ANNAMALAI UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
B.E. COMPUTER SCIENCE & ENGINEERING
(Four Year Degree Programme)
(Choice Based Credit System)
(FULL–TIME)
REGULATIONS AND SYLLABUS
REGULATIONS

1. Condition for Admission
Candidates for admission to the first year of the four year B.E. Degree programmes shall be required to have passed the final examination of the plus 2 Higher Secondary Course with Mathematics, Physics and Chemistry as subjects of study and candidates who have passed the Higher Secondary Examination through vocational stream under Engineering, conducted by the Board of Secondary Education, Government of Tamilnadu or an examination of any other authority accepted by the Syndicate of this University as equivalent thereto. They shall satisfy the conditions regarding qualifying marks, age and physical fitness as may be prescribed by the Syndicate of the Annamalai University from time to time.

Candidates who have passed the Diploma course in Engineering of the State Board of Technical Education, TamilNadu (listed in Annexure-1) will be eligible for admission to the second year of the four year degree programme in B.E. under the lateral entry scheme provided they satisfy other conditions.

2. Branches of Study in B.E.
BRANCH I - Civil Engineering
BRANCH II - Civil and Structural Engineering
BRANCH III - Mechanical Engineering
BRANCH IV - Mechanical Engineering (Manufacturing)
BRANCH V - Electrical and Electronics Engineering
BRANCH VI - Electronics and Instrumentation Engineering
BRANCH VII - Chemical Engineering
BRANCH VIII - Computer Science and Engineering
BRANCH IX - Information Technology
BRANCH X - Electronics and Communication Engineering

3. Courses of study
The courses of study and the respective syllabi are given separately.

4. Scheme of Examinations
The scheme of Examinations is given separately.
5. **Choice Based Credit System (CBCS)**

The curriculum includes six components namely Humanities/Social Sciences/Management, Basic Sciences, Engineering Sciences, Professional Core, Professional Electives and Open Electives in addition to Seminar & Industrial Training and Project. Each semester curriculum shall normally have a blend of theory and practical courses. The total credits for the entire degree Programme is 176 (135 for lateral entry students).

6. **Eligibility for the Degree**

A candidate shall be eligible for the degree of Bachelor of Engineering if the candidate has satisfactorily undergone the prescribed courses of study for a period of four academic years and has passed the prescribed examinations in all the four academic years. For the award of the degree, a student has to

1. Earn a minimum of 176 credits (135 for lateral entry students).
2. Serve in any one of the Co-curricular activities such as
   - National Cadet Corps (NCC)
   - National Service Scheme (NSS)
   - National Sports Organization (NSO) and
   - Youth Red Cross (YRC)

for at least one year. The students enrolled in any one of the co-curricular activities (NCC / NSS / NSO / YRC) will undergo training for about 80 hours and attend a camp of about seven days. The training shall include classes on hygiene and health awareness and also training in first-aid. While the training activities will normally be during weekends, the camp will normally be during vacation period.

(OR)

Enroll as a student member of a recognized professional society such as
- Student Chapters of Institution of Engineers (India)
- Student Chapters of other Professional bodies like ICI, ISA, IICChE

7. **Assignment of Credits for Courses**

Each course is normally assigned one credit per hour of lecture / tutorial per week and one credit for two hours or part thereof for laboratory or practical or drawing per week.

8. **Duration of the programme**

A student is normally expected to complete the B.E. programme in four years but in any case not more than eight years from the time of admission.
9. **Registration for courses**

A newly admitted student will automatically be registered for all the courses prescribed for the first, second and third semesters without any option.

Every other student shall enroll for the courses intended to be credited in the succeeding semester in the current semester itself by completing the registration form indicating the list of courses. This registration will be done a week before the last working day of the current semester.

A student is required to earn 176 (135 for lateral entry students) credits in order to be eligible for obtaining the degree. However the student is entitled to enjoy an option to earn either more or less than the total number of credits prescribed in the curriculum of a particular semester on the following guidelines:

The **slow learners** may be allowed to withdraw certain courses with the approval by Head of the Department and those courses may be completed by them in the fifth year of study and still they are eligible to be awarded with I Class. A student can withdraw a maximum of 2 courses per semester from IV semester to VII semester and take up those courses in the fifth year of study. However, courses withdrawn during odd semesters (V and VII) must be registered in the odd semester of fifth year and courses withdrawn during even semesters (IV and VI) must be registered in the even semester of fifth year.

The **advance learners** may be allowed to take up the open elective subjects of eighth semester in sixth and seventh semesters one in each to enable them to pursue industrial training / project work in the entire eighth semester period provided they should register those courses in the fifth semester itself. Such students should meet the teachers offering those elective courses themselves for clarifications. No specific slots will be allotted in the time table for such courses.

10. **Seminar / Industrial Training**

The student has to present a seminar on the chosen topic. However, the student can select a topic duly approved by the Seminar Coordinator and the Head of the Department concerned. The student who has presented the seminar has to submit a report and appear for viva-voce examination at the end of the semester.

11. **Project Work**

The student typically registers for project at the end of seventh semester and completes it at the end of the eighth semester along with the courses prescribed for study in the eighth semester. However a student who has registered and successfully completed the courses of eighth semester by acquiring additional credits in the earlier semesters can attempt to spend his / her period of study in an industry and complete his / her project work, submit the project report and appear for viva-voce examination at the end of eighth semester.
12. Industrial Training (Value added courses)

One credit courses shall be offered by a Department with the prior approval from the Dean, Faculty of Engineering and Technology. For one credit course, a relevant potential topic may be selected by a committee consisting of Head of the department concerned and the Board of Studies member from the Department and a senior faculty member from the department concerned. An expert from industry familiar with the topic chosen may be accordingly invited to handle classes for the students. The details of the syllabus, time table and the name of the industrial expert may be sent by the above committee to the Dean for approval. The credits earned through the one credit courses shall be over and above the total credit requirement prescribed in the curriculum for the award of the degree. Students can take a maximum of two one credit courses (one each in VI and VII semesters). They shall be allowed to take one credit courses offered in other Departments with the permission of Head of the Department offering the course. A separate mark sheet shall be issued for one credit courses.

13. Electives

The elective courses fall under two categories: Professional Electives and Open Electives. The Professional Elective courses are offered in the concerned branch of specialization and a student can choose the Professional Elective courses with the approval of the Head of the Department concerned. Apart from the various Professional elective courses, a student can choose the open electives from any specialization offered in any Department in the Faculty of Engineering & Technology during the entire period of study, with the approval of the Head of the Department and the Head of the Department offering the course.

Further, the student can also credit not more than two courses offered through the SWAYAM Portal of UGC with the approval of the Head of the Department concerned. These courses will be considered as equivalent of open electives.

14. Assessment

The break-up of continuous assessment and examination marks for theory courses is as follows:

First assessment (Mid-Semester Test-I) : 10 marks
Second assessment (Mid-Semester Test-II) : 10 marks
Third Assessment : 5 marks
End Semester Examination : 75 marks

The break-up of continuous assessment and examination marks for Practical courses is as follows:
First assessment (Test-I) : 15 marks
Second assessment (Test-II) : 15 marks
Maintenance of record book : 10 marks
End Semester Examination : 60 marks

The continuous assessment marks for the seminar / industrial training will be 40 and to be assessed by a seminar committee consisting of the Seminar Coordinator and a minimum of two members nominated by the Head of the Department. The continuous assessment marks will be awarded at the end of seminar session. 60 marks are allotted for the seminar / industrial training and viva voce examination conducted based on the seminar / industrial training report at the end of the semester.

The continuous assessment marks for the project work will be 40 and to be assessed by a review committee consisting of the project guide and a minimum of two members nominated by the Head of the Department. One of the committee members will be nominated as the Chairman by the Head of the Department. The Head of the Department may be a member or the Chairman. At least two reviews should be conducted during the semester by the review committee. The student shall make presentation on the progress made before the committee. 60 marks are allotted for the project work and viva voce examination at the end of the semester.

15. Substitute Assessment

A student who has missed, for genuine reasons accepted by the Head of the Department, one or more of the assessments of a course other than the final examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the third meeting of the respective class committees.

A student who wishes to have a substitute assessment for a missed assessment must apply to the Dean / Head of the Department within a week from the date of the missed assessment.

16. Student Counsellors (Mentors)

To help the students in planning their course of study and for general advice on the academic programme, the Dean / Head of the Department will attach a certain number of students to a member of the faculty who shall function as student counsellor for those students throughout their period of study. Such student counsellors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the Dean / Head of the Department.
17. Class Committee

For all the branches of study during the first two semesters, a common class committee will be constituted by the Dean of the faculty. From among the various teachers teaching the same common course to different classes during each semester of the first year, the Dean shall appoint one of them as course coordinator. The composition of the class committee during first and second semesters will be as follows:

- Course coordinators of all courses.
- All Heads of the Sections, among whom one may be nominated as Chairman by the Dean.
- The Dean may opt to be a member or the Chairman.

For each of the higher semesters, separate class committees will be constituted by the respective Head of the Departments. The composition of the class committees from third to eighth semester will be as follows:

- Teachers of the individual courses.
- A seminar coordinator (for seventh semester only) shall be appointed by the Head of the Department
- A project coordinator (for eighth semester only) shall be appointed by the Head of the Department from among the project supervisors.
- One Professor or Associate Professor, preferably not teaching the concerned class, appointed as Chairman by the Head of the Department.
- The Head of the Department may opt to be a member or the Chairman.

The class committee shall meet three times during the semester. The first meeting will be held within two weeks from the date of class commencement in which the type of assessment like test, assignment etc. for the third assessment and the dates of completion of the assessments will be decided.

The second meeting will be held within a week after the completion of the first assessment to review the performance and for follow-up action.

The third meeting will be held after all the assessments but before the University semester examinations are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 25 marks for theory / 40 marks for seminar / industrial training, practical and project work will be finalized for every student and tabulated and submitted to the Head of the Department (to the Dean in the case of I & II Semester) for approval and transmission to the Controller of Examinations.

18. Attendance requirements
The students with 75% attendance and above are permitted to appear for the University examinations. However, the Vice Chancellor may give a rebate / concession not exceeding 10% in attendance for exceptional cases only on Medical Grounds.

19. Temporary break of study

A student is permitted to go on break of study for a maximum period of one year either as two breaks of one semester each or a single break of one year.

The student applies for break of study, the student shall apply to the Dean in advance, in any case, not later than the last date of the first assessment period. The application duly filled by the student shall be submitted through the Head of the Department. In the case of short term employment/ training/ internship, the application for break of study shall be approved and forwarded by the Head of the department concerned to the Dean.

However, the student must complete the entire programme within the maximum period of eight years.

20. Procedure for withdrawing from the Examinations

A student can withdraw from all the examinations of the semester only once during the entire programme on valid grounds accepted by the University. Such withdrawal from the examinations of a semester will be permitted only if the candidate applies for withdrawal at least 24 hours before the commencement of the last examination. The letter grade ‘W’ appears in the mark sheet for such candidates.

21. Passing and declaration of examination results

All assessments of all the courses on an absolute marks basis will be considered and passed by the respective results passing boards in accordance with the rules of the University. Thereafter, the Controller of examinations shall convert the marks for each course to the corresponding letter grade as follows, compute the Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), and prepare the mark sheets.

<table>
<thead>
<tr>
<th>Marks</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 to 100</td>
<td>'S'</td>
</tr>
<tr>
<td>80 to 89</td>
<td>'A'</td>
</tr>
<tr>
<td>70 to 79</td>
<td>'B'</td>
</tr>
<tr>
<td>60 to 69</td>
<td>'C'</td>
</tr>
<tr>
<td>55 to 59</td>
<td>'D'</td>
</tr>
<tr>
<td>50 to 54</td>
<td>'E'</td>
</tr>
<tr>
<td>Less than 50</td>
<td>'RA'</td>
</tr>
<tr>
<td>Withdrawn from</td>
<td>'W'</td>
</tr>
</tbody>
</table>


A student who obtains less than 30 / 24 marks out of 75 / 60 in the theory / practical examinations respectively or is absent for the examination will be awarded grade RA.

A student who earns a grade of S,A,B,C,D or E for a course is declared to have successfully completed that course. Such a course cannot be repeated by the student.

A student who is detained for lack of attendance must re-register for and repeat the courses in the respective semester.

A student who obtains letter grade RA / W in the mark sheet must reappear for the examination of the courses.

The following grade points are associated with each letter grade for calculating the grade point average and cumulative grade point average.

\[
\begin{align*}
S & : 10; \quad A : 9; \quad B : 8; \quad C : 7; \quad D : 6; \quad E : 5; \quad RA : 0
\end{align*}
\]

Courses with grade RA / W are not considered for calculation of grade point average or cumulative grade point average.

A student can apply for re-totaling of one or more of his examination answer papers within a week from the date of issue of mark sheet to the student on payment of the prescribed fee per paper. The application must be made to the Controller of Examinations with the recommendation of the Head of the Department.

After the results are declared, mark sheets will be issued to the students. The mark sheet will contain the list of courses registered during the semester, the grades scored and the grade point average for the semester.

GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the semester, divided by the sum of the number of credits for all courses taken in that semester.

CGPA is similarly calculated considering all the courses taken from the time of admission.

22. **Awarding degree**

After successful completion of the programme, the degree will be awarded with the following classification based on CGPA.

- For **First Class with Distinction**, the student must earn a minimum of 176 credits within four years (135 credits within three years for lateral entry students) from the time of admission, pass all the courses in the first attempt and obtain a CGPA of 8.25 or above for all the subjects from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).
- For **First Class**, the student must earn a minimum of 176 credits within five years (135 credits within four years for lateral entry students) from the time of admission and obtain a CGPA of 6.75 or above for all the subjects from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).
• For Second Class, the student must earn a minimum of 176 credits within eight years (135 credits within seven years for lateral entry students) from the time of admission.

23. Ranking of Candidates

The candidates who are eligible to get the B.E. degree in the First Class with Distinction will be ranked together on the basis of CGPA for all the subjects of study from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

The Candidates passing with First Class will be ranked next after those with distinction on the basis of CGPA for all the subjects of study from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

The ranking of candidates will be done separately for each branch of study.

24. Transitory Regulations

The University shall have powers to revise or change or amend the regulations, the scheme of examinations, the courses of study and the syllabi from time to time.

Wherever there had been change of syllabi, examinations based on the existing syllabi will be conducted for three consecutive times after implementation of the new syllabi in order to enable the students to clear the arrears. Beyond that the students will have to take up their examinations in equivalent courses, as per the new syllabi, on the recommendations of the Head of the Department concerned.

