Academic Regulations
Programme Structure
&
Detailed Syllabus

Bachelor of Technology
(B. Tech)
(Four Year Regular Programme)
(Applicable for Batches admitted from 2018)

Department of Information Technology

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING & TECHNOLOGY
Bachupally, Kukatpally, Hyderabad, Telangana, India
500 090

Academic Regulations
GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY,
HYDERABAD
DEPARTMENT OF INFORMATION TECHNOLOGY (B. Tech)
GR18 REGULATIONS

Gokaraju Rangaraju Institute of Engineering and Technology 2018 Regulations (GR18 Regulations) are given hereunder. These regulations govern the programmes offered by the Department of Information Technology with effect from the students admitted to the programmes in 2018-19 academic year.

1. **Programme Offered:** The programme offered by the Department is B. Tech in Information Technology, a four-year regular programme.

2. **Medium of Instruction:** The medium of instruction (including examinations and reports) is English.

3. **Admissions:** Admission to the B. Tech in Information Technology Programme shall be made subject to the eligibility, qualifications and specialization prescribed by the State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the Government/University or on the basis of any other order of merit approved by the Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. **Programme Pattern:**
   a) Each Academic year of study is divided in to two semesters.
   b) Minimum number of instruction days in each semester is 90.
   c) Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
   d) The total credits for the Programme is 160.
   e) Student is introduced to “Choice Based Credit System (CBCS)”.
   f) A student has a choice to register for all courses in a semester/ one less or one additional course from other semesters provided the student satisfies prerequisites.
   g) All the registered credits will be considered for the calculation of final CGPA.
   h) Each semester has - ‘Continuous Internal Evaluation (CIE)’ and ‘Semester End Examination (SEE)’. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and course structure as suggested by AICTE are followed.
   i) **Subject/Course Classification:** All subjects/ courses offered for the under graduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Broad Course Classification</th>
<th>Course Group/ Category</th>
<th>Course Description</th>
</tr>
</thead>
</table>

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<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BSC</td>
<td>Basic Science Courses</td>
<td>Basic Science Courses</td>
</tr>
<tr>
<td>2</td>
<td>ESC</td>
<td>Engineering Science Courses</td>
<td>Includes Engineering subjects</td>
</tr>
<tr>
<td>3</td>
<td>HSMC</td>
<td>Humanities and Social sciences</td>
<td>Includes Management courses</td>
</tr>
<tr>
<td>4</td>
<td>PCC</td>
<td>Professional Core Courses</td>
<td>Includes core subjects related to the parent discipline/ department/ branch of Engineering.</td>
</tr>
<tr>
<td>5</td>
<td>PEC</td>
<td>Professional Elective Courses</td>
<td>Includes elective subjects related to the parent discipline/ department/ branch of Engineering.</td>
</tr>
<tr>
<td>6</td>
<td>OEC</td>
<td>Open Elective Courses</td>
<td>Electives from other technical and/or emerging subjects</td>
</tr>
<tr>
<td>7</td>
<td>LC</td>
<td>Laboratory Courses</td>
<td>Laboratory Courses</td>
</tr>
<tr>
<td>8</td>
<td>MC</td>
<td>Mandatory Courses</td>
<td>Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge</td>
</tr>
<tr>
<td>9</td>
<td>PROJ</td>
<td>Project Work</td>
<td>Project work, seminar and internship in industry or elsewhere</td>
</tr>
</tbody>
</table>

5. **Award of B. Tech Degree:** A student will be declared eligible for the award of B. Tech Degree if he/she fulfills the following academic requirements:
   a) He/She pursues the course of study and completes it successfully in not less than four academic years and not more than eight academic years.
   b) A student has to register for all the 160 credits and secure all credits.
   c) A student, who fails to fulfill all the academic requirements for the award of the degree within eight academic years from the date of admission, shall forfeit his/her seat in B. Tech course.
   d) The Degree of B. Tech in Information Technology shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, on the students who are admitted to the programme and fulfill all the requirements for the award of the degree.

6. **Attendance Requirements**
   a) A student shall be eligible to appear for the semester-end examinations if he/she puts in a minimum of 75% of attendance in aggregate in all the courses concerned in the semester.
   b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.
   c) Students who have been granted condonation shall pay a fee as decided by the Academic Council.
   d) Shortage of Attendance more than 10% (attendance less than 65% in aggregate) shall in no case be condoned.
   e) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek reregistration for that semester when offered next with the academic regulations of the batch into which he/she gets re-registered.

