors etc.

**UNIT - VI: Fire Protection, Plant and Service Areas**

Key terms and concepts, introduction, Fire classification, Portable existing gushers, Fixed – Fire fighting installation, fire detectors and alarus, smoke ventilation. Key terms and conditions, Introduction, Mains and services, Plant room space requirements, service ducts, pipe, duct and cable supports, plant connections, Co-ordinated service drawings boiler room ventilation.

**Text Books:**


1. S.C.Rangwala, Water supply and sanitary engineering, Charotar publishing house.
2. A. Kamala & DL Kanth Rao, Environmental Engineering, Tata McGraw – Hill publishing company Limited


**Reference Books:**


1. Technical teachers Training Institute (Madras), Environmental Engineering, Tata McGraw Hill publishing Company Limited.
2. M.David Egan, Concepts in Building Fire Safety.28
3. V.K.Jain, Fire Safety in Building.
4. E.G.Butcher, Smoke control in Fire-safety Design.
5. National Building Code 2005.


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*Open Elective - III*

## MODERN OPTIMIZATION TECHNIQUES

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the students with the concepts of evolutionary optimization
- To develop an understanding of Genetic Algorithm
- To expose students to Particle Swarm Optimization
- To introduce the principles of Differential Evolution
- To gain knowledge on Ant Colony Optimization

**Learning Outcomes:**

Students will be able to

- analyze the pros and cons of different optimization techniques.
- describe the concepts of various techniques.
- develop suitable algorithms for the implementation of above techniques.
- apply these techniques to solve various engineering optimization problems .
- compare the performance of various techniques.
- select a suitable technique to optimize a given problem.

**UNIT – I: Definition-Classification of optimization problems**

Unconstrained and Constrained optimization-Optimality conditions, Evolution in nature-Fundamentals of Evolutionary algorithms- Evolutionary Strategy and Evolutionary Programming.

**UNIT – II: Genetic Algorithm**

Basic concepts- search space- working principle -encoding-fitness function - Genetic Operators-Selection: Roulette-wheel, Boltzmann, Tournament, Rank and Steadystate-Elitism- Crossover: single-pint, two-point, multi-point, uniform, matrix and cross over rate.

**UNIT – III: Mutation**

Mutation, mutation rate. Variations of GA: Adaptive GA and Real coded GA - Issues in GA implementation-Particle Swarm Optimization: Introduction-Fundamental principles of Particle Swarm Optimization-Velocity Updating-Advanced operators-Parameter selection.

**UNIT – IV:**

Binary, discrete and combinatorial PSO-Implementation issues-Convergence issues, Multi-objective PSO (Dynamic neighbourhood PSO-Vector evaluated PSO)-Variations of PSO: weighted, repulsive, stretched, comprehensive learning, combined effect PSO and clonal PSO.

**UNIT V: Differential Evolution**

Introduction-Fundamental principles of Differential Evolution- different strategies of differential evolution-function optimization formulation-mutation and crossover operators-estimation and selection-Discrete Differential Evolution.

**UNIT VI: Ant Colony Optimization**

Introduction-Fundamental principles of Ant colony optimization-Ant foraging behaviour-initialization-transition strategy-pheromone update rule- applications.

**Text Books:**


1. Kalyanmoy Deb, "Multi objective optimization using Evolutionary Algorithms", John Wiley and Sons, 2008.
2. E. Goldberg, Genetic Algorithms in search, Optimization and machine learning, 1989
3. Particle Swarm Optimization, An overview by Riccardo Poli, James Kennedy, Tim Blackwell, Springer
4. Differential Evolution, A Practical Approach to Global Optimization, Authors: Price, Kenneth, Storn, Rainer M., Lampinen, Jouni A. , Springer
5. Ant Colony Optimization by Marco Dorigo, Thomas Stutzle, MIT Press.


**Reference Books:**


1. Soliman Abdel Hady, Abdel Aal Hassan Mantawy, "Modern optimization techniques with applications in Electric Power Systems", Springer,2012.
2. M. Mitchell, 'Introduction to Genetic Algorithms", Indian reprint, MIT press Cambridge, 2nd edition, 2002.
3. R.C. Eberhart, Y.Sai and J. Kennedy, Swarm Intelligence , The Morgan Kaufmann Series in Artificial Intelligence, 2001.
4. K.M. Passino, Biomimicry for optimization, control and automation, Springer-Verlag, London, UK, 2005.
5. G. C. Onwubolu, & B. V. Babu, New Optimization Techniques in Engineering, Springer- Verlag Publication, Germany, 2003.


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*Open Elective - III*

## ELECTRICAL POWER UTILIZATION
### (Other than EEE)
IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the students with the mechanics of train movement.
- To gain knowledge on selection of appropriate heating method.
- To introduce the laws of illumination.
- To develop an understanding of refrigeration and air-conditioning.
- To expose students to the process of elctrolysis.

**Learning Outcomes:**

Students will be able to

- analyze the appropriate type of traction system.
- select a suitable method of heating for a given application.
- design an illumination system.
- calculate the required tonnage capacity for a given air-conditioning system.
- select a suitable charging method.
- evaluate domestic wiring connection and debug any faults occured.

**UNIT – I: Electrical Traction**

Features of an Ideal Traction System, Systems of Electrical Traction, Traction Supply System, Mechanism of Train Movement, Speed- Time Curve, Traction Motors, Tractive Effort and Horse Power, Speed Control Schemes, Electric Braking, Recent Trends in Traction.

**UNIT – II: Electric Heating**

Classification, Heating Element, Losses in Oven and Efficiency, Resistance Furnace, Radiant Heating, Induction Heating, High Frequency Eddy Current Heating, Dielectric Heating, Arc Furnace, Heating of Furnace, Electric Welding, Methods and Equipments.

**UNIT – III: Illumination**

Radiant Energy, Terms and Definitions, Laws of Illumination, Polar Curves, Photometry, MSCP, Integrating Sphere, Luminous Efficacy, Electrical Lamps, Design of Interior and Exterior Lighting Systems, Illumination Levels for Various Purposes, Light Fittings, Factory Lighting, Flood Lighting, Street Lighting, Energy Conservation in Lighting.

**UNIT – IV: Air Conditioning and Refrigeration**

Control of Temperature, Protection of Motors, Simple Heat-Load and Motor Calculations, Various Types of Air Conditioning, Functioning of Complete Air Conditioning System, Type of Compressor Motor, Cool Storage, Estimation of Tonnage Capacity and Motor Power.

**UNIT – V: Electro-Chemical Processes**

Electrolysis – Electroplating – Electro deposition – Extraction of metals current, Efficiency - Batteries – types – Charging Methods.

**UNIT – VI: Basics of Domestic Electrical Wiring**

Types of Cables, Flexible Wires Sizes and Current Capacity, Use of Fuse, MCB and MCCB (Working and Construction), Idea about Megger, Earthling – Domestic and Industrial.

**Text Books:**


1. Garg and Girdhar, "Utilisation of Electric Energy" 1982, Khanna Publisher.
2. Pratab H., "Art and Science of Utilization of Electrical Energy", Second Edition, Dhanpat Rai and Sons, New Delhi.


**Reference Books:**


1. Wadhwa C.L., "Generation, Distribution and Utilization of Electrical Energy",1993, Wiley Eastern Limited,
2. S.C.Tripathy, "Electric Energy Utilization and Conservation",1993, Tata McGraw Hill.
3. R.K. Rajaput, . "Utilization of Electric Power", Laxmi Publications, 1st Edition, 2007.
4. N.V.Suryanarayana, "Utilization of Electric Power", New Age International, 2005
5. C.L.Wadhwa, "Generation, Distribution and Utilization of Electrical Energy, New Age International, 4th Edition, 2011.
6. M. Prasad, Refrigiration and Air-conditioning, Wiley Eastern Ltd., 1995 .
7. Taylor E. Openshaw, "Utilization of Electrical Energy", 1968, Orient Longman.
8. Gupta J. B., "Utilization of Electric Power and Electric Traction", 2002,S. K. Kataria and Sons.


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*Open Elective - III*

## ROBOTICS
### (Other than ME)
IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the students with anatomy, kinematics, sensors and dynamics of a programmable machine, robot.

**Learning Outcomes:**

Students will be able to

- distinguish between fixed automation and programmable automation.
- identify various components of robot.
- select appropriate type of actuator for a joint.
- illustrate robot applications in manufacturing.
- analyze kinematics of a robot.
- derive equations of motion of a manipulator for a particular application.
- write a programme to control a robot for execution of a work cycle.

**UNIT – I: Introduction**

Automation and Robotics, Components of Robot – Mechanical manipulator-control system and end effectors-Types of end effectors — Requirements and challenges of end effectors classification of robots by coordinate system and control system. Control resolution, accuracy, repeatability and work volume of robot.

**UNIT – II: Robot actuators and Feed back components**

Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors.
Feedback components: position sensors – potentiometers, resolvers, encoders – Velocitysensors.

