ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

COMPUTER SCIENCE &
ENGINEERING

For

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2017-2018)

JNTUH COLLEGE OF ENGINEERING HYDERABAD
(Autonomous)
Kukatpally, Hyderabad - 500085
TELANGANA, INDIA
1.0 Under-Graduate Degree Programme in Engineering & Technology (UGP in E&T)

JNTUH offers 4 Year (8 Semesters) Bachelor of Technology (B.Tech.) Degree Programme, under Choice Based Credit System (CBCS) at its Constituent Autonomous College - JNTUH College of Engineering, Hyderabad, with effect from the Academic Year 2017-18 onwards, in the following Branches of Engineering …

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>II.</td>
<td>Computer Science and Engineering</td>
</tr>
<tr>
<td>III.</td>
<td>Electrical and Electronics Engineering</td>
</tr>
<tr>
<td>IV.</td>
<td>Electronics and Communication Engineering</td>
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<tr>
<td>V.</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>VI.</td>
<td>Metallurgical Engineering</td>
</tr>
<tr>
<td>VII.</td>
<td>Chemical Engineering</td>
</tr>
</tbody>
</table>

2.0 Eligibility for Admission

2.1 Admission to the UGP shall be made either on the basis of the merit rank obtained by the qualifying candidate at an Entrance Test conducted by the Telangana State Government (EAMCET), OR the University, OR on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government from time to time.

2.2 The medium of instructions for the entire UGP in E&T will be ENGLISH only.

3.0 B.Tech. Programme (UGP) Structure

3.1 The B.Tech. Programmes of JNTUH-CEH are of Semester Pattern, with 8 Semesters constituting 4 Academic Years, each Academic Year having TWO Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 Weeks duration (inclusive of Examinations), with a minimum of 90 Instructional Days per Semester.

3.2 UGC/ AICTE specified Definitions/ Descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations/ Norms, which are as listed below.

3.2.1 Semester Scheme:
Each UGP is of 4 Academic Years (8 Semesters), with the year being divided into two Semesters of 22 weeks (≥ 90 working days) each, each Semester having - ‘Continuous Internal Evaluation (CIE)’ and ‘Semester End Examination (SEE)’. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as denoted by UGC, and Curriculum/ Course Structure as suggested by AICTE are followed.

3.2.2 Credit Courses:
All Subjects/ Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Subject/ Course in a L: T: P: C (Lecture Periods: Tutorial Periods: Practicals Periods : Credits) Structure, based on the following general pattern ..

- One Credit - for One hour/ Week/ Semester for Theory/ Lecture (L) Courses; and,
- One Credit - for Two hours/ Week/ Semester for Laboratory/ Practical (P) Courses or Tutorials (T).

Other student activities like NCC, NSS, NSO, Study Tour, Guest Lecture etc., and identified Mandatory Courses will not carry Credits.
### 3.2.3 Subject/Course Classification:

All Subjects/Courses offered for the UGP are broadly classified as: (a) Foundation Courses (FnC), (b) Core Courses (CoC), and (c) Elective Courses (EℓC).

- **Foundation Courses (FnC)** are further categorized as: (i) HS (Humanities and Social Sciences), (ii) BS (Basic Sciences), and (iii) ES (Engineering Sciences);

- **Core Courses (CoC) and Elective Courses (EℓC)** are categorized as **PS (Professional Subjects)**, which are further subdivided as – (i) PC (Professional/Departmental Core) Subjects, (ii) PE (Professional/Departmental Electives), (iii) OE (Open Electives); and (iv) Project Works (PW);

- **Minor Courses** (1 or 2 Credit Courses, belonging to HS/BS/ES/PC as per relevance); and

- **Mandatory Courses** (MC - non-credit oriented).

### 3.2.4 Course Nomenclature:

The Curriculum Nomenclature or Course-Structure Grouping for each of the UGP E&T (B.Tech. Degree Programmes), is as listed below (along with AICTE specified % Range of Total Credits)...

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Broad Course Classification</th>
<th>Course Group/Category</th>
<th>Course Description</th>
<th>Range of Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Foundation Courses (FnC)</td>
<td>BS – Basic Sciences</td>
<td>Includes - Mathematics, Physics and Chemistry Subjects</td>
<td>15% - 20%</td>
</tr>
<tr>
<td>2)</td>
<td></td>
<td>ES – Engineering Sciences</td>
<td>Includes fundamental engineering subjects</td>
<td>15% - 20%</td>
</tr>
<tr>
<td>3)</td>
<td></td>
<td>HS – Humanities and Social Sciences</td>
<td>Includes subjects related to Humanities, Social Sciences and Management</td>
<td>5% - 10%</td>
</tr>
<tr>
<td>4)</td>
<td>Core Courses (CoC)</td>
<td>PC – Professional Core</td>
<td>Includes core subjects related to the Parent Discipline/Department/Branch of Engg.</td>
<td>30% - 40%</td>
</tr>
<tr>
<td>5)</td>
<td>Elective Courses (EℓC)</td>
<td>PE – Professional Electives</td>
<td>Includes Elective subjects related to the Parent Discipline/Department/Branch of Engg.</td>
<td>10% - 15%</td>
</tr>
<tr>
<td>6)</td>
<td></td>
<td>OE – Open Electives</td>
<td>Elective subjects which include inter-disciplinary subjects or subjects in an area outside the Parent Discipline/Department/Branch of Engg.</td>
<td>5% - 10%</td>
</tr>
<tr>
<td>7)</td>
<td>Core Courses</td>
<td>Project Work</td>
<td>B.Tech. Project or UG Project or UG Major Project</td>
<td></td>
</tr>
<tr>
<td>8)</td>
<td></td>
<td>Industrial Training/Mini-Project</td>
<td>Industrial Training/Internship/UG Mini-Project/Mini-Project</td>
<td>10% - 15%</td>
</tr>
<tr>
<td>9)</td>
<td></td>
<td>Seminar</td>
<td>Seminar/Colloquium based on core contents related to Parent Discipline/Department/Branch of Engg.</td>
<td></td>
</tr>
<tr>
<td>10)</td>
<td>Minor Courses</td>
<td>1 or 2 Credit Courses (subset of HS)</td>
<td>included</td>
<td></td>
</tr>
<tr>
<td>11)</td>
<td>Mandatory Courses (MC)</td>
<td>Mandatory Courses (non-credit)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total Credits for UGP (B. Tech.) Programme | 192 (100%) |

### 4.0 Course Work

#### 4.1 A student, after securing admission, shall pursue the B.Tech. UGP in a minimum period of 4 Academic Years, and a maximum period of 8 Academic Years (starting from the Date of Commencement of I Year).

#### 4.2 Each student shall Register for and Secure the specified number of Credits required for the completion of the UGP and Award of the B.Tech. Degree in respective Branch of Engineering.

#### 4.3 Each Semester is structured to provide typically 24 Credits (24 C), totaling to 192 Credits (192 C) for the entire B.Tech. Programme.
5.0 Course Registration

5.1 A ‘Faculty Advisor or Counselor’ shall be assigned to each student, who will advise him about the UGP, its Course Structure and Curriculum, Choice/Option for Subjects/Courses, based on his competence, progress, pre-requisites and interest.

5.2 Academic Section of the College invites ‘Registration Forms’ from students apriori (before the beginning of the Semester), through ‘ON-LINE SUBMISSIONS’, ensuring ‘DATE and TIME Stamp’ing. The ON-LINE Registration Requests for any ‘CURRENT SEMESTER’ shall be completed BEFORE the commencement of SEE (Semester End Examination) of the ‘PRECEDING SEMESTER’.

5.3 A Student can apply for ON-LINE Registration, ONLY AFTER obtaining the ‘WRITTEN APPROVAL’ from his Faculty Advisor, which should be submitted to the College Academic Section through the Head of Department (a copy of the same being retained with Head of Department, Faculty Advisor and the Student).

5.4 A Student may be permitted to Register for his Subjects/Course of CHOICE with a typical total of 24 Credits per Semester (Minimum being 20 C and Maximum being 28 C, permitted deviation being ± 17%), based on his PROGRESS and SGPA/CGPA, and completion of the ‘PRE-REQUISITES’ as indicated for various Subjects/Courses, in the Department Course Structure and Syllabus contents. However, a MINIMUM of 20 Credits per Semester must be registered to ensure the ‘STUDENTSHIP’ in any Semester.

5.5 Choice for ‘additional Subjects/Courses’ to reach the Maximum Permissible Limit of 28 Credits (above the typical 24 Credit norm) must be clearly indicated, which needs the specific approval and signature of the Faculty Advisor/ Counselor.

5.6 If the Student submits ambiguous choices or multiple options or erroneous entries - during ON-LINE Registration for the Subject(s)/Course(s) under a given/specify Course Group/Category as listed in the Course Structure, only the first mentioned Subject/Course in that Category will be taken into consideration.

5.7 Subject/ Course Options exercised through ON-LINE Registration are final and CAN NOT be changed, and CAN NOT be inter-changed; further, alternate choices will also not be considered. However, if the Subject/Course that has already been listed for Registration (by the Head of Department) in a Semester could not be offered due to any unforeseen or unexpected reasons, then the Student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing Subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

5.8 Dropping of Subjects/Courses may be permitted, ONLY AFTER obtaining prior approval from the Faculty Advisor (subject to retaining a minimum of 20 C), ‘within 15 Days of Time’ from the beginning of the current Semester.

5.9 For Mandatory Courses like NCC/ NSS/ NSO etc., a ‘Satisfactory Participation Certificate’ from the concerned authorities for the relevant Semester is essential. No Marks or Grades or Credits shall be awarded for these activities.

6.0 Subjects/Courses to be offered

6.1 A typical Section (or Class) Strength for each Semester shall be 60.

6.2 A Subject/Course may be offered to the Students, ONLY IF a Minimum of 20 Students (1/3 of the Section Strength) opt for the same. The Maximum Strength of a Section is limited to 80 (60 + 1/3 of the Section Strength).

6.3 More than ONE TEACHER may offer the SAME SUBJECT (Lab./Practicals may be included with the corresponding Theory Subject in the same Semester) in any Semester. However, selection choice for students will be based on - ‘FIRST COME FIRST SERVE Basis and CGPA Criterion’ (ie., the first focus shall be on early ON-LINE ENTRY from the student for Registration in that Semester, and the second focus, if needed, will be on CGPA of the student).
6.4 If more entries for Registration of a Subject come into picture, then the concerned Head of Department shall take necessary action, whether to offer such a Subject/ Course for TWO (or multiple) SECTIONS or NOT.

6.5 In case of options coming from Students of other Departments/ Branches/ Disciplines (not considering OPEN ELECTIVES), PRIORITY shall be given to the student of the 'Parent Department' first.

7.0 Attendance Requirements

7.1 A student shall be eligible to appear for the End Semester Examinations, if he acquires a minimum of 75% of attendance in aggregate of all the Subjects/ Courses (excluding Mandatory or Non-Credit Courses) for that Semester.

7.2 Condoning of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each Semester may be granted by the College Academic Committee on genuine and valid grounds, based on the student's representation with supporting evidence.

7.3 A stipulated fee shall be payable towards condoning of shortage of attendance.

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

7.5 Students, whose shortage of attendance is not condoned in any Semester, are not eligible to take their End Examinations of that Semester, they get detained and their registration for that Semester shall stand cancelled. They will not be promoted to the next Semester. They may seek re-registration for all those Subjects registered in that Semester in which he got detained, by seeking re-admission for that Semester as and when offered; in case if there are any Professional Electives and/ or Open Electives, the same may also be re-registered if offered, however, if those Electives are not offered in later Semesters, then alternate Electives may be chosen from the SAME set of Elective Subjects offered under that category.

8.0 Academic Requirements

8.1 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Subject/ Course, if he secures not less than 35% marks (25 out of 70 marks) in the End Semester Examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades, this implies securing P Grade or above in that Subject/ Course.

8.2 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to - Industry oriented Mini-Project/ Seminar, if he secures not less than 40% of the total marks (40 marks) to be awarded for each. The student would be treated as failed, if he - (i) does not submit a report on his Industry oriented Mini-Project, or does not make a presentation of the same before the Evaluation Committee as per schedule, or (ii) does not present the Seminar as required in the IV year II Semester, or (iii) secures less than 40% of marks (40 marks) in Industry oriented Mini-Project/ Seminar evaluations.

He may reappear once for each of the above evaluations, when they are scheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent Semester, as and when it is scheduled.

8.3 A Student will not be promoted from I Year to II Year, unless he fulfills the Attendance and Academic Requirements and secures a total of minimum 24 Credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

8.4 A Student will not be promoted from II Year to III Year, unless he fulfills the Attendance and Academic Requirements and secures a total of minimum 58 Credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

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8.5 A Student will not be promoted from III Year to IV Year, unless he fulfills the Attendance and Academic Requirements and secures a total of minimum 86 Credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

8.6 A Student shall - register for all Subjects covering 192 Credits as specified and listed (with the relevant Course/ Subject Classifications as mentioned) in the Course Structure, put up all the Attendance and Academic requirements for 192 Credits securing a minimum of P Grade (Pass Grade) or above in each Subject, and ‘earn ALL 192 Credits securing SGPA ≥ 5.0 (in each Semester), and CGPA (at the end of each successive Semester) ≥ 5.0’, to successfully complete the UGP.

8.7 After securing the necessary 192 Credits as specified for the successful completion of the entire UGP, an exemption of maximum 8 secured Credits (in terms of two of their corresponding Subjects/Courses) may be permitted for optional drop out from these 192 Credits earned; i.e., the performance of the Student after the deduction of maximum 8 credits shall alone be taken into account for the calculation of the final CGPA however, the Student’s Performances in the earlier individual Semesters, with the corresponding SGPA and CGPA for which already Grade Cards are given, will not be altered. Further, optional drop out for such 8 secured Credits shall not be allowed for Subjects/ Courses listed as … i) Laboratories/ Practicals, Industrial Training/ Mini-Project, iii) Seminar, iv) Major Project.

8.8 If a Student registers for some more ‘extra Subjects’ (in the parent Department or other Departments/Branches of Engg.) other than those listed Subjects totaling to 192 Credits as specified in the Course Structure of his Department, the performances in those ‘extra Subjects’ (although evaluated and graded using the same procedure as that of the required 192 Credits) will not be taken into account while calculating the SGPA and CGPA. For such ‘extra Subjects’ registered, % marks and Letter Grade alone will be indicated in the Grade Card, as a performance measure, subject to completion of the Attendance and Academic Requirements as stated in Items 7 and 8.1 – 8.7 above.

8.9 Students who fail to earn 192 Credits as per the Course Structure, and as indicated above, within 8 Academic Years from the Date of Commencement of their I Year shall forfeit their seats in B.Tech. Programme and their admissions shall stand cancelled.

8.10 When a Student is detained due to shortage of attendance in any Semester, he may be re-admitted into that Semester, as and when offered, with the Academic Regulations of the Batch into which he gets readmitted. However, no Grade Allotments or SGPA/ CGPA calculations will be done for that entire Semester in which he got detained.

8.11 When a Student is detained due to lack of Credits in any year, he may be readmitted in the next year, after fulfilment of the Academic Requirements, with the Academic Regulations of the Batch into which he gets readmitted.

8.12 A student eligible to appear in the End Semester Examination in any Subject/ Course, but absent at it or failed (thereby failing to secure P Grade or above), may reappear for that Subject/ Course at the supplementary examination (SEE) as and when conducted. In such cases, his Internal Marks (CIE) assessed earlier for that Subject/ Course will be carried over, and added to the Marks to be obtained in the SEE supplementary examination, for evaluating his performance in that Subject.

9.0 Evaluation - Distribution and Weightage of Marks

9.1 The performance of a student in each Semester shall be evaluated Subject-wise (irrespective of Credits assigned) with a maximum of 100 marks for Theory or Practicals or Seminar or Drawing/Design or Industry oriented Mini-Project or Minor Course, etc; however, the B.Tech. Project Work (Major Project) will be evaluated for 200 Marks. These evaluations shall be based on 30% CIE (Continuous Internal Evaluation) and 70% SEE (Semester End Examination), and a Letter Grade corresponding to the % marks obtained shall be given.
9.2 For all Subjects/Courses as mentioned above, the distribution shall be 30 marks for CIE, and 70 marks for the SEE. The semester end examinations will be conducted for 70 marks consisting of two parts viz. i) Part-A for 20 marks (10 x 2 marks), ii) Part-B for 50 marks. Part-B consists of five questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an “either” “or” choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

9.3 a) For Theory Subjects (inclusive of Minor Courses), during the Semester, there shall be 2 mid-term examinations for 25 marks each. Each mid-term examination consists of one objective paper for 10 marks, plus one subjective paper for 15 marks, with a duration of 120 minutes (20 minutes for objective and 100 minutes for subjective papers). Further, there will be an allocation of 5 marks for Assignment. Objective paper may be set with multiple choice questions, True/False, fill-in the blanks, matching type questions, etc. Subjective paper shall contain 5 questions, out of which the Student has to answer 3 questions, each for 5 marks.

b) The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.

c) First Assignment should be submitted before the conduct of the first mid-term examinations, and the Second Assignment should be submitted before the conduct of the second mid-term examinations. The Assignments shall be as specified by the concerned subject teacher.

d) The first mid-term examination Marks and first Assignment Marks shall make one set of CIE Marks, and the second mid-term examination Marks and second Assignment Marks shall make second set of CIE Marks; and the better of these two sets of marks shall be taken as the final marks secured by the Student towards Continuous Internal Evaluation in that Theory Subject.

9.4 For Practical Subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 internal marks, and 70 marks are assigned for Lab./Practical End Semester Examination (SEE). Out of the 30 marks for internals, day-to-day work in the laboratory shall be evaluated for 20 marks; and for the remaining 10 marks - two internal practical tests (each of 10 marks) shall be conducted by the concerned laboratory teacher and the better of these two tests is taken into account. The SEE for Practicals shall be conducted at the end of the Semester by Two Examiners appointed by Head of the Department.

9.5 For the Subjects having Design and/or Drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation), the distribution shall be 30 marks for CIE (20 marks for day-to-day work, and 10 marks for internal tests) and 70 marks for SEE. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests.

9.6 Open Electives: Students are to choose One Open Elective (OE-I) during III Year I Semester, one (OE-II) during III Year II Semester, and one (OE-III) in IV Year II Semester, from the list of Open Electives given. However, Students can not opt for an Open Elective Subject offered by their own (parent) Department, if it is already listed under any category of the Subjects offered by parent Department in any Semester.

9.7 a) There shall be an Industry oriented Mini-Project, in collaboration with an Industry of the relevant specialization, to be registered immediately after III Year II Semester examinations, and taken up during the summer vacation for about eight weeks duration.

b) The Industry oriented Mini-Project shall be submitted in a Report form, and a presentation of the same shall be made before a Committee, which evaluates it for 100 marks. The Committee shall consist of Head of the Department, the supervisor of Mini-Project, and a Senior Faculty Member of the Department. There shall be no internal marks for Industry oriented Mini-Project. The Mini-Project shall be evaluated in the IV Year I Semester.

9.8 There shall be a Seminar Presentation in IV Year II Semester. For the Seminar, the student shall collect the information on a specialized topic, prepare a Technical Report and submit to the Department at the time of Seminar
Presentation. The Seminar Presentation (along with the Technical Report) shall be evaluated by Two Faculty Members assigned by Head of the Department, for 100 marks. There shall be no SEE or external examination for Seminar.

9.9 Each Student shall start the Project Work during the IV Year I Semester, as per the instructions of the Project Guide/Project Supervisor assigned by the Head of Department. Out of a total 200 marks allotted for the Project Work, 60 marks shall be for CIE (Continuous Internal Evaluation and 140 marks for the SEE (End Semester Viva-voce Examination). The Project Viva-voce shall be conducted by a Committee comprising of an External Examiner, Head of the Department and Project Supervisor. Out of 60 marks allocated for CIE, 30 marks shall be awarded by the Project Supervisor (based on the continuous evaluation of student’s performance throughout the Project Work period), and the other 30 marks shall be awarded by a Departmental Committee consisting of Head of the Department and Project Supervisor, based on the work carried out and the presentation made by the Student at the time of Viva-voce Examination.

9.10 For NCC/ NSS/ NSO types of Courses, and/or any other Mandatory Non-Credit Course offered in a Semester, a ‘Satisfactory Participation Certificate’ shall be issued to the Student from the concerned authorities, only after securing ≥ 65% attendance in such a Course. No marks or Letter Grade shall be allotted for these activities.

10.0 Grading Procedure

10.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practicals, or Seminar, or Project, or Mini-Project, Minor Course etc., based on the % marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in item 9 above, and a corresponding Letter Grade shall be given.

10.2 As a measure of the student’s performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed …

<table>
<thead>
<tr>
<th>% of Marks Secured in a Subject / Course</th>
<th>Letter Grade As per UGC Guidelines</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than or equal to 90%</td>
<td>O (Outstanding)</td>
<td>10</td>
</tr>
<tr>
<td>80 and less than 90%</td>
<td>A (Excellent)</td>
<td>9</td>
</tr>
<tr>
<td>70 and less than 80%</td>
<td>A (Very Good)</td>
<td>8</td>
</tr>
<tr>
<td>60 and less than 70%</td>
<td>B (Good)</td>
<td>7</td>
</tr>
<tr>
<td>50 less than 60%</td>
<td>B (Average)</td>
<td>6</td>
</tr>
<tr>
<td>40 less than 50%</td>
<td>C (Pass)</td>
<td>5</td>
</tr>
<tr>
<td>Below 40%</td>
<td>F (Fail)</td>
<td>0</td>
</tr>
<tr>
<td>Absent</td>
<td>Ab</td>
<td>0</td>
</tr>
</tbody>
</table>

10.3 A student obtaining F Grade in any Subject shall be considered failed and will be required to reappear as ‘Supplementary Candidate’ in the End Semester Examination (SEE), as and when offered. In such cases, his Internal Marks (CIE Marks) in those Subject(s) will remain same as those he obtained earlier.