Annexure-1

Diploma Programmes Eligible for the B.E (Lateral Entry) Programmes offered in FEAT (from 2017-2018)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Branches of Study</th>
<th>Eligible Diploma Programme (FT / PT / SW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Civil Engineering</td>
<td>i. Civil Engineering</td>
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<tr>
<td></td>
<td></td>
<td>ii. Civil Engineering(Architecture)</td>
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<tr>
<td></td>
<td></td>
<td>iii. Environmental Engineering and Pollution Control(Full Time)</td>
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<tr>
<td></td>
<td></td>
<td>iv. Architectural Assistantship</td>
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<td></td>
<td></td>
<td>v. Civil Engineering (Rural Tech.)</td>
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<tr>
<td></td>
<td></td>
<td>vi. Civil and Rural Engineering</td>
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<tr>
<td>2</td>
<td>Civil and Structural Engineering.</td>
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</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Mechanical Engineering</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>i.</td>
<td>Mechanical Engineering</td>
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<tr>
<td>ii.</td>
<td>Mechanical and Rural Engineering</td>
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<tr>
<td>iii.</td>
<td>Mechanical Design and Drafting</td>
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<tr>
<td>iv.</td>
<td>Production Engineering</td>
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<tr>
<td>v.</td>
<td>Production Technology</td>
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<tr>
<td>vi.</td>
<td>Automobile Engineering</td>
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<tr>
<td>vii.</td>
<td>Automobile Technology</td>
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<tr>
<td>viii.</td>
<td>Metallurgy</td>
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<tr>
<td>ix.</td>
<td>Mechatronics Engineering</td>
<td></td>
</tr>
<tr>
<td>x.</td>
<td>Machine Tool Maintenance and Repairs</td>
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<tr>
<td>xi.</td>
<td>Tool and Die making</td>
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<tr>
<td>xii.</td>
<td>Tool Engineering</td>
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<tr>
<td>xiii.</td>
<td>Tool Design</td>
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<tr>
<td>xiv.</td>
<td>Foundry Technology</td>
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<tr>
<td>xv.</td>
<td>Refrigeration and Air Conditioning</td>
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<tr>
<td>xvi.</td>
<td>Agricultural Engineering</td>
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<tr>
<td>xvii.</td>
<td>Agricultural Technology</td>
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<tr>
<td>xviii.</td>
<td>Marine Engineering</td>
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</tr>
<tr>
<td>xix.</td>
<td>Mechanical Engineering(Production)</td>
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<tr>
<td>xx.</td>
<td>Mechanical Engineering(Tool &amp;Die)</td>
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<tr>
<td>xxi.</td>
<td>Mechanical Engineering (Foundry)</td>
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<tr>
<td>xxi.</td>
<td>Mechanical Engineering(R &amp; A.C.)</td>
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<tr>
<td>xxiii.</td>
<td>Electronics(Robotics)</td>
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<tr>
<td>xxiv.</td>
<td>Mining Engineering</td>
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<tr>
<td>xxv.</td>
<td>Agricultural Engineering and Farm</td>
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<tr>
<td>xxvi.</td>
<td>Equipment Technology</td>
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<thead>
<tr>
<th></th>
<th>Electrical and Electronics Engineering</th>
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<tr>
<td>i.</td>
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<tr>
<td>ii.</td>
<td>Electronics and Communication Engg.</td>
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<tr>
<td>iii.</td>
<td>Electronics and Instrumentation Engg</td>
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<tr>
<td>iv.</td>
<td>Electronics Engineering(Instrumentation)</td>
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<tr>
<td>v.</td>
<td>Instrument Technology</td>
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<tr>
<td>vi.</td>
<td>Instrumentation and Control Engineering</td>
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<tr>
<td>vii.</td>
<td>Electrical Engineering (Instruments and Control)</td>
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<tr>
<td>viii.</td>
<td>Electrical Engineering</td>
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<tr>
<td>ix.</td>
<td>Instrumentation Technology</td>
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<tr>
<td>x.</td>
<td>Electronics (Robotics)</td>
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<td>xi.</td>
<td>Mechatronics Engineering</td>
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<tr>
<th></th>
<th>Electronics and Instrumentation Engineering</th>
<th>6</th>
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<tbody>
<tr>
<td>i.</td>
<td>Electrical and Electronics Engineering</td>
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<tr>
<td>ii.</td>
<td>Electronics and Communication Engg.</td>
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<td>iii.</td>
<td>Electronics and Instrumentation Engg</td>
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<tr>
<td>iv.</td>
<td>Electronics Engineering(Instrumentation)</td>
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<td>v.</td>
<td>Instrument Technology</td>
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<td>Electronics (Robotics)</td>
<td></td>
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<td>xi.</td>
<td>Mechatronics Engineering</td>
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</tr>
<tr>
<td>Semester</td>
<td>No. of Courses</td>
<td>HS</td>
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<tr>
<td>I</td>
<td>4+2</td>
<td>6</td>
</tr>
<tr>
<td>II</td>
<td>4+4</td>
<td>8</td>
</tr>
<tr>
<td>III</td>
<td>6+2</td>
<td>8</td>
</tr>
<tr>
<td>IV</td>
<td>6+2</td>
<td>8</td>
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<tr>
<td>V</td>
<td>6+3</td>
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<td>VI</td>
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<td>9</td>
</tr>
<tr>
<td>VII</td>
<td>5+3</td>
<td>8</td>
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<tr>
<td>VIII</td>
<td>2+1</td>
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<tr>
<td>Total Courses</td>
<td>39+20</td>
<td>59</td>
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</table>

Total credits: 176

FT- Full Time; PT-Part Time; SW- Sandwich

**COURSES AND CREDITS - SUMMARY**

- Chemical Engineering
  - Petrochemical Engineering
  - Chemical Engineering
  - Environmental Engineering and Pollution Control
  - Leather Technology (Footwear)
  - Leather Technology
  - Plastic Technology
  - Polymer Technology
  - Sugar Technology
  - Textile Technology
  - Chemical Technology
  - Ceramic Technology
  - Petro Chemical Technology
  - Pulp & Paper Technology
  - Petroleum Engineering

- Computer Science and Engineering
  - Electronics and Communication Engineering
  - Computer Technology
  - Computer Science and Engineering
  - Information Technology
  - Computer Engineering
  - Computer Networking
  - Electronics(Robotics)
  - Mechatronics Engineering

- Information Technology

- Electronics and Communication Engineering
  - Mechatronics Engineering

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* - No of Credits ** - No of Courses
## DETAILS OF COURSE CODE

<table>
<thead>
<tr>
<th>Code (First Two digits)</th>
<th>Details</th>
<th>Code (3rd and 4th Digits)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Common course for the faculty</td>
<td>HS</td>
<td>Humanities Theory</td>
</tr>
<tr>
<td>01</td>
<td>Civil Engg. Course</td>
<td>HP</td>
<td>Humanities Practical</td>
</tr>
<tr>
<td>02</td>
<td>Civil and Structural Engg. course</td>
<td>BS</td>
<td>Basic Science Theory</td>
</tr>
<tr>
<td>03</td>
<td>Mechanical Engg. Course</td>
<td>BP</td>
<td>Basic Science Practical</td>
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<tr>
<td>04</td>
<td>Mechanical Engg (Manufacturing). Course</td>
<td>ES</td>
<td>Engineering Science Theory</td>
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<tr>
<td>05</td>
<td>Electrical and Electronics Engg. Course</td>
<td>SP</td>
<td>Engineering Science Practical</td>
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<tr>
<td>06</td>
<td>Electronics and Instrumentation Engg. course</td>
<td>PC</td>
<td>Professional Core Theory</td>
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<tr>
<td>07</td>
<td>Chemical Engg. course</td>
<td>CP</td>
<td>Professional Core Practical</td>
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<tr>
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5th digit represents the semester and 6th and 7th digits represent the serial number of courses.
## DEPARTMENT OF COMPUTER SCIENCE and ENGINEERING
### Curriculum for B.E.(Computer Science and Engineering)

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L-Lecture; T-Tutorial; P-Practical; D-Drawing
Exam-End Semester Examination; CA-Continuous Assessment

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SYLLABUS
FIRST SEMESTER

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<th>00HS101</th>
<th>TECHNICAL ENGLISH</th>
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Course Objectives:

- English technical communication focuses on developing the proficiency of Engineering students in communicative skills, ensuring them to face the demand of their profession with high command in English.
- At the end of the course, the learners will be able to use English for all purposes of technical communication and come out in “flying colours”.

Unit - I : Listening Strategies

This unit makes the students to get exposed to the listening exercises and get registered in their minds the nuances of listening and its importance.

1. Listening process.
2. Types of listening.
3. Barriers to listening.
5. Team listening and note making.

Unit - II : Critical Reading and Creative Writing Skills

This unit introduces communication model like courtesy, body language, role play and good presentation in an effective manner, where the students are given an opportunity to observe, analyze, interpret, imagine and implement their ideas too.

Poem : Road not taken – Robert Frost
       Ulysses – Alfred Lord Tennyson.

Prose : Of Studies – Francis Bacon
        Science – Destroyer or creator – J. Bronowski

Play : Pygmalion – Bernardshaw.

Unit - III : Speaking Skill

Students shall be motivated to speak in English on familiar or unfamiliar topics. It is a platform to train the students to achieve competency in oral expression.

1. Interview Techniques
2. Group discussion
3. Making presentation and Discussing on the presentation.
4. Sample interviews
5. Dialogue writing

Unit - IV : Professional Writing

Students shall be trained to create their own proficiency in writing like - calling for quotation, asking clarification, placing orders and so on.

1. Poster making
2. Letter writing (formal and E-mail)
3. Analytical writing
4. Format of memos.
5. Report Writing

Unit - V : Theoretical writing

The nuances of English grammar may be taught to the students so as to present flawless English both in their oral and written communication

2. Single word substitution
3. Concord
4. Tag Questions
5. Active voice and passive voice

Text Book:

Reference books:

Course Outcomes:
1. Understand the role of speaking in English and its contribution to their success.
2. Help the students increase the lingual power and word power, and frame suitable structures to use appropriately in different contexts.
3. Initiate the students to adopt different strategies for personal and professional writing.
4. Train the students use diversified rhetorical functions of technical English.
Course Objectives:
To acquaint the student with the concepts in
- matrices,
- differential calculus,
- multiple integrals,
- vector calculus, which are most important in connection with practical engineering problems.

Unit I: Matrices

Unit II: Differential Calculus
Curvature in Cartesian and parametric co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes.

Unit III: Differential Calculus: Functions of Several Variables
Jacobians – Taylor’s and Maclaurin’s series expansions of functions of two variables – Maxima and Minima of functions of two variables – Constrained Maxima and Minima by Lagrange Method.

Unit IV: Multiple Integrals

Unit V: Laplace Transform
Definition, Transform of elementary functions, Properties, Derivatives and integrals of transforms, Transforms of derivatives, Convolution theorem, Transforms of periodic functions, Inverse Laplace transform, Application to solution of linear ordinary differential equations of second order with constant coefficients.
(In all units, proof of theorems are not included)

Text books:

Reference Books:
Course Outcomes:
1. This course equips students to have knowledge and understanding in matrices, differential calculus, multiple integrals and Laplace transforms.
2. Students will be able to solve problems related to above fields in engineering applications.

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Course Objectives:
At the end of the course the students would be exposed to fundamental knowledge in various engineering subjects and applications
- Determine the different modulus of elasticity and viscosity of the less and highly viscous liquids.
- Design of acoustically good buildings.
- Interferometric techniques in metrology, communication and civil engineering.
- Application of quantum physics to optical and electrical phenomena.
- Application of ultrasonics and acoustics.
- Structure identification of engineering materials.
- Applications of Radio isotopes and power reactor systems.

Unit - I : Properties of Matter

Unit - II : Sound
Introduction to Acoustics - factors affecting acoustics of buildings and their remedies– absorption coefficient– Sabine’s formula for reverberation time.
Introduction to Ultrasonics – production – magnetostriction and piezo electric methods – Detection of Ultrasonic waves (Acoustics grating) – Applications.

Unit – III : Optics

Unit – IV : Crystal Physics
Lattice - Unit cell - Bravais lattice - Atomic radius, co-ordination number, Packing factor and their calculations of SC,BCC,FCC and HCP crystal structures - Miller indices - Crystal imperfections (Point defect, Line defect, surface defect and volume defect).

Unit – V: Nuclear Physics
Introduction - General properties of Nucleus – Mass defect, Binding energy, Nuclear models – Liquid drop model and Nuclear shell model - Nuclear detector – G.M counter – Scintillation
Counter – Ionisation Chamber – Fission, Fusion, Thermonuclear reaction and Stellar energy – Nuclear reactor – General nuclear reactor – Breeder nuclear reactor.

**Text Books:**

**Reference Books:**

**Course Outcomes:**
1. The Engineering students can gain the basic knowledge in the field of optics, sound, nuclear physics and crystalline materials etc.
2. It will be useful to apply in engineering applications.

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<tr>
<th>00BS104</th>
<th>APPLIED CHEMISTRY – I</th>
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**COURSE OBJECTIVES:**
To make the student conversant with the
- Water treatment techniques and disinfection methods.
- Working principle of electrochemical cells.
- Sources, refining and various types of fuels.
- Mechanism, classification, applications of lubricants and introduction adhesives.
- Surface chemistry, principle and applications of chromatography.

**Unit I : WATER TREATMENT**
Unit II : ELECTROCHEMISTRY

Unit III : FUELS AND COMBUSTION

Unit IV : ENGINEERING MATERIALS – I

Unit V : ANALYTICAL TECHNIQUE AND SURFACE CHEMISTRY
Chromatography – Definition – classifications – partition chromatography and adsorption chromatography.

Text Books:

Reference Books

Course Outcomes:
At the end of the course, the student will be able to
1. Understand and develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. Understand and apply the concepts of electrochemistry including electroplating.
3. Understand the properties, sources of fuel and the concept of combustion.
4. Gain the knowledge about types of lubricants, uses & their mechanisms and to understand the binding process of adhesives, and its application in building and construction.
5. Separate and purify various organic and inorganic compounds using different chromatographic techniques.
6. Understand the concept of surface chemistry and its applications.

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<th>00SP105</th>
<th>COMPUTER PROGRAMMING LABORATORY</th>
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**Course Objectives:**
- To enable the students to have a good understanding about the concepts of “C” programming.
- To provide the hands on experience in basic concepts of AUTOCAD to students.

**C Programs based on the following concepts:**
- Basic structure of C Programs – Constants – Variables - Data Types - -- Keywords – Identifiers - Operators - Expressions – IF, IF-ELSE, Nested IF-ELSE, Switch, WHILE, DO, FOR and GOTO statements - Arrays: one dimensional and two dimensional – Strings - Functions.

**AUTOCAD:**
- Special Features – Dimensioning – Angular, Diameter and Radius – Hatching – Patterns – Slides – Attributes – Configuring – Plotting– Exercises in AUTOCAD (2D Drawings only)

**Text Books:**

**Reference Books**

**Course Outcomes:**
1. Understand the concepts of C programming.
2. Apply the syntax of conditional and looping statements for writing C programs
3. Use the features of AUTOCAD for 2D drawing
### Course Objectives:
- To provide the students simple hands-on-experience in the basic aspects of production engineering in fitting, carpentry and sheet metal.