7. **Paper Setting, Evaluation of Answer Scripts, Marks and Assessment**
a) Paper setting and evaluation of the answer scripts shall be done as per the procedures laid down by the Academic Council from time to time.

b) **Distribution and Weightage of marks**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Components</th>
<th>Internal</th>
<th>External</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Theory</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Practical</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Engineering Graphics</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Mini Project</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Project I</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>Project II</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

c) **Continuous Internal Evaluation and Semester End Examinations:** The assessment of the student’s performance in each course will be based on Continuous Internal Evaluation (CIE) and Semester-End Examination (SEE). The marks for each of the component of assessment are fixed as shown in the following Table.

**Assessment Procedure:**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Component of Assessment</th>
<th>Marks Allotted</th>
<th>Type of Assessment</th>
<th>Scheme of Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Theory</td>
<td>30</td>
<td>Internal Examination &amp; Continuous Evaluation</td>
<td>1) Two mid semester examination shall be conducted for 20 marks each for a duration of 2 hours. Average of the two mid exams shall be considered i) <strong>Subjective - 15 marks</strong> ii) <strong>Objective - 5 marks</strong> 2) <strong>Tutorials - 5 marks</strong> 3) <strong>Continuous Assessment – 5 marks</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Semester end examination</td>
<td>The semester-end examination is for a duration of 3 hours</td>
</tr>
<tr>
<td>2</td>
<td>Practical</td>
<td>30</td>
<td>Internal Examination &amp; Continuous Evaluation</td>
<td>i) <strong>Internal Exam-10 marks</strong> ii) <strong>Record - 5 marks</strong> iii) <strong>Continuous Assessment – 15 marks</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Semester end examination</td>
<td>The semester-end examination is for a duration of 3 hours</td>
</tr>
</tbody>
</table>

d) **Mini Project:** The Mini Project is to be taken up with relevance to Industry and is evaluated for 100 marks. Out of 100 marks, 30 marks are for internal evaluation and 70 marks are for external evaluation. The supervisor continuously assesses the students for 20 marks (Continuous Assessment – 15 marks, Report – 5 marks). At the end of the semester, Mini Project shall be displayed in the road show at the
e) Main Project Phase–I and Phase-II: The project work is evaluated for 100 marks. Out of 100, 30 marks shall be for internal evaluation and 70 marks for the external evaluation. The supervisor assesses the student for 20 marks (Continuous Assessment – 15 marks, Report –5 marks). At the end of the semester, projects shall be displayed in the road show at the department level for the benefit of all students and staff and the same is to be evaluated by the Project Review Committee for 10 marks. The external evaluation for Project Work is a Viva-Voce Examination which is conducted by the Project Review Committee in the presence of external examiner and is evaluated for 70 marks, Project Review Committee consists of HOD, Project Coordinator and Supervisor. These rules are applicable for both Project I and Project II.

f) Engineering Graphics:
   • Two internal examinations, each is of 10 marks. The average of the two internal tests shall be considered for the award of marks.
   • Submission of day to day work - 15 marks.
   • Continuous Assessment - 5 marks.

8. Recounting of Marks in the End Examination Answer Books: A student can request for recounting of his/her answer book on payment of a prescribed fee.

9. Re-evaluation of the End Examination Answer Books: A student can request for re-evaluation of his/her answer book on payment of a prescribed fee.

10. Supplementary Examinations: A student who has failed to secure the required credits can appear for a supplementary examination, as per the schedule announced by the College.

11. Malpractices in Examinations: Disciplinary action shall be taken in case of malpractices during Mid / End-examinations as per the rules framed by the Academic Council.

12. Academic Requirements and Promotion Rules:
   a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he/she secures not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end Examination taken together.
   b) A student shall be promoted to the next year only when he/she satisfies the requirements of all the previous semesters.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Promotion</th>
<th>Conditions to be fulfilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>First year first semester to first year second semester</td>
<td>Regular course of study of first year first semester.</td>
</tr>
</tbody>
</table>
| 2      | First year second semester to second year first semester | (i) Regular course of study of first year second semester.  
          (ii) Must have secured at least 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not. |
3  Second year first semester to second year second semester  Regular course of study of second year first semester.