10.4 A Letter Grade does not imply any specific % of Marks.

10.5 In general, a student shall not be permitted to repeat any Subject/Course (s) only for the sake of ‘Grade Improvement’ or ‘SGPA/CGPA Improvement’. However, he has to repeat all the Subjects/Courses pertaining to that Semester, when he is detained (as listed in Items 8.10-8.11).

10.6 A student earns Grade Point (GP) in each Subject/Course, on the basis of the Letter Grade obtained by him in that Subject/Course (excluding Mandatory non-credit Courses). Then the corresponding ‘Credit Points’ (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/Course.

\[
\text{Credit Points (CP)} = \text{Grade Point (GP)} \times \text{Credits} 
\]

For a Course
10.7 The Student passes the Subject/Course only when he gets GP $\geq 5$ (P Grade or above).

10.8 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points ($\sum CP$) secured from ALL Subjects/Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

$$\text{SGPA} = \left( \frac{\sum_{i=1}^{N} C_i G_i}{\sum_{i=1}^{N} C_i} \right) \ldots \text{For each Semester,}$$

where ‘i’ is the Subject indicator index (takes into account all Subjects in a Semester), ‘N’ is the no. of Subjects ‘REGISTERED’ for the Semester (as specifically required and listed under the Course Structure of the parent Department), ‘j’ is the no. of Credits allotted to the ith Subject, and represents the Grade Points (GP) corresponding to the Letter Grade awarded for that ith Subject.

Illustration of calculation of SGPA

<table>
<thead>
<tr>
<th>Course / Subject</th>
<th>Credits</th>
<th>Letter Grade</th>
<th>Grade Points</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course 1</td>
<td>4</td>
<td>A</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>Course 2</td>
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<td>Course 3</td>
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<td>Course 6</td>
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<td>12</td>
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<tr>
<td>Course 8</td>
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<td>C</td>
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<td><strong>165</strong></td>
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</tbody>
</table>

SGPA = 165/24 = 6.87

10.9 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered Courses in ALL Semesters, and the Total Number of Credits registered in ALL the Semesters. CGPA is rounded off to TWO Decimal Places. CGPA is thus computed from the I Year Second Semester onwards, at the end of each Semester, as per the formula

$$\text{CGPA} = \left( \frac{\sum_{i=1}^{M} C_i G_i}{\sum_{i=1}^{M} C_i} \right) \ldots \text{for all S Semesters registered (i.e., up to and inclusive of S Semesters, S \geq 2),}$$

where ‘M’ is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has ‘REGISTERED’ from the 1st Semester onwards up to and inclusive of the Semester S (obviously M > N), ‘j’ is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), is the no. of Credits allotted to the jth Subject, and represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

10.10 For Merit Ranking or Comparison Purposes or any other listing, ONLY the ‘ROUNDED OFF’ values of the CGPAs will be used.

10.11 For Calculations listed in Item 10.6 – 10.10, performance in failed Subjects/Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/Courses will also be included in the multiplications and summations. However, Mandatory Courses will not be taken into consideration.

10.12 Passing Standards:

10.12.1 A student shall be declared successful or ‘passed’ in a Semester, only when he gets a SGPA $\geq 5.00$ (at the end of that particular Semester); and a student shall be declared successful or ‘passed’ in the entire UGP, only when gets a CGPA $\geq 5.00$; subject to the condition that he secures a GP $\geq 5$ (P Grade or above) in every registered Subject/Course in each Semester (during the entire UGP) for the Degree Award, as required.
10.12.2 In spite of securing P Grade or above in some (or all) Subjects/Courses in any Semester, if a Student receives a SGPA < 5.00 and/or CGPA < 5.00 at the end of such a Semester, then he 'may be allowed' (on the 'specific recommendations' of the Head of the Department and subsequent approval - by the College Academic Committee.

(i) to go into the next subsequent Semester (subject to fulfilling all other attendance and academic requirements as listed under Items 7-8);

(ii) to 'improve his SGPA of such a Semester (and hence CGPA) to 5.00 or above', by reappearing for ONE or MORE (as per Student's choice) of the same Subject(s) / Course(s) in which he has secured P Grade(s) in that Semester, at the Supplementary Examinations to be held in the next subsequent Semester(s). In such cases, his Internal Marks (CIE Marks) in those Subject(s) will remain same as those he obtained earlier.

In these considerations, the newly secured Letter Grades will be recorded and taken into account for calculation of SGPA and CGPA, only if there is an improvement.

10.12.3 A Student shall be declared successful or 'passed' in any Non-Credit Subject/ Course, if he secures a 'Satisfactory Participation Certificate' for that Mandatory Course.

10.13 After the completion of each Semester, a Grade Card or Grade Sheet (or Transcript) shall be issued to all the Registered Students of that Semester, indicating the Letter Grades and Credits earned. It will show the details of the Courses Registered (Course Code, Title, No. of Credits, Grade Earned etc.), Credits earned, SGPA, and CGPA.

11.0 Declaration of Results

11.1 Computation of SGPA and CGPA are done using the procedure listed in 10.6 – 10.10.

11.2 For Final % of Marks equivalent to the computed final CGPA, the following formula may be used ...

% of Marks = (final CGPA – 0.5) x 10

12.0 Award of Degree

12.1 A Student who registers for all the specified Subjects/ Courses as listed in the Course Structure, satisfies all the Course Requirements, and passes all the examinations prescribed in the entire UG E&T Programme (UGP), and secures the required number of 192 Credits (with CGPA ≥ 5.0), within 8 Academic Years from the Date of Commencement of the First Academic Year, shall be declared to have 'QUALIFIED' for the Award of the B.Tech. Degree in the chosen Branch of Engineering as selected at the time of Admission.

12.2 A Student who qualifies for the Award of the Degree as listed in Item 12.1, shall be placed in the following Classes ...

12.3 Students with final CGPA (at the end of the UGP) ≥ 8.00 :

(i) Shall be placed in 'First Class with distinction' if fulfilling the following conditions.

(a) should not fail in any Subjects/Courses and should complete the required credits for the Award of Degree within the first 4 Academic Years (or 8 Sequential Semesters) from the Date of Commencement of his First Academic Year,
(b) should not have been detained or prevented from writing the End Semester Examinations in any Semester due to shortage of attendance or any other reason.

(ii) Shall be placed in 'First Class' if not fulfilling the above a & b conditions

12.4 Students with final CGPA (at the end of the UGP) ≥ 6.50 but < 8.00, shall be placed in 'FIRST CLASS'.

12.5 Students with final CGPA (at the end of the UGP) ≥ 5.50 but < 6.50, shall be placed in 'SECOND CLASS'.

12.6 All other Students who qualify for the Award of the Degree (as per Item 12.1), with final CGPA (at the end of the UGP) ≥ 5.00 but < 5.50, shall be placed in 'PASS CLASS'.

12.7 A student with final CGPA (at the end of the UGP) < 5.00 will not be eligible for the Award of the Degree.
12.8 Students fulfilling the conditions listed under Item 12.3 alone will be eligible candidates for - 'University Rank' and 'Gold Medal' considerations.

13.0 Withholding of Results

13.1 If the student has not paid fees to University/College at any stage, or has pending dues against his name due to any reason whatsoever, or if any case of indiscipline is pending against him, the result of the student may be withheld, and he will not be allowed to go into the next higher Semester. The Award or issue of the Degree may also be withheld in such cases.

14.0 Transitory Regulations

14.1 Student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the Degree Programme, may be considered eligible for readmission to the same Subjects/Courses (or equivalent Subjects/Courses, as the case may be), and same Professional Electives/Open Electives (or from set/category of Electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the Date of Commencement of his I Year I Semester).

15.0 Student Transfers

15.1 There shall be no Branch transfers after the completion of Admission Process.

15.2 There shall be no transfer among the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.

16.0 Scope

i) Where the words “he”, “him”, “his”, occur in the write-up of regulations, they include “she”, “her”, “hers”.

ii) Where the words “Subject” or “Subjects”, occur in these regulations, they also imply “Course” or “Courses”.

iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.

iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor/Principal is final.

v) The College may change or amend the Academic Regulations, Course Structure or Syllabi at any time, and the changes or amendments made shall be applicable to all Students with effect from the dates notified by the College Authorities.

* * * * *
# MALPRACTICES RULES

<table>
<thead>
<tr>
<th>Nature of Malpractices</th>
<th>Punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the candidate:</td>
<td></td>
</tr>
<tr>
<td>1 (a) Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only.</td>
</tr>
<tr>
<td>1 (b) Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.</td>
</tr>
<tr>
<td>2 Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. The Hall Ticket of the candidate is to be cancelled.</td>
</tr>
<tr>
<td>3 Impersonates any other candidate in connection with the examination.</td>
<td>The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination included practicals and project work already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</td>
</tr>
<tr>
<td>4 Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.</td>
<td>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</td>
</tr>
<tr>
<td>5 Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.</td>
<td>Cancellation of the performance in that subject.</td>
</tr>
<tr>
<td>6 Refuses to obey the orders of the Chief Superintendent / Assistant --Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the</td>
<td>In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all the other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to</td>
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<td>Clause</td>
<td>Description</td>
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<td>7</td>
<td>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall. Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</td>
</tr>
<tr>
<td>8</td>
<td>Possess any lethal weapon or firearm in the examination hall. Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.</td>
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<tr>
<td>9</td>
<td>If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8. Student of the college's expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to the police and a police case will be registered against them.</td>
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<td>10</td>
<td>Comes in a drunken condition to the examination hall. Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.</td>
</tr>
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<td>11</td>
<td>Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny. Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.</td>
</tr>
<tr>
<td>12</td>
<td>If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the College / University for further action to award suitable punishment.</td>
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### I YEAR

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### II SEMESTER

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**Total Credits:** 24

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**Total Credits:** 24

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**Total Credits:** 24

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**Total Credits:** 24
### Professional Elective -I
1) Artificial Intelligence
2) Computer Graphics
3) Software Project Management
4) Speech Processing
5) Principle of Programming Languages

### Professional Elective -II
1) Machine Learning and Pattern Recognition
2) Software Testing Methodologies
3) Social Network Analysis
4) Digital Image Processing

### Professional Elective -III
1) Design Patterns
2) Advance Databases
3) Mobile Computing
4) Business Intelligence & Big data

### Professional Elective -IV
1) Information Retrieval Systems
2) Adhoc and sensor Networks
3) Embedded Systems
4) Natural Language Processing

### Professional Elective -V
1) Ethical Hacking
2) Web Mining
3) Bioinformatics
4) Simulation and Modeling

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<td>2 Non – Conventional Power Generation</td>
<td>Electrical &amp; Electronics Engineering</td>
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<td>3 Electrical Engineering Materials</td>
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<td>4 Nano-Technology</td>
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<td>5 Operations Research</td>
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<td>6 Basics of Thermodynamics</td>
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<td>7 Fabrication Processes</td>
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<td>8 Electronic Measuring Instruments</td>
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<td>10 Computer Graphics</td>
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<td>12 Metallurgy for Non Metallurgists</td>
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<td>2 Design Estimation and Costing of Electrical Systems</td>
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<td>3 Energy Storage Systems</td>
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<td>9 Cyber Security</td>
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<td>10 Database Management Systems</td>
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<td>11 Corrosion Engineering</td>
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<td>12 Testing of Materials</td>
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<td>2 Entrepreneur Resource Planning</td>
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<td>3 Management Information Systems</td>
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<td>5 Fundamentals of Robotics</td>
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<td>6 Non-Conventional Energy Sources</td>
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<td>7 Aspects of Heat Transfer in Electrical/Electronically controlled units</td>
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<td>8 Principles of Computer Communications and Networks</td>
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<td>9 Web technologies</td>
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<td>10 Simulation &amp; Modeling</td>
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<td>12 Nano Materials</td>
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<td>13 Industrial Safety &amp; Hazard Management</td>
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MATHEMATICS – I  
(Common to all Branches)

Pre Requisites: NIL

Objectives:
- To train the students thoroughly in mathematical concepts of ordinary differential equations and their applications.
- To prepare students for lifelong learning and successful careers using mathematical Concepts of differential and integral calculus, ordinary differential equations and vector calculus.
- To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information.

Outcomes:
At the end of the course, the student will be able to:
- become familiar with the application of differential and integral calculus, ordinary differential equations and vector calculus to engineering problems.
- attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.

UNIT–I: Differential calculus  (12 lectures)
Rolle’s Mean value Theorem – Lagrange’s Mean Value Theorem – Cauchy’s mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.
Curve tracing – Equations given in Cartesian, polar and parametric forms.
Functions of several variables – Functional dependence- Jacobian-Maxima and Minima of functions of two variables with constraints and without constraints-Method of Lagrange multipliers.

UNIT–II: Improper Integrals, Multiple Integration  (12 lectures)
Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.
Multiple integrals – double and triple integrals – change of order of integration- change of variables (polar, cylindrical and spherical).

UNIT–III: Vector Calculus         (12 lectures)

UNIT–IV: First Order Ordinary Differential Equations      (10 lectures)
Linear and exact differential equations
Applications of first order differential equations – Newton’s Law of cooling, Law of natural growth and decay, orthogonal trajectories and electrical circuits

UNIT–V: Higher Order Ordinary Differential Equations     (10 lectures)
Linear, homogeneous and non- homogeneous differential equations of second and higher order with constant coefficients. Non-homogeneous term of the type e^{ax}, Sin ax, Cos ax, and x^i, e^{ax}V(x), x^i V(x). Method of variation of parameters. Applications: Bending of beams, Electrical circuits and simple harmonic motion.

Text books:
1) HIGHER ENGINEERING MATHEMATICS BY B S GREWAL, KHANNA PUBLICATIONS.
2) ENGINEERING MATHEMATICS BY ERWIN KREYSZIG, WIELY PUBLICATIONS.
3) VECTOR ANALYSIS BY GHOSG & MAITY, NEW CENTRAL BOOK AGENCY.

References:
1) ENGINEERING MATHEMATICS BY SRIMANTAPAL & SUBODH C. BHUNIA, OXFORD UNIVERSITY PRESS.
2) ADVANCED ENGINEERING MATHEMATICS BY PETER V O’NEIL, CENGAGE LEARNING.
In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students’ handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read the topics selected for discussion on their own in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material, etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

2. OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
b. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
c. To develop the study skills and communication skills in formal and informal situations.

LEARNING OUTCOMES:

1. Use of English Language - written and spoken.
2. Enrichment of comprehension and fluency

SYLLABUS:

Listening Skills:

Objectives
1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

$Students should be given practice in listening to the sounds of the language, to be able to recognize them, to distinguish between them, to mark stress and recognize and use the right intonation in sentences.$

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives
1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: Skills Annexe–Functional English for Success)
- Just A Minute (JAM) Sessions.
Reading Skills:

Objectives
1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences, etc.
   - Skimming the text
   - Understanding the gist of an argument
   - Identifying the topic sentence
   - Scanning
   - Inferring lexical and contextual meaning
   - Understanding discourse features
   - Recognizing coherence/sequencing of sentences

NOTE: The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using ‘unseen’ passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives
1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
   - Writing sentences
   - Use of appropriate vocabulary
   - Paragraph writing
   - Coherence and cohesiveness
   - Narration / description
   - Note Making
   - Formal and informal letter writing
   - Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

For Detailed study: First Textbook: “Skills Annexe - Functional English for Success”, Published by Orient Black Swan, Hyderabad

For Non-detailed study
Second Textbook “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad.
- The course content and study material is divided into Five Units.

Unit –I
1. Chapter entitled ‘Wit and Humour’ from ‘Skills Annexe’ - Functional English for Success, Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘Mokshagundam Visvesvaraya’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad.
   - Listening for Sounds, Stress and Intonation
   - Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)
   - Reading for Subject/ Theme - The Palm Islands from Epitome of Wisdom is for Reading Comprehension
   - Writing Paragraphs
   - Types of Nouns and Pronouns
   - Homonyms, Homophones & Homographs

Unit –II
1. Chapter entitled “Cyber Age” from “Skills Annexe - Functional English for Success” Published by Orient Black Swan, Hyderabad.
2. Report Writing (First & Second Textbooks)
   - Listening for themes and facts
   - Apologizing, interrupting, requesting and making polite conversation
   - Reading for theme and gist - The 1 Thing Every Business Executive Must Understand about Social Media by Dave Kerpen from Skills Annexe is for Reading Comprehension
   - Describing people, places, objects, events
   - Verb forms
   - Noun, Verb, Adjective and Adverb
Unit –III

1. Chapter entitled ‘Risk Management’ from “Skills Annexe - Functional English for Success” Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘Leela’s Friend’ by R.K. Narayan from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad

L - Listening for main points and sub-points for note taking
S - Giving instructions and directions; Speaking of hypothetical situations
R - Reading for details- Sivakasi: Who to Blame for the Frequent Fire Accidents in India’s Largest Fireworks Industry Hub? by Amrutha Gayathri from Skills Annexe & Forensic Science from Epitome of Wisdom are for Reading Comprehension
W - Note-making, Information transfer, Punctuation
G - Present tense
V - Synonyms and Antonyms

Unit –IV

1. Letter Writing – Writing formal letters, letter of application along with curriculum vitae (First & Second Textbooks)
2. Chapter entitled ‘The Last Leaf’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad

L - Listening for specific details and information
S - Narrating, expressing opinions and telephone interactions
R - Reading for specific details and information- What I Cherish Most by V. S. Srinivasa Sastrl from Skills Annexe & Choose How to Start Your Day from Epitome of Wisdom are for Reading Comprehension
W - Writing e-mails
G - Past and Future tenses
V - Vocabulary - Idioms and Phrasal verbs

Unit –V

1. Chapter entitled ‘Sports and Health’ from “Skills Annexe - Functional English for Success” Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘The Convocation Speech’ by N.R. Narayanmurthy from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad

L - Critical Listening and Listening for speaker’s tone/ attitude
S - Group discussion and Making presentations
R - Critical reading, reading for reference - Benefits of Physical Activity from Skills Annexe & What is meant by Entrepreneurship? from Epitome of Wisdom are for Reading Comprehension
W - Project proposals; Project Reports and Research Papers
G - Adjectives, Prepositions and Concord
V - Collocations and Technical vocabulary, Using words appropriately

Exercises from the texts not prescribed shall be used for classroom tasks.

REFERENCES:

2. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
4. Technical Communication, Meenakshi Raman, Oxford University Press
5. Practical English Usage, Michael Swan, Oxford University Press
12. Everyday Dialogues in English, Robert J. Dixon, Prentice Hall India Pvt Ltd.,
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan, Frank Bros & CO

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JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year B.Tech. CSE I-Sem

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COMPUTER PROGRAMMING & DATA STRUCTURES

Prerequisites:
There are no prerequisites for this course, except that anyone who wants to learn C should have analytical skills and logical reasoning.

Objectives:
1. This course starts from the basics of computers and program development.
2. It covers various concepts of C programming language.
3. It introduces searching and sorting algorithms.
4. It provides an understanding of data structures such as stacks and queues.

Outcomes:
At the end of the course, the student will be able to:
1. Develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings; and data structures like stacks, queues and linked lists.
2. Implement searching and sorting algorithms.

UNIT - I

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

UNIT – II
Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Programming examples.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programs.

UNIT – III
Arrays and Strings – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples. Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

UNIT - IV
Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

UNIT – V
Sorting and Searching selection sort, bubble sort, insertion sort, linear and binary search methods.

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education.
REFERENCES:

6. C Programming & Data Structures, E.Balagurusamy, TMH.
7. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year B.Tech. CSE I-Sem

ENGINEERING GRAPHICS

Pre-requisites: Nil

Course objectives:

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Outcomes:

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

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING:


UNIT – II

ORTHOGRAPHIC PROJECTIONS:

Principles of Orthographic Projections – Conventions – Projections of Points and Lines
Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views.

UNIT – IV

Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.
Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone
UNIT – V
ISOMETRIC PROJECTIONS:

TEXT BOOKS:
1. Engineering Drawing N.D. Bhatt / Charotar

REFERENCE BOOKS:
1. A Text Book of Engineering Drawing / Dhawan R K / S. Chand

JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year B.Tech. CSE I-Sem

ENVIRONMENTAL SCIENCE

Prerequisites : NIL

Objectives:
- Creating the awareness about environmental problems among students.
- Imparting basic knowledge about the environment and its allied problems.
- Developing an attitude of concern for the environment.
- Motivating students to participate in environment protection and environment improvement.