### Workshop Practice in the Shops:
- **Carpentry**: Use of hand tools – exercises in planning and making joints namely, half lap joint, dovetail joint, mortising and tenoning.
- **Fitting**: Use of bench tools, vice, hammers, chisels, files, hacksaw, centre punch, twist drill, taps and dies – Simple exercises in making T joint and dovetail joints.
- **Sheet Metal Work**: Use of hand tools – Simple exercises in making objects like cone, funnel, tray, cylinder.
- **Smithy**: Demonstration of hand forging and drop forging.

### Course Outcomes:
This course
1. Use basic tools of fitting, carpentry and sheet metal fabrication.
2. Experience in the fabrication of simple carpentry joints.
3. Develop skill to make simple fitting joints.
4. Train to make simple shapes of sheet material.
5. Distinguish hand forging and drop forging operation.

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### SECOND SEMESTER

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### Course Objectives:
- To acquaint the student with the concepts in ordinary differential equations and vector calculus.
- To acquaint the student with the techniques in the theory of analytic functions and complex integration.
- Above topics are most important in connection with practical engineering problems.

### Unit I : Ordinary Differential Equations
Second order linear differential equations with constant coefficients, Second order linear differential equations with variable coefficients (Euler and Legendre’s linear equations), Simultaneous first order linear equations with constant coefficients, method of variation of parameters.

### Unit II : Vector Differentiation
Gradient, divergence and curl, directional derivative, unit normal vector, irrotational and solenoidal vector fields, expansion formulae for operators involving \( \nabla \).
Unit III: Vector Integration
Line, surface and volume integrals, Green’s theorem in a plane, Gauss divergence theorem, Stoke’s theorem – Verification of the above theorems and evaluation of integrals using them.

Unit IV: Analytic Functions
Functions of a complex variable, Analytic function, the necessary conditions (Cauchy-Riemann equations), sufficient conditions, Properties of analytic functions, harmonic functions, construction of Analytic function by Milne-Thomson method, Conformal mapping: \( w = z^2 \), \( 1/z \), \( e^z \), \( \sin z \), \( \cos z \).

Unit V: Complex Integration
Statement and application of Cauchy theorem, Cauchy integral formulas, Taylor and Laurent expansion, Singularities – Classification; Residues – Statement and application of Cauchy residue theorem, Contour integration round the unit circle.
(In all units, proof of theorems are not included)

Text Books:

Reference Books

Course Outcomes:
1. This course equips students to have knowledge and understanding in ordinary differential equations, vector calculus and complex variables.
2. Students will be able to solve problems related to above fields in engineering applications.

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<th>00BS202</th>
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Course Objectives
At the end of the course the students would be exposed to fundamental knowledge in various materials and applications
- Application of lasers and fiber optics in engineering and technology.
- Astrophysics is the study of physics of the universe. In various objects, such as stars, planets and galaxies.
- To measure positions, brightness, spectra structure of gas clouds, planets, starts, galaxies, globular clusters, quasars etc.
- Physics of modern engineering materials.
- Electromagnetic phenomena and wave propagation.
• Applications of nano materials, nano electronics and optoelectronic devices.
• Design of energy sources and applications of solar energy.

Unit I: Laser and Fiber Optics
Fiber optics - Principle and propagation of light in optical fibers - Numerical aperture and acceptance angle - Types of optical fibers (Material, Mode and refractive index) - Applications - Fiber Optic communication system.

Unit II: Dielectrics and Superconductors

Unit III: Nano Materials

Unit IV: Quantum Mechanics
The wave Equation, Schrödinger’s Time dependent wave equation, Schrödinger’s time independent wave equation - The Wave function and its physical significance - The particle in a box – energy quantization – Eigen values and Eigen functions.

Unit V: Energy Physics

Text Books:
Reference Books:

Course Outcomes:
1. The student will have the theoretical knowledge in this field of laser, dielectrics, Nano technique, energy physics etc.
2. It will be very useful to the students to apply in different field of engineering.

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Course Objectives:

To make the students to understand the
- Types of polymers and polymerization processes.
- Phase rule with different kinds of systems.
- Different types of corrosion and their mechanism.
- Working principle and applications of primary and secondary batteries.
- Engineering materials such as refractories and abrasives.

Unit I :POLYMERS
High polymers: plastics – Thermoplastics and thermosetting resins. Addition polymerization and condensation polymerization – compounding of plastics – Moulding methods – Compression,

Unit II : PHASE RULE

Unit III : CORROSION AND PREVENTION

Unit IV : ENERGY STORAGE DEVICES

Unit V : ENGINEERING MATERIALS II

Text Books:

Reference Books:

**Course Outcomes:**
At the end of the course, the student will be able to
1. Understand the synthesis and applications of various types of polymers and moulding processes.
2. Understand the concept of phase rule and its applications, which is applicable in alloy preparation.
3. Understand the concept of corrosion and to apply the knowledge in the protection of different metals from corrosion.
4. Gain the knowledge about various energy storage devices, especially solar energy.
5. Have the knowledge of converting solar energy into most needy electrical energy efficiently and economically to reduce the environmental pollution.
6. Gain knowledge on classification, synthesis and applications of abrasives and refractories.

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**Course Objectives:**
- To inculcate a knowledge on essentials of Civil Engineering
- To expose the students on the role, significance and contributions of Civil Engineering in satisfying societal needs
- To illustrate the concepts of various construction techniques

**Unit I**
Introduction to Civil Engineering - various disciplines of Civil Engineering, relevance of Civil Engineering in the overall infrastructural development of the country. Introduction to various building materials – Stone, Bricks, Steel, Cement, Concrete, Timber – its characteristics, types and uses. Various types of buildings as per nbc; Selection of suitable site for buildings, Components of a residential building – its functions, Orientation of a building, simple definitions - plinth area / built up area, floor area / carpet area – floor space index.

**Unit II**
Surveying - Principles and objectives of surveying; Types, Classifications of surveying, measurement of areas and distances – chain – compass: Introduction to Leveling, Total station, Remote sensing - fundamental principles and applications.


**Unit III**

Text Books:

Reference books:

Course Outcomes:
1. Understand the basic knowledge on civil engineering materials
2. Develops the skill to satisfy the social needs
3. Describe the suitable method of construction technique

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<th>00ES204</th>
<th>BASIC ENGINEERING (ELECTRICAL)</th>
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Course Objectives:
- To impart the basic principles of generation of electrical energy.
- To explain the operation of electrical machines and various measuring instruments.
- To understand the basic concepts of circuit analysis.
- To provide an overview of the principles, operation and application of semiconductor devices like diodes, BJT, FET and a basic knowledge of fundamentals of Communication Systems.

Unit I
Sources of Electrical energy–Generation of electrical energy – working principles of DC generators and alternators– Advantages of electrical energy over other forms of Energy.
Working principles of MC and MI voltmeters and Ammeters, Dynamo meter type wattmeter, Induction type energy meter and Multimeter–types of wiring– requirements for house wiring–typical layout for a small house– earthing.

Unit II
DC Circuits: Definition of current, voltage, power and energy– DC voltage and current sources– resistance, types of resistors, series and parallel connections of resistors, current and
voltage division-loop method of analysis of simple circuits.

AC Circuits: Sinusoidal signals – average, r.m.s values –inductance, capacitance and their V–I relationships. Analysis of simple single phase series circuits– power and power factor–phasor diagrams– Introductions to three phase AC circuits.

Unit III

Basic Electronics: Principle and characteristics, uses of PN junction Diode, Zenerdiode, BJT, FET, UJT, Thyristors,- Operating principle of Half wave, Full wave and Bridge rectifiers.


Text Books:

Reference Books:

Course Outcomes:
After the completion of the course, the student should be able to
1. Provide comprehensive idea about simple circuit analysis, working principles of machines and common measuring instruments
2. Analyze the behavior of any dc and ac circuits
3. Characterize semiconductor devices that include diodes, BJT and digital functions.
4. Understand fundamental principles of communication systems

Course Objectives:
- To familiarize the students the functioning of different types of Boilers, the mountings and accessories.
- To provide basic knowledge about the use of various machine tools and the basic principles of welding, brazing and soldering.
- To illustrate the concepts of various metal forming operations and metal joining techniques.
Unit I
Boilers: Classification – Description and working of Simple vertical boiler, Cochran boiler, Babcock and Wilcox boiler - Description and working of boiler mountings: water level indicator, Pressure gauge, Dead weight and Spring loaded Safety value, Fusible plug, Feed check value, Steam stop value and Blow–off cock - Description and working of boiler accessories: Economiser and Super heater.

Unit II

Unit III

Text Books:

Reference Books:

Course Outcomes:
1. Understand the construction and working principles of boiler operations
2. Distinguish between steam turbines and gas turbines.
3. Select suitable manufacturing methods to produce a new component.
Course Objectives:

- The Language Lab focuses on the production and practices of sounds of language
- The Language Lab familiarizes the students with the use of English in everyday situations and contexts.

Theoretical Session (Internal Assessment only)
1. English sound pattern
2. Sounds of English
3. Pronunciation
4. Stress and Intonation
5. Situational Dialogues/Role play
6. Oral presentations - Prepared or Extempore
7. ‘Just a Minute’ sessions (JAM)
8. Describing Objects/situations/people
9. Debate
10. Giving Directions

Practical Session

➢ To make the students recognize the sounds of English through Audio Visual Aids
➢ To enable the students speak fluently without fear
➢ To develop their communicative skill with individual practice through the prescribed package
➢ The Globarena Package consists of the following exercises
  1. Reading comprehension
  2. Listening comprehension
  3. Vocabulary exercises
  4. Phonetics
  5. Role Play in dialogues
  6. Auto Speak

References:

1. Globarena Package for communicative English
2. Cambridge Advanced Learner’s English Dictionary
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
8. English Skills for Technical Students, WBSCTE with British Council, OL.
DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:
1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 40 sessional marks and 60 year-end Examination marks. The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Course Outcomes:
1. Help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT, etc.
2. Train the students to use language effectively to face interviews, group discussions, and public speaking.
3. **Initiate the students into greater use of the computer in resume preparation, report writing, format-making, etc**

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<td>00BP206</td>
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APPLIED PHYSICS LABORATORY

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Course Objectives:

The ability to offer students a variety of research opportunities

- To determine the radius of curvature of the plano convex lens and the wavelength of the sodium light by measuring the diameter of Newton’s rings.
- We can use a spectrometer to measure this angle of deviation.
- To measure the modulus of elastic material by torsional pendulum and bending of a beam.
- To determine the resistivity of a given steel and brass wire.
- To find the velocity of ultrasonic waves in a liquid.
- Less viscosity of the liquid by poiseuille’s method.

List of Experiments (Any Ten)

1. Non-Uniform Bending - Determination of Young’s modulus of the given scale or beam.
2. Newton’s rings- Determination of Radius of curvature of the given Plano convex lens.
4. Spectrometer – Dispersive power of a given prism.
5. Torsional Pendulum – Determination of Moment of Inertia of the metallic disc and Rigidity Modulus of the material of a wire.
6. Field along the axis of a coil- Determination of horizontal earth magnetic flux density.
7. Air wedge – Determination of thickness of a given thin wire and paper.
8. Viscosity - Determination of co-efficient of Viscosity of a less viscous liquid by Capillary flow method
9. Uniform bending - Determination of Young’s modulus of the given scale or beam.
10. Spectrometer – Determination of wavelength of the prominent spectral lines using Grating.

Course Outcomes:
This course
1. To determine resistivity of a given steel and brass wire.
2. To find the velocity of ultrasonic waves in a liquid.
3. To measure the thickness of a thin materials.
4. To determine the band gap of a given semiconductor.
5. Diffraction patterns can be formed by light passing through a series of fine lines.
6. Applications of opto electronic devices.

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<th>00BP207</th>
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Course Objectives
- To appreciate the practical significance of acidimetry, alkalimetry and permanganometry
- To analyse quantitatively the amount of a substance present in a given sample.
- To assess the composition of an alloy
- To test the water quality standards.

LIST OF EXPERIMENTS
1) Estimation of Potassium hydroxide
2) Estimation of Acetic acid in vinegar
3) Estimation of Temporary hardness of water sample
4) Estimation of Total hardness of water sample
5) Estimate separate amount of sodium carbonate and sodium hydroxide in a mixture.
6) Estimation of Ferrous sulphate
7) Estimation of Mohr’s salt
8) Estimation of ferrous iron
9) Estimation of Oxalic acid
10) Determination of available free chlorine in a water sample.
11) Estimation of copper in brass by iodometry
12) Estimation of iron by dichrometry
13) Estimation of nickel in an alloy
Course Outcomes:
At the end of the course, the student will be able to

1. Gain knowledge in the quantitative chemical analysis of water quality related parameters, acid-base, red-ox and iodometry titrations.

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<th>00SP 208</th>
<th>ENGINEERING GRAPHICS</th>
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Course Objectives:

- To develop the ability to produce simple engineering drawing and sketches based on current practice.
- To develop the means for communication of ideas, thoughts and design of objects, related to engineering applications, to others through drawing.
- To develop the skills to read manufacturing and construction drawings used in industry.
- To develop a working knowledge of the layout of plant and equipment.
- To develop skills in abstracting information from calculation sheets and schematic diagrams to produce working drawings for manufacturers, installers and fabricators.
- To expose the international standards of technical drawing

UNIT – I
Introduction to Engineering Drawing, Use of drafting instruments—Lettering and dimensioning. Construction of conic sections - Ellipse, Parabola & Hyperbola (Eccentricity Method, Rectangle method, Intersecting arcs method) - Special curves- Simple cycloids and involutes—Tangent and normal at points on the curves only.

UNIT – II
Orthographic projections - Projections of Points- Projections of Straight lines (given the projections, to determine the true length and true inclinations).

UNIT – III
Projections of Solids like prism, pyramid, cylinder, cone, tetrahedron and octahedron in simple positions. Auxiliary Projections of prism, pyramid, cylinder, cone when the axis is inclined to one plane only.

UNIT – IV
Sections of prism, pyramid, cylinder, cone in simple position – true shape of sections. Intersection of surfaces - cylinder to cylinder and cylinder to cone with axis intersecting at right angles. Development of lateral surfaces of prism, pyramid, cylinder, cone and cut solids.

UNIT – V
Isometric Projections of simple solids and combinations. Perspective Projections of simple solids. Conversion of Pictorial view of simple objects into Orthographic views
Text Books:

Reference Books:

Course Outcomes:
Upon completion of this course, the students will be able to:
1. Construct, read, and understand the Title and Revision Block
2. Usage of common drafting tools to construct engineering drawings enhances
3. Apply dimensions on engineering drawing.
4. Ability of converting sketches to engineered drawings will increase.
5. Developing cognitive and psychomotor skills, visualize images and their dimensions
6. Develop good communication skills and team work.
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

To provide an academically ambient environment for individuals to develop and blossom as academically superior, socially conscious and nationally responsible citizens.