4  Second year second semester to third year first semester  (i) Regular course of study of second year second semester  (ii) Must have secured at least 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

5  Third year first semester to third year second semester  Regular course of study of third year first semester.

6  Third year second semester to fourth year first semester  (i) Regular course of study of third year second semester  (ii) Must have secured at least 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

7  Fourth year first semester to fourth year second semester  Regular course of study of fourth year first semester.

Grade Points: A 10 - point grading system with corresponding letter grades and percentage of marks, as given below, is followed

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade Point</th>
<th>Percentage of marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>O (Outstanding)</td>
<td>10</td>
<td>Marks &gt;= 90</td>
</tr>
<tr>
<td>A+ (Excellent)</td>
<td>9</td>
<td>Marks &gt;= 80 and Marks &lt; 90</td>
</tr>
<tr>
<td>A (Very Good)</td>
<td>8</td>
<td>Marks &gt;= 70 and Marks &lt; 80</td>
</tr>
<tr>
<td>B+ (Good)</td>
<td>7</td>
<td>Marks &gt;= 60 and Marks &lt; 70</td>
</tr>
<tr>
<td>B (Average)</td>
<td>6</td>
<td>Marks &gt;= 50 and Marks &lt; 60</td>
</tr>
<tr>
<td>C (Pass)</td>
<td>5</td>
<td>Marks &gt;= 40 and Marks &lt; 50</td>
</tr>
<tr>
<td>F (Fail)</td>
<td>0</td>
<td>Marks &lt; 40</td>
</tr>
<tr>
<td>Ab (Absent)</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Earning of Credit:
A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-P. Letter grade ‘F’ in any Course implies failure of the student in that course and no credits earned.

Computation of SGPA and CGPA:
The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) \( S_k \), the SGPA of \( k^{th} \) semester (1 to 8) is the ratio of sum of the product of the number of credits and grade points to the total credits of all courses registered by a student, i.e.,

\[
SGPA (S_k) = \frac{\sum_{i=1}^{n_k} (Ci \times Gi)}{\sum_{i=1}^{n_k} Ci}
\]
Where $C_i$ is the number of credits of the $i^{th}$ course and $G_i$ is the grade point scored by the student in the $i^{th}$ course and $n$ is the number of courses registered in that semester.

ii) The CGPA is calculated in the same manner taking into account all the courses $m$, registered by student over all the semesters of a programme, i.e., upto and inclusive of $S_k$, where $k \geq 2$.

$$\text{CGPA} = \frac{\sum_{i=1}^{m}(C_i \times G_i)}{\sum_{i=1}^{m}C_i}$$

iii) The SGPA and CGPA shall be rounded off to 2 decimal points.

14. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes based on CGPA secured from the 160 credits.

<table>
<thead>
<tr>
<th>Class Awarded</th>
<th>CGPA Secured</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1 First Class With Distinction</td>
<td>CGPA $\geq$ 8.00 with no F or below grade/detention anytime during the programme</td>
</tr>
<tr>
<td>14.2 First Class</td>
<td>CGPA $\geq$ 8.00 with rest of the clauses of 14.1 not satisfied</td>
</tr>
<tr>
<td>14.3 First Class</td>
<td>CGPA $\geq$ 6.50 and CGPA &lt; 8.00</td>
</tr>
<tr>
<td>14.4 Second Class</td>
<td>CGPA $\geq$ 5.50 and CGPA &lt; 6.50</td>
</tr>
<tr>
<td>14.5 Pass Class</td>
<td>CGPA $\geq$ 5.00 and CGPA &lt; 5.50</td>
</tr>
</tbody>
</table>

15. **Withholding of Results:** If the student has not paid dues to the Institute/University, or if any case of indiscipline is pending against the student, the result of the student (for that Semester) may be withheld and the student will not be allowed to go into the next semester. The award or issue of the Degree may also be withheld in such cases.

16. **Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/Universities:** Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/Universities shall be considered only on case-to-case basis by the Academic Council of the Institute.

17. **Transitory Regulations:** Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the Degree Programme, may be considered eligible for readmission/re-registration to the same or equivalent subjects as and when they are offered.

18. **General Rules**

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

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

   c) In case of any error in the above rules and regulations, the decision of the Academic Council is final.

   d) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.
Academic Regulations for B.Tech (Lateral Entry) under GR18
(Applicable for Batches Admitted from 2019-2020)

1. All regulations as applicable for B.Tech Four year degree programme (Regular) will hold good for B.Tech (Lateral Entry Scheme) except for the following rules
   a) Pursued programme of study for not less than three academic years and not more than six academic years.
   b) A student should register for all 123 credits and secure all credits. The marks obtained in all 123 credits shall be considered for the calculation of the final CGPA.
   c) Students who fail to fulfil all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech programme.