Outcomes:
At the end of the course, it is expected that students will be able to:
- Identify and analyze environmental problems as well as the risks associated with these problems
- Understand what it is to be a steward in the environment
- Studying how to live their lives in a more sustainable manner

UNIT- I
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:
Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES:
Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other 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, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. 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
ECOSYSTEMS: 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:
  a. Forest ecosystem
  b. Grassland ecosystem
  c. Desert ecosystem
  d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - III

UNIT - IV
ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of:
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Marine pollution
  e. Noise pollution
  f. Thermal pollution
  g. Nuclear hazards

SOLID WASTE MANAGEMENT: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - V


FIELD WORK: Visit to a local area to document environmental assets. - River / forest / grassland / hill / mountain - Visit to a local polluted site - Urban/Rural/Industrial Agricultural Study of common plants, insects, birds. - Study of simple ecosystems (pond, river, hill slopes, etc.).

TEXT BOOK:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press
2. Environmental Studies by R. Rajagopalan, Oxford University Press

REFERENCE:
1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
COMPUTER PROGRAMMING & DATA STRUCTURES LAB

Week 1:
1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.

Week 2:
5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 3:
9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices

Week 4:
11. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to a given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not.
13. Write a C program that displays the position or index in the string S where the string T begins, or −1 if S doesn't contain T.
14. Write a C program to count the lines, words and characters in a given text.

Week 5:
15. Write a C program to generate Pascal's triangle.
16. Write a C program to construct a pyramid of numbers.
17. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 
   \[ 1 + x + x^2 + x^3 + \ldots + x^n \]
   For example: if n is 3 and x is 5, then the program computes 
   \[ 1 + 5 + 25 + 125 \]
   Print x, n, the sum
   Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 6:
18. 2’s complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2’s complement of 11100 is 00100. Write a C program to find the 2’s complement of a binary number.
19. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 7:
20. Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers
   (Note: represent complex number using a structure.)

Week 8:
21. i) Write a C program which copies one file to another.
    ii) Write a C program to reverse the first n characters in a file.
        (Note: The file name and n are specified on the command line.)
22. i) Write a C program to display the contents of a file.
    ii) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)
Week 9:
23. Write a C program that uses functions to perform the following operations on singly linked list:
   i) Creation    ii) Insertion     iii) Deletion
   iv) Traversal

Week 10:
24. Write C programs that implement stack (its operations) using
   i) Arrays     ii) Pointers
25. Write C programs that implement Queue (its operations) using
   i) Arrays     ii) Pointers

Week 11:
26. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Bubble sort     ii) Selection sort

Week 12:
27. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
   i) Linear search     ii) Binary search

JNTUH COLLEGE OF ENGINEERING HYDERABAD
1 Year B.Tech. CSE I-Sem

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

Objectives
- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Learning Outcomes
- Better Understanding of nuances of language through audio-visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students

SYLLABUS

English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab

Exercise – I
CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II
CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker
- Weak Forms and Strong Forms - Consonant Clusters.
Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

Exercise - III
CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.
ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.
Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV
CALL Lab: Intonation and Common errors in Pronunciation.
ICS Lab: Extempore- Public Speaking
Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V
CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Information Transfer- Oral Presentation Skills
Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:
The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self-study by learners.
System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
   i) P – IV Processor
      a) Speed – 2.8 GHZ
      b) RAM – 512 MB Minimum
      c) Hard Disk – 80 GB
   ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab:
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Suggested Software:
- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley
- Punctuation Made Easy by Darling Kindersley
- Clarity Pronunciation Power – Part I
- Clarity Pronunciation Power – part II
- Oxford Advanced Learner's Compass, 8th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
- Raman, M & Sharma, S. 2011. Technical Communication, OUP

SUGGESTED READING:
4. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
DISTRIBUTION AND WEIGHTAGE OF MARKS

**English Language Laboratory Practical Examination:**
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 30 sessional marks and 70 semester-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). 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.

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I. TRADES FOR EXERCISES:
(Any six trades from the following with minimum of two exercises in each trade)
1. Carpentry
2. Fitting
3. Tin-Smithy
4. Black Smithy
5. House-wiring
6. Foundry
7. Plumbing

II. Trades for Demonstration & Exposure
1. Demonstration of power tools & wiring
2. Welding
3. Machine Shop

III. IT Workshop I: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, simple diagnostic exercises.

IT Workshop II: Installation of operating system windows and linux simple diagnostic exercises.

JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year B.Tech. CSE II-Sem

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MATHEMATICS – II
(Common to all Branches)

Pre Requisites: NIL

Objectives:
- Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and solution of partial differential equations.

Outcomes:
At the end of the course, the student will be able to:
- gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.

UNIT–I: Linear ODE with variable coefficients and series solutions
(8 lectures)
Equations reducible to constant coefficients-Cauchy’s and Legendre’s differential equations. Motivation for series solutions, Ordinary point and Regular singular point of a differential equation, Transformation of non-zero singular point to zero singular point. Series solutions to differential equations around zero, Frobenius Method about zero.

Unit-II: Special Functions
(8 lectures)
Bessel’s Differential equation, Bessel functions properties: – Recurrence relations, Orthogonality, Generating function, Trigonometric expansions involving Bessel functions.

UNIT–III: Laplace Transform
(8 lectures)
Definition of integral transform. Domain of the function and Kernel for the Laplace transforms, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by “t”. Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac’s delta function, Periodic function – Inverse Laplace transform by Partial fractions( Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by “s”, Inverse Laplace Transforms of
derivatives and integrals of functions, Convolution theorem-solving differential equations by Laplace transforms

UNIT – IV: Fourier series and Fourier Transforms (8 lectures)

UNIT-V: Partial Differential Equations (10 lectures)
Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations (Charpit’s method).
Method of separation of variables for second order equations. Applications of Partial differential equations- one dimensional wave equation., Heat equation.

Text books:
1) HIGHER ENGINEERING MATHEMATICS BY B S GREWAL, KHANNA PUBLICATIONS.
2) ENGINEERING MATHEMATICS BY ERWIN KREYSZIG, WIEY PUBLICATIONS

References:
1) ENGINEERING MATHEMATICS BY SRIMANTAPAL & SUBODH C. BHUNIA, OXFORD UNIVERSITY PRESS.
2) ADVANCED ENGINEERING MATHEMATICS BY PETER V O’NEIL, CENGAGE LEARNING
UNIT- III P-N JUNCTION DIODE & DIODE CIRCUITS
P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.
Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L-section Filters, τ-section Filters.

UNIT- IV BIPOLAR JUNCTION TRANSISTOR
Transistor Biasing And Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in $V_{BE}$ and $\beta$, Bias Compensation using Diodes and Transistors.
Transistor Configurations: BJT modeling, Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters, Comparison of CE, CB and CC configurations.

UNIT- V JUNCTION FIELD EFFECT TRANSISTOR & SPECIAL PURPOSE DEVICES
Special Purpose Devices: Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

TEXT BOOKS:

REFERENCES:
1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
APPLIED PHYSICS

Prerequisites: Nil

Course Objectives:
The course primarily aims at understanding the behavior of matter in the condensed state and tries to explore the causes with reference to micro level mechanism of the solid matter. The objective of the first chapter is to study the micro level behavior of the quantum particles of the matter and their nature as wave and particle and hence to estimate the statistics of the phenomenon arising out of their nature of existence. The second chapter aims at to assess the draw backs of the free electron theory leading to the introduction of the Band Theory of Solids. In the third, fourth, fifth, sixth, seventh and tenth chapters the different natures of the solid matter are taken as the main task discuss. In the eighth chapter, it is expected to understand the basic principles behind the coherent artificial light source (LASER) with reference to their construction, mechanism, operation and classification etc. The ninth chapter is explicitly aimed at to study an advanced communication system presently ruling the world throughout i.e. Fiber Optic communication system.

Outcomes:
The understanding of properties of matter is an essential part to utilize them in various applications in different walks of life. In most of the cases, the behavior of matter as solid material body purely depends upon the internal micro level nature, structure and characters. By studying first few chapters the students as graduates can acquire the knowledge of the connection between the micro level behavior of the matter as fundamental particles and the macro level real time characters of the material bodies. The quantum mechanism in phenomena can best be understood and analyzed by estimating the statistics of the phenomena. The study of chapters on Laser and fiber optics forms basis for understanding an advanced communication system. Other chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.

UNIT-I


UNIT-II


UNIT-III
5. Dielectric Properties: Basic definitions, Electronic, Ionic (Quantitative) and Orientation Polarizations(Qualitative) and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mosossotti Equation, Piezo-electricity, Pyro- electricity and Ferro -electricity.


7. Superconductivity: Introduction to Superconductivity, Properties of Superconductors, Meissner Effect, BCS theory, Type-I and Type –II Superconductors, Magnetic Levitation and Applications of Superconductors.
UNIT-IV

UNIT-V
10. Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-Gel, Precipitation, Combustion Methods; Top-Down Fabrication: Chemical Vapor Deposition, Physical Vapor Deposition, Characterization Techniques(XRD, SEM & TEM) and Applications of Nanotechnology.

Text books:
2. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
4. Solid State Physics by A J Dekker, MACMILLAN INDIA LTD.

References:
1. Modern Engineering Physics by Dr.K.Vijaya Kumar, Dr. S. Chandralingam, S.CHAND & COMPANY LTD
4. Introduction to Nanotechnology by Charles P.Poole, Jr.Frank J owen, John Wiley & sons
equation - electrochemical series and its applications. – Concept of concentration cell – Numerical problems.


**Unit-III: High Polymers**
Definition – Classification of polymers with examples – Types of polymerisation – Chain growth (free radical addition mechanism), step growth polymerization, Plastics, fibres and elastomers - definition and characteristics. Plastics – thermoplastic and thermosetting plastics, compounding of plastics. Fibre reinforced plastics. Preparation, properties and Engineering applications of PVC, Teflon, Bakelite, Nylon 6:6 and terylene (Dacron); Rubber – Natural rubber, its processing and vulcanization. Elastomers: Preparation, properties and applications of Styrene butadiene, butyl and thiokol rubbers. Conducting polymers – Classification with examples; mechanism of conduction in transpolyacetylene and applications of conducting polymers. Biodegradable polymers – concept and advantages - Polylactic acid and its applications.

**Unit-IV: Chemistry of Energy sources**

**Combustion** – Definition, calorific value, HCV and LCV. Calculation of air quantity required for combustion of a fuel - Numerical problems.

**Alternate Energy sources** : Biodiesel - trans-esterification - advantages of biodiesel, fuel cells (H2–O2 and Methanol – O2 fuel cell).

**Unit-V : Batteries and Materials**
**Batteries** : Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell). Secondary battery ( lead acid, Ni-Cd and lithium ion cell) **Liquid crystal polymers** : classification, characteristics and applications.

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**Insulators** - Characteristics and applications of thermal and electrical insulators.

**Nanomaterials** : Introduction. Preparation of nanomaterials by top down and bottom up approaches. Carbon nano fibres, and fullerenes - Applications of nanomaterials.

**Text Books:**

**Reference Books:**
ENGINEERING MECHANICS

Prerequisites: Nil

Objectives:
During this course, students should develop the ability to:

- Work comfortably with basic engineering mechanics concepts required for analyzing static structures.
- Identify an appropriate structural system to studying a given problem and isolate it from its environment.
- Model the problem using good free-body diagrams and accurate equilibrium equations.
- Identify and model various types of loading and support conditions that act on structural systems.
- Apply pertinent mathematical, physical and engineering mechanical principles to the system to solve and analyze the problem.
- Understand the meaning of centers of gravity (mass)/centroids and moments of inertia using integration methods.
- Communicate the solution to all problems in an organized and coherent manner and elucidate the meaning of the solution in the context of the problem.

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

- solve problems dealing with forces in a plane or in space and equivalent force systems.
- solve beam and cable problems and understand distributed force systems.
- solve friction problems and determine moments of inertia and centroid using integration methods.
- understand and know how to solve three-dimension force and moment problems.
- understand and know how to use vector terminology.

UNIT – I
INTRODUCTION OF ENGINEERING MECHANICS – Basic concepts

UNIT – II

UNIT – III

MOMENT OF INERTIA: Moment of inertia of Areas and Masses - Transfer Formula for Moments of Inertia - Moment of inertia of composite areas and masses.

UNIT – IV

UNIT – V

TEXT BOOKS:

REFERENCES:
1. Engineering Mechanics (Statics and Dynamics) by Hibbler; Pearson Education.
COMPUTATIONAL MATHEMATICS
(Common to all Branches)

Pre Requisites: NIL

Objectives:
- This course aims at providing the student with the concepts of matrices, numerical techniques and curve fitting.

Outcomes:
At the end of the course, the student will be able to:
- analyze engineering problems using the concepts of Matrices and Numerical Methods.

UNIT-I: Matrices and Linear Transformations (8 lectures)

UNIT–II: Interpolation and Curve fitting (5 lectures)

UNIT–III: Numerical techniques (5 lectures)
Solution of Algebraic and Transcendental Equations and Linear system of equations.
Solving system of non-homogeneous equations by L-U Decomposition method(Crout’s Method)Jacobi’s and Gauss-Seidel Iteration method

UNIT–IV: Numerical Differentiation, Integration: (5 lectures)

UNIT – V: Numerical solutions of First order differential equations (5 lectures)

Text Books:
1) INTRODUCTORY METHODS OF NUMERICAL ANALYSIS BY SS SASTRY
2) NUMERICAL AND STATISTICAL METHODS WITH PROGRAMMING IN C BY SUJATHA SINHA AND SUBHABRADA DINDA, SCITEC PUBLISHERS.
3) NUMERICAL METHODS, PRINCIPLES, ANALYSIS AND ALGORITHMS BY SRIMANTAPAL & SUBODH C. BHUNIA, OXFORD UNIVERSITY PRESS.

References:
1) ADVANCED ENGINEERING MATHEMATICS BY ALAN JEFFERY
2) APPLIED NUMERICAL METHODS USING MATLAB BY RAO.V.DUKKIPATI, NEW AGE PUBLISHERS
3) NUMERICAL METHODS IN SCIENCE AND ENGINEERING –APRACTICAL APPROACH BY S.RAJASEKARAN, S.CHAND PUBLICATIONS
BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

PART A: ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):
1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB’s
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT’s, Low power JFET’s, MOSFET’s, Power Transistors, LED’s, LCD’s, SCR, UJT.
3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

PART B: (For Laboratory examination – Minimum of 09 experiments to be conducted)
1. PN Junction diode characteristics  A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator
3. Input & Output characteristics of Transistor in CB / CE configuration
4. Full Wave Rectifier with & without filters
5. Input and Output characteristics of FET in CS configuration
6. Measurement of h-parameters of transistor in CB, CE, CC configurations
7. SCR Characteristics.
8. Verification of KVL and KCL.
10. Verification of Superposition and Reciprocity theorems.
11. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
12. Experimental determination of Thevenin’s and Norton’s equivalent circuits and verification by direct test.

APPLIED PHYSICS LAB

LIST OF EXPERIMENTS:
1. Study of characteristics of LED and LASER sources.
2. Magnetic field along the axis of current carrying coil-Stewart and Gee’s method.
3. Study of characteristics of p-i-n diode detectors.
4. Determination of frequency of A.C Mains-Sonometer.
5. Torsional pendulum.
8. L-C-R circuit.
9. Time constant of an R-C Circuit.
10. Characteristics of solar cell
COMPUTATIONAL MATHEMATICS LAB
(Common to all Branches)

UNIT- I: Interpolation
Programming Tasks:
A) Write a program to determine y for a given x, if two arrays of x and y of same size are given (using Newton’s interpolation both forward and backward)
B) Write a program to determine y for a given x, if two arrays of x and y of same size are given (using Lagrange’s interpolation)
C) Write a program to determine y for a given x, if two arrays of x and y of same size are given (using Gauss’s interpolation)

(Selection criteria of the interpolation formula are important.)

UNIT- II: Curve fitting
Programming Tasks:
A) Write a program to find a line of best fit from the given two arrays of x and y of same size.
B) Write a program to find a curve of the form $y = Ae^{Bx}$ from the given two arrays of x and y of same size.
C) Write a program to find a curve of the form $y = Ax^{B}$ from the given two arrays of x and y of same size.
D) Write a program to find a curve of the form $y = Ax^2 + Bx + C$ from the given two arrays of x and y of same size.

UNIT- III: Solution of Algebraic and Transcendental Equations
Programming Tasks:
A) Write a program to find the root of a given equation using bisection method.
(Write this program such that the initial values given to the system are not usable, then the system should ask us to give new set of initial values).
B) Write a program to find the root of a given equation using method of false position (regula falsi position).
C) Write a program to find the root of a given equation using iteration method.
D) Write a program to find the root of a given equation using Newton Raphson method.

UNIT- IV: Linear system of equations
Programming Tasks:
A) Write a program to find the solution of given system of linear equations using L-U decomposition method.
B) Write a program to find the solution of given system of linear equations using Jacobi’s method.
C) Write a program to find the solution of given system of equations using Gauss-Seidel iteration method.
D) Write a program to find the solution of given system of equations using Gaussian elimination method.

UNIT-V: Numerical Differentiation, Integration and Numerical solutions of First order differential equations
Programming Tasks:
A) Write a program to evaluate definite integral using trapezoidal rule, Simpson’s 1/3rd rule and 3/8th rule.
B) Write a program to solve a given differential equation using Taylor’s series.
C) Write a program to solve a given differential equation Euler’s and modified Euler’s method.
D) Write a program to solve a given differential equation using Runge-Kutta method.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year B.Tech. CSE I -Sem.  
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MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Prerequisites
1. No prerequisites
2. An understanding of Math in general is sufficient.

Objectives
1. Introduces the elementary discrete mathematics for computer science and engineering.
2. Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Outcomes
1. Ability to understand and construct precise mathematical proofs
2. Ability to use logic and set theory to formulate precise statements
3. Ability to analyze and solve counting problems on finite and discrete structures
4. Ability to describe and manipulate sequences
5. Ability to apply graph theory in solving computing problems


UNIT-II: Set Theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.


TEXT BOOKS:

REFERENCE:
UNIT V
Instruction set and Assembly language programming of 8086:
instruction formats, addressing models, Instruction set, simple
programs involving logical, Branch all instructions, Solving, String
manipulations
Text Books:
1. Switching theory and logic design –A. Anand Kumar PHI,2013
References:
1. Switching and Finite Automatic theory-Zvi Kohavi ,Niraj K.Jha
Cambridge ,3rd edition
3. Microprocessor and Interfacing –Douglas V. Hall, TMGH 2nd
edition.
**ADVANCED DATA STRUCTURES**

**Prerequisites**
1. A course on “Computer Programming & Data Structures

**Objectives**
1. Introduces the basic concepts of Abstract Data Types.
2. Reviews basic data structures such as stacks and queues.
3. Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs, and B-trees.
4. Introduces sorting and pattern matching algorithms

**Outcomes**
1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and B-trees.

**Unit I:**
Review of basic data structures: The list, Stack, Queue, Implementation Using C.

**Dictionaries:** linear list representation, skip list representation, operations - insertion, deletion and searching.

**Unit II:**
Hash table representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, and comparison of hashing and skip lists.

**Priority Queues** – Definition, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion.

**Unit III:**
Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red-Black, Splay Trees, B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees.

**UNIT-IV:**
Graphs: Graph Implementation Methods. Graph Traversal Methods.
Sorting: Quick sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort, Multiway merge, Polyphase merge.

**Unit V:**
Pattern matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

**TEXTBOOKS:**

**REFERENCES:**
1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
4. Introduction to data structures in c, 1/e Ashok Kamthane
OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Prerequisites
1. A course on “Computer Programming & Data Structures”

Objectives
1. Introduces object oriented programming concepts using the Java language.
2. Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
3. Introduces the implementation of packages and interfaces
4. Introduces exception handling, event handling and multithreading
5. Introduces the design of Graphical User Interface using applets and swings

Outcomes
1. Develop applications for a range of problems using object-oriented programming techniques
2. Design simple Graphical User Interface applications

UNIT I:
Object oriented thinking and Java Basics-
Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT II:
Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism-method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring java.io.

UNIT III:
Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploring java.util.Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads, Enumerations, auto boxing, annotations, generics.

UNIT IV:
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT V:
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

TEXT BOOKS:
1. Java the complete reference, 7th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

REFERENCES:
1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch,
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
4. An introduction to Java programming and object oriented application development,
5. R.A. Johnson- Thomson.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year B.Tech. CSE I-Sem

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COMPUTER ORGANIZATION AND ARCHITECTURE

Prerequisites
No prerequisites

Co-requisite
A Course on “Digital Logic Design and Microprocessors”

Objectives
1. The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
2. It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. Topics include computer arithmetic, instruction set design, micro programmed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

Outcomes
1. Understand the basics of instructions sets and their impact on processor design.
2. Demonstrate an understanding of the design of the functional units of a digital computer system.
3. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
4. Design a pipeline for consistent execution of instructions with minimum hazards.
5. Recognize and manipulate representations of numbers stored in digital computers

UNIT I
Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

UNIT II
Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit.
Central Processing Unit: General Register Organization, STACK organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT III
Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

UNIT IV
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT V
Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.
Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing.
Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication and synchronization, Cache Coherence.

Text Books:

Reference:
Objectives of the Course:

- To develop students’ sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
Essential Reading: All the Units in the Textbook, “Towards a World of Equals: A Bilingual Textbook on Gender” written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

Reference Books:


DIGITAL LOGIC DESIGN AND MICRO PROCESSOR LAB

Prerequisites
1. A course on “Computer Programming and Data Structures"

Objectives
1. The aim of the course is to introduce the operations of logic gates and flip-flops; combinational and sequential circuits; design of digital circuits and systems; microprocessors and assembly language programming.
2. The topics include Boolean Algebra, Logic Gates, Flip-Flops, 8086 Architecture, Assembly Language Programming

Outcomes
1. Understand how digital circuits are designed.
2. Able to interconnect digital circuits to a microprocessors
3. Able to interpret and write assembly language programs

Digital Logic Design Lab:
1. Implement of Logic gates using NAND and NOR gates
2. Design Full adder using gates
3. Design and implement of 4:1 MUX,8:1 MUX using gates /Ics.
4. Design and Implement of 3 to 8 decoder using gates
5. Design of 4 bit comparator using gates/IC
6. Design of Implement of 4 bit shift register using Flip flops
7. Design and Implement of Decode counter
8. Design and Implement of Asynchronous counter.