**UNIT – III: Robot Application in Manufacturing**

Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.
Future applications of robots.

**UNIT – IV: Motion Analysis**

Homogeneous transformations as applicable to rotation and translation – problems.

**Manipulator Kinematics:** Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

**UNIT – V:**

Differential transformation and manipulators, Jacobians – problems.Dynamics: Lagrange – Euler and
Newton – Euler formations – Problems.

**UNIT – VI:**

Trajectory planning and avoidance of obstacles, path planning, Slew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

**Text Books:**


1. Industrial Robotics / Groover M P /Pearson Edu.
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.


**Reference Books:**


1. Robotics / Fu K S/ McGraw Hill.
2. An Introduction to Robot Technology, / P. Coiffet and M. Chaironze / Kogam Page Ltd. 1983 London.
3. Robotic Engineering / Richard D. Klafter, Prentice Hall.
4. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.
5. Introduction to Robotics / John J Craig / Pearson Edu.
6. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.


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*Open Elective - III*

## ASSISTIVE TECHNOLOGIES

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- Understand the laws that govern the use of assistive technology in higher education.
- Evaluate appropriate pieces of technology according to a student's specific disability and academic needs.

**Learning Outcomes:**

Students will be able to

- identify the legislative policies connected with assistive
- discuss Universal design principles in the context of general education environments and curriculum materials.
- explore the process for finding the right technology and the right applications, and determine how to pay for it.
- explore and discuss how to establish a technology team with an assistive technology representative, perform a school wide assessment of all student needs and develop a school and/or classroom tech plan.

**UNIT – I: Introduction to Assistive Technology (AT) Devices and Services**

Assistive Technology Defined. Historical Overview of Assistive Technology. Multidisciplinary Nature of at Service Provision.

**UNIT – II: Adaptations Framework for Considering Assistive Technology**

Introduction to the Adaptations Framework, Setting-Specific Demands, Person-Specific Characteristics, Adaptations, Evaluation of Effectiveness of Adaptations.

**UNIT – III: Assistive Technology Assessments**

Overview of Assessment Issues, Overview of General Assessments , Assistive Technology Assessments, Assessment Components.

**UNIT – IV: Enhance Speech Communication**

Nature of Spoken Language, Introduction to Augmentative and Alternative Communication Systems, Selection Techniques for Aided Communication Systems, Overview of Nonelectronic Systems and Electronic Devices.

**UNIT – V: Mobility & Access to Information**

Introduction to Mobility Adaptations, Basic Design Considerations, Seating and Positioning Issues. Introduction to Information Access, Computer Access, Telecommunication, Listening and Print Access.

**UNIT – VI: Enhance Independent Living**

Introduction to Independent Living, Devices for Daily Life, Switches and Scanning. Environmental Control Units, Access to Management Devices.

**Text Books:**


1. Diane P edrotty Bryant, Brian R. Bryant, Allyn and Bacon "Assistive Technology for People with Disabilities", 2nd edition ***Psycho-Educational Services***
2. Amy G.Dell, Deborah A.Newton, Jerry G.Petroff, "Assistive Technology in the class room Enhancing the school experiences of students with disabilities", Pearson Publications


**Reference Books:**


1. Marion A.Hersh, Michael A.Johnson , " Assistive Technology for the Hearing-impaired, Deaf and Deafblind", Springer Publications
2. Meeko Mitsuko K.Oishi, lan M.Mitchell, H.F. Machiel vanderloss, "Design and use of Assistive Technology, Springer Publications.
3. Eckehard Fozzy Moritz, "Assistive Technologies for the Interaction of the Elderly", Springer Publications.


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*Open Elective - III*

## INTRODUCTION TO EMBEDDED SYSTEMS

**(Other than ECE, CSE & IT)**

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge on basic quantitative principles of embedded system design and performance measurements.
- To study about different embedded firmware and RTOS concepts

**Learning Outcomes:**

Students will be able to

- know the design concepts of different embedded systems.
- know the embedded system components and firmware.
- learn about the techniques of the task communication and RTOS concepts
- design principles of RTOS Based Embedded System Design

**UNIT – I: Introduction to Embedded Systems**

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

**UNIT – II: Typical Embedded System**

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory selection for Embedded Systems, Processor selection for embedded system.

**UNIT – III: Embedded System Components and Firmware**

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware design approaches and Development languages.

**UNIT – IV: Embedded communication interface**

Communication Interface: Onboard and External Communication Interfaces, Serial/ Parallel Communication – Serial communication protocols -RS232 standard – RS485 –Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C).

**UNIT – V: RTOS Based Embedded System Design**

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

**UNIT – VI: Task Communication**

Task Synchronization, Task communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

**Text Books:**

1. Shibu K.V, “Introduction to Embedded Systems “,Mc Graw Hill. (I to VI Units)
2. Raj Kamal,”Embedded Systems”, TMH. (IV Unit)

**Reference Books:**

1. Frank Vahid, Tony Givargis,”Embedded System Design”, John Wiley.
2. Lyla, “Embedded Systems”, Pearson, 2013
3. David E. Simon, “An Embedded Software Primer”, Pearson Education.

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*Open Elective - III*

## SOCIAL NETWORKS

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To provide basic concepts of Social networks and make them learn the psychological foundations of Social networks.
- To Know about Network Influence and diffusion

**Learning Outcomes:**

Students will be able to

- describe Social network concepts.
- categorize segmentation and Characteristics.
- analyze psychological foundation of Social networks.
- evaluation of various organizations of networks.
- define Network Influence and diffusion.
- design social network systems in different areas.

**UNIT – I:**

Basic social network concepts-Distributions- Multiplexity-Roles and positions-Embedded of the informal within instituted or named networks.

**UNIT – II:**

Network segmentation-Named and Unnamed Network segments-segmenting groups on the basis of cohesion-structural similarity and structural equivalence.

**UNIT – III:**

Psychological foundations of social networks-safety-effectiveness-Status-Limits on individual networks

**UNIT – IV:**

Organizations and networks Information-Driven organizations-Bridging the gaps: Network size, diversion and social cohesion

**UNIT – V:**

Networks, Influence and diffusion – influence and decision making-epidemiology and network diffusion.

**UNIT – VI:**

Network as social capital –Individual level social capital-social capital as an attribute of social systems.

**Text Books:**

1. Understanding Social Networks: Theories, Concepts, and Findings By Charles Kadushin.

**Reference Books:**

1. Social Networks and the Semantic Web By Peter Mika.
1. **Social Network Analysis: Methods and Applications** By Stanley Wasserman, Katherine Faust

*Open Elective - III*

## MOBILE APPLICATION DEVELOPMENT

**(Other than CSE & IT)**

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course objectives:**

- To prepare students with skills and knowledge of Mobile application development using J2ME Technology.
- Understand the Android OS architecture and able to develop the applications for mobile devices

**Learning Outcomes:**

Students will be able to

- configure a J2ME environment for development.
- plan and design of J2ME applications.
- access and work with database under the J2ME.
- reproduce the installation of the Android Eclipse SKD.
- implement the user interface for android applications.
- use best design practices for mobile development, designing applications for performance and responsiveness and also implement communication between the mobile devices.

**UNIT – I: J2ME Overview**

Inside J2ME, How J2ME Is Organized, J2ME and Wireless Devices, What J2ME Isn't, Other Java Platforms for Small Computing Devices.

**J2ME Architecture and Development Environment:**

J2ME Architecture ,Small Computing Device Requirements, Run-Time Environment, MIDlet Programming .Java Language for J2ME ,J2ME Software Development Kits ,Hello World J2ME Style Multiple MIDlets in a MIDlet Suite ,J2ME Wireless Toolkit.

**UNIT – II: Commands, Items, and Event Processing**

J2ME User Interfaces ,Display Class ,The Palm OS Emulator ,Command Class ,Item Class ,Exception Handling .High-Level Display: Screens :Screen Class , Alert Class, Form Class ,Item Class ,List Class, Text Box Class, Ticker Class. **Canvas**: The Canvas, User Interactions Graphics, Clipping Regions, Animation

**UNIT – III: Record Management System**

Record Storage ,Writing and Reading Records, Writing and Reading Mixed Data Types ,Record Enumeration ,Sorting Records, Searching Records ,Record Listener .

**J2ME Database Concepts:** Data, Databases, Database Schema, Overview of the JDBC Process, Database Connection.

**UNIT – IV: Introduction to Android**

Installation and configuration of android, starting an android application project: components, debugging with eclipse. Application design: the screen layout and Main.xml file, components ids, controls, creating and configuring android Emulator, communication with emulator.

**UNIT – V: User Interface**

**Controls and user interface:** radio buttons, radio group ,the spinner, data picker, buttons, array adapter .

**view class:** combining graphics with a touch listener ,canvas, bitmap, paint ,motion event.

**UNIT – VI: Android Applications**

Working with images :display images ,using images stored on android devices ,image view, working with text files ,working with data tables, using sqlite ,using xml for data exchange, cursor, content values, XML PUL Parser, XML Resource parser.