MISSION

- To impart high quality computer knowledge to the students by conducting education programmes.
- To provide exposure to the students about the emerging technological advancements for meeting the demands of the industry.
- To advance discipline of computing through internationally recognized research and development.
- To foster an environment that promotes extension activities and continuing education.
- To discover new knowledge through innovative research and creative teaching and learning that lead to prosperity, economic and societal benefit to the people.
### B. E. (CSE) - PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>PEO</th>
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<tr>
<td>PEO1</td>
<td>To prepare graduates with potential to get employed in the right role and/or become entrepreneurs to contribute to the society.</td>
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<tr>
<td>PEO2</td>
<td>To provide the graduates with the requisite knowledge to pursue higher education and carry out research in the field of Computer Science.</td>
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<tr>
<td>PEO3</td>
<td>To equip the graduates with the required skills to stay motivated and adapt to a dynamically changing world so as to remain successful in their career.</td>
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### B.E. (CSE) – PROGRAMME OUTCOMES (PO)

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<tr>
<th>Sl. No.</th>
<th>PROGRAMME OUTCOMES</th>
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<tr>
<td><strong>PO1</strong></td>
<td>Adapt the acquired knowledge for solving current and emerging issues and involved in lifelong learning.</td>
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<tr>
<td><strong>PO2</strong></td>
<td>Apply the engineering knowledge in various disciplines such as engineering, medicine, agriculture, banking, law, etc.</td>
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<td><strong>PO3</strong></td>
<td>Assess and analyze the problem, breaking into components with clear boundaries and interaction among them to achieve the expected outcome within the stipulated duration.</td>
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<td><strong>PO4</strong></td>
<td>Utilize the knowledge acquired in programming laboratories for further analysis, modification and understanding of data for research.</td>
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<td><strong>PO5</strong></td>
<td>Identify and formulate algorithmic principles, mathematical knowledge and theory of Computer Science in modeling and design of computer based systems.</td>
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<td><strong>PO6</strong></td>
<td>Transmit the healthy engineering solutions to customers/users or peers.</td>
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<td><strong>PO7</strong></td>
<td>Implement innovative notions and solutions to produce user friendly tools for the benefit of the society.</td>
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<td><strong>PO8</strong></td>
<td>Develop and deploy software and/or hardware systems with assured quality and efficiency.</td>
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### B.E. (CSE) – MAPPING OF PO WITH PEO

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<tr>
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PE - PROFESSIONAL ELECTIVES

1. Web Design
2. Perl Programming
3. Visual Programming
4. Java Programming
5. Real Time Systems
6. Mobile Computing
7. Mobile App Development
8. Software Testing and Quality Assurance
9. Distributed Systems
10. Network Security
11. Pervasive Computing
12. Adhoc and Sensor Networks
13. Digital Image Processing
14. Digital Watermarking and Steganography
15. Digital Signal Processing
16. Cloud Computing
17. Pattern Classification
18. Artificial Intelligence and Fuzzy Systems
19. Data Mining
20. Unix Programming
21. Natural Language Processing

PE-LAB - PROFESSIONAL ELECTIVE LABS

1. Java and Web Design Lab
2. Perl Programming Lab
3. Visual Programming Lab
4. Mobile App Development Lab
5. Software Testing Lab
6. Distributed Systems Lab  
7. Data Mining Lab  
8. Unix Programming Lab  
9. Natural Language Processing Lab

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<tr>
<th>OE - OPEN ELECTIVES</th>
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<tbody>
<tr>
<td>1. Enterprise Resource Planning</td>
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<td>2. E-Commerce</td>
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<td>3. Bioinformatics</td>
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<td>4. Supply Chain Management</td>
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<td>5. Cyber Forensics</td>
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<td>6. System Modeling and Simulation</td>
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<td>7. Data Analytics</td>
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<td>8. Social Network Analysis</td>
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<td>9. Organizational Behaviour and Management</td>
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<td>10. Product Design</td>
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<td>11. Embedded Systems</td>
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<td>12. Knowledge Management</td>
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<td>13. Project Management</td>
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<td>14. Biology for Engineers</td>
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<td>15. Disaster Management</td>
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<td>16. Entrepreneurship</td>
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<td>17. Human Rights</td>
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<td>18. National Service Scheme</td>
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</table>
Course Objectives:
- To make the students conversant with basic principles of natural resources, forest resources, ecosystem and bio-diversity.
- To get knowledge about pollution and its control

UNIT - I
Introduction - Multidisciplinary nature of environmental studies - Definition, scope and importance - Need for public awareness.

Natural resources - Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles.

UNIT - II
Concept of an ecosystem - Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological - pyramids - Introduction, types, characteristic features, structure and function of the following ecosystem - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - III
Introduction – Definition: genetic, species and ecosystem diversity - Bio geographical classification of India - Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels - India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

UNIT - IV
Definition - Cause, effects and control measures of Air pollution - Water pollution - Soil pollution - Marine pollution- Noise pollution - Thermal pollution - Nuclear hazards- Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Disaster management : floods, earthquake, cyclone and landslides. Sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, and watershed management - Resettlement and rehabilitation of people; its problems and concerns. - Environmental ethics: Issues and possible solutions - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

UNIT - V

Text Books:
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)

Reference Books:
2. Clark R.S., Marine Pollution, Claderson Press Oxford
5. Down to Earth, Centre for Science and Environment
7. Hawkins R.E., Encyclopaedia of Indian Natural History, Bombay Natural History Society, Bombay
16. Survey of the Environment, The Hindu (M)
Course Outcomes:

At the end of this course, the students will be able to
1. To conversant with basic principles of natural resources, forest resources
2. To conversant with basic principles of ecosystem and bio-diversity
3. To identify the causes of pollution and its control measures

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Course Objectives:
- To learn, partial differential equations, Fourier series, Boundary value problems.
- To learn the transforms such as Sine, Cosine, Fourier transform and Z-transforms.
- To gain knowledge of the method to find the Solution of difference equations.

UNIT - I

UNIT - II
Fourier Series - Dirichle's conditions - General Fourier series - Odd and Even functions - Half range sine series - Half range cosine series - Complex form of Fourier series – Parseval’s identity.

UNIT - III
Boundary value problems - Solutions of one dimensional wave equation – One dimensional heat equation (without derivation) – Fourier series solutions in Cartesian co-ordinates.

UNIT - IV

UNIT - V
Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
2. Understand Fourier transform and Z-transforms

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Course Objectives:
- To introduce the fundamentals of forces and their effects with their governing laws.
- To understand the definitions of particle, body forces and their equilibrium conditions.
- To understand and predict the forces and its related motions.

UNIT - I
Equilibrium of Particle - Vector representation of Space Force - Equilibrium of Particle in Space - Equivalent System of Forces - Principle of Transmissibility

UNIT - II
UNIT - III
Centroid and Centre of Gravity - Determination of Centroid of Sections of Different Geometry - Centre of Gravity of a Body - Area Moment of Inertia – Parallel Axis Theorem - Perpendicular Axis Theorem - Determination of Moment of Inertia of Rectangular, Triangular, Circular and Semi-circular areas from the first principle- Moment of Inertia of structural Steel Sections of Standard Flanged and Composite Sections. Polar Moment of Inertia - Radius of Gyration - Principal Moment of Inertia - Mass Moment of Inertia - Determination of Mass Moment of Inertia of a Rod, Thin Rectangular Plate, Thin Circular Disc, Solid Prism, Cylinder, Sphere and Cone from the first principles.

UNIT - IV

UNIT - V
Friction Force - Laws of Sliding Friction - Equilibrium Analysis of simple systems with Sliding Friction - Wedge Friction. Rolling Resistance- Translation and Rotation of Rigid Bodies - Velocity and Acceleration - General Plane Motion of Simple Rigid Bodies such as Cylinder, Disc/Wheel and Sphere.

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Explain the forces and its related laws of mechanics in static and dynamic conditions.
2. Analyse the forces and its motions on particles, rigid bodies and structures.
3. Solve the moment of inertia of any sections and masses for the structural members.
Course Objectives:

- To understand the fundamentals of semiconductor devices, transistors and amplifiers
- To introduce the laws of Boolean algebra and solve problems in combinational logic
- To explain sequential logic and memory circuits and systems

UNIT - I

UNIT - II

UNIT - III

UNIT - IV
Combinational Logic: Transistor as a switch - Reversible stable states - Laws of boolean algebra - Boolean expressions and logic diagrams - Negative logic - Introduction to mixed logic - Min Terms and Max Terms - Truth tables and maps - Solving digital problems using maps - Sum of products and product of sums map reduction - Hybrid functions - Incompletely specified functions - Multiple output...
minimization - Implementation of Boolean expressions using AND, OR, INVERT Logic gates
Universal gates-Multiplexer - Demultiplexer - Decoder - Code converter.

UNIT - V
Sequential Logic: Sequential logic - Flip-flops - Counters - Types of counters - Ripple counter design
- Type T, type D and type JK design – Shift registers- Memory circuit and systems ROM, PROM, EPROM,EEPROM, RAM, DRAM - PLA,PAL architecture.

Text Books:

Reference Books:
   2007.

Course Outcomes:
At the end of this course, the students will be able to
   1. Acquire knowledge of diodes, rectifiers and transistors.
   2. Understand the operation of amplifiers and oscillators.
   3. Implement Boolean expressions using gates.
   4. Design counters using flip flops.

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Course Objectives:

- To study the architecture of 8086 microprocessor and other processors
- To learn the design aspects of I/O and memory interfacing circuits
- To study about I/O peripheral communication and bus interfacing
- To study the architecture of 8051 microcontroller

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:
**Reference Books:**

**Course Outcomes:**

At the end of this course, the students will be able to
1. Develop the 8086 based assembly language programs for different applications.
2. Familiarize the architecture and instruction set of various advanced processors.
3. Acquire knowledge in interfacing the memory and I/O devices with microprocessor.
4. Design 8051 microcontroller based computing systems.

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<th>DATA STRUCTURES AND ALGORITHMS</th>
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**Course Objectives:**

- To understand Abstract Data Types (ADT), lists, Stacks, queues and their applications.
- To understand the various types of Trees.
- To learn about Hashing and sets.
- To understand the analysis of algorithms and their design.

**UNIT - I**

**UNIT - II**
Tree structures: Tree ADT – tree traversals – left child right sibling data structures for general trees – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT – Threaded

UNIT - III

UNIT - IV
Algorithms : Definition- Efficiency of Algorithms- Average and worst case Analysis- What is an elementary Operations- Asymptotic Notation- Notation for the order of – Other Asymptotic Notations- Analysing control structures- Greedy Algorithms- Minimum Spanning Tree- Prim’s and Kruskal's algorithms – Knapsack problem

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Understand the concepts of data structure, data type and array data structure and analyze algorithms and determine their time complexity.
2. Implement linked list data structure to solve various problems.
3. Understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C++programming language.
4. Implement and know when to apply standard algorithms for searching and sorting.
5. Effectively choose the data structure that efficiently model the information in a problem
Mapping with Programme Outcomes

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08ES307 | BASIC ELECTRONICS ENGINEERING LAB | L | T | P
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Course Objectives:

- To study and experiment the characteristics of semiconductor diode and Zener diode.
- To do estimation of parameters of amplifiers, oscillators and multivibrators.
- To implement the concepts of Digital Logic design such as logic gates, flip flops, multiplexer and demultiplexer

LIST OF EXERCISES

1. Characteristics of semiconductor diode
2. Characteristics of Zener diode and Zener diode as a voltage regulator
3. Estimation of ripple factor and efficiency in a full wave / Bridge rectifier with and without filter
4. Characteristics of CE PNP and NPN transistor
5. Frequency response of RC coupled amplifier
6. Estimation of gain and efficiency in a class B power amplifier
7. Measurement of frequency of the output voltage in a RC phase shift oscillator
8. Estimation of the frequency of the output voltage of a Bestable Multivibrator
9. Verification of Truth table of AND / OR / NOT / NAND/ NOR / XOR gates
10. Reduction of variables using KMap
11. Study of multiplexer and Demultiplexer
12. Verification of state table of RS / JK flipflop
Course Objectives:

- To understand the basic concept of microprocessor and its applications
- To study the architecture of 8085 and 8086 microprocessors
- To acquire the in-depth knowledge in assembly language programming using 8085 microprocessor
- To familiarize with the microprocessor interfacing and its applications

LIST OF EXERCISES

1. Study of 8085 and study of 8086 microprocessor
2. 8-bit Arithmetic Operation
3. 16-bit Arithmetic Operation
4. Find the number of even and odd number in a block of data
5. Fibonacci series
6. Hexadecimal to binary conversion
7. Matrix Addition
8. Sorting an array of numbers
9. Searching a string
10. Digital clock
11. Square wave generation using 8253IC
12. Stepper motor interface using 8255IC
13. Data transfer using USART
14. Keyboard status
15. Message display 8279IC
16. Simulation of traffic light control signal

Course Objectives:

- Discrete Mathematics is designed to study various finite structures of Mathematics which are essential to develop the various concepts of Computer Science
- The rise of the digital computer over the second half of the twentieth century has coincided with a growth of interest in these fields
- Discrete Mathematics has now become a major area of Mathematics in its own right
UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V
Graph Theory: Graphs – Special simple graphs – Matrix representation of graphs – Path cycles and connectives – Eulerian and Hamiltonian graphs – Shortest path algorithms.

Text Book:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Acquire the basic concepts in Mathematical Logic and theory of inferences.
2. Understand the concepts of Set theory, Relations and equivalence classes with matrix representation.
3. Familiarize Lattice theory, Boolean algebra and Group theory
4. Design coding and encoding group codes concept.
5. Understand the basic concepts of Graph theory, Eulerian and Hamiltonian graphs
Course Objectives:

- This subject enables the students to gain a vast knowledge about various conducting, semi-conducting, magnetic, dielectric and optical materials.

**UNIT - I**

**UNIT - II**
Semiconducting Materials: Elemental and compound semiconductors and their properties-carrier concentration intrinsic semiconductors-carrier concentration in n-type and p-type semiconductors - variation of Fermi level and carrier concentration with temperature - Hall effect – applications.

**UNIT - III**

**UNIT - IV**
Optical Materials: Optical properties of metals, insulators and semiconductors - phosphorescence and fluorescence - excions, traps and colour centres and their importance-different phosphors used in CRO screens-liquid crystals display material- Thermography and its applications-photoconductivity and photo conducting materials.
UNIT - V
New Engineering Materials: Metallic glasses as transformer core materials - Nano phase materials-
Shape memory alloys-Bio-materials-Non-linear materials – Second harmonic generation-Optical
mixing – Optical phase conjugation – Solutions – IC packaging material.

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Acquire knowledge of a wide variety of materials
2. Analysis of suitability of materials for various applications in designing products useful for
   the society
3. Gain knowledge of new engineering materials such as nano and optical materials.