Computer Organization & Micro Processor Lab
Write assembly language programs for the following using MASAM.
1. Write assembly language programs to evaluate the expressions:
   i) \( a = b + c - d \times e \)
   ii) \( z = x \times y + w - v + u / k \)
   a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.
   b. Considering 2 digit, 4digit and 8 digit BCD numbers.
   Take the input in consecutive memory locations and results also Display the results by using “int xx” of 8086. Validate program for the boundary conditions.
2. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
   a. Arrange in ascending and descending order.
3. Find max and minimum
   a. Find average
   Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using “int xx” of 8086. Validate program for the boundary conditions.
4. Write an ALP of 8086 to take a string of as input (in ‘C’ format)and do the following Operations on it.
   a. Find the length
   b. Find it is Palindrome or not
5. Find whether given string substring or not.
   a. Reverse a string
   b. Concatenate by taking another sting
   Display the results by using “int xx” of 8086.
6. Write the ALP to implement the above operations as procedures and call from the main procedure.
7. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

Text Books:
1. Switching theory and logic design –A. Anand Kumar PHI,2013

References:
ADVANCED DATA STRUCTURES THROUGH C LAB

Prerequisites
1. A course on Computer Programming & Data Structures

Objectives
1. Introduces the basic concepts of Abstract Data Types.
2. Reviews basic data structures such as stacks and queues.
3. Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs, and B-trees.
4. Introduces sorting and pattern matching algorithms

Outcomes
1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and B-trees.

1. Write C programs to implement the following using an array.
   a) Stack
   b) Queue
2. Write C programs to implement the following using a singly linked list.
   a) Stack
   b) Queue
3. Write C programs to implement the deque (double ended queue) using a doubly linked list and an array.
4. Write a C program to perform the following operations:
   a) Insert an element into a binary search tree.
   b) Delete an element from a binary search tree.
   c) Search for a key element in a binary search tree.
5. Write C programs that use non-recursive functions to traverse the given binary tree in
   a) Preorder
   b) Inorder
   c) Postorder.
6. Write C programs for the implementation of BFS and DFS algorithms.
7. Write C programs for implementing the following sorting methods:
   a) Merge sort
   b) Heap sort
8. Write a C program to perform the following operations
   a) Insertion into a B-tree
   b) Deletion from a B-tree
9. Write a C program to perform the following operations
   a) Insertion into an AVL-tree
   b) Deletion from an AVL-tree
10. Write a C program to implement all the functions of a dictionary using hashing.
11. Write a C program for implementing Knuth-Morris-Pratt pattern matching algorithm.
12. Write a C program for implementing Boyer-Moore Pattern matching algorithm

TEXTBOOKS:

REFERENCES:
1. The C Programming Language, B.W. Kernighan, Dennis M. Ritchie, PHI/Pearson Education
4. Introduction to Data Structures in C, 1/e Ashok Kamthane
OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Prerequisites
1. A course on “Computer Programming & Data Structures”

Co-requisite
1. A Course on “Object-Oriented Programming Through Java”

Objectives
1. Introduces object oriented programming concepts using the Java language.
2. Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
3. Introduces the implementation of packages and interfaces
4. Introduces exception handling, event handling and multithreading
5. Introduces the design of Graphical User Interface using applets and swings

Outcomes
1. Develop applications for a range of problems using object-oriented programming techniques
2. Design simple Graphical User Interface applications

Use Eclipse or Netbean platform and get acquainted with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

1) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box. [Use JOption Pane – Input dialog, Message dialog]

2) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea() that prints the area of the given shape.

3) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

4) Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.

5) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.

6) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero

7) a) Develop an applet in Java that displays a simple message.
   b) Develop an applet in Java that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “Compute” is clicked.

8) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a Java program to display the table using Labels in Grid Layout.

9) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

10) Implement the above program with the database instead of a text file.

11) Write a Java program that prints the meta-data of a given table
Text Books:
1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

References:
1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.

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II Year B.Tech. CSE II-Sem.

COMPUTER ORIENTED STATISTICAL METHODS

Prerequisites
1. No prerequisites

Objectives
1. The aim of the course is to introduce the concepts of probability and statistics so that a student gains an appreciation for the diverse applications of statistics and its relevance to their lives and fields of study.
2. Topics include: probability, random variables and distributions, correlation and regression, sampling distribution, testing of hypothesis for large samples and small samples, queueing theory and stochastic processes

Outcomes
1. Demonstrate an understanding of the basic concepts of probability and random variables.
2. The ability to classify the types of random variables and calculate the mean and variance.
3. The ability to choose an appropriate model (either the Binomial Distribution or Poisson distribution) and find mean and variance of the distribution.
4. Demonstrate the ability to apply the inferential methods relating to the means of Normal Distributions.
5. Be able to explain multiple random variables and find covariance of two random variables.
6. Be able to calculate the correlation and regression for the given data.
7. Understand the concept of sampling distribution of statistics and in particular describe the behavior of the sample mean.
8. Understand the foundation for classical inference involving confidence interval and hypothesis testing. Apply the testing of hypothesis for large samples and small samples.
9. Describe the queuing system, mean arrival and service rates. Calculate expected queue length and waiting lines.
10. Define a random process, Markov chain and stochastic matrix and limiting probabilities. Calculate the gambler ruin for the given data.


UNIT-II: Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Joint Probability Distributions, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev’s Theorem, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

Some Discrete Probability Distributions: Introduction and Motivation, Binomial and Multinomial Distributions, Hyper geometric Distribution, Negative Binomial and Geometric Distributions, Poisson Distribution and the Poisson Process, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

UNIT-III: Some Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions, Chi-Squared Distribution, Beta Distribution, Lognormal Distribution, Weibull Distribution (Optional), Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

Functions of Random Variables (Optional): Introduction, Transformations of Variables, Moments and Moment-Generating Functions.

UNIT-IV: Fundamental Sampling Distributions and Data Descriptions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S², t-Distribution, F-Distribution, Quantile and Probability Plots, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.


UNIT-V: Multiple Linear Regression and Certain Nonlinear Regression Models: Introduction, Estimating the Coefficients, Linear Regression Model Using Matrices, Properties of the Least Squares Estimators, Inferences in Multiple Linear Regression, Choice of a Fitted Model through Hypothesis Testing, Special Case of Orthogonality (Optional), Categorical or Indicator Variables, Sequential Methods for Model Selection, Cross Validation, Cp, and Other Criteria for Model Selection, Special Nonlinear Models for Non ideal Conditions, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

and Mixed Models, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

TEXT BOOK:

REFERENCE:

JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year B.Tech. CSE II-Sem.

DESIGN AND ANALYSIS OF ALGORITHMS

Prerequisites
1. A course on "Computer Programming and Data Structures"
2. A course on "Advanced Data Structures"

Objectives
1. Introduces the notations for analysis of the performance of algorithms.
2. Introduces the data structure disjoint sets.
3. Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate;
4. Describes how to evaluate and compare different algorithms using worst-, average-, and best-case analysis.
5. Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Outcomes
1. Ability to analyze the performance of algorithms
2. Ability to choose appropriate data structures and algorithm design methods for a specified application
3. Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs

UNIT I:
Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis. Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT II:
UNIT III:
Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT IV:
Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT V:
Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP-Complete classes, Cook’s theorem.

Text Books:

References:

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FORMAL LANGUAGES AND AUTOMATA THEORY

Prerequisites
1. A course on "Mathematical Foundations of Computer Science".

Objectives
1. Introduces the fundamental concepts of formal languages, grammars and automata theory.
2. Topics include finite automata, regular expressions, regular languages and their properties, context-free grammars, context-free languages and their properties, pushdown automata, Turing machines and un decidability.

Outcomes
1. Gain proficiency in classifying machines by their power in recognizing languages.
2. Learn to employ finite state machines for modeling and solving computing problems.
3. Comprehend the hierarchy of problems arising in computing

Unit I

Deterministic Finite Automata. Definition of a Deterministic Finite Automaton. How a DFA Processes Strings. Simpler Notations for DFA’s. Extending the Transition Function to Strings. The Language of a DFA

UNIT II


UNIT III


UNIT IV


UNIT V

Problem. Definition of Post's Correspondence Problem. The “Modified” PCP. Completion of the Proof of PCP Undecidability. Other Undecidable Problems. Problems about Programs.


Additional Classes of Problems: Complements of Languages in \( NP \). The Class of Languages Co\( NP \).NP-Complete Problems and \( NP \). Problems Solvable in Polynomial Space. Polynomial-Space Turing Machines. Relationship of \( PS \) and \( NPS \) to Previously Defined Classes. Deterministic and Nondeterministic Polynomial Space. A Problem That Is Complete for \( PS \).

Text Book:
1. Introduction to Automata Theory, Languages, and Computation, 2nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education

References:
1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to Languages and The Theory of Computation, John C Martic, TMH

JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year B.Tech. CSE II-Sem.

SOFTWARE ENGINEERING

Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Object Oriented Programming Through Java”

Objectives
1. The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
2. Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Outcomes
1. Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

UNIT-I:
Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.
A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.
Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT-II:
Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.
System models: Context models, behavioral models, data models, object models, structured methods.
UNIT-III:
Design Engineering: Design process and design quality, design concepts, the design model.
Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT-IV:
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.
Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT-V:
Metrics for Process and Products: Software measurement, metrics for software quality.
Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.
Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Text Books:
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

References:

JNTUH COLLEGE OF ENGINEERING HYDERABAD
II Year B.Tech. CSE II-Sem.

OPERATING SYSTEMS

Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Computer Organization and Architecture”

Objectives
1. Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
2. Introduce the issues to be considered in the design and development of operating system
3. Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

Outcomes
1. Will be able to control access to a computer and the files that may be shared
2. Demonstrate the knowledge of the components of computer and their respective roles in computing.
3. Ability to recognize and resolve user problems with standard operating environments.
4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT I:

UNIX/LINUX Utilities - Introduction to Unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, text processing utilities and backup utilities.

UNIT II:
System call interface for process management: fork, exit, wait, waitpid, exec


UNIT – III:

Inter process Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory, semaphores.

UNIT IV

UNIT V:

Unix/Linux Files: File structure, directories, files and devices, System calls, library functions, low level file access, usage of open, create, read, write, close, lseek, stat, ioctl.

TEXT BOOKS:

REFERENCE BOOKS:
2. Operating System A Design Approach-Crowley,TMH.
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education

SCRIPTING LANGUAGES LAB

Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Object Oriented Programming through Java”

Objectives
1. This course provides an introduction to the script programming paradigm, and introduces scripting languages such as Perl, PHP and Python.
2. Gain knowledge of the strengths and weaknesses of Perl, PHP and Python; and select an appropriate language for solving a given problem.

Outcomes
1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. Gain knowledge of the strengths and weaknesses of Perl, PHP and Python; and select an appropriate language for solving a given problem.

Practical Extraction Reporting Language (PERL)
1. a) Write a Perl script to find the largest number among three numbers.
   b) Write a Perl script to print the multiplication tables from 1-10 using subroutines.
2. Write a Perl program to implement the following list of manipulating functions
   a) Shift
   b) Unshift
   c) Push
3. a) Write a Perl script to substitute a word, with another word in a string.
   b) Write a Perl script to validate IP address and email address.
4. Write a Perl script to print the file in reverse order using command line arguments

Personal Home Page (PHP).
1. Write a PHP script to print prime numbers between 1-50.
2. PHP script to
   a. Find the length of a string.
   b. Count no of words in a string.
   c. Reverse a string.
d. Search for a specific string.
3. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4. Write a PHP script that reads data from one file and write into another file.

**Python.**
1. Write a python program to solve a quadratic equation.
2. a) Write a python program to find the factorial of a number.
b) Write a python program to generate Fibonacci series.
3. Write a python program to make a simple calculator.
4. a). Write a python program to sort words in alphabetical order.
b) Write a python program to add two matrices.

**Text Books:**
Weeks 5 & 6
1. Write C programs to illustrate the following IPC mechanisms:
   a. Pipes    b. FIFOs     c. Message     d. Shared
   queues     memory

Weeks 7 & 8
1. Write C programs to simulate the following memory management techniques:
      Memory     Memory     technique   Technique

Week 9
1. Write programs using the I/O system calls of UNIX/LINUX operating system:
   (open, read, write, close, fcntl, seek, stat, opendir, readdir)

Weeks 10 & 11
1. Write C programs to simulate the following file organization techniques:
   a. Single    b. Two      c. Hierarchical d. DAG
      level      level

Week 12
1. Write C programs to simulate the following file allocation strategies:
   e. Sequential f. Linked   g. Indexed

Week 13
1. Write C programs to simulate the following Page Replacement Techniques:
   a. FIFO   b. LRU     c. Optimal

TEXT BOOKS:
1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin,
   Greg Gagne 7th
   Edition, John Wiley
2. Advanced programming in the Unix environment, W. R. Stevens,
   Pearson education.

REFERENCE BOOKS:
1. Operating Systems – Internals and Design Principles Stallings,
   Fifth Edition–2005,
2. Pearson Education/PHI
3. Operating System A Design Approach-Crowley,TMH.
4. Modern Operating Systems, Andrew S Tanenbaum 2nd edition,
   Pearson/PHI
5. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
SOFTWARE ENGINEERING LAB

Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Object Oriented Programming Through Java”

Co-requisite
1. A Course on “Software Engineering”

Objectives
1. To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Outcomes
1. Ability to translate end-user requirements into system and software requirements
2. Ability to generate a high level design of the system from the software requirements
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

LIST OF EXPERIMENTS

Do the following 8 exercises for any two projects given in the list of sample projects or any other projects:

1) Development of problem statement.
4) Study and usage of any Design phase CASE tool
5) Performing the Design by using any Design phase CASE tools.
6) Develop test cases for unit testing and integration testing
7) Develop test cases for various white box and black box testing techniques.

Sample Projects:
1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
10. Recruitment system

Text Books:
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
HUMAN VALUES AND PROFESSIONAL ETHICS

Course Objectives
1. To introduce the basic concepts of universal human values
2. To familiarize the students with desirable business and professional ethics, rights and responsibilities
3. To prepare students against possible gaps and unethical practices in contemporary times
4. To sensitize the students so that they can protect themselves and the organization from the possible professional crime malpractices

Learning Outcomes
1. The students learn about diverse ethical issues rooted in society, trade, business, and environment on local as well as a global platform.
2. The students appreciate their role as a responsible citizen, professional, and as managers, advisors, experts and consultants.
3. The students will reflect and learn major values and ethics from their observations of a spiritual discourse and a visit to a business organization as a practical part of this course.

Unit I Human Values:

Unit II Professional Ethics:

Unit III Professional Responsibilities:

Unit IV Professional Rights:
professional rights and employee rights communicating risk and public policy – Whistle blowing - Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Regulatory compliances, Monitoring and control- Mini-Cases

Unit V Ethics in global context:

Mini-projects
Project 1: The student of this course should invariably attend (or watch on internet/any TV channel/ Youtube/ social media) two speeches of 30 minutes duration each dealing with spiritual discourse and submit a report on the contents of the lecture proceedings.
Project 2: Visit any organization (including shops/hotels or shopping malls in your region) of your choice and observe how the professionals perform the given job with a focus on professional ethics and human values.

References
1. Aryasri, Human Values and Professional Ethics, Maruthi Publications.
2. S B George, Human Values and Professional Ethics, Vikas Publishing.
Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Design and Analysis of Algorithms”

Objectives
1. The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
2. Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.
3. The following topics are included: Reference models, the physical layer (transmission media); the data link layer (error detection and correction, point-to-point protocols); the medium access layer protocols; the network layer (routing algorithms, congestion control); internetworking (addressing, internetwork routing and protocols, quality of service); the transport layer (connection-oriented transport layer services and protocols); application layer protocols

Outcomes
1. Gain the knowledge of the basic computer network technology.
2. Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of subnetworking and routing mechanisms.
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.

UNIT-I
Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.

UNIT-II
Data link layer: Design issues, framing, Error detection and correction.
Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for a noisy channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.
Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT-III

UNIT-IV
Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT –V
Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:

REFERENCE BOOKS:
COMPILER DESIGN

Prerequisites
1. A course on “Formal Languages and Automata Theory”
2. A course on “Computer Programming and Data Structures”

Objectives
1. Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
2. Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.

Outcomes
1. Demonstrate the ability to design a compiler given a set of language features.
2. Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
3. Acquire skills in using lex tool & yacc tool for developing a scanner and parser.
4. Design and implement LL and LR parsers
5. Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
6. Design algorithms to generate machine code.

Unit I
Introduction: The structure of a compiler, the science of building a compiler, programming language basics
Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

Unit II

Unit III
Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD’s, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, and Implementing L-Attributed SDD’s.

Unit IV
Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Unit V

Text Book:

References:
1. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O’reilly
2. Compiler Construction, Louden, Thomson...
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DATABASE MANAGEMENT SYSTEMS

Prerequisites
1. A course on "Advanced Data Structures"

Objectives
1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Outcomes
1. Gain knowledge of fundamentals of DBMS, database design and normal forms
2. Master the basics of SQL for retrieval and management of data.
3. Be acquainted with the basics of transaction processing and concurrency control.
4. Familiarity with database storage structures and access techniques.

UNIT I:
Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, storage manager, the query processor, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model, conceptual design for large enterprises.

UNIT II:
Introduction to the Relational Model: integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views, form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity’s, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT III:
Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT IV:

UNIT V:

Text Books:

References:
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Aim:
1. To understand the concepts and importance of economics in managerial problems
2. To understand the basic financial management concepts including the principles of financial analysis

Learning outcomes:
- Students will be able to apply the principles of economics for managerial decisions.
- The students will be able to analyze the financial position of a company with the techniques of financial accounting and ratio analysis.


Unit II Production & Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economies of Scale. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.


Unit IV Capital Budgeting: Methods and sources of raising capital - Capital Budgeting: Methods of Capital Budgeting: Payback Method,
Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V Introduction to Financial Accounting & Financial Analysis:

TEXT BOOKS:
1. Aryasri: Managerial Economics and Financial Analysis, TMH.,

REFERENCES:
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson,
3. Lipsey & Chrystel, Economics, Oxford University Press, Domnick Salvatore: Managerial Economics In a Global Economy, Thomson.,

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DATABASE MANAGEMENT SYSTEMS LAB

Co-requisites
1. Co-requisite of course “Database Management Systems”

Objectives
1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation

Outcomes
1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:-
1) Concept design with E-R Model
2) Relational Model
3) Normalization
4) Practicing DDL commands
5) Practicing DML commands
6) Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7) Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8) Triggers (Creation of insert trigger, delete trigger, update trigger)
9) Procedures
10) Usage of Cursors
Text Books:

References:
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.

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COMPILER DESIGN LAB

Prerequisites
1. A course on “Formal Languages and Automata Theory”
2. A course on “Computer Programming and Data Structures”

Co-requisite
1. A course on “Compiler Design”

Objectives
1. To provide practical programming skills necessary for constructing a compiler.

Outcomes
1. Ability to design a compiler given a set of language features.
2. Ability to use the knowledge of patterns, tokens & regular expressions for lexical analysis.
3. Able to use lex tool & yacc tool to develop a scanner & parser.
4. Design and implement LL(1), SLR, LR(1), LALR and operator precedence parsers
5. Generation of machine code

List of Experiments:-
1. Design a DFA to accept all strings containing a substring(01)
2. Write a LEX Program to scan reserved word & Identifiers of C Language
3. Write a LEX Program to scan integers as Float Numbers in C Language
4. Implement Predictive Parsing algorithm
5. Implement RD Parser for the Grammar
   S->AB
   A->a/E
   B->b/E
6. Write a C program to generate three address code.
7. Implement SLR(1) Parsing algorithm
8. Write a YACC program to parse the Strings.

Text Books:

References:
1. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O’reilly

Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Design and Analysis of Algorithms”

Co-requisite
1. A course on “Computer Networks”

Objectives
1. Intended to provide practical exposure of the concepts in computer networks.
2. Provide hands on experience of designing, modeling, and evaluation of computer networks

Outcomes
1. Implement data link layer framing methods.
2. Implement error correction and detection techniques.
3. Implement data link layer protocols
4. Implement routing and congestion algorithms
5. Implement encryption algorithms
6. Able to create a scenario and study the performance of computer networks and protocols
7. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
8. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
9. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
10. Implement Dijsktra’s algorithm to compute the shortest path through a network
11. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
12. Implement instance vector routing algorithm for obtaining routing tables at each node.
13. Implement data encryption and data decryption.
14. Using a simulation software
   i. Create a scenario and study the performance of CSMA/CD protocol
ii. Create a scenario and study the performance of token bus and token ring
iii. Study Transmission Control Protocol

**TEXT BOOK:**

**REFERENCE BOOKS:**

**DATA WAREHOUSING AND DATAMINING**

**Prerequisites**
1. A course on “Database Management Systems”
2. Knowledge of probability and statistics

**Objectives**
1. This course presents the techniques for preprocessing data before mining, and describes the concepts related to data warehousing, On-Line Analytical Processing (OLAP), and data generalization.
2. It also presents methods for mining frequent patterns, associations, and correlations.
3. It then describes methods for data classification and prediction, and data-clustering approaches.