2. Academic Requirements and Promotion Rules:
   a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he/she secures not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end Examination taken together.
   b) A student shall be promoted to the next year only when he/she satisfies the requirements of all the previous semesters.
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Promotion</th>
<th>Conditions to be fulfilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Second year first semester to second year second semester.</td>
<td>Regular course of study of second year first semester.</td>
</tr>
<tr>
<td>2</td>
<td>Second year second semester to third year first semester.</td>
<td>(i) Regular course of study of second year second semester.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii) Must have secured at least 50% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.</td>
</tr>
<tr>
<td>3</td>
<td>Third year first semester to third year second semester.</td>
<td>Regular course of study of third year first semester.</td>
</tr>
<tr>
<td>4</td>
<td>Third year second semester to fourth year first semester.</td>
<td>(i) Regular course of study of third year second semester.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii) Must have secured at least 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.</td>
</tr>
<tr>
<td>5</td>
<td>Fourth year first semester to fourth year second semester.</td>
<td>Regular course of study of fourth year first semester.</td>
</tr>
</tbody>
</table>

3. Award of Class: After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes based on CGPA secured from the 123 credits.

<table>
<thead>
<tr>
<th>Class Awarded</th>
<th>CGPA Secured</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 First Class With Distinction</td>
<td>CGPA &gt;= 8.00 with no F or below grade/detention anytime during the programme</td>
</tr>
<tr>
<td>3.2 First Class</td>
<td>CGPA &gt;= 8.00 with rest of the clauses of 3.1 not satisfied</td>
</tr>
<tr>
<td>3.3 First Class</td>
<td>CGPA ≥ 6.50 and CGPA &lt; 8.00</td>
</tr>
<tr>
<td>3.4 Second Class</td>
<td>CGPA ≥ 5.50 and CGPA &lt; 6.50</td>
</tr>
<tr>
<td>3.5 Pass Class</td>
<td>CGPA ≥ 5.00 and CGPA &lt; 5.50</td>
</tr>
<tr>
<td>S.NO.</td>
<td>Course Codes</td>
</tr>
<tr>
<td>-------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>GR18A1001</td>
</tr>
<tr>
<td>2</td>
<td>GR18A1005</td>
</tr>
<tr>
<td>3</td>
<td>GR18A1008</td>
</tr>
<tr>
<td>4</td>
<td>GR18A1006</td>
</tr>
<tr>
<td>5</td>
<td>GR18A1013</td>
</tr>
<tr>
<td>6</td>
<td>GR18A1016</td>
</tr>
<tr>
<td>7</td>
<td>GR18A1014</td>
</tr>
<tr>
<td>8</td>
<td>GR18A1017</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total** | **12** | **2** | **10** | **24** | **19** | **240** | **560** | **800** |
### I YEAR II SEMESTER

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Course Code</th>
<th>COURSE</th>
<th>Hours</th>
<th>Total Hours</th>
<th>Total Credits</th>
<th>Int</th>
<th>Ext</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GR18A1002</td>
<td>Differential Equations and Vector Calculus</td>
<td>3 1 0</td>
<td>4</td>
<td>4</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>GR18A1003</td>
<td>Applied Physics</td>
<td>3 1 0</td>
<td>4</td>
<td>4</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>GR18A1007</td>
<td>Programming for Problem Solving</td>
<td>3 1 0</td>
<td>4</td>
<td>4</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>GR18A1010</td>
<td>Engineering Graphics</td>
<td>1 0 4</td>
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<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>GR18A1011</td>
<td>Applied Physics Lab</td>
<td>0 0 3</td>
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<td>1.5</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>GR18A1015</td>
<td>Programming for Problem Solving Lab</td>
<td>0 0 3</td>
<td>3</td>
<td>1.5</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>10 3 10</td>
<td>23</td>
<td>18</td>
<td>18</td>
<td>0</td>
<td>420</td>
</tr>
</tbody>
</table>