Mapping with Programme Outcomes

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Course Objectives:

- To understand the fundamentals of DBMS and E-R Diagrams
- To impart the concepts of the Relational model and SQL
- To disseminate the knowledge on various Normal Forms
- To inculcate the fundamentals of transaction management and Query processing
- To give an introduction on current trends in data base technologies
UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Differentiate database systems from file systems by enumerating the features provided by database systems.
3. Formulate the solutions to a broad range of query and data update problems using SQL
4. Understand the normalization theory and apply such knowledge to the normalization of a database
5. Inculcate the various implementation techniques and current trends

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Course Objectives:
- To understand the basic structure and operation of digital computer.
- To study the basic processing concepts and bus organization.
- To study the two types of control unit techniques and the concept of pipelining.
- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT - I

UNIT - II

UNIT - III
Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.

UNIT - IV
UNIT - V

Text Books:

Reference Books:

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

1. Understand the functional units of a computer, bus organizations and addressing modes.
2. Design and analyze the pipelining concepts.
3. Analyze RAM, ROM, cache memory and virtual memory concepts.
4. Evaluate the various I/O interfaces.

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Course Objectives:

- To get a clear understanding of object-oriented concepts
- To understand the basics of C++ and objects and classes, Inheritance, Polymorphism
- To understand the basics of I/O and file management, and advanced topics including templates, exceptions and Standard Template Library

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V
Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Student should be able to analyze and design a computer program based on Object Oriented Principles.
2. Students will be able to solve a real world problems based on Object Oriented Principles.
3. Gain the basic knowledge on Object Oriented concepts
4. Ability to develop applications using Object Oriented Programming Concepts
5. Ability to implement features of object oriented programming to solve real world problems

| Mapping with Programme Outcomes |
|-------------------------------|---|---|---|---|---|---|---|---|
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Course Objectives:

- To introduce students with basic concepts of operating system its function and services.
- To teach the features of operating system and the fundamental theory associated with process, memory and file management component of operating systems
- To provide the knowledge about UNIX operating system.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:
Course Outcomes:
At the end of this course, the students will be able to
1. Appreciate the role of operating system.
2. Compare the various algorithms and comment about performances of various algorithms used for management of memory, CPU scheduling, file handling and I/O operations.
3. Apply various concept related with deadlock to solve problem related with resources allocation, after checking system in safe state or not.
4. Appreciate role of process synchronization towards increasing throughput of system.
5. Understand the various data structures and algorithm used by Unix operating system pertaining with process, file, I/O management.

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Mapping with Programme Outcomes

Course Objectives:
- To learn how the choice of data structures and algorithm design methods impacts the performance of programs.
- To learn object-oriented design principles and gain experience writing programs in C++.
- To study specific data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs.
- To study specific algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking, and branch and bound.

LIST OF EXERCISES
1. Write a C++ program to design a class having static function names showcount() which has the property of displaying the number of objects created of the class
2. Write a C++ program to find maximum of two numbers using friend function
3. Write a C++ program using copy constructor to copy data of an object to another object.
4. Write a C++ program to design a class representing complex numbers and having functionality of performing addition and multiplication of two complex numbers using operator overloading.

5. Write a C++ program to design a student class representing student roll no. and a test class (derived class of student) representing the scores of the student in various subjects and a sports class representing the score in sports. The sport and test class should be inherited by the result class having the functionality to add the scores and display the final result for the student.

6. Write a C++ program to maintain the records of the person with details (Name and Age) and find the eldest among them. The program must use this pointer to return the result.

7. Write a C++ program to illustrate the use of virtual function in a class.

8. Write a C++ program showing data conversion between objects of different classes.

9. Write a program to create a Stack and perform insertion and deletion operations on it.

10. Write a program to create a List and perform operations such as insert, delete, update and reverse.

11. Write a program to create a Queue and perform operations such as insertion and deletion.

12. Write a program to Implement Linear Search Algorithm.


14. Write a program and simulate various graph traversing techniques.

15. Write a program and simulate various tree traversing techniques.

16. Write a program to Implement Binary Search Tree.

17. Write a program to simulate Bubble sort, quick sort and Merge sort algorithms.

### Course Objectives:

- to enable students to understand and use a relational database system.
- to understand the role of a database management system in an organization.
- to understand basic database concepts, including the structure and operation of the relational data model.
- to construct simple and moderately advanced database queries using Structured Query Language (SQL).
- to understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
- To design and implement a small database project using Microsoft Access.
LIST OF EXERCISES

1. Implementation of queries for student data base
2. Data Definition Language – with constraint and without constraint
3. Data Manipulation language – Insert, Delete, Update, Select and truncate
4. Transaction Control Statement – Commit, Save point, Roll back
5. Data Control Statement – Grant, Revoke
6. Data Projection Statement – Multi column, alias name, arithmetic operations, distinct records, concatenation, where clause
7. Data Selection Statement – Between, and, not in, like, relational operators and logical operators
8. Aggregate functions – count, maximum, minimum, sum, average, order by, group by, having
9. Joint queries – inner join, outer join, self join, Cartesian join, or cross join
10. Sub queries – in, not in, some, any, all, exist, not exist
11. Set operations – union, union all, intersect, minus
12. Database objects – synonym, sequences, views and index
13. Cursor
14. Functions and procedures
15. Trigger
16. Exceptions
17. Packages
18. Factorial of a number
19. Checking whether a number is prime or not
20. Fibonacci series
21. Reverse the string
22. Swapping of numbers
23. Odd or even number
24. Duplication of records
Course Objectives:
- Understand various computing models like Finite State Machine, Pushdown Automata and Turing Machine.
- Be aware of decidability and undecidability of various problems.
- Learn types of grammars.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV
Turing Machines : Definitions of Turing machines – Models – Computable languages and functions – Techniques for Turing machine construction – Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine-Chomskian hierarchy of languages.

UNIT - V

Text Books:
Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
2. Explain the decidability or undecidability of various problems.
3. Explain the concept of different types of grammars.

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08PC502 | COMPUTER GRAPHICS AND MULTIMEDIA | L | T | P |
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Course Objectives:
- To develop, design and implement two dimensional and three dimensional graphical structures
- To provide knowledge about transformations and clipping techniques
- To acquire knowledge in OpenGL programming
- To understand various aspects of multimedia
- To learn the concept of sound, images and videos

UNIT - I

UNIT - II
UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Design 2D and 3D graphical structures
2. Apply 2D and 3D transformations
3. Implement clipping techniques
4. Create graphical structures using OpenGL
5. Gain knowledge of multimedia systems
Course Objectives:

- To understand the phases of development of a Software Project.
- To understand the major considerations for enterprise integration and deployment concepts of Requirements engineering and Analysis Modeling.
- To learn various testing, maintenance measures and risk management methods.
- To learn the Software quality management and configuration management concepts.

UNIT - I

UNIT - II

UNIT - III
UNIT - IV

UNIT - V

Text Book:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Comprehend the basic elements of Software Project Models.
2. Visualize the significance of the different kind of Software Testing methods.
3. Explore the various Management methods in Software Development Projects and analyze the strategies in Software Designing.

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72
Course Objectives:

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

UNIT - I

UNIT - II
Media Access & Internetworking: Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP)

UNIT - III
Routing: Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM)

UNIT - IV
Transport Layer: Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

UNIT - V
Application Layer: Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS - SNMP

Text Book:

Reference Books:
Course Outcomes:
At the end of this course, the students will be able to
1. Identify the components required to build different types of networks
2. Choose the required functionality at each layer for given application
3. Identify solution for each functionality at each layer
4. Trace the flow of information from one node to another node in the network

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08CP507 OPERATING SYSTEMS LAB

Course Objectives:
- To understand basic concepts such as techniques, management, know how to use them
- To understand Operating System features and its difference from structured design
- To use the Unix as a modeling and communication utilities
- To utilize the step of the process to produce better software

LIST OF EXERCISES
1. Job scheduling techniques
2. Disk scheduling techniques
3. Memory allocation techniques
4. Memory management techniques
5. Page replacement techniques
6. Producer consumer problem
7. Bankers algorithm
8. Dining Philosophers problem
9. Write a shell script to perform the file operations using UNIX commands.
10. Write a shell script to perform the operations of basic UNIX utilities.
11. Write a shell script for arrange ‘n’ numbers using ‘awk’.
12. Write a shell script to perform \(^nC_r\) calculation using recursion.
13. Write a shell script to sort numbers and alphabetic from a text file using single ‘awk’ command.
14. Write a Shell script to display all the files which are accessed in the last 10 days and to list all the files in a directory having size less than 3 blocks, greater than 3 blocks and equal to 3 blocks.
15. Write a Shell script to display the numbers between 1 and 9999 in words.
16. Write a Shell script for Palindrome Checking.

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Course Objectives:
- To develop, design and implement two dimensional and three dimensional graphical structures.
- To provide knowledge in OpenGL programming.
- To understand various aspects of multimedia and to learn the concept of sound, images and videos.

LIST OF EXERCISES
1. Implementation of Bresenhams Algorithm – Line and Circle.
4. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.
5. Cohen Sutherland 2D line clipping and Windowing.
7. Three dimensional transformations - Translation, Rotation, Scaling.
8. Drawing three dimensional objects and Scenes.
9. Lline DDA, chain of diamonds, chessboard.

GIMP:
11. Creating Logos
12. Simple Text Animation

Audacity:
13. Silencing,Trimming and Duplicating the Audio signal
14. Giving the Advanced Effect to the Audio Signal
Windows Movie Maker:
15. Applying Effect to Video.

Swish:
17. Text Effects.
18. Pre-Loader

Flash:
19. Changing the shape of the Object.
20. Imaging Viewing using Mask.

Photo Impact:
22. Image Slicing.

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Course Objectives:
- View some of the major tasks of the system software of a computer system, focusing on internal working of the hardware and software interface of a typical system.
- Identify and understand the design, function and implementation of assemblers, linkers, loaders, macro processors and system software tools.
- Understand the theory and practice of compiler implementation and to learn context free grammars, compiler parsing techniques, construction of syntax trees, symbol tables, intermediate representations and actual code generation.

UNIT - I

UNIT - II

UNIT - III
Automata - Designing a lexical analyzer generator - Pattern matching based on NFA.

UNIT - IV

UNIT - V
Compiler- Code Generation, Optimization: Intermediate languages - graphical representations – DAGs - Three address code - types of three address statements - syntax directed translation into three address code - implementation of three address statements - Code Optimization: Machine dependent and machine independent code generation - Sources of optimization - Code Generation - Semantic stacks - evaluation of expressions - control structures and procedure calls.

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Understand and design principles of assemblers, linkers and loaders
2. Know the Phases of compilation
3. Optimize code and study techniques of syntax directed translation

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Course Objectives:

- To understand and be able to use the basic programming principles such as data types, variable, conditionals, loops, recursion and function calls
- To learn how to use basic data structures such as List, Dictionary and be able to manipulate text files and images
- To understand the process and will acquire skills necessary to effectively attempt a Programming problem and implement it with a specific programming language – Python

UNIT - I

UNIT - II
UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Gain knowledge about the basic concepts of python programming
2. Solve the basic design problems using object and classes
3. Able to demonstrate systematic knowledge of backend and front end by developing an appropriate application
4. Obtain the knowledge of DBM and SQL databases from python

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Course Objectives:
- Design the different stages of a Compiler.
- Implement aspects of Networking and their applications.

**LIST OF EXERCISES**

1. Implementation of Lexical Analyzer for IF Statement.
2. Implementation of Lexical Analyzer for Arithmetic Expression
3. Construction of NFA from Regular Expression
4. Construction of DFA from NFA
5. Implementation of Shift Reduce Parsing Algorithm
6. Implementation of Operator Precedence Parser
7. Implementation of Code Optimization Techniques
8. Implementation of Code Generator
10. (a) To Find The IP Address of Local Host
    (b) To Find The IP Address of Remote Host
11. Implementation of Echo Server and Client Using TCP Sockets
12. Implementation of Echo Server and Client Using UDP Sockets
13. Send and Receive Message between Client and Server Using TCP
14. Send And Receive Message between Client and Server Using UDP
15. Sliding Window Protocols
Course Objectives:

- To understand and be able to use the basic programming principles such as data types, variable, conditionals, loops, array, recursion and function calls.
- To learn how to use basic mathematical problems are evaluated and be able to manipulate text files and file operations.
- To understand the process and will acquire skills necessary to effectively attempt a programming problem and implement it with a specific programming language - Python.

LIST OF EXERCISES

1. Python Program to check if a Number is Positive, Negative or Zero.
2. Python program to check prime numbers.
3. Python Program to check Armstrong Number.
4. Python Program to Solve Quadratic Equation.
5. Python Program to Transpose a Matrix.
6. Python Program to Find the Size (Resolution) of Image.
7. Python Program to Display the Multiplication Table using FOR loop.
8. Python Program to Find ASCII Value of Character.
9. Python Program to Convert Decimal to Binary, Octal and Hexadecimal.
11. Python Program to Display Fibonacci Sequence Using Recursion.
12. Python Program to Shuffle Deck of Cards.
13. Python Program to Merge Mails.
14. Python Program to Find Hash of File.
15. Python Program to Root search.

Course Objectives:

- To understand the moral and ethical dimensions in engineering.
- To take balanced decisions.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
1. Understand the relationship between the engineer and the society.
2. Learn the importance of codes in engineering practice.
3. Acquire knowledge on the legal, moral and ethical aspects in engineering.

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Course Objectives:

- Learn the various soft computing frameworks
- Be familiar with the design of various Neural Networks
- Be exposed to Fuzzy Logic
- Learn Genetic programming
- Be exposed to Hybrid Systems

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V
Neuro-fuzzy hybrid systems - Genetic Neuro Hybrid systems - Genetic fuzzy hybrid and Fuzzy genetic hybrid systems - Simplified fuzzy ARTMAP - Applications: A fusion approach of
Multispectral images with SAR, Optimization of Traveling Salesman Problem using Genetic Algorithm approach, Soft computing based hybrid fuzzy controllers.

**Text Books:**

**Reference Books:**

**Course Outcomes:**
At the end of this course, the students will be able to

1. Select and apply various soft computing frameworks
2. Design of various neural networks
3. Use fuzzy logic
4. Apply genetic programming
5. Understand hybrid soft computing

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Course Objectives:

- To impart the concepts of neural networks, fuzzy logic and optimization algorithms and their relations.

LIST OF EXERCISES

1. Performing Union, Intersection and Complement operations.
3. Plotting various membership functions.
4. Fuzzy toolbox to model tip value.
5. Implementation of FIS Editor.
6. Simple addition and subtraction of fuzzy sets.
7. To find the weight matrix.
10. Perceptron net for an AND function with bipolar inputs and targets.
11. Calculate the weights using hetero-associative neural net for mapping of vectors.
12. XOR function (binary input and output) using back propagation algorithm.
Course Objectives:

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
- To train the students in preparing project reports and to face reviews and viva voce examination.

Course Outcomes:

1. On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
2. Carrying out any experimental works on concrete and steel or any other construction material to know the behavior and properties
3. Understand the modelling, analysis and design concepts by taking up a structure.