**Outcomes**
1. Examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
2. Apply preprocessing statistical methods for any given raw data.
3. Devise efficient and cost effective methods for designing and maintaining data warehouses.
4. Extract interesting patterns from large amounts of data that can be used for further analysis, for example in machine learning and prediction.
5. Discover the role played by data mining in various fields.
6. Choose and employ suitable data mining algorithms to build analytical applications
7. Evaluate the accuracy of supervised and unsupervised models and algorithms.
UNIT-I
Data mining
Data Types of Data - Data Mining Functionalities - Interestingness
Patterns - Classification of Data Mining systems - Data mining Task
primitives - Integration of Data mining system with a Data
warehouse - Major issues in Data Mining - Data Preprocessing.

UNIT-II
Data warehouse and business analysis
Data Warehouse - Data Warehouse Architecture - Multidimensional
Data Model - Data cube and OLAP Technology - Data Warehouse
Implementation - DBMS schemas for Decision support - Efficient
methods for Data cube computation.

UNIT-III
Association rule mining and classification
Mining Frequent Patterns - Associations and correlations - Mining
Methods - Mining Various kinds of Association Rules - Correlation
Analysis - Constraint based Association mining - Classification and
Prediction - Basic concepts - Decision tree induction - Bayesian
classification, Rule-based classification - classification by Back
propagation - Support vector machines - Associative Classification,
Lazy learners - Other classification methods - Prediction.

UNIT-IV
Clustering and applications
Cluster analysis - Types of Data in Cluster Analysis - Categorization of
Major Clustering Methods - Partitioning Methods - Hierarchical
Methods - Density-Based Methods - Grid-Based Methods - Model-
Based Clustering Methods - Clustering high dimensional data-
Constraint - Based cluster analysis - Outlier Analysis

UNIT V
Mining data streams, time-series and sequence data
Basic concepts - Mining data streams - Mining Time-series data -
Mining sequence patterns in Transactional databases - Mining
Object - Spatial - Multimedia - Text and Web data - Spatial Data mining -

Text Books:
1. Data Mining - Concepts and Techniques - Jiawei Han &
   Micheline Kamber, Elsevier.
2. Data Warehousing, Data Mining & OLAP - Alex Berson and

References:
1. Building the Data Warehouse - W. H. Inmon, Wiley Dreamtech
   India Pvt. Ltd.
2. Data Mining Introductory and Advanced topics - Margaret H
   Dunham, Pearson Education.
WEB TECHNOLOGIES

Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Objected-Oriented Programming Through Java”

Objectives
1. To learn the basic web concepts and Internet protocols
2. To introduce XML and processing of XML data
3. To introduce client side scripting with Javascript and DHTML
4. To introduce server side programming with Java servlets and JSP

Outcomes
1. Ability to create dynamic and interactive web sites
2. Gain knowledge of client side scripting using javascript and DHTML.
3. Demonstrate understanding of what is XML and how to parse and use XML data
4. Able to do server side programming with Java Servelt and JSP

UNIT I: Introduction
Web Essentials - Clients, Servers and Communication:

Markup Languages – HTML: Basic Tags, Forms, Style sheets

UNIT II: Client-Side Programming
Introduction to JavaScript, JavaScript in Perspective, Basic Syntax, Variables and Data Types, Statements, Operators, Literals, Functions, Objects, Arrays, Built-in Objects, JavaScript Debuggers.


UNIT III: Server-Side Programming
Java Servlets: Servlet Architecture, Servlets Generating Dynamic Content, Servlet Life Cycle, Parameter Data, Sessions, Cookies, URL Rewriting, Case Study.

UNIT IV: Representing Web Data

UNIT V: Separating Programming and Presentation
JSP Technology: Introduction to JavaServer Pages, Running JSP Applications, Basic JSP, JavaBeans Classes and JSP, Tag Libraries and Files, Support for the Model-View-Controller Paradigm, Case Study.

TEXT BOOKS:
1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education

REFERENCES:
4. Paul Dietel and Harvey Deitel, "Java How to Program", Prentice Hall of India, 8th Edition
PROFESSIONAL ELECTIVE - I

ARTIFICIAL INTELLIGENCE

Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Advanced Data Structures”
3. A course on “Design and Analysis of Algorithms”
4. A course on “Mathematical Foundations of Computer Science”

Objectives
1. To learn the distinction between optimal reasoning Vs. human like reasoning
2. To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
3. To learn different knowledge representation techniques.
4. To understand the applications of AI, namely game playing, theorem proving, expert systems, machine learning and natural language processing.

Outcomes
1. Ability to formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and natural language processing.

UNIT I

Introduction:
AI problems, The Underlying Assumption, AI Techniques, The Level of the Model, Criteria for Success

Problems, Problem Spaces and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs

UNIT II

Knowledge Representation:
Issues in Knowledge Representation, Representing Simple Facts in Predicate Logic, Representing Instance and ISA Relations, Computable Functions and Predicates, Resolution, Natural Deduction


Weak Slot – and – Filler Structures: semantic nets, frames

Strong Slot – and – Filler Structures: conceptual dependency, scripts, CYC

UNIT III


UNIT IV

Game Playing: Overview, Minimax Search, Alpha – Beta Cutoffs
Understanding: Understanding as constraint satisfaction, Waltz Algorithm

Natural Language Processing: Introduction, Syntactic Processing, Augmented Transition Networks, Semantic Analysis

UNIT V

Text Books:
1) Artificial Intelligence* 3rd Edn., E. Rich and K. Knight (TMH)

References:
2) Artificial Intelligence and Expert systems – Patterson PHI

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Professional Elective - I
COMPUTER GRAPHICS

Prerequisites
1. Familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.
2. A course on “Computer Programming and Data Structures”

Objectives
1. The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
2. Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection;

Outcomes
1. Acquire familiarity with the relevant mathematics of computer graphics.
2. Be able to design basic graphics application programs, including animation
3. Be able to design applications that display graphic images to given specifications

UNIT-I:
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (Bresenham’s and DDA Algorithm), mid-point circle and ellipse algorithms

Filled area primitives: Scan-line polygon fill algorithm, boundary-fill and flood-fill algorithms

UNIT-II:
2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems
2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm, Polygon Filling

UNIT-III:
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV:
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V:
Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area subdivision and octree methods

Text Books:
3. Computer Graphics, Steven Harrington, TMH

References:
perspective. **Work Flows of the process:** Software process workflows, iteration workflows.

**UNIT IV**

**Checkpoints of the process:** Major milestones, Minor Milestones, periodic status assessments. Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating, iteration planning process, Pragmatic planning.


**UNIT V**

**Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates.

**Future Software Project Management:** modern Project Profiles, Next generation Software economics, modern process transitions.

**Case Study:** The command Center Processing and Display system-Replacement (CCPDS-R).

**Text Books:**

**References:**
2. Software Project Management, Joel Henry, Pearson Education.

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**Professional Elective -I**

**SPEECH PROCESSING**

**Prerequisites**
1. A course on “Mathematics II”
2. A course on “Computer Oriented Statistical Methods”
3. Generally, a basic knowledge of signals and systems, linear algebra, and probability and statistics and programming experience in a high-level language is required.

**Objectives**
1. The aim of the course is to familiarize students with the basic characteristics of the speech signal with regard to the production and perception of speech by humans.
2. To describe the basic techniques and practical aspects of speech analysis.
3. To present an overview of speech processing applications (such as speech recognition and speaker recognition)
4. The course includes the topics such as speech production, speech analysis, speech enhancement, speech and speaker recognition.

**Outcomes**
1. Ability to understand and describe the mechanisms of speech production.
2. Ability to determine speech sound from the acoustic characteristics.
3. Ability to analyze the speech signal in time and frequency domains, and in terms of the parameters of a source-filter model.
4. Describe and implement methods for speech enhancement.
5. Design a simple speech processing system that recognizes a limited number of isolated words; and a speaker recognition system.


UNIT V: Automatic Speech & Speaker Recognition: Basic Pattern Recognition Approaches, Parametric Representation of Speech, Evaluating the Similarity of Speech Patterns, Isolated Digit Recognition System, Continuous Digit Recognition System

Hidden Markov Model (HMM) For Speech: Hidden Markov Model (HMM) for Speech Recognition, Viterbi algorithm, Training and Testing using HMMS

Speaker Recognition: Recognition techniques, Features That Distinguish Speaker, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System.

TEXT BOOKS:

REFERENCE BOOKS:
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PROFESSIONAL ELECTIVE-I
PRINCIPLES OF PROGRAMMING LANGUAGES

Prerequisites
1. A course on "Mathematical Foundations of Computer Science"
2. A course on "Computer Programming and Data Structures"

Objectives
1. Introduce important paradigms of programming languages
2. To provide conceptual understanding of high level language design and implementation
3. Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages

Outcomes
1. Acquire the skills for expressing syntax and semantics in formal notation
2. Identify and apply a suitable programming paradigm for a given computing application
3. Gain knowledge of and able to compare the features of various programming languages

UNIT-I
Preliminary Concepts: reasons for studying concepts of programming languages, programming domains, language evaluation criteria, influences on language design, language categories, language design trade-offs, implementation methods, programming environments

Major Programming Languages – LISP, ALGOL-60, COBOL, BASIC, PL/I, APL, SNOBOL, SIMULA67, ALGOL 68, Prolog, Ada, C++, Java, Scripting Languages, C#, Markup/Programming Hybrid Languages

Syntax and Semantics: general problem of describing syntax and semantics, formal methods of describing syntax attribute grammars, describing the meanings of programs

UNIT-II
Names, Bindings, and Scopes: introduction, names, variables, concept of binding, scope, scope and lifetime, referencing environments, named constants

Data types: introduction, primitive, character string types, user defined ordinal types, array, associative arrays, record, union, tuple types, list types, pointer and reference types, type checking, strong typing, type equivalence

Expressions and Statements: arithmetic expressions, overloaded operators, type conversions, relational and Boolean expressions, short circuit evaluation, assignment statements, mixed-mode assignment

Control Structures – introduction, selection statements, iterative statements, unconditional branching, guarded commands

UNIT-III
Subprograms and Blocks: Fundamentals of sub-programs, design issues for subprograms, local referencing environments, parameter passing methods, parameters that are subprograms, calling subprograms indirectly, overloaded subprograms, generic subprograms, design issues for functions, user defined overloaded operators, closures, co routines

Implementing subprograms: general semantics of calls and returns, implementing simple subprograms, implementing subprograms with stack-dynamic local variables, nested subprograms, blocks, implementing dynamic scoping

Abstract Data types: The concept of abstraction, introductions to data abstraction, design issues, language examples, parameterized ADT, encapsulation constructs, naming encapsulations

UNIT-IV
Concurrency: introduction, introduction to subprogram level concurrency, semaphores, monitors, message passing, Java threads, concurrency in function languages, statement level concurrency

Exception Handling and Event Handling: Introduction, exception handling in Ada, C++, Java, introduction to event handling, event handling with Java and C#.

UNIT-V
Functional Programming Languages: Introduction, mathematical functions, fundamentals of functional programming language, LISP, support for functional programming in primarily imperative languages, comparison of functional and imperative languages

Logic Programming Language: Introduction, an overview of logic programming, basic elements of prolog, applications of logic programming.
Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library. (Text Book 2)

Text Books:

References:

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PROFESSIONAL ELECTIVE-II
MACHINE LEARNING AND PATTERN RECOGNITION

Prerequisites
1. Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge of Digital Signal Processing is desirable.
2. A course on “Computational Mathematics”
3. A course on “Computer Oriented Statistical Methods”

Objectives
1. This course introduces fundamental concepts, theories, and algorithms for pattern recognition and machine learning.
2. Topics include: Pattern Representation, Nearest Neighbor Based Classifier, Bayes Classifier, Hidden Markov Models, Decision Trees, Support Vector Machines, Clustering, and an application of hand-written digit recognition.

Outcomes
1. Understand the theory, benefits, inadequacies and possible applications of various machine learning and pattern recognition algorithms
2. Identify and employ suitable machine learning techniques in classification, pattern recognition, clustering and decision problems.

UNIT-I: Introduction: What is Pattern Recognition, Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition.

Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifier, Evaluation of Clustering;

UNIT-II: Nearest Neighbor Based Classifier: Nearest Neighbor Algorithm, Variants of the NN Algorithm use of the Nearest Neighbor
Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection.

**Bayes Classifier:** Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with the NNC, Naïve Bayes Classifier, Bayesian Belief Network.


**Decision Trees:** Introduction, Decision Tree for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Over-fitting and Pruning, Examples of Decision Tree Induction.

**UNIT-IV:** Support Vector Machines: Introduction, Learning the Linear Discriminant Functions, Neural Networks, SVM for Classification.

**Combination of Classifiers:** Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

**UNIT-V:** Clustering: Why is Clustering Important, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets.

**An Application-Hand Written Digit Recognition:** Description of the Digit Data, Pre-processing of Data, Classification Algorithms, Selection of Representative Patterns, Results.

**TEXT BOOK:**


**REFERENCES:**


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**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year B.Tech. CSE II-Sem.**

**PROFESSIONAL ELECTIVE-II**

**SOFTWARE TESTING METHODOLOGIES**

**Prerequisites**

1. A course on “Software Engineering”

**Objectives**

1. To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
2. To develop skills in software test automation and management using latest tools.

**Outcomes**

1. Design and develop the best test strategies in accordance to the development model.

**UNIT-I:**

**Introduction:**

- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

**Flow graphs and Path testing:**

- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**UNIT-II:**

**Transaction Flow Testing:**

- Transaction flows, transaction flow testing techniques.

**Dataflow testing:**

- Basics of data flow testing, strategies in data flow testing, application of dataflow testing.

**Domain Testing:**

- Domains and paths, nice & ugly domains, domain testing, domains and interfaces’ testing, domain and interface testing, domains and testability.

**UNIT-III:**

**Paths, Path products and Regular expressions:**

- Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

**Logic Based Testing:**

- Overview, decision tables, path expressions, kv charts, specifications.
UNIT-IV:
State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V:
Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

Text Books:

References:
1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)

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PROFESSIONAL ELECTIVE-II
SOCIAL NETWORK ANALYSIS

Prerequisites
1. A course on “Web Technologies”
2. A course on “Computer Networks”
3. A course on “Data Warehousing and Data Mining”

Objectives
1. It introduces the concepts of social media
2. It provides the mechanisms for social network analysis
3. Includes the concepts that allow for better visualization and analysis of widely used services such as email, Wikis, Twitter, flickr, YouTube, etc.

Outcomes
1. Ability to construct social network maps easily
2. Gain skills in tracking the content flow through the social media

UNIT I:
Introduction: Social Media and Social Networks

Social Media: New Technologies of Collaboration


UNIT-II:

UNIT-III:
CASE STUDIES-I:
Email: The lifeblood of Modern Communication.
Thread Networks: Mapping Message Boards and Email Lists
Twitter: Conversation, Entertainment and Information
UNIT-IV:
CASE STUDIES-II:
  Visualizing and Interpreting Face Book Networks, WWW Hyperlink Networks
  Flickr: Linking People, Photos, Tags

UNIT-V:
CASE STUDIES-III:
  You Tube: Contrasting Patterns of Content Interaction, and Prominence.
  Wiki Networks: Connections of Creativity and Collaboration

Text Books:

JNTUH COLLEGE OF ENGINEERING HYDERABAD
III Year B.Tech. CSE II-Sem.

PROFESSIONAL ELECTIVE-II
DIGITAL IMAGE PROCESSING

Prerequisites
1. Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge of Digital Signal Processing is desirable.
2. A course on “Computational Mathematics”
3. A course on “Computer Oriented Statistical Methods”

Objectives
1. Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
2. The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression.

Outcomes
1. Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition, sampling, and quantization.
2. Demonstrate the knowledge of filtering techniques.
3. Demonstrate the knowledge of 2D transformation techniques.
4. Demonstrate the knowledge of image enhancement, segmentation, restoration and compression techniques.

UNIT I: Digital Image Fundamentals:


UNIT IV: Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.


TEXT BOOK:

REFERENCES:

JNTUH COLLEGE OF ENGINEERING HYDERABAD

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WEB TECHNOLOGIES LAB

Prerequisites
1. A Course on “Computer Programming and Data Structures”
2. A Course on “Objected Oriented Programming through Java”

Co-requisites
1. A course on “Web Technologies”

Objectives
1. To provide hands-on experience on web technologies
2. To develop client-server application using web technologies
3. To introduce server side programming with Java servlets and JSP
4. To introduce client side scripting with Javascript and AJAX

Outcomes
1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML
2. Apply client-server principles to develop scalable and enterprise web applications.

List of Experiments:
1. Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
   a) Home page
   b) Registration and user Login
   c) User Profile Page
   d) Books catalog
   e) Shopping Cart
   f) Payment By credit card
   g) Order Confirmation

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
4. Bean Assignments
   a. Create a JavaBean which gives the exchange value of INR (Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
   b. Create a simple Bean with a label - which is the count of number of clicks. Then create a BeanInfo class, such that only the "count" property is visible in the Property Window.
   c. Create two Beans- a) KeyPad.   b) DisplayPad. After that integrate the two Beans to make it work as a Calculator.
   d. Create two Beans: Traffic Light(Implemented as a Label with only three background colors - Red, Green, Yellow) and Automobile (Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the following Light Transition Table.

<table>
<thead>
<tr>
<th>Light Transition</th>
<th>Automobile State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red --&gt; Yellow</td>
<td>Ready</td>
</tr>
<tr>
<td>Yellow --&gt; Green</td>
<td>Move</td>
</tr>
<tr>
<td>Green --&gt; Red</td>
<td>Stopped</td>
</tr>
</tbody>
</table>

5. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

6. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.
DATA WAREHOUSING AND DATA MINING LAB

Prerequisites
1. A course on “Database Management Systems”

Objectives
1. The course is intended to obtain hands-on experience using data mining software.
2. Intended to provide practical exposure of the concepts in data mining algorithms

Outcomes
1. Apply preprocessing statistical methods for any given raw data.
2. Gain practical experience of constructing a data warehouse.
3. Implement various algorithms for data mining in order to discover interesting patterns from large amounts of data.

LIST OF EXPERIMENTS:-
Experiments using Weka & Clementine Tools
1. Data Processing Techniques:
   (i) Data cleaning  (ii) Data transformation - Normalization
   (iii) Data integration
2. Partitioning - Horizontal, Vertical, Round Robin, Hash based
3. Data Warehouse schemas – star, snowflake, fact constellation
4. Data cube construction – OLAP operations
5. Data Extraction, Transformations & Loading operations
6. Implementation of Attribute oriented induction algorithm
7. Implementation of apriori algorithm
8. Implementation of FP – Growth algorithm
9. Implementation of Decision Tree Induction
10. Calculating Information gain measures
11. Classification of data using Bayesian approach
12. Classification of data using K – nearest neighbour approach
13. Implementation of K – means algorithm
15. Implementation of PAM algorithm
16. Implementation of DBSCAN algorithm

Text Books:
ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS (ACS) LAB

1. Introduction

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use ‘good’ English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students’ fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Learning Outcomes

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

3. Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. Activities on Fundamentals of Inter-personal Communication and Building Vocabulary - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. Activities on Reading Comprehension – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.


4. Activities on Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ e-mails/assignments etc.

5. Activities on Group Discussion and Interview Skills – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

4. Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- T. V, a digital stereo & Camcorder
- Headphones of High quality
5. **Suggested Software:** The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner’s Compass, 8th Edition
- DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from ‘train2success.com’
  - Preparing for being Interviewed
  - Positive Thinking
  - Interviewing Skills
  - Telephone Skills
  - Time Management

6. **Books Recommended:**

2. **English Language Communication: A Reader cum Lab Manual** by Dr. A Ramakrishna Rao, Dr G Nathan & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.

**DISTRIBUTION AND WEIGHTAGE OF MARKS:**

**Advanced Communication Skills Lab Practical Exam:**

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 30 sessional marks and 70 End Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

**Mini Project: As a part of Internal Evaluation**

1. Seminar/ Professional Presentation
2. A Report on the same has to be prepared and presented.

* Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
* Not more than two students to work on each mini project.
* Students may be assessed by their performance both in oral presentation and written report.
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B.Tech(CSE) IV Year I-Sem

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NETWORK SECURITY & CRYPTOGRAPHY

Prerequisites
1. A Course on “Computer Networks

Objectives
1. To impart knowledge on network security issues, services, goals and mechanisms.
2. To analyze the security of communication systems, networks and protocols.
3. To apply algorithms used for secure transactions in real world applications

Outcomes
1. Demonstrate the knowledge of cryptography and network security concepts and applications.
2. Ability to apply security principles in system design.
3. Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.

UNIT-I: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT-II: Conventional Encryption: Principles, Conventional encryption algorithms (DES, AES, RC4, Blowfish), cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT-III: Number Theory: Modular Arithmetic, Euclid’s Algorithm, Fermat’s and Euler’s Theorem, Chinese Remainder Theorem, Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

UNIT-IV: Email privacy: Pretty Good Privacy (PGP) and S/MIME.


UNIT-V


Text Books:
2. “Applied Cryptography” by Bruce Schneier.