### II YEAR I SEMESTER

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Course Code</th>
<th>COURSE</th>
<th>Hours</th>
<th>Total Hours</th>
<th>Total Credits</th>
<th>Int</th>
<th>Ext</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GR18A2065</td>
<td>Digital Logic Design</td>
<td>3 0 0</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
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<td>2</td>
<td>GR18A2066</td>
<td>Data Structures</td>
<td>3 0 0</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>GR18A2005</td>
<td>Probability &amp; Statistics</td>
<td>3 0 0</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>GR18A2068</td>
<td>Database Management Systems</td>
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### II YEAR II SEMESTER

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### III YEAR I SEMESTER

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**Total** | 15 | 1 | 11 | 27 | 21.5 | 240 | 560 | 800 |

### III YEAR II SEMESTER

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### Professional Electives

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<th>Programming</th>
<th>Data Science and Machine Learning</th>
<th>Applications and Networking</th>
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<td>Advanced Computer Architecture</td>
<td>Principles of Programming Languages</td>
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<th>Advanced Operating Systems</th>
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<th>Professional Elective 4 (IV-I)</th>
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<th>Software Project Management</th>
<th>Middleware Technologies</th>
<th>Speech and Natural Language Processing</th>
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### OPEN ELECTIVES – 2 THREADS

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<td>3. Java Programming</td>
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<td>IT: 1. Multimedia and Application Development</td>
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**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**LINEAR ALGEBRA AND DIFFERENTIAL CALCULUS**

Course code: GR18A1001  
L/T/P/C: 3/1/0/4

**Course Objectives:** To provide the student with

- The ideas of linearity and linear systems, which lie at the core of many engineering concepts
- The concept of latent values of a matrix which is critical in many engineering applications
- The ideas of function approximation using the tools of mean value theorems
- The skill of using a definite integral for various geometrical applications
- The skill of finding the optimal values of multi-variable functions

**Course Outcomes:** After learning the contents of this paper the student must be able to

- Compute the rank of a matrix to determine the existence of solutions of a linear algebraic system
- Determine the eigenvalues and eigenvectors of a square matrix which arise in several engineering applications
- Determine approximate solution of over determined systems using the pseudo inverse
- Apply the definite integral for various computational problems in geometry and Evaluate some improper integrals using special functions
- Develop the skill of determining optimal values of multivariable functions using classical methods

**Unit I: VECTOR AND MATRIX ALGEBRA**

Vector space (definition and examples), linear independence of vectors, orthogonality of vectors, projection of vectors, Gram-Schmidt orthonormalization of vectors, Symmetric, Hermitian, skew-symmetric, skew-Hermitian, orthogonal and UNIT-ary matrices; Rank of a matrix by echelon reduction, Solution of a linear algebraic system of equations (homogeneous and non-homogeneous).
Unit II: MATRIX EIGENVALUE PROBLEM AND QUADRATIC FORMS
Determination of eigenvalues and eigenvectors of a matrix, properties of eigenvalues and eigenvectors (without proof), diagonalization of a matrix, orthogonal diagonalization of symmetric matrices, Similarity of matrices, Quadratic Forms: Definiteness and nature of a quadratic form, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit III: MATRIX DECOMPOSITION AND PSEUDO INVERSE OF A MATRIX
Spectral decomposition of a symmetric matrix, L-U decomposition, Q-R factorization, Singular value decomposition, Moore-Penrose pseudo inverse of a matrix, least squares solution of an over determined system of equations using pseudo inverse.

Unit IV: SINGLE VARIABLE CALCULUS
Mean value theorems: Rolle’s theorem, Lagrange’s Mean value theorem and Taylor’s theorem (without proof), their geometrical interpretation and applications, approximation of a function by Taylor’s series, Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (only in Cartesian coordinates), Evaluation of improper integral using Beta and Gamma functions.

Unit V: MULTIVARIABLE DIFFERENTIAL CALCULUS AND FUNCTION OPTIMIZATION
Partial Differentiation: Total derivative; Jacobian; Functional dependence, unconstrained optimization of functions using the Hessian matrix, constrained optimization using Lagrange multiplier method

Text/Reference Books:

2. Fourth edition 2014
Course Objectives:

- To relate how the basic concepts and principles of chemistry can be applied to practical utility in a broader perspective of the society.
- To distinguish the ranges of electromagnetic spectrum and its interaction with matter and to develop knowledge of various spectroscopic techniques at atomic and molecular levels.
- To identify and apply various principles of electrochemistry, corrosion and water treatment which are essential for an engineer in industry.
- To acquire knowledge of existence of different organic molecules in different stereo chemical orientations useful for understanding reaction path ways.
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.