**Client -server applications:** socket, server socket, HTTP URL connection, URL.

**Text Books:**


1. James Keogh J2ME: The Complete Reference, McGraw-Hill/Osborne.
2. James C Sheusi Android Application development for java programmers, Cengage Learning.


**Reference Books:**


1. John W. Muchow, Core J2ME Technology by Prentice Hall PTR; 1st edition.
2. Michael juntao yuan, Enterprise J2ME : developing mobile java applications pearson Education ,2004.
3. Ray Richpater, Beginning java ME platform, après,2009.
4. Wallace Jackson, Android apps for absolute Beginners Apress.
5. Wei-meng lee,wiley Begining android 4 application development.
6. Ziguord Mednieks, Laired Dornin, G.Blake Meike &Masumi Nakameera, Programming android, Orelly.

*Open Elective - III*

## REAL - TIME SYSTEMS

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with the concepts of Real – Time systems.

**Learning Outcomes:**

Students will be able to

- understand the use of multi tasking techniques in real time systems.
- evaluate the performance of soft and hard real time systems.
- analyze multi task scheduling algorithms for periodic, aperiodic and sporadic tasks.
- design real time operating systems.

**UNIT – I:**

Real-Time systems, typical real-time applications, hard versus soft real-time systems, a reference model of real-time systems.

**UNIT – II:**

Commonly used approaches to hard real-time scheduling, clock-driven scheduling,

**UNIT – III:**

Priority-driven scheduling of periodic tasks, scheduling aperiodic and sporadic jobs in priority- driven systems.

**UNIT – IV:**

Resources and resource access control, multiprocessor scheduling and resource access control.

**UNIT – V:**

Scheduling flexible computations and tasks with temporal distance constraints.

**UNIT – VI:**

Real-Time Communications, Operating Systems.

**Text Books:**

1. Jane Liu, Real-Time Systems, Prentice Hall, 2000.
2. Philip.A.Laplante, Real Time System Design and Analysis, 3rd Edition, PHI, 2001.

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*Open Elective - III*

## NETWORK MANAGEMENT SYSTEMS

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand key elements of Network Management.
- To understand the various Network management tools.

**Learning Outcomes:**

Students will be able to

- analyze the key elements of Network Management.
- distinguish different types of SNMPs.
- apply the remote monitoring mechanism for an application.

**UNIT – I: Data communications**

Analogy of Telephone Network Management, Communications protocols and Standards, Challenges of Information Technology Managers

**UNIT – II: Network Management**

Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

**UNIT – III: SNMPV1 Network Management**

Organization and Information and Information Models.

**Managed network**: Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model.

**UNIT – IV: SNMPv1 Network Management**

Communication and Functional Models, The SNMP Communication Model, Functional model

**UNIT – V: SNMP Management**

**SNMPv2:** Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, the SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1

**UNIT – VI: SNMP Management**

**RMON:** What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring

**Network Management Tools and Systems:** Network Management Tools, Network Statistics Measurement Systems.

**Text Book:**

1. Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

**Reference Books:**

1. Network management, Morris, Pearson Education.
2. Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
. Distributed Network Management, Paul, John Wiley.

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*Open Elective - III*

## FUNDAMENTALS OF E-COMMERCE

**(Other than CSE & IT)**

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To introduce the basic concepts of E-Commerce.
- To gain the knowledge on various Mercantile Process models.
- To identify the fundamental concepts in E-Payment systems like smart card, credit card..etc
- To expose to electronic data interchange (EDI) problems.

**Learning Outcomes:**

Students will be able to

- outline the fundamentals in E-Commerce.
- describe various Mercantile Process models.
- discuss about various E-Payment systems.
- identify electronic data interchange (EDI) problems.
- describe various Advertising techniques on internet

**UNIT – I: Electronic Commerce-Frame work**

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

**UNIT – II: Consumer Oriented Electronic commerce**

Consumer Oriented Electronic commerce - Mercantile Process models.

**UNIT – III: Electronic payment systems**

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

**UNIT – IV: Inter Organizational Commerce**

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

**UNIT – V: Intra Organizational Commerce**

Work Flow, Automation Customization and internal Commerce, Supply chain Management.

**UNIT – VI: Advertising and Marketing**

Information based marketing, Advertising on Internet, on-line marketing process, market research

**Text Book:**

1. Kalakota, Whinston *Frontiers of electronic commerce*, Pearson.

**Reference Books:**

1. Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang *E-Commerce fundamentals and applications*, John Wiley.
2. S.Jaiswal – Galgotia *E-Commerce*.
3. Kenneth C.Taudon, Carol Guyerico Traver *E-Commerce – Business, Technology, Society.*

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*Open Elective - III*

## STATISTICAL METHODS USING R SOFTWARE

IV Year – I Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand statistical concepts.
- To know R software.

**Learning Outcomes:**

Students will be able to

- examine the relationship between the variables and forecast.
- apply suitable range of statistical tests.
- use R for statistical programming, Computation, Graphics, and modeling.
- expand their knowledge of R on their own.

**UNIT – I: Correlation-Regression**

Simple correlation for ungrouped data , rank correlation and simple regression.

**UNIT – II: Testing of Hypothesis**

Introduction - population-sample-large sample and small sample. Testing of hypothesis - hypothesis - null hypothesis - alternative hypothesis - level of significance - degrees of freedom - one tailed and two tailed tests - procedure of testing of hypothesis.

**UNIT – III: One Sample Significance Tests**

One sample tests: Large sample - Test for single mean, single proportion, Small sample tests: t-test for single mean.

**UNIT – IV: Two Sample Significance Tests**

Two sample tests : Large sample - test for two means, two proportions, Small sample: t-test for two means, F-test.

**UNIT – V: Introduction to R software**

An introductory R session- R as a calculator- Getting help and loading packages- Data entry and exporting data.

**Correlation and Regression using R:** Calculating correlation coefficient-calculating rank correlation-finding regression lines- interpretations

**UNIT – VI: One Sample and Two Sample Tests using R**

Large sample: Calculating Z value for single and two means - interpretation - Calculating Z value for single proportion and two proportions-interpretations

Small sample: Calculating t for single mean and two means- interpretations Calculating F value -interpretations

**Text Books:**


1. S.C.Gupta and V.K.kapoor-Fundamentals of Mathematical Statistics-S.chand & co.
2. Probability and Statistics, Dr. T. K. V. Iyengar, Dr. B. Krishna Gandhi, S. Ranganatham and Dr. M.V. S. S. N. Prasad, S. Chand & Company Ltd.
3. Peter Dalgaard. Introductory Statistics with R (Paperback) 1st Edition Springer-Verlag New York, Inc. ISBN 0-387-95475-9
4. W. N. Venables and B. D. Ripley. 2002. Modern Applied Statistics with S. 4th Edition. Springer. ISBN 0-387-95457-0


**Reference Books:**


1. An Introduction to R. Online manual at the R website at http://cran.r-project.org/manuals.html
2. Andreas Krause, Melvin Olson. 2005. The Basics of S-PLUS. 4th edition. Springer-Verlag, New York. ISBN 0-387-26109-5.


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# INFORMATION SECURITY LAB

IV Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To familiarize with security concepts.
- To gain hands-on experience on cryptographic algorithms

**Learning Outcomes:**

Students will be able to

- analyze the authentication and encryption techniques of information system.
- implement detection of threats in Web security.
- evaluate the security over e-mail application.

**List of Experiments:**

1. Implement different substitution and transposition techniques.
2. write a program to implement format string vulnerabilities.
3. Implement DES encryption & decryption algorithm.
4. Write a program to break DES coding.
5. Implement the Blowfish algorithm logic.
6. Implement AES encryption & decryption algorithm.
7. Using RSA algorithm Encrypt a text data and decrypt the same.
8. Implement Diffie - Hellman key exchange algorithm.
9. Calculate the message digest of a text using the SHA-1 algorithm.
10. Implement any virus application.
11. Examine how PGP works.

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## MOBILE APPLICATION DEVELOPMENT LAB
**(Common to CSE & IT)**
IV Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To gain knowledge about application software for Mobile node.

**Learning Outcomes:**

Students will be able to

- design J2ME applications that run on a mobile.
- design J2ME applications that make SOCKET connection to the server.
- develop android applications.