References:
GRID AND CLOUD COMPUTING

Prerequisites
1. A course on “Network Security and Cryptography”
2. A course on “Computer Networks”
3. A course on “Operating Systems”

Objectives
1. This course provides a comprehensive study of Grid and cloud computing.
2. Topics include- distributed system models, design of cloud computing platforms, service oriented architectures, cloud programming and software environments, grid computing and resource management.

Outcomes
1. Ability to understand various service delivery models of a cloud computing architecture.
2. Ability to understand the ways in which the cloud can be programmed and deployed.
3. Ability to understand the security challenges and address the challenges.
4. Ability to understand how Grid computing helps in solving large scale scientific problems.

UNIT I
Distributed System Models and Enabling Technologies: scalable computing services over the Internet, technologies for network-based computing, system models for distributed and cloud computing, software environments for distributed systems and clouds, performance, security, and energy-efficiency.

UNIT II
Design of Cloud Computing Platforms: cloud computing and service models, datacenter design and interconnection networks, architecture design of compute and storage clouds, public cloud platforms, cloud resource management and exchanges, cloud security and trust management.

UNIT III
Service Oriented Architectures: message-oriented middleware, portals and science gateways, discover, registries, metadata, and databases, workflow in service-oriented architectures

UNIT IV
Cloud Programming and Software Environments: features of cloud and grid platforms, parallel and distributed programming paradigms, programming support of Google App engine, Amazon Web Services programming, Microsoft Azure programming support, emerging cloud software environments

UNIT V

TEXT BOOK:

REFERENCES:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

PROFESSIONAL ELECTIVE -III
DESIGN PATTERNS

Prerequisites
1. A Course on Software Engineering*
2. A Course on “Object Oriented Programming Through Java”

Objectives
1. The aim of the course is to appreciate the idea behind Design Patterns in handling common problems faced during building an application
2. This course covers all pattern types from creational to structural, behavioral to concurrency and highlights the scenarios when one pattern must be chosen over others.

Outcomes
1. Create software designs that are scalable and easily maintainable
2. Understand the best use of Object Oriented concepts for creating truly OOP programs
3. Use creational design patterns in software design for class instantiation
4. Use structural design patterns for better class and object composition
5. Use behavioral patterns for better organization and communication between the objects
6. Use refactoring to compose the methods for proper code packaging
7. Use refactoring to better organize the class responsibilities of current code

UNIT I:
Introduction: What is a design pattern? design patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT II:
Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary

UNIT III:
Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT IV:
Structural Pattern: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy

UNIT V:

Text Book:
1. Design Patterns, Erich Gamma, Pearson Education

Reference Books:
4. Head First Design Patterns, Eric Freeman, O’reily publications
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IV Year B.Tech. CSE I-Sem

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PROFESSIONAL ELECTIVE -III
ADVANCED DATABASES

Prerequisites
1. A course on “Database Management Systems”

Objectives
1. The purpose of the course is to enrich the previous knowledge of database systems and exposing the need for distributed database technology to confront with the deficiencies of the centralized database systems.
2. Introduce basic principles and implementation techniques of distributed database systems.
3. Equip students with principles and knowledge of parallel and object oriented databases.
4. Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

Outcomes
1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object oriented database system and related development.

UNIT-I
Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

UNIT-II
Query processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

UNIT-III
Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT –IV
Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

UNIT-V
Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Text Books:
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

Reference Books:
PROFESSIONAL ELECTIVE -III
MOBILE COMPUTING

Prerequisites:
1. A course on “Computer Networks”

Objectives:
1. To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSM protocol
3. To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
4. To understand the database issues in mobile environments & data delivery models.
5. To understand the ad hoc networks and related concepts.
6. To understand the platforms and protocols used in the mobile environment.

Outcomes:
1. Able to think and develop new mobile application.
2. Able to take any new technical issue related to this new paradigm and come up with a solution(s).
3. Able to develop new ad hoc network applications and/or algorithms/protocols.
4. Able to understand & develop any existing or new protocol related to the mobile environment.

UNIT I
Introduction
Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.
GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT II
(Wireless) Medium Access Control (MAC)
Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)
Mobile Network Layer
IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT III
Mobile Transport Layer
Database Issues
Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT IV
Data Dissemination and Synchronization
Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

UNIT V
Mobile Ad hoc Networks (MANETs)
Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, Mobile Agents, Service Discovery.
Protocols and Platforms for Mobile Computing

Text Books:
Department Elective III
BUSINESS INTELLIGENCE & BIG DATA

Prerequisites
1. Data Mining

Objectives
1. The purpose of this course is to provide the students with the knowledge of Business Intelligence principles and techniques.
2. This course is also designed to give an exposure of the frontiers of BI-intensive Big data computing

Outcomes
1. Explain the foundations, definitions, and capabilities of Big Data and Business Intelligence.
2. Apply Big Data technologies in Business Intelligence.
3. Ability to program using HADOOP

UNIT-I:
Business Intelligence, Data mining and Decision making, Business Intelligence Architecture, Distributed Computing, Cloud and Big Data, Cloud Storage, Virtualization, Cloud Models, Cloud Services

UNIT-II:

UNIT-III:
Information Management, Big Data Management, Geo-Spatial Intelligence, Business analytics, Data Analytics, Big data Analytics, Big Data Technology.

UNIT-IV:
Exploring the World of HADOOP, HDFS, Name Nodes, Data Nodes, Map Reduce Programming

UNIT-V:
Advanced Analytics, Operational Analytics, Monetizing Analytics, NOKIA, NASA, Consumption of Analytics, 360 Modeling

Text Books:
1. Big Data and Big Analytics by Michael Minelli and Michell Chambers
2. Big Data for DUMMIES by Alan Nugent Dr. Fern Halper

References:
1. Business Intelligence Data Mining and Optimization for decision making [Author: Carlo-Verellis] [Publication: (Wiley)]
Prerequisites
1. A course on “Computer Programming and Data Structures”
2. A course on “Advanced Data Structures”
3. A basic knowledge of probability and statistics.

Objectives
1. The purpose of the course is to introduce the techniques for retrieving useful information from repositories such as the Web, documents, etc.
2. The course first introduces standard concepts in information retrieval such as documents, queries, collections, and relevance.
3. The course then covers a selection of application areas such as Web search, multimedia searching and indexing.

Outcomes
1. Gain the knowledge of solving computational search problems.
2. Understand the inadequacies of different information retrieval techniques
3. Understand how to evaluate search engines.
4. Able to comprehend and appreciate the different applications of information retrieval techniques in the Internet or Web environment.

UNIT I
Introduction: Motivation, Basic Concepts, Past-Present and Future, the Retrieval Process

UNIT II
Retrieval Evaluation: Introduction, retrieval performance evaluation, Reference Collections

Query languages: Introduction, Keyword-Based Querying, Pattern Matching, Structural Queries, Query Protocols
Query Operations: Introduction, User Relevance Feedback, Automatic Local Analysis, and Automatic global Analysis

UNIT III
Indexing and Searching: Introduction, Inverted Files, Other Indices for Text, Boolean queries, Sequential Searching, pattern Matching, Structural Queries, Compression
Searching the Web: Introduction, Challenges, Characterizing the Web, Search Engines, Browsing, Met searchers, Finding the Needle in the Haystack, Searching Using Hyperlinks

UNIT IV

UNIT V:
Multimedia IR: Models and Languages: Introduction, Data Modeling, Query Languages

Text Books
1. Modern Information Retrieval By Yates and Neto Pearson Education.

Reference:
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**B.Tech(CSE) IV Year I-Sem**

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<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

**PROFESSIONAL ELECTIVE-IV**

**AD HOC & SENSOR NETWORKS**

**Prerequisites**
1. A course on “Computer Networks”
2. A course on “Mobile Computing”

**Objectives**
1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for ad hoc networks
3. To understand the security of sensor networks
4. To understand the applications of adhoc and sensor networks

**Outcomes**
1. Ability to understand the state of the art research in the emerging subject of Ad Hoc and Wireless Sensor Networks
2. Ability to solve the issues in real-time application development based on ASN
3. Ability to conduct further research in the domain of ASN

**UNIT I**

**Introduction to Ad Hoc Networks** - Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

**Routing in MANETs** - Criteria for classification, Taxonomy of MANET routing algorithms, *Topology-based* routing algorithms

- *Proactive*: DSDV, WRP
- *Reactive*: DSR, AODV, TORA
- Hybrid: ZRP

**Position-based routing algorithms** - Location Services

- DREAM, Quorum-based, GLS

**Forwarding Strategies**

- Greedy Packet, Restricted Directional Flooding
- Other routing algorithms

**UNIT II**

**Data Transmission** - Broadcast Storm Problem, Rebroadcasting Schemes

- Simple-flooding, Probability-based Methods, Area-based Methods, Neighbour Knowledge-based: SBA, Multipoint Relaying, AHB.

**Multicasting** - Tree-based: AMRIS, MAODV, Mesh-based: ODMRP, CAMP

**Hybrid**

- AMRoute, MCEDAR and **Geocasting**

**UNIT III**

**TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc**

**Basics of Wireless, Sensors and Applications**

- Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

**UNIT IV**

**Data Retrieval in Sensor Networks**

- Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

**UNIT V**

**Security** - Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

**Text Books:**
### JNTUH COLLEGE OF ENGINEERING HYDERABAD

**IV Year B.Tech. CSE I-Sem**

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**Department Elective - IV**

**EMBEDDED SYSTEMS**

**Prerequisites**
1. A course on “Digital Logic Design and Microprocessors”
2. A course on “Computer Organization and Architecture”

**Objectives**
1. The aim of the course is to introduce the hardware and software design aspects of embedded systems.
2. To equip the students with the knowledge and skills necessary to design and develop embedded applications by means of real-time operating systems.
3. The course includes the basics of embedded systems, interfacing, embedded programming and real-time operating systems.

**Outcomes**
1. Ability to design a system, component, or process that meets the requirements within realistic constraints
2. Gain the skills in programming embedded systems
3. Gain the knowledge of typical interfacing standards and be able to interface to peripherals
4. Ability to design and develop embedded applications by means of real-time operating systems

**UNIT I: INTRODUCTION TO EMBEDDED SYSTEMS**

Definition and Classification - Overview of Processors and hardware units in an embedded system - Software embedded into the system - Exemplary Embedded Systems - Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits.

**UNIT II: DEVICES AND BUSES FOR DEVICES NETWORK**

I/O Devices - Device I/O Types and Examples - Synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports-Timer and Counting Devices - ‘12C’, ‘USB’

**UNIT III: PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C**

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of FunctionCalls - Multiple function calls in a Cyclic Order in the Main Function Pointers - Function Queues and Interrupt Service Routines Queues Pointers

**UNIT IV: REAL TIME OPERATING SYSTEMS - PART - 1**


**INTER PROCESS COMMUNICATION AND SYNCHRONIZATION**

- Shared data problem - Use of Semaphore(s)- Inter Process Communications using Signals - Semaphore Flag or mutex as Resource key - Message Queues - Mailboxes – Pipes.

**UNIT V: REAL TIME OPERATING SYSTEMS - PART - 2**

Study of Micro C/OS-II or Vx Works or Any other popular RTOS - RTOS System Level Functions - Task Service Functions - Time Delay Functions - Memory Allocation Related Functions - Semaphore Related Functions - Mailbox Related Functions - Queue Related Functions.

**Text Books:**

**References:**
Prerequisites
1. A course on "Machine Learning"
2. A course on "Formal Languages and Automata Theory"

Objectives
1. This course is intended to introduce the fundamental concepts and ideas in Natural Language Processing (NLP).
2. Provides an understanding of the algorithms available for the processing of linguistic information and the underlying computational properties of natural languages.
3. The course covers methods for parsing and semantic interpretation with applications to practical engineering tasks such as part-of-speech tagging, word sense disambiguation, information retrieval and extraction, natural language generation and machine translation.

Outcomes
1. Understand the mathematical and linguistic concepts of NLP.
2. Design and implement algorithms for NLP problems

UNIT - I:
INTRODUCTION: Knowledge in speech and language processing - Ambiguity - Models and Algorithms - Language, Thought and Understanding.

UNIT - II:

UNIT - III:

UNIT – IV:
Representing Meaning: Computational desiderata for representations - Meaning structure of language - First order predicate calculus - Some linguistically relevant concepts - Related representational approaches - Alternative approaches to meaning.
Semantic Analysis: Syntax-Driven semantic analysis - Attachments for a fragment of English - Integrating semantic analysis into the early parser - Idioms and compositionality - Robust semantic analysis.

UNIT - V:
Word Sense Disambiguation and Information Retrieval: Selectional restriction-based disambiguation - Robust word sense disambiguation - Information retrieval - other information retrieval tasks.
Natural Language Generation: Introduction to language generation - Architecture for generation - Surface realization - Discourse planning - Other issues.
Machine Translation: Language similarities and differences - The transfer metaphor - The interlingua idea: Using meaning - Direct translation - Using statistical techniques - Usability and system development.
TEXT BOOKS:

REFERENCES:

JNTUH COLLEGE OF ENGINEERING HYDERABAD

B.Tech(CSE) IV Year I-Sem

Professional Elective-V
ETHICAL HACKING

Prerequisites
1. A course on “Operating Systems”
2. A course on “Computer Networks”
3. A course on “Network Security and Cryptography”

Objectives
1. The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
2. The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

Outcomes
1. Gain the knowledge of the use and availability of tools to support an ethical hack
2. Gain the knowledge of interpreting the results of a controlled attack
3. Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
4. Comprehend the dangers associated with penetration testing

UNIT I
Introduction: Hacking Impacts, The Hacker
Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration

UNIT II
The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges
Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point,
UNIT III
Preparing for a Hack: Technical Preparation, Managing the Engagement
Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

UNIT IV
Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase
Exploitation: Intuitive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

UNIT V
Deliverable: The Deliverable, The Document, Overall Structure, Aligning Findings, Presentation
Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

TEXT BOOK

REFERENCE BOOKS
1. EC-Council, “Ethical Hacking and Countermeasures Attack Phases”, Cengage Learning

JNTUH COLLEGE OF ENGINEERING HYDERABAD
B.Tech(CSE) IV Year I-Sem
PROFESSIONAL ELECTIVE-V
WEB MINING

Prerequisites
1. A course on “Web Technologies”
2. A course on “Advanced Data Structures”
3. A course on “Database Management Systems”

Objectives
1. The purpose of the course is to introduce the concepts of extracting knowledge from web data
2. The course introduces the mechanisms for effective web search and includes-WWW; fundamentals of data mining; information retrieval and web search; link analysis and web crawling; opinion mining and web usage mining;

Outcomes
1. Ability to design algorithms for generating association and classification rules from web data
2. Ability to design algorithms for clustering and managing the web documents
3. Ability to design algorithms for web searching and crawling.
4. Ability to perform sentiment analysis, opinion mining needed for recommendation systems
5. Ability to use web usage mining concepts for customization and personalization.

UNIT I:
Introduction to Web Data Mining and Data Mining Foundations
Introduction – World Wide Web(WWW), A Brief History of the Web and the Internet, Web Data Mining-Data Mining, Web Mining.
Data Mining Foundations – Association Rules and Sequential Patterns – Basic Concepts of Association Rules, Apriori Algorithm-Frequent Item set Generation, Association Rule Generation, Data Formats for Association Rule Mining, Mining with multiple minimum supports – Extended Model, Mining Algorithm, Rule Generation,
UNIT II: Supervised and Unsupervised Learning

Supervised Learning - Basic Concepts, Decision Tree Induction – Learning Algorithm, Impurity Function, Handling of Continuous Attributes, Classifier Evaluation, Rule Induction – Sequential Covering, Rule Learning, Classification Based on Associations, Naïve Bayesian Classification, Naïve Bayesian Text Classification - Probabilistic Framework, Naïve Bayesian Model.


UNIT III: Information Retrieval and Web Search


UNIT IV: Link Analysis and Web Crawling

Link Analysis - Social Network Analysis, Co-Citation and Bibliographic Coupling, Page Rank Algorithm, HITS Algorithm, Community Discovery-Problem Definition, Bipartite Core Communities, Maximum Flow Communities, Email Communities.


UNIT V: Opinion Mining and Web Usage Mining

Opinion Mining - Sentiment Classification – Classification based on Sentiment Phrases, Classification Using Text Classification Methods, Feature based Opinion Mining and Summarization – Problem Definition, Object feature extraction, Feature Extraction from Pros and Cons of Format1, Feature Extraction from Reviews of Format 2 and 3, Comparative Sentence and Relation Mining, Opinion Search and Opinion Spam.

Web Usage Mining - Data Collection and Preprocessing- Sources and Types of Data, Key Elements of Web usage Data Preprocessing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web usage Patterns -Session and Visitor Analysis, Cluster Analysis and Visitor Segmentation, Association and Correlation Analysis, Analysis of Sequential and Navigation Patterns.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year B.Tech (CSE) I - Sem

Professional Elective- V

BIO-INFORMATICS

Prerequisites
1. A course on “Database Management Systems”
2. A course on “Data Warehousing and Data Mining”
3. A course on “Computer Programming and Data Structures”

Objectives
1. To impart knowledge of theoretical and practical concepts of Bioinformatics.
2. To develop skills in designing biological database and retrieving.
3. To apply appropriate sequence analysis methods for analyzing Bio-molecular Sequences.

Outcomes
1. Demonstrate knowledge on concepts of biological databases, Genomes and Proteome.
2. Analyze biological database management system.
3. Select and apply appropriate techniques and tools to manage the biological data.

UNIT I

UNIT II
UNIT III
ALIGNMENT OF PAIR OF SEQUENCES:- Terminology – Global and
Local alignment – Dot matrix – dynamic programming – using scoring
matrices – PAM matrices – BLOSUM, Working with FASTA –
Algorithm – output – E-values – Histogram, Working with BLAST –
algorithm – output – services – gapped BLAST- PSIBLAST –
comparison of FASTA and BLAST.

UNIT IV
MULTIPLE SEQUENCE ALIGNMENT:- Criteria for Multiple sequence
alignment – applications – choosing the right sequences; FASTA,
ClustalW, TCoffee methods – interpreting multiple sequence
alignment – getting in right format – converting formats – using
Jalview – preparing for publication.

UNIT V
PROTEIN CLASSIFICATION & STRUCTURE PREDICTION:- Structure
of amino acids – primary structure – secondary structure – folds and
motifs – alpha and beta helix – structure based protein classification –
protein structure Data bases – folding problem – PROPSEARCH –
primary structure analysis and prediction – secondary structure
analysis and prediction – motifs – profiles – patterns and fingerprints

TEXT BOOKS
and applications”,second edition, PHI 2006.
2. Jean Mickel Clavere & Cadrienotredom “Bio Informatics– A

REFERENCE BOOKS
2. Dan E.Krane, Michael L.Raymer, “Fundamental concepts of Bio
Unit-III: Simulation of Continuous and Discrete Systems
Simulation of Continuous Systems: A chemical reactor, Numerical integration vs. continuous system simulation, Selection of an integration formula, Runge-Kutta integration formulas, Simulation of a servo system, Simulation of a water reservoir system, Analog vs. digital simulation.
Discrete System Simulation: Fixed time-step vs. event-to-event model, On simulating randomness, Generation of random numbers, Generation of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.

Unit-IV: System Simulation
Simulation of Queueing Systems: Rudiments of queuing theory, Simulation of a single-server queue, Simulation of a two-server queue, Simulation of more general queues.

Unit-V: Simulation Experimentation
Design and Evaluation of Simulation Experiments: Length of simulation runs, Variance reduction techniques, Experimental layout, Validation.
Simulation Languages: Continuous and discrete simulation languages, Continuous simulation languages, Block-structured continuous simulation languages, Expression-based languages, Discrete-system simulation languages, GPSS.

Text Books

Reference Books
1. System Modeling and Simulation: An Introduction, Frank L. Severance, Wiley Publisher, 2005

NET4WORD SECURITY AND CRYPTOGRAPHY LAB

Prerequisites
1. A course on “Computer Networks”

Co-requisite
1. A course on “Network Security and Cryptography”

Objectives
1. To impart practical knowledge on network security concepts and mechanisms.
2. To practically analyze and monitor network communication in order to overcome security threats
3. To practically analyze the network protocols, and configure applications for enhancing security.

Outcomes
1. Gain practical experience of designing and implementing network security algorithms and protocols.
2. Gain practical experience of analyzing network protocols and communication network.

Lab Exercises
1. Write a program to perform encryption and decryption using the following substitution ciphers.
2. Caesar cipher
3. Play fair cipher
4. Hill Cipher
5. Write a program to implement the DES algorithm.
6. Write a program to implement the Blowfish algorithm.
7. Write a program to implement RSA algorithm.
8. Implement the Diffie-Hellman Key Exchange mechanism.
9. Calculate the message digest of a text using the SHA-1 algorithm.
10. Calculate the message digest of a text using the MD5 algorithm.
11. Working with sniffers for monitoring network communication (Wireshark).
13. Using Snort, perform real time traffic analysis and packet logging.

Text Books:
2. “Applied Cryptography” by Bruce Schneier.

References:
Unit IV Project Management (PERT/CPM): PERT Vs CPM- Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).


TEXT BOOKS:

REFERENCES:

GRID AND CLOUD COMPUTING LAB

Prerequisites
1. A course on “Grid and Cloud Computing”
2. A course on “Object Oriented Programming Through Java”

Objectives
1. This course provides hands-on experience with using Hadoop, Amazon EC2, Google Compute Engine, Windows Azure and Globus toolkit.