Course Outcomes:

- Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Relate electromagnetic spectra used for exciting different molecular energy levels in various spectroscopic techniques and their application in medicine and other fields.
- Recognize various problems related to electro chemistry and corrosion in industry and is able to explain different prevention techniques and apply concepts of chemistry in Engineering.
- Know the origin of different types of engineering materials used in modern technology and Interpret different problems involved in industrial utilization of water.
- Understand the processing of fossil fuels for the effective utilization of chemical energy.

Unit I: ATOMIC AND MOLECULAR STRUCTURE

Atomic and molecular orbitals, Linear Combination of Atomic Orbitals (LCAO), Molecular orbitals of homo-nuclear diatomic molecules, MO energy diagrams of N₂ and O₂.

Metallic bonding, Valence Bond Theory, Crystal Field Theory, Crystal Field Splitting of transition metal ion d-orbitals in tetrahedral, octahedral, and square planar geometries.

Unit II: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Vibrational Spectroscopy: The vibrating diatomic molecule, simple and anharmonic oscillators of a diatomic molecule, selection rules, applications of IR spectroscopy.


**Unit III: ELECTROCHEMISTRY AND CORROSION**


Corrosion: Definition, causes and effects of corrosion, Theories of chemical and electro chemical corrosion with mechanism, Types of corrosion - Galvanic, concentration cell and pitting corrosions, factors affecting corrosion (Nature of metal & Nature of Environment), corrosion control methods: Proper designing, cathodic protection (sacrificial anodic and impressed current cathodic protection), Metallic coatings: Hot dipping- Galvanization and tinning, electroplating, electroless plating of nickel.

**Unit IV: ENGINEERING MATERIALS AND WATER TECHNOLOGY**

Semiconductors: Si and Ge, preparation, purification and crystal growth by zone refining and Czochralski pulling methods, doping.


Water: impurities, hardness- causes of hardness, types, Units. Boiler troubles- scales and sludges, caustic embrittlement, water purification by reverse osmosis (RO) method.

**Unit V: STEREOCHEMISTRY AND ENERGY RESOURCES**

Stereo chemistry: Structural isomers and stereoisomers, representations of 3D structures, configurations and symmetry, chirality, enantiomers, diastereomers, optical activity, conformational analysis of n-butane. Structure, synthesis and pharmaceutical applications of paracetamol and aspirin.


**Text/Reference Books:**


GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
BASIC ELECTRICAL ENGINEERING

Course Code: GR18A1008
L/ T/ P/ C: 3/0/0/3

Course Objectives:
- To introduce the fundamentals of Electrical Engineering.
- To Solve problems in AC circuits.
- To provide foundation in theory and applications of Transformers and DC machines
- Understand the basic principles of AC Electrical machinery and their applications.
- To import the knowledge of Electrical Installations.

Course Outcomes:
- To understand and analyze basic electric circuits with suitable theorems.
- To solve 1-phase and 3-phase balanced sinusoidal systems.
- To interpret the working principle of Electrical machines.
- To appraise the applications of Induction motors and synchronous generators used in Industries.
- To identify the components of Low Voltage Electrical Installations.

Unit I: D.C. CIRCUITS


Time-domain analysis of first-order RL and RC circuits.

Unit II: A.C. CIRCUITS

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series RL-C circuit.

Three-phase balanced circuits, voltage and current relations in star and delta connections.

Unit III: TRANSFORMERS

Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Unit IV: ELECTRICAL MACHINES

Unit V: ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Text/Reference Books:

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objectives: The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.
- Understand the importance of defining, classifying and practice the unique qualities of professional writing style.
- Employ the acquired knowledge in classroom with reference to various social and professional spheres thus leading to a life-long learning process.

Course Outcomes: Students should be able to

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultures.
- Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively by listening carefully and respect others point of view.
Unit I:

‘The Raman Effect’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes. Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions. Reading: Reading and Its Importance- Techniques for Effective Reading.


Unit II:

LETTER WRITING

Vocabulary: Synonyms and Antonyms. Use of phrases for formal and informal letter writing. Eg., I would like to apply, I regret to inform, This is to bring to your kind notice... etc. Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement. Reading: Improving Comprehension Skills – Techniques for Good Comprehension, Read a letter Writing: Format of a Formal Letter-Writing Formal Letters E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume. Reorganising of sentences /paragraphs in a letter.