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PE - PROFESSIONAL ELECTIVES
Course Objectives:

- To understand the concept of static web designing using HTML
- To understand the concept of dynamic web designing using Java Script and XML
- To understand the concept of server-side web designing using PHP
- To understand the concept of server-side web designing using C#
- To understand the concept of server-side web designing using VB and Java

UNIT - I
HTML: Introduction to Internet - Introduction to HTML5 - Cascading Style Sheets - Canvas - WebSockets and Web Workers.

UNIT - II

UNIT - III

UNIT - IV
Server-Side Scripting with PHP and C#: PHP - Web App Development with ASP.NET in C# - Web Services in C#.

UNIT - V

Text Books:

Reference Books:
Course Outcomes:

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

1. Design static web page using HTML
2. Develop dynamic web page using Java Script and XML
3. Acquire engineering knowledge on server-side web page using PHP
4. Develop individual and team work based server-side web page using C#
5. Perform server-side project management using VB and Java

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Course Objectives:

- To understand the basic Perl language features
- To understand Perl language as a tool for convenient text, data storage and file processing
- Execute programs from Perl environment and process their result

UNIT - I


UNIT - II

Lists and Hashes: Introduction to lists, Simple lists, Complex lists, Accessing list values, List slices, Ranges, Combining ranges and Slices. Arrays – Accessing single and Multiple elements from an array – Interpolating Arrays into Strings – For Control Structure – Array functions (pop, push, shift, unshift, and sort) – Array manipulations; Introduction to Hashes – Hash element access – Hash functions – Typical use of hash.
UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Ability to apply prerequisite basic programming concepts to Perl
2. Write, compile, and run Perl programs, analyze the effects of using Perl structures that implement decisions, loops, and store arrays and use these structures in a well-designed, OOP program
3. Create Perl programs that make use of various directories and use several files linked together

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Course Objectives:

- To get an introduction about .NET concepts
- To enable the students to develop applications in VB.NET
- To know about the implementation of object oriented concepts using VB.NET
- To understand some advanced concepts in .NET technologies

UNIT - I

UNIT - II

UNIT - III
Programming with controls: Properties, Events and Methods of Form, Label, Textbox, List Box, Combo Box, Radio Button, Button, Check Box, Progress Bar, Date Time Picker, Calendar, Picture Box, Scrollbar, VScrollBar, Group Box, Tooltip, Timer. Creating MDI Parent and Child

UNIT - IV

UNIT - V

Text Books:

Reference Books:
Course Outcomes:

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

1. Understand .NET Framework and describe some of the major enhancements to the new version of Visual Basic.
2. Describe the basic structure of a Visual Basic .NET project and use main features of the integrated development environment (IDE).
3. Create applications using Microsoft Windows Forms.

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Course Objectives:

- To understand the concept of OOP as well as identify the classes, objects, members of class relationships among them needed for a specific problem
- To develop Java application programs using sound OOP practices
- To develop a GUI based programs using the Java collection APIs as well as Java standard class library

UNIT - I
Review of OOP concepts: Encapsulation, Inheritance, Polymorphism, Classes, Objects, Constructors, Methods, Parameter passing, Static fields and Methods, Access Control, This reference, Overloading methods and Constructors, Recursion, Garbage Collection, Building strings, Exploring string class, Enumerations, Autoboxing and Unboxing, Generics.
Java Basics: History of Java, Comments, Data Types, Variables, Constants, Variables, Operators, Control Statements, Looping Statements, Type Conversion and Casting, Enumerated Types, Arrays, Classes and Objects, Fields and Methods, Constructors, Overloading Methods, Garbage Collection, Nested classes, Methods and Constructors and Wrapped classes.

UNIT - II
Inheritance: Inheritance Concept, Benefits of Inheritance, Super Classes and Sub Classes, Member access rules, Inheritance hierarchies, Final classes and Methods, Casting, Polymorphism– Dynamic Binding, Method Overriding, Abstract classes and Methods. Interfaces – Interfaces vs. Abstract
classes, Defining an interface, Implementing Interfaces, Accessing implementations through interface references, Extending interface. Inner classes – Uses of Inner classes, Local Inner classes, Anonymous Inner classes, Static Inner classes.

Package: Defining, Creating and Accessing a user defined packages, Understanding CLASS PATH, Importing own packages.

UNIT - III
Multithreading: Differences between Multiple processes and Multiple threads, Thread states, Creating threads, Interrupting threads, Thread priorities, Synchronizing threads, Interthread Communication, Thread groups, Daemon threads.
Exception Handling: Dealing with errors, Benefits of exception handling, The classification of Exceptions – Exception Hierarchy, Checked Exceptions and Unchecked Exceptions, Usage of try, Catch, Throw, Throws and Finally, Rethrowing Exceptions, Exception Specification, Built in Exceptions, Creating own exception sub classes.

UNIT - IV
Event Handling – Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Semantic and Low–level events.

UNIT - V
Servlets: Introduction - Life cycle of Servlet - Java Servlet Development Kit - javax.servlet package - Reading Servlet Parameters - Reading Initialization Parameters. RMI: RMI Architecture - Designing RMI application Executing RMI application

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Understand OOP concepts and basics of Java programming
2. Should have the ability to extend their knowledge of Java programming in further on their own
3. The skills to apply OOP and Java programming in problem solving mythology

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08PExxx REAL TIME SYSTEMS

Course Objectives:
- To introduce the fundamental problems, concepts, and approaches in the design and analysis of real-time systems.
- To emphasize the issues related to the design and analysis of systems with real-time constraints.
- To study the real time applications and their functional semantics.
- To provide a comprehensive idea about time management, language and tool support, real time operating systems, scheduling and communication, and related fault tolerance issues.
- To acquire the basic knowledge about real time system programming.

UNIT - I
UNIT - II
Task Assignment and Scheduling: Classical Uni-processor scheduling Algorithms - Clock-driven approach, weighted round robin approach, Priority driven approach, dynamic versus static systems, Effective release times and deadlines, Optimality of EDF and LST algorithms, Challenges in validating timing constraints in priority driven systems, Offline versus online scheduling. Task Assignment - Mode Changes - Fault Tolerant Scheduling.

UNIT - III

UNIT - IV

UNIT - V
Programming Languages and Tools: Desired language characteristics, Data typing, control structures, Facilitating hierarchical decomposition, packages, Run-Time error (exception) handling, overloading and generics - Multitasking, Low-level programming, Task scheduling - Timing specifications, Run-time support, Programming environments.

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Apply formal software engineering methods and practices to the design, analysis and development of several small real-time systems.
2. Characterize various real-time approaches for reliability and fault tolerance issues.
3. Acquire the basic programming skills in the development of real-time computing systems.
4. Understand the general purpose and full featured real-time operating systems.

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Course Objectives:

- To study the concepts of mobile computing.
- To study the concepts of medium access control protocol.
- To understand the concepts of GSM.
- To understand the concept of mobile ad-hoc networks, Bluetooth, HIPERLAN.
- To study the concepts of mobile IP and mobile TCP.

UNIT - I

UNIT - II
Motivation for a specialized MAC –SDMA–FDMA– TDMA–CDMAand comparison of these methods.

UNIT - III
GSM : mobile services - system architecture - radio interface – protocols - localization and calling - handover – security - new data services – DECT : system and protocol architecture – TETRA.

UNIT - IV
Introduction - Infrared vs. radio transmission - Infrastructure and ad-hoc networks - IEEE 802.11: system and protocol architecture - physical and MAC layer – HIPERLAN : protocol architecture - physical layer and MAC sub layer - Bluetooth : physical and MAC layer..
UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Understand the principles and concepts of mobile communication
2. Analyze and compare the multiplexing techniques
3. Describe the architecture of GSM.
4. Understand the protocol architecture of Bluetooth and HIPERLAN.

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Course Objectives:
- To demonstrate their understanding of the fundamentals of Android operating systems
- To demonstrate their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
To demonstrate their ability to deploy software to mobile devices
To demonstrate their ability to debug programs running on mobile devices

UNIT - I

UNIT - II
Building User Interface: Fundamental Android UI design - Android User Interface fundamentals - Layouts - Linear - Relative - Grid Layouts - Fragments - Creating new fragments - The Fragments Lifecycle - Introducing the Fragment Manager - Adding Fragments to Activities - Interfacing between Fragments and Activities

UNIT - III
Intents And Broadcasts Receivers: Introducing Intents - Using intents to launch Activities - Introducing Linkify - Using Intents to Broadcast Events - Introducing the Local Broadcast Manager - Introducing pending intents - Using Intent filters to service implicit Intents - Using Intent Filters for Plug-Ins and extensibility - Listening for Native Broadcast Intents - Monitoring Device State Changes Using Broadcast Intents

UNIT - IV
Files, Saving State and Preferences: Saving Simple Application Data - creating and Saving Shared Preferences - Retrieving Shared Preferences - Introducing the Preference Framework and the Preference Activity - Working with the File System - Introducing Android Databases - Introducing SQLite - Content Values and Cursors - Working with SQLite Databases - Creating Content Providers, Using Content Providers

UNIT - V
Advanced Topics: Alarms - Creating and using alarms - Using Location Based Services - Using the Emulator with Location-Based Services - Finding the Current Location - Using the Geocoder - Creating Map-Based Activities

Text Books:

Reference Books:
1. Wei-Meng Lee, “Beginning Android 4 Application Development”, Wiley India (Wrox), 2013
Course Outcomes:
At the end of this course, the students will be able to

1. Understand the existing state of mobile app development via researching existing apps, meeting with industry professionals, and formulating new ideas
2. Display proficiency in coding on a mobile programming platform
3. Understand the limitations and features of developing for mobile devices
4. Create a complete Mobile app with a significant programming component, involving the sensors and hardware features of the phone
5. Understand the economics and features of the app marketplace by offering the app for download

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Course Objectives:
- To impart knowledge on software testing, quality and Software Quality Assurance (SQA).
- To introduce the various software testing techniques and different levels of testing.
- To introduce the SQA standards and components of SQA system.
- To explain the components of quality plan for software projects.

UNIT - I
Phases of Software project – Quality, Quality assurance and quality control – Testing, Verification and Validation – White box testing – Static testing – Structural testing – Black box testing – Definition, need for black box testing – Black box testing techniques - Requirements based testing, Positive and Negative testing, Boundary Value Analysis, Decision Tables, Equivalence Partitioning, Graph based Testing, Compatibility Testing, Domain Testing.

UNIT - II
Integration testing - Integration testing as a type of testing - Integration testing as a phase of testing – Scenario testing – Defect bash - System and Acceptance testing – System testing overview – Need for System testing – Functional system testing – Non-functional testing – Acceptance testing.
UNIT - III

UNIT - IV
Software quality – definition - Software quality assurance – definition and objectives - Software quality assurance and software engineering - Software quality factors - The components of the software quality assurance system - The SQA system - SQA architecture Pre-project components - Software project life cycle components - Infrastructure components for error prevention and improvement - Management SQA components - SQA standards, system certification, and assessment components - Organizing for SQA – The human components - Considerations guiding construction of an organization’s SQA system.

UNIT - V
Development plan and quality plan objectives - Elements of the development plan - Elements of the quality plan - Development and quality plans for small projects and for internal projects - Integrating quality activities in the project life cycle - Classic and other software development methodologies - Factors affecting intensity of quality assurance activities in the development process - Verification, validation and qualification - A model for SQA defect removal effectiveness and cost.

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Techniques and skills on use of modern software testing tools to support software testing projects
2. Planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generating a test report
3. Advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions
## Mapping with Programme Outcomes

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### Course Objectives:
- To understand the foundations of Distributed System
- To introduce the idea of peer to peer services and file system
- To understand the components and support required for distributed system
- To understand the remote method invocation and objects
- To understand the design process and resource management systems

### UNIT - I

### UNIT - II

### UNIT - III

### UNIT - IV
UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Acquiring Knowledge on foundations of Distributed System.
2. Familiarizing the idea of peer to peer services and file system.
3. Familiarizing the components and support required for distributed system.
4. Acquiring Knowledge on remote method invocation and objects.
5. Gaining experienced skills on design process and resource management systems.

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Course Objectives:
- To Study the concepts of Computer Security and Cryptography.
- To Understand the Symmetric Key Algorithms and AES.
- To Study the concepts of Asymmetric Key Algorithms- Digital Signatures and RSA.
- To Study the Digital Certificates and Public Key Infrastructure (PKI).
To Understand the Network Security, Firewalls and Virtual Private Networks and Internet Security Protocols.

UNIT - I
Introduction - Need for security - Principles of Security - Types of Attacks - Plain text and Cipher Text - Substitution techniques - Caesar Cipher - Monoalphabetic Cipher - Polygram - Polyalphabetic Substitution - Playfair - Hill Cipher - Transposition techniques - Encryption and Decryption - Symmetric and Asymmetric Key Cryptography - Steganography - Key Range and Key Size - Possible Types of Attacks.

UNIT - II
Algorithms types and modes - Overview of Symmetric key Cryptography - Data Encryption Standard (DES) - International Data Encryption Algorithm (IDEA) - RC4 - RC5 - Blowfish - Advanced Encryption Standard (AES).

UNIT - III
Brief history of Asymmetric Key Cryptography - Overview of Asymmetric Key Cryptography - RSA algorithm - Symmetric and Asymmetric key cryptography together - Digital Signatures - Knapsack Algorithm - Some other algorithms (Elliptic curve Cryptography - ElGamal - problems with the public key exchange).

UNIT - IV

UNIT - V
Brief Introduction to TCP/IP - Firewalls - IP Security - Virtual Private Networks (VPN) - Intrusion.

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Understand the concepts of Computer Security, Cryptography, Symmetric Key Algorithms, AES, Asymmetric Key Algorithms - Digital Signatures, RSA.
2. Understand the Digital Certificates, Public Key Infrastructure (PKI)

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Course Objectives:

- To introduce the characteristics, basic concepts and systems issues in pervasive computing.
- To illustrate architecture and protocols in pervasive computing and to identify the trends and latest development of the technologies in the area.
- To analyze and compare the performance of different data dissemination techniques and algorithms for mobile real-time applications.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV
UNIT - V


Text Books:


Reference Books:


Course Outcomes:

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

1. Develops an attitude to propose solutions with comparisons for problems related to pervasive computing system through investigation.
2. Gives knowledge about the strengths and limitations of the tools and devices for development of pervasive computing systems.
3. Discovers the characteristics of pervasive computing applications including the major system components and architectures of the systems.

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Course Objectives:
- Understand the design issues in ad hoc and sensor networks
- Learn the different types of MAC protocols
- Be familiar with different types of ad hoc routing protocols
- Learn the architecture and protocols of wireless sensor networks

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:
Course Outcomes:
At the end of this course, the students will be able to
1. Understand the principles of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure-based networks
2. Analyze the protocol design issues of ad hoc and sensor networks
3. Understanding the principles and characteristics of wireless sensor networks
4. Knowledge of the current topics in MANETs and WSNs, both from an industry and research point of view

Mapping with Programme Outcomes

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Course Objectives:

- To learn the fundamental concepts of MATLAB.
- To introduce basic concepts like acquiring, storing and processing of images.
- To provide details about enhancing the quality of images.
- To introduce techniques for extraction and processing of region of interest.
- To understand the applications of Image Processing.