**List of Experiments:**

1. Write a J2ME program to show how to change the font size and color.
2. Write a J2ME program which creates the following kind of menu.
   a. Cut
   b. Copy
   c. Paste
   d. Delete
   e. Select all
   f. Unselect all
3. Create a J2ME menu which has the following options(Event Handling):
   a. Cut – can be on / off
   b. Copy – can be on / off
   c. Paste – can be on / off
   d. Delete – can be on / off
   e. Select all – put all 4 options on
   f. Unselect all - put all 4 options off
4. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data(integer) values to the input text field.
5. Create a MIDP application which examine, that a phone number, which a user has entered is in the given format(Input checking:
   a. Area code should be one of the following: 040, 041, 050, 0400, 044
   b. There should be 6-8 numbers in telephone number (+area code)
6. Write a sample program to show how to make a SOCKET connection from J2ME phone. This J2ME sample program shows how to make a SOCKET connection from a J2ME phone. Many a times there is a need to connect

backend HTTP server from the J2ME application. Show how to make a SOCKET connection from the phone to port 80.

7. The following should be carried out with respect to the given set of application domains: Assume that the server is connected to the well-maintained database of the given domain. Mobile client is to be connected to the server and fetch the required data value / information)
   a. Students Marks Enquiry
   b. Town / City Movie Enquiry
   c. Railway / Road / Air ( For example PNR) Enquiry / Status
   d. Sports (say, cricket) update
   e. Town / City weather update
   f. Public exams (say Intermediate or SSC) / Entrance (say EAMCET) results Enquiry. Divide student into batches and suggest them to design database according to their domains and render information according the requests.
8. Write an Android application program that displays Hello World using Eclipse.
9. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using Eclipse.
10. Write an Android application program that demonstrates the following:
    a. Linear Layout
    b. Relative Layout
    c. Table Layout
    d. GridView Layout
11. Write an Android application program that converts the temperature in Celsius to Fahrenheit.
12. Write an Android application program that demonstrates intent in mobile application development.

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# MULTIMEDIA APPLICATION DEVELOPMENT LAB
**(Common to CSE & IT)**
IV Year – I Semester

| | | | |
|---|---|---|---|
| Practical | : 3 | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To gain knowledge on creating basic multimedia applications.
- To use Action script to create basic multimedia programs.
- To create simple animations.

**Learning Outcomes:**

Students will be able to

- create basic multimedia programs.
- use Action script to create programs.
- write code for Sorting or Reversing an array

**List of Experiments:**

1. Assigning Actions to an Object and a Button.
2. Drawing shapes like circle, rectangle. Apply colors to them.
3. Fill the shapes with gradient.
4. Calculate distance between the points.
5. Conversion between units of measurement and currencies.
6. Implement a action script program using keyboard events and mouse events.
7. Create a program to give different movements like velocity, acceleration, easing, friction to an object on stage.
8. Create a flash program using ActionScriptMovieClip subclass.
9. Create a program to detect collision.
   a. Collision with objects
   b. Collision with points
   c. Collision with on stage boundaries
10. Create program to use sound file in flash program with various option like play, pause, stop, volume increase and decrease.

All the above programs are to be done in Adobe Flash CS3 or higher.

**Reference Books:**


1. Rich Shupe and Zevan Rosser, "Learning ActionScript 3.0: ABeginner's Guide", Adobe Developer Library.
2. Joey Lott, Action Script Cookbook, SPD-Oreilly.


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*Elective - IV*

## DISTRIBUTED DATA BASES

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To understand the concepts of Distributed and Centralized Databases.
- To learn about various Query transformation and Optimization techniques.
- To gain the knowledge about transaction management, deadlocks and reliability.

**Learning Outcomes:**

Students will be able to

- distinguish Distributed and Centralized Databases.
- evaluate Distributed Grouping , Aggregate Function and Optimization of Access Strategies.
- describe the strategies of query transformation and optimization.
- describe the Distributed Deadlocks and distributed concurrency control.
- evaluate the Non-blocking Commitment Protocols.

**UNIT – I: Introduction**

Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Reference Architecture for Distributed Databases, Types of data fragmentation

**UNIT – II: Translation of Global Queries to Fragment Queries**

Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation

**UNIT – III: Query Optimization**

Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries.

**UNIT – IV: The Management of Distributed Transactions**

A frame work for transaction management, Supporting atomicity of transactions, Concurrency Control for Distributed Transactions.

**UNIT – V: Concurrency control**

Distributed Deadlocks, Concurrency Control based on Timestamps, optimistic methods for Distributed Concurrency Control

**UNIT – VI: Reliability**

Basic Concepts, Non-blocking Commitment Protocols, Reliability and concurrency Control, Detection and Resolution of Inconsistency

**Text Books:**

1. Stefano Ceri, Giuseppe Pelagatti Distributed Database Principles & Systems, McGraw-Hill International Editions.
2. M.Tamer Ozsu,– Pearson Patrick Principles of Distributed Database Systems, Valduriez Education.

**Reference Books:**

1. Chanda Ray Distributed Database Systems, Pearson Publications.
2. Andrew s.Tanenbaum and Maarten Van Steen Distributed Systems Principles and Paradigms (2nd edition) (Handcover-Oct 12,2006).
3. Jean Dollimore, Tim Kindberg and George Coulouris Distributed Systems Concepts and Design (4th Edition ) (International Computer Science Series).

*Elective - IV*

## SOFTWARE PROJECT MANAGEMENT

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To plan and manage projects at each stage of the software development life cycle (SDLC).
- To design effective software projects that support organization's strategic goals.

**Learning Outcomes:**

Students will be able to

- identify the basic concepts and issues of software project management.
- prepare project plans that address real time management challenges.
- identify important risks facing a new project.
- design effective software development model to meet organizational needs.
- apply appropriate methodologies to develop a project schedule.
- apply appropriate techniques to assess ongoing project performance.

**UNIT - I: Introduction**

**Conventional Software Management:** The waterfall model, conventional software Management performance.

**Evolution of Software Economics:** Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

**The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

**UNIT - II: Software Architectures**

**Life cycle phases:** Engineering and production stages, inception, Elaboration, construction, transition phases.

**Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

**Model based software architectures:** A Management perspective and technical perspective.

Work Flows of the process: Software process workflows, Iteration workflows.

**UNIT - III: Software Project Planning**

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

**UNIT - IV: Project Organizations and Responsibilities**

Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment.

**UNIT - V: Project Control and Process instrumentation**

The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation, Tailoring the Process- Process discriminants.

**UNIT - VI: Future Software Project Management**

Modern Project Profiles, Next generation Software economics, modern process transitions.

**Text Books:**

1. Walker Royce, Software Project Management, Pearson Education, 2005.

**Reference Books:**

1. Bob Hughes and Mike Cotterell, Software Project Management, Tata McGraw-Hill Edition.
2. Joel Henry, Software Project Management, Pearson Education.
3. Pankaj Jalote, Software Project Management in practice, Pearson Education.2005.

*Elective - IV*

## SEMANTIC WEB

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To explain the motivations for extending the web technologies with semantic models, ontologies and inference systems.
- To explain the applications of semantic web to real world problems

**Learning Outcomes:**

Students will be able to

- understand the importance of semantic web over the current web and describe the working of semantic web.
- represent real world knowledge in description logic and using this generate assertions and inferences to deduce new knowledge.
- describe how RDF can be used to represent semantic web data and create RDF for a sample domain.
- recognize how OWL helps to represent the knowledge more meaningfully and describe how to infer new knowledge from existing knowledge using OWL.
- recognize the need for metadata in semantic web and understand various semantic metadata repositories and their use in real world applications

**UNIT – I: Introduction**

**The Future of the Internet -** Introduction, The Syntactic Web, The Semantic Web, How the Semantic Web Will Work, What the Semantic Web Is Not, What Will Be the Side Effects of the Semantic Web

**Ontology in Computer Science -** Defining the Term Ontology, Differences Among Taxonomies, Thesauri, and Ontologies, Classifying Ontologies, Web Ontology Description Languages

**UNIT – II: Knowledge Representation in Description Logic**

Introduction, An Informal Example, The Family of Attributive Languages: Concept Descriptions, Terminologies, Assertions, Inference Problems**:** Inference Problems for Concept Descriptions, Inference Problems for Assertions

**UNIT – III: RDF and RDF Schema**

**Introduction, XML Essentials-** Elements and Attributes, URIs and Namespaces, **RDF-** RDF Statements and Vocabularies, RDF Triples and Graphs, RDF/XML

**RDF Schema-** Classes, Properties, Individuals

**UNIT – IV: OWL**

Introduction, Requirements for Web Ontology Description Languages, Header Information, Versioning, and Annotation Properties, Properties: Data and Object Properties, Property Characteristics, Classes: Class Descriptions, Class Axioms, Individuals, Data types, A Summary of the OWL Vocabulary

**UNIT – V: Methods for Ontology Development**

Introduction, Uschold and King Ontology Development Method, Toronto Virtual Enterprise Method, Methontology, KACTUS Project Ontology Development Method, Simplified Methods: Ontology Development 101, Horrocks Ontology Development Method

**UNIT – VI: Ontology Sources & Applications of Ontologies**

**Ontology Sources-** Introduction, Metadata: What is Metadata? Dublin Core, PICS, vCards, FOAF, Upper Ontologies: SUMO, CYC, WordNet

**Applications of Ontologies-** Semantic Web Services and Discovery, Semantic Integration of Tourism Information Sources, Semantic Digital Libraries, Semantic Web Search, Bioinformatics Ontologies

**Text Books:**


1. Semantic Web: Concepts, Technologies and Applications, K.K. Breitman, M.A. asanova and W. Truszkowski, Springer-Verlag London Limited 2007.
2. Semantic Web Services, Processes, and Applications, Jorge Cardoso, Amit P. Sheth, 2006 Springer Science+Business Media, LLC.