Unit III:

‘Blue Jeans’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives- Words from Foreign Languages and their Use in English. Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses. Reading: Sub-skills of Reading- Skimming and Scanning Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying - Providing Examples or Evidence

Unit IV:

‘What Should You Be Eating’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English Grammar: Redundancies and Clichés in Oral and Written Communication.
Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

Unit V:


Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice


Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Text/Reference Books:


GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING CHEMISTRY LAB

Course code: GR18A1013 L/T/P/C: 0/0/3/1.5

Course Objectives:
• Introduce practical applications of chemistry concepts to engineering problems.
• To determine the rate constant of reactions from concentrations as a function of time.
• Measure the molecular or ionic properties such as conductance, redox potentials
• Synthesize a drug molecule to learn how organic compounds are prepared in industry.
• Know the laboratory practices implemented in a research and industrial chemistry laboratory setting.

Course Outcomes:

• Ability to perform experiments illustrating the principles of chemistry relevant to the study of science and engineering.
• Determination of parameters like hardness and chloride content in water.
• Understand the kinetics of a reaction from a change in concentrations of reactants or products as a function of time.
• Synthesize a drug molecule as an example of organic synthesis methods widely used in industry.
• Determination of physical properties like adsorption and viscosity.

TASK 1: Determination total hardness of water by complexometric method using EDTA.

TASK 2: Determination of chloride content of water by Argentometry.

TASK 3: Redox titration: Estimation of ferrous iron using standard KMnO₄

TASK 4: Estimation of HCl by Conductometric titrations

TASK 5: Estimation of Acetic acid by Conductometric titrations

TASK 6: Estimation of Ferrous iron by Potentiometry using dichromate

TASK 7: Determination of rate constant of acid catalyzed reaction of methyl acetate

TASK 8: Determination of acid value of coconut oil.

TASK 9: Adsorption of acetic acid by charcoal

TASK 10: Determination of surface tension of liquid by using stalagmometer

TASK 11: Determination of viscosity of liquid by using Ostwald’s viscometer.

TASK 12: Determination of partition coefficient of acetic acid between n-butanol and water.

TASK 13: Synthesis of Aspirin

TASK 14: Synthesis of Paracetamol.

Text/Reference Books:

2. Senior Practical Physical Chemistry, B.D. Khosala, A. Gulati and V. Garg (R. Chand & Co., Delhi)
Course Objectives:

- To introduce the use of measuring instruments.
- To analyze a given network by applying various electrical laws
- To calculate, measure and know the relation between basic electrical parameters.
- To know the response of electrical circuits for different excitations
• To summarize the performance characteristics of electrical machines.

Course Outcomes:
• Get an exposure to common electrical components and their ratings.
• Get an exposure to basic electrical laws.
• Understand the measurement, calculation and relation between the basic electrical parameters
• Understand the response of different types of electrical circuits to different excitations.
• Compare the basic characteristics of Electrical machines

TASK 1: Verification of Ohms Law
TASK 2: Verification of KVL and KCL
TASK 3: Transient Response of Series RL and RC circuits using DC excitation
TASK 4: Transient Response of RLC Series circuit using DC excitation
TASK 5: Resonance in series RLC circuit
TASK 6: Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
TASK 7: Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
TASK 8: Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
TASK 9: Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
TASK 10: Measurement of Active and Reactive Power in a balanced Three-phase circuit
TASK 11: Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
TASK 12: Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
TASK 13: Performance Characteristics of a Three-phase Induction Motor
TASK 14: Torque-Speed Characteristics of a Three-phase Induction Motor
TASK 15: No-Load Characteristics of a Three-phase Alternator

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Course code: GR18A1014  L/T/P/C: 0/0/2/1

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

Course Objectives:
• To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
• To sensitize students to the nuances of English speech sounds, word accent, intonation, rhythm and Neutralization of accent for intelligibility
To bring about a consistent accent and intelligibility in students’ pronunciation of English by providing an opportunity for practice in speaking

To improve the fluency of students in spoken English and neutralize their mother tongue influence

To train students to use language appropriately for public speaking and interviews

Course Outcomes:

- Interpret the role and importance of various forms of communication skills.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively by listening carefully and respect others point of view.
- Utilize various media of verbal and non-verbal communication with reference to various professional contexts.
- Recognise the need to work in teams with appropriate ethical, social and professional responsibilities.
- Evaluate and use a neutral and correct form of English.