Outcomes
1. Ability to install and configure Hadoop
2. Ability to install and configure Globus Toolkit
3. Ability to create an instance using Amazon EC2, Google Compute Engine and Windows Azure
4. Ability to create a database instance on the cloud

Lab Exercises
1. Installation and configuration of Hadoop
2. Using Hadoop for counting word frequency using map reduce
3. Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance.
4. Repeat Exercise-3 using Google Compute Engine.
6. Create a database instance in the cloud using Amazon RDS.
7. Create a database instance in the cloud using Google Cloud SQL
8. Installation and Configuration of Globus Toolkit
9. Build and deploy a grid server, then build the client and execute the application
Text Books:

References:

OPEN ELECTIVE- I
Pre Requisites: NIL

Course Objectives:
The subject provide different disasters, tools and methods for disaster management

Course Outcomes:
Estimate, perform quantity survey & valuate various engineering works

UNIT 1: Understanding Disaster
Concept of Disaster
Different approaches
Concept of Risk
Levels of Disasters
Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerability
Natural and man-made hazards; response time, frequency and forewarning levels of different hazards
Characteristics and damage potential or natural hazards; hazard assessment
Dimensions of vulnerability factors; vulnerability assessment
Vulnerability and disaster risk
Vulnerabilities to flood and earthquake hazards

UNIT 2: Disaster Management Mechanism
Concepts of risk management and crisis managements
Disaster Management Cycle
Response and Recovery
Development, Prevention, Mitigation and Preparedness
Planning for Relief

UNIT 3: Capacity Building
Capacity Building; Concept
Structural and Nonstructural Measures
Capacity Assessment; Strengthening Capacity for Reducing Risk
Counter-Disaster Resources and their utility in Disaster Management
Legislative Support at the state and national levels

UNIT 4: Coping with Disaster
Coping Strategies; alternative adjustment processes
Changing Concepts of disaster management
Industrial Safety Plan; Safety norms and survival kits
Mass media and disaster management

UNIT 5: Planning for disaster management
Strategies for disaster management planning
Steps for formulating a disaster risk reduction plan
Disaster management Act and Policy in India
Organizational structure for disaster management in India
Preparation of state and district disaster management plans

Text Books

References
OPEN ELECTIVE-I
NON CONVENTIONAL POWER GENERATION

Pre-requisite: Nil.

OBJECTIVES:
- To introduce various types of renewable technologies available.
- The technologies of energy conversion from these resources and their quantitative analysis.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

OUTCOMES:
- The student will be able analyse solar thermal and photovoltaic systems and related technologies for energy conversion.
- Wind energy conversion and devices available for it.
- Biomass conversion technologies.
- Geo thermal resources and energy conversion principles and technologies.
- Power from oceans (thermal, wave, tidal) and conversion and devices.
- Fundamentals of fuel cells and commercial batteries.

TEXT BOOKS

REFERENCE BOOKS
2. F.C.Treble, Generating Electricity from Sun.
4. S.P.Sukhatme, Solar Energy Principles and Application - TMH
OPEN ELECTIVE-I

ELECTRICAL ENGINEERING MATERIALS

Pre-requisites: Nil

Objectives: To understand the importance of various materials used in electrical engineering and obtain a qualitative analysis of their behavior and applications.

UNIT – I

DIELECTRIC MATERIALS: Dielectric as Electric Field Medium, leakage currents, dielectric loss, dielectric strength, breakdown voltage, breakdown in solid dielectrics, flashover, liquid dielectrics, electric conductivity in solid, liquid and gaseous dielectrics, Ferromagnetic materials, properties of ferromagnetic materials in static fields, spontaneous, polarization, curie point, anti-ferromagnetic materials, piezoelectric materials, pyroelectric materials.

UNIT – II

MAGNETIC MATERIALS: Classification of magnetic materials, spontaneous magnetization in ferromagnetic materials, magnetic Anisotropy, Magnetostriction, diamagnetism, magnetically soft and hard materials, special purpose materials, feebly magnetic materials, Ferrites, cast and cermet permanent magnets, ageing of magnets. factors effecting permeability and hysteresis

UNIT – III

SEMICONDUCTOR MATERIALS: Properties of semiconductors, Silicon wafers, integration techniques, Large and very large scale integration techniques (VLSI)

UNIT – IV

MATERIALS FOR ELECTRICAL APPLICATIONS: Materials used for Resistors, rheostats, heaters, transmission line structures, stranded conductors, bimetals fuses, soft and hard solders, electric contact materials, electric carbon materials, thermocouple materials. Solid, Liquid and Gaseous insulating materials, Effect of moisture on insulation.

UNIT – V

SPECIAL PURPOSE MATERIALS: Refractory Materials, Structural Materials, Radioactive Materials, Galvanization and Impregnation of materials, Processing of electronic materials, Insulating varnishes and coolants, Properties and applications of mineral oils, Testing of Transformer oil as per ISI

OUTCOMES: Will be able to

- Understand various types of dielectric materials, their properties in various conditions.
- Evaluate magnetic materials and their behavior.
- Evaluate semiconductor materials and technologies.
- Materials used in electrical engineering and applications.

TEXT BOOKS

3. TTTI Madras: Electrical Engineering Materials
OPEN ELECTIVE-I
NANO-TECHNOLOGY

Pre-requisites: Nil

OBJECTIVES: To enable the student to understand fundamentals of nano materials and technologies for these materials and their manufacturing, applications in various fields.

UNIT - I
Background of Nanotechnology: Scientific Revolutions, Nanotechnology and Nanomachines - The Periodic Table, Atomic Structure, Molecules and Phases, Energy, Molecular and Atomic size, Surfaces and Dimensional Space, Top down and Bottom up approach.

UNIT - II

UNIT - III
Nanopowders and Nanomaterials: Preparation, Plasma arcing, chemical vapor deposition, Sol-gels, Electrodeposition, Ball milling, using natural nanoparticles, Applications of nanomaterials.

UNIT - IV
Nanoelectronics: Approaches to nanoelectronics, Fabrication of integrated circuits, MEMS, NEMS, Nano circuits, Quantum wire, Quantum well, DNA-directed assembly and application in electronics.

UNIT - V

OUTCOMES:

- To evaluate electronic structural studies of nano materials and different synthesis methods to obtain nano structures.
- Understand characterization techniques through various measurements to study electrical, mechanical,thermal properties of nano materials.
- Applications of nano materials for specific purposes like MEMS, NEMS, nano electronics, energy storage.

TEXT BOOKS

1. Introduction to Nanoscience and Nanotechnology Gabor L. Hornyak, NanoThread, Inc., Golden, Colorado, USA; H.F. Tibbals, University of Texas Southwestern Medical Center, Dallas, USA; Joydeep Dutta, Asian Institute of Technology, Pathumthani, Thailand; John J. Moore, Colorado School of Mines, Golden, USA
2. Introduction to Nanotechnology by Charles P. Poole Jr and Frank J. Owens Wiley India Pvt Ltd.
3. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya.K.K, and Banerjee A.N,
4. Introduction to nano tech by phani kumar
5. Introduction to Nano Technology by Charles P. Poole Jr and Frank J. Owens, Wiley India Pvt Ltd.
6. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya.K.K, and Banerjee A.N,

NANOTECHNOLOGY Basic Science and Emerging Technologies by Michael Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse- CHAPMAN & HALL/CRC PRESS 2002.
OPERATIONS RESEARCH
OPEN ELECTIVE-I

Prerequisites: None

Objectives:
Understanding the mathematical importance of development of model in a particular optimization model for the issue and solving it.

Outcomes:
Understanding the problem, identifying variables & constants, formulas of optimization model and applying appropriate optimization Techniques

UNIT – I


UNIT – II

UNIT – III
SEQUENCING – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through ‘m’ machines-graphical model

REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely- Group Replacement.

UNIT – IV

INVENTORY: Introduction – Single item, Deterministic models – Types - Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand discrete variable or continuous variable – Single Period model with no setup cost.

UNIT – V


TEXT BOOK :
2. Operations Research/A.C.S.Kumar/Yesdee

REFERENCE BOOKS :
1. Operations Research: Methods and Problems / Maurice Saseini, Arhur Yaspan and Lawrence Friedman
4. Introduction to O.R/Hillier & Libermann (TMH).
5. Introduction to O.R /Taha PHI
JNTUH COLLEGE OF ENGINEERING HYDERABAD

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BASICS OF THERMODYNAMICS  
OPEN ELECTIVE-I

Pre-requisite: Engineering Chemistry and Physics

Course Objective: To understand the treatment of classical Thermodynamics and to apply the First and Second laws of Thermodynamics to engineering applications

Course Outcomes:
At the end of the course, the student should be able to
- Understand and differentiate between different thermodynamic systems and processes
- Understand and apply the laws of Thermodynamics to different types of systems undergoing various processes
- Understand and analyze the Thermodynamic cycles

UNIT – I
Introduction: Basic Concepts:

UNIT II

UNIT – III

UNIT IV
Atmospheric air - Psychrometric Properties – Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation ,Psychrometric chart.

UNIT - V
Power Cycles : Otto, Diesel cycles - Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis
Refrigeration Cycles:
Bell-Coleman cycle, Vapour compression cycle-performance Evaluation.

TEXT BOOKS :
1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Thermodynamics / C.P.Arora.

REFERENCE BOOKS:
1. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
3. Thermodynamics – J.P.Holman / McGrawHill
4. Engineering Thermodynamics – Jones & Dugan
FABRICATION PROCESSES
OPEN ELECTIVE-I

Prerequisites: Nil

Objectives:
Understand the philosophies of various Manufacturing process.

Outcomes:
For given product, one should be able identify the manufacturing process.

UNIT – I
Casting: Steps involved in making a casting – Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.
Methods of Melting - Crucible melting and cupola operation – Defects in castings;

UNIT – II
Welding: Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.
Inert Gas Welding _ TIG Welding, MIG welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non-destructive testing of welds.

UNIT – III
Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth.

UNIT – IV
Extrusion of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion

UNIT – V

TEXT BOOKS:
1. Manufacturing Technology / P.N. Rao/TMH

REFERENCE BOOKS:
1. Production Technology / R.K. Jain
2. Metal Casting / T.V Ramana Rao / New Age
4. Welding Process / Parmar /
5. Production Technology /Sarma P C /
Note: No detailed mathematical treatment is required.

Prerequisite: Nil

Course Objectives:
- It provides an understanding of various measuring systems functioning and metrics for performance analysis.
- Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
- Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.

Course Outcomes:
On completion of this course student can be able to
- Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
- Measure various physical parameters by appropriately selecting the transducers.
- Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals.

Unit-I:
Block Schematics of Measuring Systems and Performance Metrics:
- Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag.

Unit-II:
Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, and Specifications.

Unit-III:
Measuring Instruments: DC Voltmeters, D’ Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS

Unit-IV:
Recorders: X-Y Plotter, Curve tracer, Galvanometric Recorders, Servo transducers, pen driving mechanisms, Magnetic Recording, Magnetic recording techniques.

Unit-V:
Transducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

TEXT BOOKS:

REFERENCES:
OPEN ELECTIVE-I
OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Prerequisites
1. A course on “Computer Programming & Data Structures”

Objectives
1. Introduces object oriented programming concepts using the Java language.
2. Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
3. Introduces the implementation of packages and interfaces
4. Introduces exception handling, event handling and multithreading
5. Introduces the design of Graphical User Interface using applets and swings

Outcomes
1. Develop applications for a range of problems using object-oriented programming techniques
2. Design simple Graphical User Interface applications

UNIT I:
Object oriented thinking and Java Basics- Need for OOP paradigm, summary of OOP concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT II:
Inheritance, Packages and Interfaces – Hierarchical abstractions. Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring java.io.

UNIT III:
Exception handling and Multithreading– Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploring java.util, Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter-thread communication, thread groups, daemon threads, Enumerations, auto boxing, annotations, generics.

UNIT IV:
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT V:
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

TEXT BOOKS:
1. Java the complete reference, 7th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

REFERENCES:
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
OPEN ELECTIVE-I
COMPUTER GRAPHICS

Prerequisites
1. Familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.
2. A course on “Computer Programming and Data Structures”

Objectives
1. The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
2. Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection;

Outcomes
1. Acquire familiarity with the relevant mathematics of computer graphics.
2. Be able to design basic graphics application programs, including animation
3. Be able to design applications that display graphic images to given specifications

UNIT-I:
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (Bresenham’s and DDA Algorithm), mid-point circle and ellipse algorithms

Filled area primitives: Scan-line polygon fills algorithm, boundary-fill and flood-fill algorithms

UNIT-II:
2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions;

UNIT-III:
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV:
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V:
Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area subdivision and octree methods

Text Books:
3. Computer Graphics, Steven Harrington, TMH

References:
ENGINEERING MATERIALS
OPEN ELECTIVE-I

Pre requisites: Nil

Course Objectives:
1. To gain an knowledge about the uses and application of various ferrous metals and alloys.
2. To gain an knowledge about the uses and application of various non ferrous alloys.
3. To gain an knowledge about the uses and application of various ceramics, polymers and composites for different engineering applications.

Course Outcomes:
At the end of the course, student would be able to recommend
1. Ferrous metals and alloys for a given engineering applications and service condition.
2. Non ferrous alloys for a given engineering applications and service condition.
3. Ceramics, Polymers and composites for a given engineering applications and service condition.

UNIT-I

UNIT-II
NONFERROUS ALLOYS: Introduction, properties and applications, Aluminum Alloys, Magnesium Alloys, Copper Alloys and Titanium Alloys.

UNIT-III
CERAMIC MATERIALS: Introduction, Properties and Applications of Ceramics, Glasses and Refractories.

UNIT-IV
POLYMERS: Introduction, Classification of Polymers, Polymerization, Degree of Polymerization, Typical Thermoplastics and Thermosets.

UNIT-V
COMPOSITES: Introduction, Classification, Properties and Applications of Polymer matrix, Metal Matrix Ceramic Matrix and Laminar composites.

TEXT / REFERENCE BOOKS:
METALLURGY FOR NON METALLURGIST  
OPEN ELECTIVE-I

Pre requisites: Nil

Course Objectives:
1. To describe the basic principles of metallurgy and the importance of metallurgy in various discipline of engineering.
2. Gain a thorough knowledge about heat treatment of steels.
3. Gain a knowledge about properties and uses of cast irons and non ferrous metals.
4. Gain a working knowledge of basic testing methods for metals.

Course Outcomes:
At the end of the course Student would be able
1. To use and apply metallurgy in his own branch of engineering.
2. The student will be able to justify the various testing methods adopted for metals.

UNIT-I
Introduction: Crystal structure and defects, Crystal structure of metals, Classification of steels, Carbon steels

UNIT-II
Heat Treatment of Steels: The Iron carbon systems, Common phases in steels, Annealing, Normalizing, Hardening and tempering

UNIT-III
Cast irons: Properties and applications of Ductile irons, Malleable irons, Compacted graphite iron.

UNIT-IV
Non Ferrous Metals: Properties and applications of Light Metals (Al, Be, Mg, Ti), Super alloys

UNIT-V

TEXT BOOKS
2. Introduction to Physical Metallurgy – SH Avner, TATA Mc GRAW HILL ,1997
3. Metallurgy for Engineers- Clark and Varney
4. Mechanical Metallurgy – G. E. Dieter

REFERENCE BOOKS
1. Engineering Physical Metallurgy and Heat treatment – Y Lakhtin
   Foundations of Materials Science and Engineering – WF Smith
OPEN ELECTIVE-I

INDUSTRIAL POLLUTION CONTROL ENGINEERING

Objective:
To expose the students to various types of industrial pollutions and controlling techniques.

UNIT -I
Introduction to industrial pollution and types of pollution from chemical industries, Effects of pollution as environment and ecosystems-global warming-green house effect; Environmental legislatures-standards and guidelines.

UNIT -II
Air pollution- Meteorological aspects of pollution dispersion-adiabatic lapse rate-Environmental lapse rate-Turbulence and stability of atmosphere, Richardson number-Plume raise-plume behavior and characteristics, effective stack height. Major air pollutants and their sources, measurement of air pollutants

UNIT -III
General methods of control air pollutants removal of sulphur dioxide, oxides of nitrogen and organic vapors from gaseous effluents; Removal of particulate matter – principle and working of setting chambers, cyclone separators, fabric and fibre filters – electro static precipitators, Treatment of gaseous effluents

UNIT -IV
Introduction to water pollution – water pollutants classification – characteristics of liquid effluents from fertilizer, pulp & paper and petroleum industries, estimation of oxygen demands – DO, BOD, COD, TOC – BOD curves, oxygen sag curve – modeling of BOD curves


UNIT -V

Text books:
1. Pollution control in process industries by S.P. Mahajan TMH.,1985

References:

OUTCOME: The student will be able learn the sources of air, water pollution and also their treatment methods
OPEN ELECTIVE - II

ESTIMATION, QUANTITY SURVEY & VALUATION

Pre Requisites:
Concrete Technology, RC Design, Design of Steel Structure

Course Objectives:
The subject provides process of estimations required for various work in construction. To have knowledge of using SOR & SSR for analysis of rates on various works.

Course Outcomes:
Able to provide control steps for disaster mitigation steps

UNIT – I

UNIT – II
Detailed Estimates of Buildings - Reinforcement bar bending and bar requirement schedules

UNIT – III
Earthwork for roads and canals.

UNIT – IV
Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT-V

NOTE: NUMBER OF EXERCISES PROPOSED:
1. Three in flat Roof & one in Sloped Roof
2. Exercises on Data – three Nos.
Text Books:
2. Estimating and Costing by G.S. Birdie

Reference books:
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.

JNTUH COLLEGE OF ENGINEERING HYDERABAD

B.Tech. EEE

OPEN ELECTIVE-II

DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS

Pre-requisite: Power systems-I and Power Systems-II

Objectives: Objectives of this course are
- To emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
- To design and estimation of wiring,
- To design overhead and underground distribution lines, substations and illumination design.

UNIT - I
DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS:
Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of electrical installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT - II
ELECTRICAL INSTALLATION FOR DIFFERENT TYPES OF BUILDINGS AND SMALL INDUSTRIES:
Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT - III
OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES: Introduction, Supports for transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.
UNIT - IV
SUBSTATIONS: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substations – Floor mounted type.

UNIT – V
DESIGN OF ILLUMINATION SCHEMES: Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes LED, CFL and OCFL differences.

OUTCOMES: Students are in a position to understand the design considerations of electrical installations.
- To design electrical installation for buildings and small industries.
- To identify and design the various types of light sources for different applications.

TEXT BOOKS
2. Design of Electrical Installations, Er. V. K. Jain, Er. Amitabh Bajaj, University Science Press.

REFERENCE BOOKS

JNTUH COLLEGE OF ENGINEERING HYDERABAD
B.Tech. EEE
OPEN ELECTIVE-II
ENERGY STORAGE SYSTEMS

Pre-requisite: None
Objectives: Objectives of this course are
- To enable the student to understand the need for energy storage, devices and technologies available and their applications.

UNIT - I
Electrical Energy Storage Technologies: Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

UNIT - II

UNIT - III
Features of Energy Storage Systems: Classification of EES systems, Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES), Electrochemical storage systems, Secondary batteries, Flow batteries, Chemical energy storage, Hydrogen (H2), Synthetic natural gas (SNG).

UNIT - IV
Types of Electrical Energy Storage systems: Electrical storage systems, Double-layer capacitors (DLC), Superconducting magnetic energy storage (SMES), Thermal storage systems, Standards for EES, Technical comparison of EES technologies.

UNIT - V
Applications: Present status of applications, Utility use (conventional power generation, grid operation & service), Consumer use (uninterruptable power supply for large consumers), New trends in applications, Renewable energy generation, Smart
Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems, Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA – aggregation of many dispersed batteries.

OUTCOMES: After this course, the student
- Can analyze the characteristics of energy from various sources and need for storage
- Can classify various types of energy storage and various devices used for the purpose
- Can apply the same concepts to real time problems.

TEXT BOOKS

REFERENCE BOOKS:

UNIT – I

INTRODUCTION: Definition – Trends - Control Methods: Standalone, PC Based (Real Time Operating Systems, Graphical User Interface, Simulation) - Applications: identification of sensors and actuators in Washing machine, Automatic Camera, Engine Management, SPM, Robot, CNC, FMS, CIM.


UNIT – II

PRECISION MECHANICAL SYSTEMS: Modern CNC Machines – Design aspects in machine structures, guideways, feed drives, spindle and spindle bearings, measuring systems, control software and operator interface, gauging and tool monitoring.

ELECTRONIC INTERFACE SUBSYSTEMS: TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC’s - Protection schemes – circuit breakers, over current sensing, resetable fuses, thermal dissipation - Power Supply - Bipolar transistors / MOSFETs

UNIT – III

ELECTROMECHANICAL DRIVES: Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM’s - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

UNIT – IV

UNIT – V

TEXT BOOKS
2. Mechatronics by M.D.Singh, J.G.Joshi PHI.
3. Mechatronics HMT

REFERENCE BOOKS

JNTUH COLLEGE OF ENGINEERING HYDERABAD

JET PROPULSION & ROCKET ENGINEERING
OPEN ELECTIVE-II

Prerequisites: None

Course outcomes:
After doing this course, student should be in position to
1. Understand Turbo Jet Propulsion System
2. Analyze the flight performance
4. Learn the Aero thermo chemistry of the combustion products
5. Understand the physics of Solid propellant rocket engine, Liquid Rocket Propulsion System & Ramjet and Integral Rocket Ramjet Propulsion System:

Unit - I:
Turbo Jet Propulsion System:
Gas turbine cycle analysis – layout of turbo jet engine. Turbo machinery-compressors and turbines, combustor, blade aerodynamics, engine off design performance analysis.