**Reference Books:**


1. A Semantic Web Primer, Grigoris Antoniou, Frank Van Hermelen, The MIT Press, Cambridge, Massachusetts London, England.
2. Semantic Web for the Working Ontologist, Second Edition, Dean Allemang, Jim Hendler, Morgan Kaufmann Publishers is an imprint of Elsevier.
3. Semantic Web Programming, John Hebeler, Matthew Fisher, Ryan Balce, Andrew Perez-Lopez, Wiley Publishing, Inc.


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*Elective - IV*

## BIG DATA
**(Common to CSE & IT)**
IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize the fundamental concepts of cloud for laying a strong foundation of Apache Hadoop (Big data framework).
- To gain knowledge of HDFS file system, MapReduce frameworks and relevant tools.

**Learning Outcomes:**

Students will be able to

- describe the fundamentals of Big cloud and data architectures.
- use HDFS file structure and Map reduce frameworks to solve complex problems.
- know how to analyze data using unix tools and hadoop.
- understand how to develop environment for analyzing Bigdata.
- understand how to use mapper and reducer functions.
- access the data base in a Hadoop environment using Hive.

**UNIT - I: Introduction to Big Data**

What is Big Data, Why Big Data is Important, Meet Hadoop- data, Data Storage and Analysis, Comparison with other systems, Grid Computing, a brief history of Hadoop, Apache Hadoop and the Hadoop Eco System.

**UNIT - II: MapReduce**

Analyzing data with unix tools, Analyzing data with hadoop, Java MapReduce classes (new API), Data flow, combiner functions, Running a distributed MapReduce Job.

**UNIT - III: Hadoop Distributed File System**

HDFS concepts, Command line interface to HDFS, Hadoop File systems, Interfaces, Java Interface to Hadoop, Anatomy of a file read, Anatomy of a file write, Replica placement and Coherency Model, Parallel copying with distcp, Keeping an HDFS cluster balanced.

**UNIT - IV: Developing a MapReduce Application**

Setting up the development environment, Managing configuration, Writing a unit test with MRUnit, Running a job in local job runner, Running on a cluster, Launching a job, The MapReduce WebUI.

**UNIT - V: MapReduce Working**

Classic MapReduce, Job submission, Job Initialization, Task Assignment, Task execution, Progress and status updates, Job Completion, Shuffle and sort on Map and reducer side, Configuration tuning, MapReduce Types, Input formats, Output formats .

**UNIT - VI: Hive**

The Hive Shell, Hive services, Hive clients, The meta store, Comparison with traditional databases, Hive QL , Tables, Querying data, User-Defined Functions.

**Text Books:**


1. Tom White, Hadoop,"The Definitive Guide", 3rd Edition, O'Reilly Publications, 2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch ,"Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH,2012.


**Reference Books:**


1. Frank J.Ohlhorst, "Big Data Analytics: Turning Big Data Into Big Money",2nd Edition, TMH,2012.


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*Elective - V*

## MACHINE LEARNING

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To familiarize with supervised and unsupervised learning.

**Learning Outcomes:**

Students will be able to

- apply appropriate machine learning algorithm for a application.
- compare various supervised and unsupervised learning Algorithms.
- analyze decision tree learning on appropriate problems.

**UNIT - I: Introduction**

Well- posed learning problems, designing a learning system, Perspectives and issues in machine learning.

**UNIT - II: Concept Learning**

Concept learning and the general to specific ordering. Introduction, A concept learning task, Concept learning as search, Find-s: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

**UNIT - III: Decision Tree Learning**

Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.

**UNIT - IV: Bayesian learning**

Bayes theorem, Byes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Bayes optimal classifier, An example learning to classify text, Bayesian belief networks.

**UNIT - V: Computational learning theory - 1**

Probability learning an approximately correct hypothesis, Sample complexity for infinite Hypothesis spaces, The mistake bound model of learning- Instance- Based learning- Introduction.

**UNIT - VI: Computational learning theory - 2**

K- Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

**Text Books:**

1. Tom M. Mitchell, Machine Learning, MGH.

**Reference Books:**

1. Ethem Alpaydin, Introduction to machine learning, 2nd edition, PHI.

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*Elective - V*

## CLOUD COMPUTING
**(Common to CSE & IT)**
IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**
- To understand Virtualization, Virtual Machine and different models of VM.
- To familiarize Cloud computing architecture and its security aspects.

**Learning Outcomes:**

Students will be able to
- know about basics of cloud computing.
- cloud computing and its services available today.
- distinguish Virtualization and Virtual Machine and its need, Types of Virtualization.
- understand how to provide security for the cloud.
- understand disaster recovery and disaster management.
- design a Cloud for an Enterprise.

**UNIT - I: Cloud computing**

Introduction, what it is and what it isn't, from collaborations to cloud- a short history of cloud computing, the network is the computer- How cloud computing works, companies in the cloud- Cloud computing today.

**UNIT - II: Ready for Computing in the cloud**

The pros and cons of Cloud Computing, Developing Cloud Services- Why Develop Web-Based Applications?, The Pros and Cons of Cloud Service Development, Types of Cloud Service Development, Discovering Cloud Services Development services and Tools.

**UNIT - III: Virtulization**

Virtualization for cloud, Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

**UNIT - IV: Security**

Data Security, Data Control Encrypt Everything, Regulatory and Standards compliances, Network Security, Firewall rules, Network Intrusion detection, Host Security, System Hardening, Antivirus Protection, Host Intrusion detection, Data segmentation, Credential Management.

**UNIT - V: Disaster**

What is Disaster, Disaster Recovery Planning, The Recovery Point objective, The Recovery Time Objective, Disasters in the Cloud, Backups and data retention, Geographic redundancy, Organizational redundancy, Disaster Management, Monitoring, Load Balancer Recovery, Application server recovery, Database Recovery.

**UNIT - VI: Defining Clouds for the Enterprise**

Storage-as-a-Service, Database-as-a- Service, Information-as-a-Service, Process-as-a-Service, Application-as-a- Service, Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service Infrastructure-as- a-Service.

**Text Books:**


1. Michael Miller, Cloud Computing – Web Based Applications That change the way you work and Collaborate Online –Person Education.
2. George Reese Cloud Application Architectures, Ist Edition O'Reilly Media.


**Reference Books:**


1. David S. Linthicum, Cloud Computing and SOA Convergence in your Enterprise : A Step-by-Step Guide- Addison-Wesley Professional.
2. Kai Hwang, Geoffery C.Fox, Jack J, Dongarra, Distributed & Cloud Computing From Parallel Processing to the Internet of Things.


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*Elective - V*

## PATTERN RECOGNITION
**(Common to CSE & IT)**
IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3 +1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To introduce various pattern recognition and dimensionality reduction techniques

**Learning Outcomes:**

Students will be able to

- understand how the pattern recognition system works.
- classify the patterns using Bayesian decision theory.
- model the pattern recognition problem with normal density.
- apply maximum likelihood technique to recognize the patterns.
- work with k-means clustering in categorizing the patterns.
- reduce the dimensionality of the data using PCA, NLCA.

**UNIT – I: Introduction**

Machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation

**UNIT – II: Bayesian Decision Theory**

Introduction, continuous features – two categories classifications, minimum error-rate classification, zero–one loss function, classifiers, discriminant functions, and decision surfaces

**UNIT - III: Normal density**

Univariate and multivariate density, discriminant functions for the normal density-different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context

**UNIT - IV: Maximum likelihood and Bayesian parameter estimation**

Introduction, maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case

**UNIT - V: Un-supervised learning and clustering**

Introduction, K-means clustering, Data description and clustering – similarity measures, training and testing with continuous HMMs, types of HMMs, Introduction to Discrete Hidden Morkov Models.

**UNIT - VI: Component analysis**

Principal component analysis, non-linear component analysis, Low dimensional representations and multi dimensional scaling.

**Text Books:**

1. Richard O. Duda, Peter E. Hart, David G. Stroke, Pattern classifications, Wiley student edition, Second Edition.
2. Lawerence Rabiner, Biing – Hwang Juang, Fundamentals of speech Recognition, Pearson education.