UNIT - I

UNIT - II
UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Understand the basic image enhancement techniques in spatial & frequency domains.
2. Understand the basic multi-resolution techniques and segmentation methods.
3. Apply this concepts for image handling in various fields.

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Course Objectives:

- To provide the basic knowledge of various methods in watermarking
- To know the current watermarking techniques
- To understand the types of watermarking and optimization techniques
- To understand the basic principles and different types of steganography
- To make them understand the steganalysis

UNIT - I

UNIT - II
Survey of Current Watermarking Techniques: Cryptographic and psycho visual aspects – Choice of a workspace – Formatting the watermark bits – Merging the watermark and the cover – Optimization of the watermark receiver – Extension from still images to video.

UNIT - III

UNIT - IV

UNIT - V

Text Books:

References Books:
Course Outcomes:
At the end of this course, the students will be able to
1. Understand the existing digital watermarking techniques and formulate new ideas
2. Have a detailed knowledge of the watermarking techniques
3. Develop skill to make and implement a simple Steganographic technique
4. Distinguish between Watermarking and Steganography techniques
5. Select the suitable steganography method to develop a new project.

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Course Objectives:
- To study the basic components of DSP systems
- To study DFT and its computation
- To study the design techniques for digital filters (IIR & FIR)
- To study the finite word length effects and applications in signal processing

UNIT - I

UNIT - II
Introduction to DFT - Properties of DFT - Filtering methods based on DFT - Relation between DTFT and DFT - FFT computations using Decimation in time and Decimation in frequency algorithms - Overlap-add and save methods.
UNIT - III

UNIT - IV
Fixed point and floating point number representations - Comparison - Truncation and Rounding errors - Quantization noise - derivation for quantization noise power - coefficient quantization error - Product quantization error - Overflow error - Round off noise power - limit cycle oscillations due to product round off and overflow errors - signal scaling.

UNIT - V
Multirate Signal Processing - Speech Compression - Adaptive Filter - Musical Sound Processing - Image enhancement - Applications of Multi rate signal Processing

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Design both analog and digital filters
2. Design DSP processors
3. Do projects in Signal processing, Image processing and Speech Processing

| Mapping with Programme Outcomes |
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| CO2              |     | ✔    | ✔    | ✔    | ✔    | ✔    |     |     |
| CO3              | ✔    | ✔    |     | ✔    |     | ✔    | ✔    | ✔    |

111
Course Objectives:
- To know the fundamentals of cloud computing
- To acquire the knowledge of cloud computing technologies and architecture
- To be familiar with cloud services and applications of cloud computing

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V
Amazon Web Services - Google AppEngine - Microsoft Azure - Scientific Applications - Business and Consumer Applications - Case Study: Cloud as Infrastructure for an Internet Data Center - Cloud Computing for Software Parks - Cloud Computing Supporting SaaS.

Text Books:
Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Identify the fundamentals and technologies of cloud computing
2. Address different cloud architectures and cloud services
3. Explore various applications by integrating the cloud services

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Course Objectives:
- To learn the basics of Pattern Recognition systems
- To learn Feature extraction methods for Classification.
- To learn Non-parametric Techniques and Non-metric Methods
- To learn Neural network concept for Pattern Recognition

UNIT - I
Introduction: Machine perception - pattern recognition systems - design cycle - learning and adaptation - Bayesian decision theory: Continuous features – minimum-error-rate classification - classifiers, discriminant functions, and decision surfaces - normal density - discrete features - Bayesian belief networks

UNIT - II
UNIT - III

UNIT - IV

UNIT - V

Text Books:

References Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Analyze the various feature extraction techniques
2. Apply different techniques for classification
3. Acquire Knowledge on classification Tools
4. Develop applications using pattern recognition techniques in various fields such as audio and video analysis, medical analysis etc

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Course Objectives:
- Search and discover intelligent characteristics of existing AI projects
- Map a new problem and show different search strategies for that problem
- Program a new game/problem in Prolog and evaluate different Knowledge Representation schemes for typical AI problems
- Design and implement an AI problem to be solved using Machine Learning Techniques
- Design and implement futuristic AI applications

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V
Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Learn different search algorithms
2. Implement AI problems
3. Implement futuristic AI applications

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08PExxx | DATA MINING | L | T | P |
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Course Objectives:
- To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
- To expose the students to the concepts of Data warehousing Architecture and Implementation
- To study the overview of developing areas – Web mining, Text mining and ethical aspects of Data mining
- To identify Business applications and Trends of Data mining

UNIT - I
Evolution of Decision Support Systems - Data warehousing Components – Building a Data warehouse - Data Warehouse and DBMS - Data marts – Metadata - Multidimensional data model - OLAP Vs OLTP - OLAP operations - Data cubes - Schemas for Multidimensional Database: Stars, Snowflakes and Fact constellations.
UNIT - II
Types of OLAP servers- 3 – Tier data warehouse architecture - distributed and virtual data warehouses - Data warehouse implementation - tuning and testing of data warehouse - Data Staging (ETL) Design and Development - data warehouse visualization - Data Warehouse Deployment – Maintenance – Growth - Business Intelligence Overview - Data Warehousing and Business Intelligence Trends - Business Applications - tools- SAS.

UNIT - III
Data mining - KDD versus data mining - Stages of the Data Mining Process - task primitives -Data Mining Techniques - Data mining knowledge representation – Data mining query languages - Integration of a Data Mining System with a Data Warehouse – Issues-Data preprocessing – Data cleaning - Data transformation - Feature selection - Dimensionality reduction - Discretization and generating concept hierarchies - Mining frequent patterns – association - correlation.

UNIT - IV

UNIT - V

Text Books:
1. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers, third edition, 2011.

References Books:
Course Outcomes:
At the end of this course, the students will be able to
1. Evolve Multidimensional Intelligent model from typical system
2. Discover the knowledge imbibed in the high dimensional system
3. Evaluate various mining techniques on complex data objects

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Course Objectives:
- To learn about Unix commands.
- To learn about Unix programming and.
- To familiarize students with the Unix Utilities.
- To learn the Unix file systems.

UNIT - I
Introduction to Unix: Architecture of Unix - Features of Unix - Unix Commands: path, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

UNIT - II

UNIT - III

UNIT - IV
UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Acquire knowledge about Unix commands.
2. Familiarize about Unix programming.
3. Familiarize the usage of Unix Utilities.
4. Acquire knowledge on Unix file systems.
5. Implement the concepts of Unix environment

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UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:
Course Outcomes:
At the end of this course, the students will be able to

1. Understand the mathematical and linguistic foundations underlying approaches in NLP
2. Understand machine learning techniques used in NLP, including hidden Markov models and probabilistic context-free grammars
3. Understand the semantic analysis and various methods of machine translation
4. Design, implement, and analyze NLP algorithms.

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121
PE-LAB - PROFESSIONAL ELECTIVE LABS
Course Objectives:

- To learn the basic syntax and semantics of the Java language and programming environment
- To design a webpage.
- To develop webpage using scripting.

LIST OF EXERCISES

1. Write a java program to implement a concept of inheritance.
2. Write a java program to draw a house for implementing a applet concept.
3. Write a Java program for implementing a multithreading concept.
4. Write a code to generate a Exception handling
5. Implementing a java concept in polymorphism to construct a employee details.
6. Write a java program to implement linked list concept
7. A Java program for implementing overloading.
8. Implement a java program to build a constructor.
9. To create a simple HTML page using different tags.
10. To create a webpage for the use of predefined functions.
11. To demonstrate exception handling in JavaScript.
12. To display an E-calendar using JavaScript.
13. To design a webpage to validate registration form.
14. To develop a webpage for cookies using ASP.
15. To create a simple servlet program to display the date.
16. To create a CD catalog using XML.

Course Objectives:

- To design and create effective reusable Perl script that could be run on Unix, Linux and Windows OS.
- To understand the concept of Perl Programming features.
- Execute programs from Perl environment and process their result
LIST OF EXERCISES

1. Perl program to display the text “hello world”.
2. Addition of two numbers with and without using Command line arguments.
3. Perl program to check a number for prime or not.
4. Perl program to check a number for Armstrong or not.
5. To find average of numbers using Function. (call by value and return argument).
6. Recursive function to find factorial of a number.
7. Perl program for Copying content of one file to another.
8. Adding and Removing Elements in an Array.
9. Perl script to send a plain message and attachment.
10. Perl code to implement a simple client-server program using Perl socket.
11. Passing Radio Button Data to CGI program.
12. Perl program to accept UNIX command from a HTML form and display the output of the command execute.
13. Perl program to accept the user name and display a greeting message randomly chosen from a list of 4 greeting messages.
14. Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
15. Write a Perl program to display a digital clock which displays the current time of the server.
16. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.

08PExxx | VISUAL PROGRAMMING LAB | L | T | P
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Course Objectives:

- To gain the knowledge and ability in implementation of algorithms using Vb.Net

LIST OF EXERCISES

1. Calculation of simple interest and compound interest
2. Checking character case
3. Checking Vowels
4. Case Conversion
5. String Operations
6. Arithmetic Operations using Menus
7. Working with Controls (options Button, Scroll Bar and list Box)
8. Text Editor Creation
9. Scientific Calculator
10. Freehand Drawing
11. Calendar Application
12. Quiz Creation
13. File and Folder Control
14. Database Access using Data Control
15. Chat Application using Win sock Control
16. Database Creation using ADO.NET
17. Database Updation using ADO.NET
18. Table View using Data grid
19. Database Creation using Data grid

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Course Objectives:

- Enable the students to explore the components of Android Studio IDE
- Making the Students to create basic to advanced android applications.
- Making the students to deploy the applications in the web
- Making the students to be aware of the usage of Java in building the business applications

LIST OF EXERCISES

1. Study of Android Studio IDE.
2. Displaying “Hello World”.
3. Designing UI based on Layouts.
5. Factorial Calculation App.
8. Storing and retrieving data from local storage.
Course Objectives:

- To provide the students with simple experiments to understand the basic aspects about the behavior of the testing techniques to detect the errors in the software
- To understand standard principles to check the occurrence of defects and its removal.
- To learn the functionality of automated testing tool

**LIST OF EXERCISES**

1. Write a C program for matrix multiplication to understand the causes of failures
2. Write a C program for Binary Search - Path Testing
3. Write a C program to derive test cases based on boundary value analysis
4. Write a C program for cause effect graph to check whether defect is found in the program
5. Write a C program to perform data flow testing for the given code and find out all d-use pairs
6. Write a C program to demonstrate the working of the looping constructs:
7. Write and test a program to count number of check boxes on the page checked and unchecked count using selenium tool.
8. Write and test a program to provide total number of objects present available on the page using selenium tool.
9. Write and test a program to login a specific web page using selenium tool.
10. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
11. Write a Java script to develop a web page which calculates the GCD of 2 numbers using Selenium server.
12. Write and test a program to update 10 student records into table into Excel file using selenium tool.

Course Objectives:

- To implement the foundations of Distributed System
- To implement the remote method invocation and objects
- To implement the idea of peer to peer services and file system
- To implement the components and support required for distributed system

**LIST OF EXERCISES**

1. Calculating average marks of five students
2. Displaying Prime Number Series for the Given Number
3. Displaying Days of the Week of a Given Input
Course Objectives:

- To obtain a practical exposure on implementation of well-known data mining tasks.
- To provide familiarity with the performance evaluation of supervised and unsupervised algorithms of data mining.
- To be up to date with the tools and techniques used for Knowledge Discovery in Databases.
- To illustrate the concepts of web mining and text mining concepts.

LIST OF EXERCISES

1. Introduction to WEKA
2. Introduction to attributes in WEKA
3. Preprocessing a Student dataset
4. Preprocessing a Labour dataset
5. Training a classification algorithm
6. Testing the training set
7. Cross validation
8. Association rule process on contactlenses dataset using apriori algorithm
9. Association rule process on test dataset using apriori algorithm
10. Classification process using j48 algorithm
11. Classification using ID3 algorithm
12. Classification via Naïve Bayes
13. Clustering process on Iris dataset using simple k-means
14. Clustering process on Student dataset using simple k-means
Course Objectives:

- To write simple scripts with basic commands
- To manipulate shell variables and user-defined variables in scripts.
- To familiarize in string handling and file handling
- To implement threads and synchronization concepts
- To impart training in tool command language

LIST OF EXERCISES

1. Introduction to UNIX and programming commands
2. Finding leap year
3. Fibonacci series
4. List the files and directories accessed in the last 10 days
5. Palindrome checking
6. File operation
7. Unix utilities
8. Find the number of characters, words and lines for a given file without using wc command
9. Calculate $nC_r$ value using recursion
10. Sorting of ‘n’ numbers / alphabets using awk
11. Check disk space and send an email alert
12. Pattern match in a file
13. Drawing a special pattern
14. Encrypt a file/directory
15. Checking server utilization
16. Implement copy, move and merge commands
17. Convert starting lowercase letter of each word into uppercase in a file
18. Display the directories in a given directory
19. List the files with size 200 bytes and remove files with 0 bytes
20. Report file type, number of links, time of last access and rwx permissions for each file
Course Objectives:

- To familiarize fundamental concepts in the area of natural language processing.
- To impart training on part-of-Speech tagging techniques
- To implement parsing techniques
- To inculcate the skills on language modeling

LIST OF EXERCISES

1. Write a program to construct FSA for the given word or statement.
2. Write a program to convert into a Regular Expression for the any given word.
3. Write a program to parse a sentence or any string into distinct words.
4. Write a program to count the number of given words using N-gram in a sentence.
5. Write a program to get the number of occurrences of each word in a String.
6. Write a program to implement morphological operations.
7. Write a program to implement finite state transducers.
8. Write a program to perform Simple Expression Evaluator.
9. Write a program to implement Syntactic Level Analysis.
10. Write a program to implement Semantic Analysis.
11. Write a program to implement top down parsing with Context Free Grammar.
12. Write a program to implement bottom up parsing with Context Free Grammar.
13. Write a program to implement Earley algorithm.
14. Write a program to implement Lexical semantics.
OPEN ELECTIVES
Course Objectives:

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

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:
Course Outcomes:

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

1. Design and develop ERP implementation cycle
2. Have awareness of core and extended UNIT - s of ERP
3. Know about the business UNIT - s of ERP

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Course Objectives:

- To provide basic knowledge about the types of Electronic payment systems.
- To illustrate the concepts of various On-Demand Education and Software Agents

UNIT - I

UNIT - II

UNIT - III

UNIT - IV
Inter organizational E-Commerce and Marketing: Internal Information Systems - Macro forces and Internal Commerce – Work-flow automation – Customization – SCM – Corporate Digital Library: Dimensions, Making a business case, Types of Digital Documents – Advertising on Internet – Charting the online marketing process – Market Research
UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Identify and analyze the construction and working principles of E-Commerce.
2. Develop and implement the Electronic Payment Systems and EDI.