Flight Performance:
Forces acting on vehicle – Basic relations of motion – multi stage vehicles.

Unit - II:
Principles of Jet Propulsion and Rocketry:
Fundamentals of jet propulsion, Rockets and air breathing jet engines – Classification – turbo jet, turbo fan, turbo prop, rocket (Solid and Liquid propellant rockets) and Ramjet engines.

Nozzle Theory and Characteristics Parameters:
Theory of one dimensional convergent – divergent nozzles – aerodynamic choking of nozzles and mass flow through a nozzle – nozzle exhaust velocity – thrust, thrust coefficient, A_c / A_t of a nozzle, Supersonic nozzle shape, non-adapted nozzles, summer field criteria, departure from simple analysis – characteristic parameters – 1) characteristic velocity, 2) specific impulse 3) total impulse 4) relationship between the characteristic parameters 5) nozzle efficiency, combustion efficiency and overall efficiency.
Unit - III: Aero Thermo Chemistry of The Combustion Products:

Solid Propulsion System:

Unit - IV:
Solid propellant rocket engine – internal ballistics, equilibrium motor operation and equilibrium pressure to various parameters. Transient and pseudo equilibrium operation, end burning and burning grains, grain design. Rocket motor hard ware design. Heat transfer considerations in solid rocket motor design. Ignition system, simple pyro devices.

Liquid Rocket Propulsion System:
Liquid propellants – classification, Mono and Bi propellants, Cryogenic and storage propellants, ignition delay of hypergolic propellants, physical and chemical characteristics of liquid propellant. Liquid propellant rocket engine – system layout, pump and pressure feed systems, feed system components. Design of combustion chamber, characteristic length, constructional features, and chamber wall stresses. Heat transfer and cooling aspects. Uncooled engines, injectors – various types, injection patterns, injector characteristics, and atomization and drop size distribution, propellant tank design.

Unit - V: Ramjet and Integral Rocket Ramjet Propulsion System:
Fuel rich solid propellants, gross thrust, gross thrust coefficient, combustion efficiency of ramjet engine, air intakes and their classification – critical, super critical and sub-critical operation of air intakes, engine intake matching, classification and comparison of IIRR propulsion systems.

TEXT BOOKS:

REFERENCE BOOKS:
1. Rocket propulsion –Sutton
2. Gas Turbines /Cohen, Rogers & Sarvana Muttoo/Addision Wesley & Longman.
3. Gas Turbines-V.Ganesan /TMH.
UNIT III
User, Cantered Workspace Design Anthropometric Data, Statistical Essentials, Types of Anthropometric Data, Applications Of Anthropometry in Design, Multiple Workspace Configurations, Status of Anthropometry in Ergonomics.

UNIT IV

UNIT V

Text books
1. Introduction to Ergonomics(Third Edition)/ R.S.Bridger/CRC Press , Taylor & Francis Group

References
1. Human factors in Engineering and Design/E.J.McCormick/ TMH Edison
UNIT – IV

UNIT – V

TEXT BOOKS :
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

REFERENCE:
1. "Designing Intelligent Machines", open University, London.
2. Michel B. Histand and David G. Alciatore, "
3. Introduction to Mechatronics and Measurement systems, "Tata MC Graw hill
**Optical Communication:** Optical Principles, Optical Communication Systems, Fiber–Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

**Unit 5:**

**Cellular and Mobile Communications:** Cellular telephone systems, AMPS, GSM, CDMA, WCDMA.

**Wireless Technologies:** Wireless LAN, PANs and Bluetooth, ZigBee and Mesh Wireless networks, WiMAX and MANs, Infrared wireless, RFID communication, UWB.

**Text Books:**
2. Kennaddy, Davis, Electronic Communications systems, 4e, TMH, 1999

**Reference Books:**
tables and views, form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity’s, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT III:
Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.
Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT IV:

UNIT V:

Text Books:

References:
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J. Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
OPEN ELECTIVE - II
CYBER SECURITY

Prerequisites
1. A Course on “Network Security and Cryptography”

Objectives
1. The purpose of the course is to educate on cyber security and the legal perspectives of cyber crimes and cyber offenses.
2. Introduce tools and methods for enhancing cyber security.
3. Topics include- cyber crimes, cyber offenses, cyber crimes on mobile and wireless devices, tools and methods to prevent cyber crimes, legal perspectives of cyber crimes and cyber security, computer forensics, Intellectual Property Rights and cyber terrorism

Outcomes
1. Demonstrate the knowledge of cyber security and understand the Indian and Global Act concerning cyber crimes
2. Employ security and privacy methods in the development of modern applications such that personal data is protected; and provide safe Internet usage.

UNIT-I
Introduction to Cybercrime:
Introduction, Cybercrime and Information security, who are cyber criminals, Classification of Cyber crimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cyber crimes.

Cyber offenses: How criminals Plan Them

UNIT-II
Cybercrime: Mobile and Wireless Devices

UNIT III
Cyber crimes and Cyber Security: the Legal Perspectives
Introduction
Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment Cyber law, Technology and Students: Indian Scenario.

Understanding Computer Forensics
Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques Forensics Auditing

UNIT IV
Cyber Security: Organizational Implications
Introduction, cost of cyber crimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cyber crimes the psychology, mindset and skills of hackers and other cyber criminals

UNIT V
Cybercrime: Illustrations, Examples and Mini-Cases
Examples:
- Official Website of Maharashtra Government Hacked
- Indian Banks Lose Millions of Rupees
- Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.
Mini-Cases:
The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios.

Text book:

Reference book:
UNIT - IV

UNIT - V
Modern theory and applications of corrosion: Introduction, free energy, cell potentials, emf series, applications of thermodynamics to corrosion, Corrosion rate expressions and measurements, corrosion testing.

Text / Reference Books:
UNIT - III

UNIT – IV
Creep and Stress Rupture: Introduction, The creep curve, Stress-rupture test, Structural changes during creep, Mechanism of creep deformation, theories of creep. Fracture at elevated temperature.

UNIT – V
NDT: Principle, Operation, Advantages and Limitations of Liquid Penetrant, Magnetic Particle, Radio graphy and Ultrasonic tests.

TEXT / REFERENCE BOOKS:
1. Mechanical Metallurgy – G. E. Dieter
2. Mechanical behavior - Ed. Wulf.

JNTUH COLLEGE OF ENGINEERING HYDERABAD
OPEN ELECTIVE-II
SOLID WASTE MANAGEMENT

OBJECTIVES:
- To know the Classification of solid waste and characterization of the same
- Understand the sense of onsite handling storage and collection systems including transportation
- Understand the different processing technologies of solid waste

UNIT I


UNIT II

UNIT III

UNIT IV

Unit V

Case studies: Major industries and management methods used in typical industries – Coal fired power stations, textile industry, oil refinery, distillery, sugar industry, and radioactive waste generation units.

Text Books:

Reference Books:

Outcomes:
The student will be able to
- Apply the knowledge of characterization of waste and develop a suitable management plan
- Assess the cost of transportation and laboratory processing of solid waste
- Identify hazardous nature of waste if any and can suggest suitable dumping methods.
- Suggest processing waste for material for energy recovery.

OPEN ELECTIVE- III
OPEN ELECTIVE -III
ENVIRONMENTAL IMPACT ASSESSMENT

Pre Requisites: Environmental Engineering

Course Objectives:
This subject will cover various aspects of Environment Impact Assessment methodologies, impact of development activities. Impact on surface water, Air and Biological Environment, Environment legislation Environment.

Course Outcomes: Environmental Science

UNIT – I
Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.


UNIT-II
Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT-III
Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures.

UNIT – IV
Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report, Post Audit activities.

UNIT - V

Text Books:

References:
3. Bhatia, H. S. - Environmental Pollution and Control, Galgotia Publication(P) Ltd, Delhi.
OPEN ELECTIVE-III
ENTERPRISE RESOURCE PLANNING

(Students must read text book. Faculty are free to choose any other cases)

Course Aim:
It enables the student to understand the foundations of Enterprise planning and ERP System Options.

Learning Outcome: The student understands the challenges in implementation of ERP system, ERP System Implementation options, and functional modules of ERP.

1. Introduction to ERP- Foundation for Understanding ERP systems-Business benefits of ERP-The challenges of implementing ERP system-ERP modules and Historical Development.
Case: Response top RFP for ban ERP system (Mary Sumner).
Case: Atlantic Manufacturing (Mary Sumner).
3 ERP system Installation Options- IS/IT Management results-Risk Identification analysis-System Projects- Demonstration of the system-Failure method-system Architecture & ERP (David L.Olson)
Case: DataSolutions & Technology Knowledge (Mary Sumner).
4 ERP - sales and Marketing- Management control process in sales and marketing-ERP customer relationship management-ERP systems-
Accounting & Finance control processes. Financial modules in ERP systems.
Case: atalantic manufacturing (Mary Sumner).
5 ERP – Production and Material Management-Control process on production and manufacturing-Production module in ERP- supply chain Management & e-market place-e-businessss & ERP-e supply chain & ERP- Future directions for ERP.
Case: HR in atalntic manufacturing. (Mary Sumner).

Text Book:

References:
The objective of the course is to provide the basic concepts of Enterprise Resource Planning and Management of Information System.


Unit – 2: IS Security, Control and Audit – System Vulnerability and Abuse, business value of security and control, Need for Security, Methods of minimizing risks IS Audit, ensuring system quality.


References
- C.S.V.Murthy: Management Information System, Himalaya,2009
- Vaman, ERP in Practice, TMH, 2009
- Dharminder and Sangeetha: Management Information Systems, Excel, 2009
- Olson: Managerial Issues of ERO, TMH, 2009
- Miller:MIS—Cases, Pearson, 2009
The objective of the course is to provide the students with the conceptual framework and the theories underlying Organisational Behaviour.


References

- Luthans, Fred: Organizational Behaviour 10/e, McGraw-Hill, 2009
- McShane: Organizational Behaviour, 3e, TMH, 2008
- Aswathappa: Organisational Behaviour,7/e,Himalaya, 2009
Course outcomes:
After this completion of this course, the student should be able to understand the basic components of robots, differentiate types of robots and robot grippers, model forward and inverse kinematics of robot manipulators, analyze forces in links and joints of a robot, program a robot to perform tasks in industrial applications, design intelligent robots using sensors.

Unit 1

Unit 2

Unit 3

Unit 4
Trajectory planning: Joint space scheme - Cubic polynomial fit - Obstacle avoidance in operation space-cubic polynomial fit with via point, blending scheme. Introduction Cartesian space scheme.

Textbooks:
2. Industrial Robotics/Grover/ McGraw hill
3. Robotics/ Mittal and Nagarath/ TMH

REFERENCE BOOKS:
1. Robot Dynamics and Controls / Spony and Vidyasagar / John Wiley
2. Robot Analysis and control Asada and Slotine / Wiley Inter-Science
3. Introduction to Robotics / John J Craig / Pearson Education
NON-CONVENTIONAL SOURCES OF ENERGY
OPEN ELECTIVE-III

Pre-requisites: None

Course Outcomes:
At the end of the course, the student will be able to identify renewable energy sources and their utilization. Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems. Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas and hydrogen. Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator. Identify methods of energy storage for specific applications

UNIT – I
PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power - Physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, Solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, solar radiation data.

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT - II
SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications - solar heating/cooling techniques, solar distillation and drying, photovoltaic energy conversion.

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT - III

UNIT – IV
GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.


UNIT – V
DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, Principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thompson effects, figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principle, faraday's laws, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:
1. Renewable Energy Resources / Tiwari and Ghosal / Narosa
2. Non-conventional Energy Sources / G.D. Rai

REFERENCE BOOKS:
1. Renewable Energy Sources / Twidell & Weir
2. Solar Energy / Sukhame
5. Non-Conventional Energy / Ashok V Desai / Wiley Eastern
7. Renewable Energy Technologies / Ramesh & Kumar / Narosa
Pre-requisites: None

Outcomes:
After the course student should be able to analyse conduction, convection and radiation heat transfer modes, heat generation, conduction and dissipation in electronically controlled units.

UNIT-I
Conduction Heat transfer: Modes of heat transfer, Fourier’s law of steady state heat conduction (one dimensional conduction), thermal conductivity and its unit, conduction through slab or plane wall, hollow cylinders and spheres conduction through composite walls and hollow cylinders and spheres with multi-layers, Convective heat transfer, Newton’s law of cooling, electrical analogy and overall heat transfer coefficient, numerical problems

UNIT-II
Convective and radiation Heat transfer:
Dimensional analysis as a tool for experimental investigation, Buckingham pi theorem and method, radiation and radiation properties of surfaces, black body, emissive power, Stefan Boltzmann’s law, emissivity, monochromatic emissive power and monochromatic emissivity, grey body, Kirchoff’s law, Wien’s displacement law, numerical problems.

UNIT - III
Cooling of Electronic equipment:
Introduction and history, manufacturing of electronic equipment, cooling load of electronic equipment, thermal environment, electronics cooling in different applications, conduction cooling, air cooling: natural convection and radiation, air cooling: forced convection, liquid cooling, immersion cooling, heat pipes, cooling of chips, PCBs, computers, logic chips etc.

UNIT - IV
Refrigeration and Air conditioning: Introduction to refrigeration, necessity and applications, unit of refrigeration and cop, Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

UNIT-V

Text books:
3. A course in Refrigeration and Air conditioning – SC Arora and & Domkundwar / Dhanpatrai

Reference books:
PRINCIPLES OF COMPUTER COMMUNICATIONS AND NETWORKS
OPEN ELECTIVE-III

Prerequisite: Nil

Course Objectives:
- To understand the concept of computer communication.
- To learn about the networking concept, layered protocols.
- To understand various communications concepts.
- To get the knowledge of various networking equipment.

Course Outcomes:
- The student can get the knowledge of networking of computers, data transmission between computers.
- Will have the exposure about the various communication concepts.
- Will get awareness about the structure and equipment of computer network structures.

UNIT-I
Overview of Computer Communications and Networking:

UNIT-II
Essential Terms and Concepts:
Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications, Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT-III
Analog and Digital Communication Concepts:
Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction, Digital Carrier Systems.

UNIT-IV
Physical and data link layer Concepts:
The Physical and Electrical Characteristics of wire, Copper media, fiber optic media, wireless Communications. Introduction to data link Layer, the logical link control and medium access control sub-layers.

UNIT-V
Network Hardware Components:
Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, switches Vs Routers.

Text Books:

Reference Books:
Prerequisites
1. A Course on “Computer Programming and Data Structures”

Objectives
1. To learn the basic web concepts and Internet protocols
2. To introduce XML and processing of XML data
3. To introduce client side scripting with Javascript and DHTML
4. To introduce server side programming with Java servlets and JSP

Outcomes
1. Ability to create dynamic and interactive web sites
2. Gain knowledge of client side scripting using java script and DHTML.
3. Demonstrate understanding of what is XML and how to parse and use XML data
4. Able to do server side programming with Java Servelets and JSP

UNIT I: Introduction
Web Essentials - Clients, Servers and Communication:
Markup Languages – HTML: Basic Tags, Forms, Style sheets

UNIT II: Client-Side Programming
Introduction to JavaScript, JavaScript in Perspective, Basic Syntax, Variables and Data Types, Statements, Operators, Literals, Functions, Objects, Arrays, Built-in Objects, JavaScript Debuggers.

UNIT III: Server-Side Programming
Java Servlets: Servlet Architecture, Servlets Generating Dynamic Content, Servlet Life Cycle, Parameter Data, Sessions, Cookies, URL Rewriting, Case Study.

UNIT IV: Representing Web Data

UNIT V: Separating Programming and Presentation
JSP Technology: Introduction to JavaServer Pages, Running JSP Applications, Basic JSP, JavaBeans Classes and JSP, Tag Libraries and Files, Support for the Model-View-Controller Paradigm, Case Study.

TEXT BOOKS:
1. Web Technologies: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education

REFERENCES:
4. Paul Dietel and Harvey Deitel, "Java How to Program", Prentice Hall of India, 8th Edition
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OPEN ELECTIVE -III
SIMULATION AND MODELING

Prerequisites
1. A course on "Computer Oriented Statistical Methods"

Objectives
1. The overall aim of the course is to provide an understanding of methods, techniques and tools for modeling, simulation and performance analysis of complex systems
2. The topics include system models and studies; random number generation; simulation of continuous and discrete systems; simulation of queuing systems and pert networks
3. The course also provides practical knowledge of simulation experimentation and introduces simulation languages.

Outcomes
1. Ability to construct a model for a given system/set of data.
2. Ability to generate and test random number variates and apply them to develop simulation models.
3. Ability to interpret the model and apply the results to resolve issues in a real world environment

Unit-I: System Models and Studies

Unit-II: Random Numbers
Random Number Generation: Properties, Generation of Pseudo-Random Numbers, Techniques of generating random numbers, tests for random numbers

Unit-III: Simulation of Continuous and Discrete Systems
Simulation of Continuous Systems: A chemical reactor, Numerical integration vs. continuous system simulation, Selection of an integration formula, Runge-Kutta integration formulas, Simulation of a servo system, Simulation of a water reservoir system, Analog vs. digital simulation.
Discrete System Simulation: Fixed time-step vs. event-to-event model, On simulating randomness, Generation of random numbers, Generation of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.

Unit-IV: System Simulation
Simulation of Queuing Systems: Rudiments of queuing theory, Simulation of a single-server queue, Simulation of a two-server queue, Simulation of more general queues.

Unit-V: Simulation Experimentation
Design and Evaluation of Simulation Experiments: Length of simulation runs, Variance reduction techniques, Experimental layout, Validation.
Simulation Languages: Continuous and discrete simulation languages, Continuous simulation languages, Block-structured continuous simulation languages, Expression-based languages, Discrete-system simulation languages, GPSS.

Text Books

Reference Books
1. System Modeling and Simulation: An Introduction, Frank L. Severance, Wiley Publisher, 2005
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SURFACE ENGINEERING
OPEN ELECTIVE-III

Pre-requisites: Thermodynamics, Physical Metallurgy.

Course Objectives:
1. To provide a state-of-the-art knowledge to the students and various surface engineering techniques.

Unit-I
Introduction to surface modification, need for surface modification, surface properties, surface property modification, history of surface modification

Unit-II
Plating and coating process: concept of coating, types of coatings, properties of coatings, hard facing, anodizing, PVD, CVD, Electro deposition Electro less deposition, hot deposition, hot dipping.

Unit-III
Thermo-chemical Processes: carburizing, nitriding, carbonitriding, nitro carburizing, Boronising, Plasma nitriding, thermal spraying, Plasma spraying.

Unit-IV

Unit-V
General design principles related to surface engineering, design guidelines for surface preparation, surface engineering solution to specific problems.

Course Outcomes:
1. This course provides an opportunity to the students to engineer the microstructure for an enhanced performance based on the need in actual practice.

Text books/References:
JNTUH COLLEGE OF ENGINEERING HYDERABAD


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NANOMATERIALS
OPEN ELECTIVE-III

Pre-requisites: Physics, chemistry

Course Objective:
1. This course is primarily intended to expose the students to a highly interdisciplinary subject.
2. This would emphasize on the classification, synthesis and applications of Nano materials.

Course Outcomes:
The student will be able to design a component/material that would provide us a ‘better tomorrow’ via nanotechnology.

Unit-I
Introduction

UNIT-II
Materials of Nano Technology

UNIT-III
Nano Particles: Introduction Synthesis procedures — wet chemical approach & physical vapor synthesis approach, size effect and shape change and their properties —examples of systems involved characterization techniques properties & their applications

UNIT- IV
Nano Wires: Introduction — Various synthesis procedures (template assisted method and VLS methods) Principles, characterization procedures, properties and applications of Nano wires
Carbon Nano Tubes: Synthesis procedures properties and applications of carbon Nano tubes.

UNIT-V
Thin films deposition and Doping. Applications of Thin films.

TEXT / REFERENCE BOOKS
2. Nano Essentials: T. Pradeep, TMH
3. Springer Handbook of Nanotechnology
4. The Guest for new materials Author S. T. Lakshmi Kumar, Published by Vigyan Prasar.
Objective: The student will be exposed to various industrial hazards and prevention and control methods

UNIT I

UNIT II
Toxicology: How toxicants enter biological organisms, How toxicants are eliminated from biological organisms.
Industrial Hygiene: Government regulations, Identification, Evaluation, Control.

UNIT III
Fires and Explosions: The fire triangle, Distinction between fire and explosions; Definitions, Flammability characteristics of liquids and vapors, MOC and inerting, ignition energy, Auto ignition, Auto oxidation, Adiabatic compression, Explosions.

UNIT IV
Designs to prevent fires and explosions: Inerting, Explosion proof equipment and instruments, Ventilations, Sprinkler systems.
Introduction to Reliefs: Relief concepts, Definitions, Location of reliefs, Relief types, Data for sizing reliefs, Relief systems.

UNIT V
Relief Sizing: Conventional spring operated reliefs in liquids, Conventional spring operated relief’s in vapor or gas service, Rupture disc relief’s in liquid, vapour or gas service.
Hazards Identification: Process hazards checklists, Hazard surveys, Hazop safety reviews.

TEXT BOOK:

REFERENCES:

OUTCOME: The student will be equipped with the knowledge by which thorough safety is ensured in the organization.

Prerequisite: Nil