**Reference Books:**

1. Earl Gose, Richard John Baugh, Steve Jost, Pattern Recognition and Image Analysis –PHI 2004.

*Elective - V*

## WIRELESS NETWORKS

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : 3+1* | Internal Marks | : 40 |
| Credits | : 3 | External Marks | : 60 |

**Course Objectives:**

- To gain knowledge of the underlying networking technologies, architectures and protocols of wireless networks.
- To study the Architecture and security of Wireless sensor networks

**Learning Outcomes:**

Students will be able to

- understand state-of-the-art wireless technologies.
- apply the routing algorithms in any large scale dynamic networks.
- design a secure Ad Hoc networks.
- introduce various wireless systems and standards and their basic operation cases.
- learn to simulate wireless networks and analyze the simulation results.
- students are enriched with the knowledge of present day technologies to enable them to face the world and contribute back as researchers

**UNIT - I: Introduction to Ad Hoc Wireless Networks & Routing in MANETs**

Introduction to Ad Hoc Wireless Networks: Cellular and Ad Hoc Wireless Networks, Characteristics of MANETs, Applications of MANETs, Issues and Challenges of MANETs.

Routing in MANETs- Classification of Routing Protocols, Topology- based versus Position – based Approaches, Topology based Routing Protocols; Position based Routing, Other Rotuing Protocols.

**UNIT - II: Data Transmission in MANETs**

The Broadcast Strom, Multicasting, Geocasting, TCP over Ad Hoc Networks-TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc.

**UNIT - III: Security in MANETs**

Security in Ad Hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**UNIT - IV: Basics of Wireless Sensors and Applications**

The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications.

Data Retrieval in Sensor Networks – Classification of WSNs, MAC Layer, Routing Layer, High-Level Application, Layer Support, Adapting to the Internet Dynamic Nature of WSNs.

**UNIT - V: Sensor Network Platforms and Tools**

Sensor Node Hardware, Sensor Network Programming Challenges, Node- Level Software Platforms, Node- Level Simulators.

**UNIT - VI: Security in WSNs**

Security in Wireless Sensor Networks, Key Management in Wireless Sensor Networks, Secure Data Aggregation in Wireless Sensor Networks, Introduction to Vehicular Ad Hoc Networks, Introduction to Wireless Mesh Networks.

**Text Books:**


1. Ad Hoc And Sensor Networks: Theory and Applications, Carlos de Morais Cordeiro and Dharma Prakash Agrawal, World Scientific Publications / Cambridge University Press, 2006.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science Imprint, Morgan Kauffman Publishers, 2005.


**Reference Books:**


1. C. Siva Ram Murthy and B.S. Manoj, Ad Hoc Wireless Networks: Architectures and Protocols, Pearson Education, 2004.
2. Sudip Misra, Issac Woungang, and Subhas Chandra Misra, Guide to Wireless Ad Hoc Networks, Springer International Edition, 2011.
3. Sudip Misra, Issac Woungang, and Subhas Chandra Misra, Guide to Wireless Sensor Networks, Springer International Edition, 2012.
4. Thomas Krag and Sebastin Buettrich,Wireless Mesh Networking, O' Reilly Publishers, 2007.


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*Self Study Course*

## GLOBAL POSITIONING SYSTEMS

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To understand the concept and usage of GPS for various applications.

**Learning Outcomes:**

Students will be able to

- explain the GPS components.
- choose a specific GPS receiver and GPS survey method.
- interpret the navigational message and signals received by the GPS satellite
- identify location of features and map the geospatial features.

**UNIT – I: Overview and Observables of GPS**

Basic concept. Space segment- constellation, satellites, operational capabilities, denial of accuracy and access. Control segment- master control station, monitor stations, ground control stations. User segment- user categories, receiver types, information services.

Observables:

Data acquisition- code pseudoranges, phase psecudoranges, Doppler data, biases and noise. Data combinations- linear phase combinations, code, psecudorange smoothing. Atmospheric effects- phase and group velocity ,ionospheric refraction, toposoheric refraction, atmospheric monitoring.

**UNIT – II: Surveying with GPS**

Introduction- terminology definitions, observation techniques, field equipment. Planning a GPS survey- General remarks, Pre survey planning, field reconnaisence, monumentation, organizational design. Surveying Procedure- preobservation, observation, postobservation, ties to control monuments. In Situ data Processing- data transfer, data processing, trouble shooting and quality control, datum transformations, computation of plane coordinates. Survey report.

**UNIT – III: Methods of Processing GPS Data**

Data processing- data handling, cycle slip detection and repair. Ambiguity resolutions- general aspects, basic approaches, search techniques, ambiguity validation. Adjustment, filtering and smoothening- least squares adjustments, kalmal filtering, smoothening. Network adjustment- single base line solution,

multipoint solution, single base line versus multi point solution, least squares adjustment of base lines. Dilutin of precision. Accuracy measures- introduction, chi-square distribution, specifications.

**UNIT – IV: Applications and Future of GPS**

General Uses of GPS- global uses, regional uses, local uses. Attitude determination- theoretical and practical considerations. Air borne GPS for photo control. Interoperability of GPS- GPS and inertial navigation systems, GPS and GLONASS, GPS and other sensors.

Future of GPS:

New application aspects. GPS modernization- future GPS satellites, augmented signal structure. GPS augmentation- ground based and satellite based augmentation. GNSS - GNSS development, GNSS/Loran-C integration.

**Text Books:**

1. B. Hofmann- Wellnhoff, H.Lichtenegger and J. Collins: GPS theory and practice, fifth edition, Springer Wien, Newyork.
2. Bradford W. Parkinson, James Spilker, Global Positioning System: Theory and Applications, Vol. I, 1996.

**Reference Books:**

1. Gunter Seeber, Satellite Geodesy Foundations, Methods and Applications, Walter de Gruyter Pub., 2003.
2. Hofmann W.B, Lichtenegger, H, Collins, J Global Positioning System – Theory and Practice, Springer-VerlagWein, 2001.

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*Self Study Course*

## INTERIOR DESIGN

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To understand concepts, principles, procedures and components of communication; interpret reasons of communication failure and source respective remedies.
- To classify communication and select appropriate media; draft business letters and reports pertinent to interior designing profession.
- To work in groups and teams; demonstrate leadership quality; make use of group skills to achieve goals.

**Learning Outcomes:**

Students will be able to

- implement the key features that can enhance architectural view.
- understand the need of designing construction projects.
- identify the paints and materials for specific interior design.

**UNIT – I: Interior Design and Decoration, Decoration and Tools**

Importance of design - Optimization, Economics, Time, Maintainability, Multiplicity, Role of Interior Designer-Interest of user with respect to economy, comfort, safety, security, etc, Limitations on design due to existing constraints

**Aesthetical tools**

a. Principles of Design - Balance, Emphasis, Rhythm, Harmony, Scale and Proportion

b. Elements of design - Point, Line, Shape, Form, colour and colour theory, Texture and Pattern

c. Aesthetical design consideration - Physical such as touch, smell, hearing, Social such as interactive, status symbols, Psychological such as derivable pleasure from use, emotional comfort, Ideological such as environmental, patriotic, socialistic conditions .

**Functional tools**

a. Ergonomics- Its study - Postures, Anthropometrics, Biomechanics.

b. Zoning, Grids, Modulation of space within and without, enveloping space within the room and furniture.

**UNIT – II: Design Notions**

Concepts - Manifestation of realization through contemplative germination, Period & Styles - Historical & Cultural approach with stress on ability to identify Occidental

Periods and Oriental styles and with special focus on Contemporary Indian period and styles.

a. Occidental - Classical, Medieval, 19th Century AD, Contemporary
b. Oriental - Japanese, Chinese, Thai, and Indian Themes - The common thread that binds the entire design in a story line on Beach and Mela.

**UNIT – III: Planning Process**

Understanding process of design (Need-Design brief-Information collection-Developing Alternatives-Analysis-Solution) Planning Process of Interior Design

a. Design Brief - simple and clear description about what is to be designed.
b. Relevant Data collection such as location & condition of site, Client profile & requirements, Materials, etc.
c. Data Analysis - analyzing and forming alternative schemes based on personal interpretations of design brief and relevant data using design tools and design concepts.
d. Selection- finalizing the best scheme through personal justifications.
e. Presentation- representing the final scheme in graphical manner.

**UNIT – IV: Materials, Paints, Varinishes and Coatings for Interior Design**

Cement, Lime, Sand and Gypsum: Types & Properties of Cement, Lime, Fine and Course Aggregates Types & Applications of Concretes, Mortars and Plasters Properties & Applications of Gypsum & its products.

Paints, varnishes and coatings:

Constituents (Pigment, Thinner, etc.), Classification (Water, Oil, acrylic based), Types (lime wash, distempers, acrylic emulsion, metallic, textured, etc.), Textural quality (Matt, Gloss, Satin, Lustre, etc) and Properties Process of painting (preparation of surface, primer coat, etc.) & application of paint with brush, roller, spray, etc. including applications of paints on different surfaces. Constituents, Types & uses of Varnishes, Polishes & Coatings.