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08OExxx | BIO INFORMATICS | L | T | P
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Course Objectives:
• To study the fundamentals of Bioinformatics technologies
• To learn principles of modern bio-informatics and to apply basic predictive methods those are common use in the field.
• To study the tools and databases applied in the field.
UNIT - I
Introduction: Need for Bioinformatics technologies –Overview of Bioinformatics technologies Structural bioinformatics –Data format and processing–Secondary resources and applications –Role of Structural bioinformatics -Biological Data Integration System.

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Develop models for biological data
2. Apply pattern matching techniques to bioinformatics data –protein data genomic data
3. Apply micro array technology for genomic expression study
Course Objectives:

- To understand the importance of major decisions in supply chain management
- To present the vision of supply chain management and their role in enterprise competitiveness
- To appreciate the current trends in SCM

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V
Text Books:

Reference Books:

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

1. Build a competitive supply chain using strategies, models, techniques and information technology
2. Know about current trends in Supply Chain Management
3. Manage a competitive supply chain using models, techniques and information technology

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Course Objectives:
- To study the fundamentals of Computer Forensics
- To learn, analyze and validate Forensics Data
- To study the tools and tactics associated with Cyber Forensics

UNIT - I
UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Identify the present indicators that a Cyber Security incident has occurred.
4. Work in teams to analyze and resolve Cyber Security issues.
Mapping with Programme Outcomes

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Course Objectives:

- To understand the basic system concept and definitions of system.
- To understand the system concept and apply functional modeling method to model the activities of a static system.
- To understand the behavior of a dynamic system and create an analogous model for a dynamic system.
- To understand simulate the operation of a dynamic system and make improvement according to the simulation results.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV
Model Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.
UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Acquire knowledge of Simulation Terminologies and Classification.
2. Familiarize the idea of Mathematical Models.
3. Familiarize the Simulation Data.
4. Gain experience skills on Verification and Validation of Simulation Models.
5. Familiarize on Simulation Tools and Simulation Project Management.

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Course Objectives:
- To introduce fundamental techniques and tools required for data analytics
- To learn basic tools for statistical analysis, R, and key methods used in machine Learning
• To learn MapReduce techniques for parallel processing and Hadoop

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:

At the end of this course, the students will be able to
1. Understand fundamental techniques and tools required for data analytics
2. Use basic tools for statistical analysis, R, Hadoop, and key methods used in machine learning
3. Apply MapReduce techniques for parallel processing
4. Apply fundamental algorithmic ideas to process data, and apply hypotheses and data into actionable predictions
5. Document and transfer the results, and effectively communicate the findings using visualization techniques

Mapping with Programme Outcomes

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08OExxx SOCIAL NETWORK ANALYSIS

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Course Objectives:
- To understand the concept of semantic web and related applications
- To learn knowledge representation using ontology
- To understand human behavior in social web and related communities
To learn visualization of social networks

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:

At the end of this course, the students will be able to
1. Know basic notation and terminology used in network science
2. Work on the internals components of the social network
3. Model and visualize the social network
4. Understand the behaviour of the users in the social network

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Course Objectives:
- Educate the students with the basic nature of management and its process.
- Know the responsibilities of a professional manager as well as the organizational behavior.
- Know the importance about leadership.
- Understand the performance at the individual and group levels.

UNIT - I

UNIT - II
UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

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

1. Understand about management, its process and also the responsibilities of a professional manager.
2. Understand the performance at the individual and group levels.
3. Obtain leadership quality.

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Course Objectives:
- To familiarize the students about the aspects of product design and development
- To provide basic knowledge about the costs of product development
- To illustrate the concepts of Quality control and reliability of product

UNIT - I
Introduction: Significance of product design- challenges of product design- product design and development process-sequential engineering design method- the challenges of product development- Identifying opportunities evaluate and prioritize projects-allocation of resources.

UNIT - II
Identifying customer needs and product Specifications: Competitor and customer –behavior analysis- understanding customer-involve customer in development and managing requirements-Interpret raw data in terms of customers need-organize needs in hierarchy - establish the relative importance of needs-Establish target specifications- setting final specifications.

UNIT - III
Product Development: Detailed design- Analysis and modeling- Best practices for detailed design- Design analysis-Prototypes in Detailed Design-Test and Evaluation-Design review, prototyping-simulation and testing-manufacturing-strategies-planning and methodologies.

UNIT - IV

UNIT - V
Quality Control and reliability: Quality control procedure-Inspection and test equipment-statistical quality control-manufacturing reliability- probability of tool reliability-reliability operations-developing a quality-control and reliability programme.

Text Books:

Reference Books:
Course Outcomes:

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

1. Describe an engineering design and development process.
2. Demonstrate the individual skill using selected manufacturing techniques including drilling, tapping and rapid prototyping.
3. Employ the engineering, scientific and mathematical principles to execute a design from concept to finished product.
4. Understand the quality control procedures and reliability issues.

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Course Objectives:

- To familiarize the students about the trends and challenges of Embedded System.
- To impart the knowledge in RTOS and scheduling algorithms
- To educate the students in various Embedded Networks and real time applications with case studies.

UNIT - I

UNIT - II

UNIT - III
Program Design And Analysis: Components for embedded programs-State machines, Stream-oriented programming circular buffers, Queues-Models of programs: Data flow graphs, Control/Data flow graphs-Assembly, Linking and Loading- Basic compilation techniques- Program-level performance
analysis: elements of program performance, measurement-driven performance analysis-Program validation and Testing.

UNIT - IV
Networks And Multiprocessors: Need of networks and multiprocessors – Categories of Multiprocessors – Distributed embedded system: Network abstractions, CAN bus, Distributed computing in cars and airplanes, FC bus, Ethernet, Internet- MPSoCs and shared memory multiprocessors: Heterogeneous shared memory multiprocessors, Accelerators, Accelerator performance analysis, Scheduling and allocation.

UNIT - V
Embedded System Application Development: Case study of: Data compressor, Model train controller, Video accelerator, Audio player, Air -bag system.

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Recognize the key features of embedded systems in terms of computer hardware and be able to discuss their functions.
2. Explain the extra-functional that are imposed on embedded systems.
3. Identify the key factors affecting the evolution of computing hardware.
4. Develop the embedded system based applications.

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Course Objectives:
- Design and maintain knowledge management system.
- Coverage of knowledge management concepts and methodologies which includes knowledge creation, knowledge architecture and knowledge codification.
- Broad understanding of knowledge management tools and knowledge portals as well as the notions of knowledge transfer in the E-world.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:
Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Obtain knowledge of components in KMS and how to use in business environment for effective decision making.
2. Become familiar with the current theories, practices, tools and techniques in Knowledge Management.
3. Learn to determine the infrastructure requirements to manage the intellectual capital in organizations.
4. Identify and select tools and techniques of KM for the stages of creation, acquisition, transfer and management of knowledge.
5. Evaluate the impact of technology including telecommunications, networks, and internet/intranet role in managing knowledge.

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Course Objectives:
- To understand the activities in project management
- To impart knowledge on project scheduling, monitoring and control
- To study about managing people and teams

UNIT - I
Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning.
UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Text Books:

Reference Books:

Course Outcomes:
At the end of this course, the students will be able to
1. Understand the basic concepts and issues of software project management.
2. Plan effectively the software projects and create project plans which address the challenges of real-world management.
3. Implement the project plans through managing people, communication and change.
4. Deliver successful software projects that support the organization's strategic goals.
Mapping with Programme Outcomes

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Course Objectives:
- The course acts as a bridge between engineering and biology to provide basic understanding of biological mechanisms of living systems from engineering perspective.
- It will illustrate the many possible means to utilize living things’ relevance to engineering principles.
- With substantial knowledge and continuing interest will make a student into a specialist in the technical diversity.

UNIT I
Requirements of Biological Systems
Biological Units Need Water; Biological Units Need the Right Amount of Oxygen; Biological Units Need Food and Nutrients; Biological Units Become Ill in the Presence of Wastes; Biological Units Need Heat Sources and Sinks.

UNIT II
Behavior of Biological Systems
Biological Units Adapt to Their Environments; Biological Units Modify Their Environments; Adaptations Require Extra Energy and Resources; Biological Units, If Possible, Move to Friendlier Environments; Biological Units Evolve under Environmental Pressures.

UNIT III
Response to Stress by Biological Systems
Crowding of Biological Units Produces Stress; Biological Units Are Affected by Chemical Stresses; Biological Units Respond to Mechanical Stresses; Optimization Is Used to Save Energy and Nutrient Resources; Biological Units Alter Themselves to Protect against Harsh Environments.

UNIT IV
Existence of Biological Systems
Biological Units Cooperate with Other Biological Units; Biological Units Compete with Other Biological Units; Biological Units Reproduce; Biological Units Coordinate Activities through Communication; Biological Units Maintain Stability with Exquisite Control; Biological Units Go through Natural Cycles; Biological Units Need Emotional Satisfaction and Intellectual Stimulation; Biological Units Die.
UNIT V
Scaling Factors and Biological Engineering Solutions
Allometric Relationships from Evolutionary Pressure; Dimensional Analysis; Golden Ratio; Fractal Scaling within an Organism; Self-Similarity for Tissues and Organs; Self-Similarity in Populations; Systems Approach; Relationships between Engineering and Biology; The Completed Design.

Text Books:

Reference Books:
1. Aydin Tözeren, Stephen W. Byers, New Biology for Engineers and Computer Scientists, Pearson/Prentice Hall, 2004

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Course Objectives:
This course helps in providing the basic concepts of disasters and also gives a thorough knowledge and experience to reduce disaster risks.

UNIT I
Introduction – Disaster- Characteristics and types of Disasters- Causes and effects of Disaster -Risk-Vulnerability – Preparedness- Disaster mitigation and disaster management- Classification of mitigation measures-Vulnerability Analysis- Observation and Perception of Vulnerability- Socio-Economic Factors of Vulnerability- Vulnerability in India- Disaster related policy goals of UNDP UNDRO and Govt. of India- Appraising disaster needs- Needs for technical expertise- Role of various Agencies in Disaster Management and Development -Disaster risk reduction planning- Role of Developmental Planning for disaster Management

UNIT II
Earthquake - Cause of Earthquake- General characteristics- Measuring Earthquakes- Distribution pattern of Earthquakes in India- Earthquake prone areas- case studies of important Indian earthquakes - Forecasting techniques and risk analysis- Possible risk reduction measures- earthquake resistance buildings and re-engineering techniques in India.

UNIT III

UNIT IV
Tropical cyclones- Structure of tropical cyclones- Nature of tropical cyclones- Cyclone experience in India and Tamilnadu- Preparedness- Tropical cyclones and their warning systems- Tropical cyclone warning strategy in India special nature of the problem in the region- Classification- Protection of buildings from cyclones of India- Precautions during and before cyclones.
UNIT V
Coastal floods- Intensification of hazards due to human interference- Management-River and coastal floods- Temperature extremes and wild fires- Physiological hazards- Flood forecasting-mitigation-planning- management- flood prone areas the Indian scenario- Flood experience in India and Tamilnadu.

Environmental hazards- Typology- Assessment and response- Strategies -The scale of disaster-Vulnerability- Disaster trends- Paradigms towards a balanced view- Chemical hazards and toxicology-Biological hazards- Risk analysis- Other technological disasters.

Text Books:

Reference Books:

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Course Objectives:
- Develop an entrepreneurship spirit
- Help to identify business opportunities within an organization or independently
- Initiate action on the business plan from the prospective business through EDC

UNIT – I

UNIT – II
UNIT – III
Meaning and nature of direction – Principles of directing – Leadership and leadership style – Motivation – Communication – Need and feedback in communication – Importance of communication – Channels of communication – Types of communication – Forms of communication.

UNIT – IV
Evolution of concept of entrepreneur – Concept of entrepreneur – Characteristics of entrepreneur – Distinction between entrepreneur and manager – Technical entrepreneur – Charms of being an entrepreneur – Types of entrepreneur – Role of entrepreneurship in economic development – Barriers in entrepreneurship.

UNIT – V

Text Books:

Reference Books:
1. “Creativity, innovation, entrepreneurship and enterprise in construction and development”, University of Reading, Alan Barrell – Entrepreneur in Residence Entrepreneur in Residence, University of Xiamen, Xiamen 2012.

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<th>Course Objectives:</th>
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<td>At the end of this course the student is expected to understand what is human rights, how to obey the rights, what is the role of a human being in making a good society for the future generations.</td>
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UNIT-I

UNIT-II

UNIT-III

UNIT-IV
UNIT-V

Text Books:

Reference Books:
2. Human Rights, Questions and Answers, UNESCO, 1982
3. Mauisce Cranston- What is Human Rights
5. Human Rights, A Selected Bibliography, USIS.
6. Cheous K (Ed) - Social Justice and Human Rights (Vols 1-7).

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<th>NATIONAL SERVICE SCHEME</th>
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Course Objectives:
- Understand the community in which they work and their relation
- Identify the needs and problems of the community and involve them in problem-solving
- Develop capacity to meet emergencies and natural disasters
- Practice national integration and social harmony and
- Utilize their knowledge in finding practical solutions to individual and community problems.

UNIT-I: NATIONAL SERVICE SCHEME
A) History and its Objectives
B) Organizational structure of N.S.S. at National, State, University and College Levels
C) Advisory committee and their functions with special reference to college principal, Programme officer, N.S.S. group leader and N.S.S. volunteers in the implementation.

UNIT-II: NATIONAL INTEGRATION
A) Need of National integration
B) Various obstacles in the way of National Integration; such as caste, religion, language and provisional problems etc.

UNIT-III: SPECIAL PROGRAMME
A) Legal awareness
B) Health awareness
C) First-aid
D) Career guidance
E) Leadership training - cum - Cultural Programme
UNIT-IV: SPECIAL CAMPING PROGRAMME
A) Nature and its objectives
B) Selection of camp site and physical arrangement
C) Organization of N.S.S. camp through various committees and discipline in the camp.
D) Activities to be undertaken during the N.S.S. camp.
E) Use of the mass media in the N.S.S. activities.

UNIT-V: N.S.S. REGULAR ACTIVITIES
A) Traffic regulation
B) Working with Police Commissioner's Office
C) Working with Corporation of Chennai
D) Working with Health Department
E) Blind assistance
F) Garments collection
G) Non-formal education
H) 'Environmental Education, Awareness and Training (EEAT)'
I) Blood donation

Text Books:
2. Training Programme on National Programme scheme, TISS.

Reference Books:
1. Orientation Courses for N.S.S. Programme officers, TISS.
2. Case material as Training Aid for field workers, Gurmeet Hans.
3. Social service opportunities in Hospitals, KapilK.Krishan,TISS.
4. Social Problems in India, Ram Ahuja.