**Text Books:**

1. Joseph De Chaira Jullius Panero Martin Zelnik Time Saver Standard for Interior Design & Space Planning Mcgraw Hill New York.
2. John Pile Interior Design Harry N. Adry Publishers.

**Reference Books:**

1. Jullius Panero Martin Zelnik Human Dimensions and Interior Spaces Whitney Library New York.
2. Phillis Sleen Allen Beginning of Interior Environment New York.
3. Shirish Bapat Basic Design of Anthropometry Bela books Publishers.
4. Shirish Bapat Living Area (Interior Space) Bela books Publishers.

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## ELECTRICAL SAFETY MANAGEMENT

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To provide a comprehensive exposure to electrical hazards, safety procedures.
- To familiarize the students with various grounding techniques.

**Learning Outcomes:**

Students will be able to

- describe electrical hazards and safety equipment.
- analyze and apply various grounding and bonding techniques.
- select appropriate safety method for low, medium and high voltage equipment.
- participate in a safety team.

**UNIT – I:**

Primary and secondary hazards- arc, blast, shocks-causes and effects-safety equipment- flash and thermal protection, head and eye protection-rubber insulating equipment, hot sticks, insulated tools, barriers and signs, safety tags, locking devices- electrician's safety kit.

**UNIT – II:**

The six step safety methods- pre job briefings- hot -work decision tree-safe switching of power system, safety equipment, procedure for low, medium and high voltage systems- the one minute safety audit.

**UNIT – III:**

General requirements for grounding and bonding- definitions- grounding of electrical equipment- bonding of electrically conducting materials and other equipment-connection of grounding and bonding equipment- system grounding- purpose of system grounding- grounding of low voltage and high voltage systems.

**UNIT – IV:**

Company safety team- safety policy- safety meetings- safety audit- accident prevention- first aid- rescue techniques-accident investigation- national electrical safety code- standard for electrical safety in work place- occupational safety and health administration standards.

**Text Book:**

1. *Dennis Neitzel*, Al Winfield,'Electrical Safety Handbook', McGraw-Hill Education, 4th Edition,2012.

**Reference Books:**


1. John Cadick, 'Electrical Safety Handbook', McGraw-Hill School Education Group, 1994.
2. Maxwell Adams.J, "Electrical safety- a guide to the causes and prevention of electric hazards",The Institution of Electric Engineers, 1994.
3. Ray A. Jones, Jane G. Jones, 'Electrical safety in the workplace', Jones & Bartlett Learning, 2000.


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## GREEN ENGINEERING

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To impart knowledge, how engineering fundamentals can be applied to achieve sustainability and minimize environmental impacts in all engineering disciplines across life cycles.

**Learning Outcomes:**

Students will be able to

- to Create sustainable products, facilities, processes and infrastructure.
- to Design ecofriendly products.

**UNIT - I: Introduction**

Humanity and Technology, the Concept of Sustainability, Industrial Ecology and Sustainable Engineering Concepts.The Relevance of Biological Ecology to Industrial Ecology, Metabolic Analysis, Technology and Risk, the Social Dimensions of Industrial Ecology.

**UNIT - II: Implementation**

Sustainable Engineering, Technological Product Development, Design for Environment and Sustainability: Customer Products, Design for Environment and Sustainability: Buildings and Infrastructure.

**UNIT - III: Life Cycle Assessment**

An Introduction to Life Cycle Assessment, The LCA Impact and Interpretation Stages, Streamlining the LCA Process.

**UNIT - IV: Analysis of Technological Systems**

Systems Analysis, Industrial Ecosystems, Material Flow Analysis, Energy and Industrial Ecology, Water and Industrial Ecology, Urban Industrial Ecology, Modelling in Industrial Ecology.

**Text Books:**


1. T E Graedel, Braden R Allenby “Industrial ecology and sustainable engineering” Prentice Hall, ©2010.
2. David T. Allen, David R Shonnard “Sustainable Engineering Concepts, Design and Case Studies” Prentice Hall, 2011.


**References Books:**


1. Anastas, Paul T, Zimmerman, Julie B, “Innovations in Green Chemistry and Green Engineering”, Springer, First Edition, 2013.
2. Daniel A. Vallero, Chris Brasier, “Sustainable Design: The Science of Sustainability and Green Engineering”, Wiley, First Edition, 2008.

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## MANAGING INNOVATION & ENTREPRENEURSHIP

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- Understand process of innovation and its exploitation.

**Learning Outcomes:**

Students will be able to

- explore opportunities to implement innovative ideas.
- assess the level of risk involved in realizing the innovative ideas as entrepreneur.

**UNIT - I:**

Innovation and entrepreneurship. A model for innovation and entrepreneurship, the challenge of innovation strategy.

**UNIT - II:**

The challenge of social entrepreneurship, the potential of" bottom of the pyramid", challenges in managing social entrepreneurship.

**UNIT - III:**

Developing new products, services and ventures. The global business plan.

**UNIT - IV:**

International Opportunities for Innovation and Entrepreneurship. The Future Impact on Innovation on Consumers, Business and Government

**Text books:**

1. John Bessant, Joe Tidd, "Innovation and Entrepreneurship", John Wiley and sons Ltd, second edition, 2011.
2. Robert D Hisrich Claudine Kearney "Managing Innovation and Entrepreneurship" SAGE publications, 2014.

**Reference Books:**

1. Joe Tidd , John Bessant, "Managing Innovation: Integrating technological, market and organizational change" Wiley, Fifth edition, 2013.
2. Joe Tidd , John Bessant, "Strategic Innovation Management", Wiley, First edition, 2014.
3. Richard Owen , John Bessant , Maggy Heintz , "Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society", Wiley, First edition,2013.

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# INTERNET OF THINGS

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To familiarize with IOT levels and Protocols.
- To provide an insight on specific IoT domain.

**Learning Outcomes:**

Students will be able to

- integrate Internet services and physical objects.
- analyze prototypes of Internet-connected products using appropriate tools.
- apply adequate patterns for user-interaction with connected-objects

**UNIT - I: Introduction to Internet of Things**

Introduction, History , Objects and things, The identifier, Enabling technology , The internet.

**UNIT - II**: **RFID**

Introduction and principles , Components- Active, Passive, Semi-active, and Semi-passive; Future of RFID, RFID application scenarios-case study

**UNIT - III**: **Wireless Sensor Network**

Overview , History, The node, Connecting Nodes, Networking Nodes. Securing communication- standards.

**UNIT - IV: Internet of Things Protocols**

An Introduction to M2M area network physical layers , Applications, Introduction to Legacy M2M protocols for sensor networks, Examples (Mod Bus, Zig Bee). Introduction to next generation Internet of Things Protocols-IP based protocols.

**Text Books**


1. Hakima Chaouchi, “The Internet of Things: Connecting Objects”, John Wiley and sons, ISTE, Briton. (I to III Units).
2. Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things: Key Applications and Protocols”, johnwiley and sons. (IV unit).


**Reference Books:**


1. Sergei Evdokimov, Benjamin Fabian, Oliver Gunther, Lenka Ivantysynova, Holger Ziekow, “RFID and the Internet of Things: Technology, Applications, and Security challenges”, Now Publishers Inc, 2011.
2. Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning,”The Internet of Things: From RFID to the Next-Generation Pervasive Networked systems”, Auerbach Publications,CRC Press.


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## CONSUMER ELECTRONICS

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To understand working principles of various electronic gadgets and consumer products.
- To study the various technical specifications and facilities of the consumer products.

**Learning Outcomes:**

Students will be able to

- how to work with latest electronic gadgets.
- understand audio and video processing.
- keen learn with home appliances.
- should able to differentiate old and latest developments in electronic world

**UNIT - I: Audio Systems**

PA system – Microphone, Amplifier, Loudspeakers, Radio receivers – AM/FM, Audio recording and reproduction – Cassettes, CD and MP3.

**UNIT - II: Video Systems**

Video system VCR/VCD/DVD players, MP4 players, Set Top box, CATV and Dish TV, LCD, Plasma & LED TV, Projectors – DLP, Home Theatres, Remote Controls.

**UNIT - III: Landline and Mobile Telephony**

Basic landline equipment – CLI, Cordless Intercom/ EPABX system, Mobile phones – GPRS & Bluetooth GPS Navigation system.

**UNIT - IV: Electronic Gadgets**

Scanners – Barcode / Flat bed, Printers, Xerox, Multifunction units (Print, Scan, fax, and copy) Digital clock, Digital camera, Handicam, Home security system, CCTV.

**Text Books:**


1. S. P. Bali ,"Consumer Electronics", Pearson Education ,2008.
2. R. G. Gupta "Audio and Video systems: Principles, Maintenance and Troubleshooting", Tata McGraw Hill (2004).


**Reference Books:**


1. Ronald K.Jurgen, "Digital Consumer Electronics Handbook", McGraw Hill Professional Publishing, 1997.
2. R.R Gulati, "Colour Television-principles and practice", Wiley Eastern Limited, New Delhi.
3. B.R. Gupta, Vandana singhal,"Consumer Electronics", S.K. Kataria and sons, 2006.


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## e-WASTE MANAGEMENT

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To familiarize the concepts of e-Waste management.
- To gain knowledge in recycling technologies for e-Waste.

**Learning Outcomes:**

Students will be able to

- analyze the recycling techniques of e-Waste management.
- analyze various toxic releases and health complications due to e-Waste.
- apply various reuse techniques for e-Waste.
- acquire knowledge for handling and management of e-Waste.
- apply waste disposal strategy for e-Waste.

**UNIT – I: Introduction to e-Waste Management in India**

Global e-waste growth, Dark shadows of digitization on Indian horizon, e-waste generation, migration, Present practice and systems, disposal methods, Present processing practices, Initiatives to manage e-waste, Strengths and weaknesses of the current system.

**UNIT – II: WEEE (waste electrical and electronic equipment) - toxicity and health**

Hazardous substances in waste electrical and electronic equipment-toxicity and release, Occupational and environmental health perspectives of e-waste recycling.

**UNIT – III: Options and Scenarios for e-Waste Management**

Actions to be considered to achieve goals of e-waste management, Collection/ take back system, Closing the Plastic loop: Turning the supply chain into a supply cycle by mining plastics from end-of-life electronics and other durable goods.

**UNIT – IV: Recycling technologies for e-waste**

Recycling of e-scrap in a global environment-opportunities and challenges, Technologies for recovery of resources from e-waste.

**Reuse:** A Bridge from Unsustainable e-waste to sustainable e-resources.

**Text Books:**


1. Rakesh Johri, E-waste: Implications, regulations, and management in India and current global best practices .
2. Klaus Hieronymi, Ramzy Kahhat, Eric Williams, E-Waste Management: from Waste to Resource


**Reference Books:**


1. Satish Sinha, Priti Mahesh,Waste Electrical and Electronic Equipment The EU and India.
2. By Ronald E. Hester, Roy M. Harrison , Electronic Waste Management .

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# MANAGEMENT INFORMATION SYSTEMS

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To understand the scope of information systems and strategies.
- To know the types of information systems and their functionalities in an enterprise.
- To know the applications of information systems in various business areas
- To analyze and develop the system.

**Learning Outcomes**

Students will be able to

- define the basic concepts, strategies and challenges of MIS.
- describe the nature of the information system in the business process.
- analyze the applications of information system in various functional business areas.
- compare various information system design and analysis.

**UNIT – I: Introduction to Information Systems**

International Information Systems Meaning, Scope of Information Systems**,** Concepts of system and organization, strategic uses, Evolution of MIS, Challenges and New opportunities. Growth of international information systems; Managing global information Systems.

**UNIT – II: Information System in the Enterprise**

Major types of Systems in the organization; Systems from a functional perspective; Enterprise e application–Enterprise systems, Business Process Reengineering and Information Technology.

**UNIT – III: Application of Information Systems to Functional Business Areas**

Significance of Information systems; Application of Operational Information System to Business;

**UNIT – IV: Systems Analysis and Design**

Systems analysis; Structured systems analysis and design; Alternative application development and evaluation, IT Act 2000

**Text Books:**


1. Kenneth C Laudon & Jane P Laudon, Management Information Systems, 8th Edition, PHI–2003.
2. Robert Schultheis & Mary Sumner, Management Information Systems–The Managers View 20th reprint, TMH –2010.


**Reference Books:**


1. V.M.Prasad, Management Information Systems, 9th Edition, PearsonEducation–2005.
2. Robert G Murdick, Joel E Ross & James R Claggett , Information Systems for Modern Management, 3rd Edition, PHI - 2007.

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## INFORMATION & COMMUNICATION TECHNOLOGY

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To explore the use of internet to access remote information, communicate and collaborate with others.
- To familiarize with social, economic, security and ethical issues associated with the use of ICT.

**Learning Outcomes:**

Students will be able to

- understand the basic concepts of networking.
- explore internet for learning.
- understand social, economic and security issues associated with the use of ICT.
- apply the concepts of ICT for their professional growth.

**UNIT – I: Computer Networks & Internet**

Concept, Types & Functions of Computer Networks, Internet and its Applications, Web Browsers & Search Engines, Legal & Ethical Issues.

**UNIT – II: E-Learning & Web Based Learning**

E-Learning, Web Based Learning, Virtual Classroom- concept, elements, advantages and limitations, EDUSAT

**UNIT – III: Effects of using ICT**

Software Copyright, Hacking, Viruses & its Management, Employment Patterns, IT in the home, Information from the Internet, Health and Safety**.**

**UNIT – IV: ICT for Professional Development**

ICT for Personal & Professional Development: Tools & Opportunities.
Open Education Resources: Concept & Significance.

**Text Books:**

1. Roger Crawford, Heinemann IGCSE ICT, Pearson Education Limited

**Reference Books:**

1. Agarwal J.P. (2013): Modern Educational Technology. Black Prints, Delhi.
2. Barton,R.(2004).Teaching Secondary Science with ICT. McGraw Hill International
3. Bhaskar Rao (2013): Samachara Prasara Sankethika vidya Shastramu, Masterminds, Guntur.
4. Cambridge, D.(2010).E-Portfolios for Lifelong Learning and Assessment. John Wiley and Sons

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## ORGANIZATIONAL BEHAVIOUR

IV Year – II Semester

| | | | |
|---|---|---|---|
| Lecture | : - | Internal Marks | : 25 |
| Credits | : 2 | External Marks | : 50 |

**Course Objectives:**

- To provide a basic knowledge of main ideas and key theories relating to organizational behavior.
- To understand basic concepts, theories and techniques in the field of human behaviour at the individual, group and organizational levels in the changing global scenario.
- To increase managerial effectiveness through understanding of self and others.
- To develop an interest in, an appreciation of, and a positive attitude toward the many aspects of the subject matter of management.

**Learning Outcomes:**

Students will be able to

- eemonstrate clear understanding of a number of established theorists, theories and studies relating to Organizational Behavior.
- explain and evaluate the key assumptions on which behaviour in organizations is currently managed and assess the effect of these ideas on employee attitudes and actions.
- apply problem solving and critical thinking abilities to analyze the kinds of choices available for developing alternative Organizational Behaviour approaches in the workplace.
- form an appreciation of the complexities and uncertainties of Organizational Behaviour by examining your own role in the light of experience of real-time problem settings.

**UNIT – I: Introduction**

Nature, scope & Importance – linkages with other social sciences – Individual Roles and Organizational Goals - Perspectives of Human Behavior, Approach to Organizational behavior - models of organizational behavior (Autocratic, Custodial, Supportive, Collegial & SOBC).

**UNIT – II: Perceptual Management**

Nature, importance - Process – selection, organization and interpretation – Influencing factors **-**Motivation – Concepts - Needs and Motives and theories (Maslow & Herzberg) Leadership and Motivating people - Leadership Theories. Attitudes and Values: formation - types – changes and behavior modification techniques.

**UNIT – III: Personality Development**

Nature - Stages, Factors, Determinants of Personality, Theories of personality - Johari Window - Transactional Analysis, Learning Processes - theories, Creativity and Creative Thinking. Leadership – nature – skills. Decision Making Process**:** Behavioral Dimensions, Groups and their formation - Group Dynamics, Informal Organizations, Group versus Individual Interaction.

**UNIT – IV: Inter- Personal Communication**

Listening, Feedback, Collaborative Processes in Work Groups, Team Building, Team Decision Making, Conflict Resolution in Groups and Problem Solving Techniques.

Taxonomy, Elements of Structure, Determinants of Structure, Functional Aspects of Structure, Role Impingement, Stress in Organization. Principles Underlying the Design of Organizations, Organizational Culture, Power and Authority. Organizational Development**:** Goals, processes, change – resistance to change – Nature of OD - interventions, OD techniques and OD applications.

**Text Books:**


1. Steven L McShane, Mary Ann Von Glinow, Radha R Sharma:"Organizational Behavior", Tata McGraw Hill Education, New Delhi, 2008.
2. K.Aswathappa: "Organizational Behavior-Text, Cases and Games", Himalaya Publishing House, New Delhi,


**Reference Books:**


1. Jerald Greenberg and Robert A Baron: "***Behavior in Organizations***", PHI Learning Private Limited, New Delhi, 2009.
2. Pareek Udai: "***Understanding Organizational Behavior***", Oxford University Press, New Delhi, 2007.
3. Jai B.P.Sinha: "***Culture and Organizational Behavior***", Sage Publication India Private Limted, New Delhi, 2008.
4. Sharma VS, Veluri: "***Organizational Behavior***", JAICO Publishing House, New Delhi, 2009.
5. Slocum,n Helireigel: "***Fundamentals of Organizational Behavior***", Cengage Learning India, New Delhi, 2009.


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