English Language and Communication Skills Lab (ELCS) shall have two parts:

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

Listening Skills Objectives:
1. To enable students develop their listening skills so that they may appreciate its 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

- Listening for general content
- Listening for specific information

Speaking Skills Objectives:
- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice: Just A Minute (JAM) Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

ICS Lab:

**Understand:** Communication at Work Place - Spoken vs. Written language.

**Practice:** Ice-Breaking Activity and JAM Session - Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

**Exercise – II**

CALL Lab:

**Understand:** Structure of Syllables – Word Stress and Rhythm – Weak Forms and Strong Forms in Context.

**Practice:** Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

**Understand:** Features of Good Conversation – Non-verbal Communication.

**Practice:** Situational Dialogues – Role-Play- Expressions in Various Situations – Making Requests and Seeking Permissions - Telephone Etiquette.

**Exercise-III:**

CALL Lab:

**Understand:** Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

**Practice:** Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

**Understand:** How to make Formal Presentations.

**Practice:** Formal Presentations.

**Exercise – IV:**

CALL Lab:

**Understand:** Listening for General Details.

**Practice:** Listening Comprehension Tests.

ICS Lab:

**Understand:** Public Speaking – Exposure to Structured Talks.

**Practice:** Making a Short Speech – Extempore.

**Exercise – V:**

CALL Lab:

**Understand:** Listening for Specific Details.
Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.

Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab

Computer systems, headphones and English language learning software for self-study by students.

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs, audio-visual aids with a Podium, LCD and a projector.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING WORKSHOP

Course Code: GR18A1017  L/T/P/C: 1/0/1.5/2.5

Course Objectives:

- To prepare and practice of scientific principles underlying the art of manufacturing in workshop/manufacturing practices.
- To Demonstrate basic knowledge of various tools and their use in different sections.
- To make students to execute applications of various tools in carpentry.
- To make students recognize applications of manufacturing methods casting, forming machining, joining and advanced manufacturing methods.
- To develop generate safety rules, safe practices and workshop dress code.

Course Outcomes:

- Develop various trades applicable to industries / Manufacturing practices.
- Create Hands on experience for common trades.
- Improve to fabricate components with their own hands.
• Develop practical knowledge on the dimensional accuracies and dimensional tolerances possible with various manufacturing processes
• To build the requirement of quality of work life on safety and organizational needs.

1. TRADES FOR EXERCISES: At least two exercises from each trade:
   i. Carpentry
   ii. Fitting Shop
   iii. Tin-Smithy
   iv. Casting
   v. Welding Practice
   vi. House-wiring
   vii. Black Smithy

2. VIDEO LECTURES: Carpentry, Fitting operations, Tin-Smithy, Casting, Welding, Electrical and Electronics, Black Smithy, Plumbing, Power tools in construction and Wood Working, Manufacturing Methods,

Text/ Reference Books:
   1. Workshop Practice /B. L. Juneja / Cengage
   4. Workshop Manual / Venkat Reddy/ BSP

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
Differential Equations and Vector Calculus
Course Code: GR18A1002 L/T/P/C: 3/1/0/4

Course Objectives: To provide the student with

• The knowledge to visualize solutions to engineering problems governed by differential equations
• The skill of evaluating multiple integrals needed for applications in mechanics and electro-magnetic field theory
• The knowledge to visualize the functions arising in vector field theory and use mathematical tools for some computations
• The skill of calculating work done by a field and flux across a surface
• The skill of using specialized theorems for fast computation of work and flux

Course Outcomes: After learning the contents of this paper the student must be able to

• Classify the differential equations of first order and solve them analytically by suggested methods
• Solve linear differential equations of higher order under various forcing functions
• Evaluate double and triple integrals and apply them to some problems in geometry and mechanics
• Perform vector differential operations on scalar and vector fields and apply them to solve some field related problems
• Apply classical vector integral theorems for fast computation of work done around closed curves and flux across closed surfaces

Unit I: FIRST ORDER ODE


Unit II: ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER

LDE with constant coefficients: Complementary function, over damping, under damping and critical damping of a system. Particular integrals for \( f(x) \) of the form \( e^{ax}, x^n, \cos ax, \sin ax \), \( e^{ax}V(x) \) and \( xV(x) \) where \( V(x) \equiv \cos ax \) and \( \sin ax \), the method of variation of parameters
LDE with variable coefficients: Cauchy’s homogeneous equation, Legendre’s homogeneous equations

Unit III: MULTIPLE INTEGRALS

Double integrals: Evaluation of Double Integrals, change of order of integration (only Cartesian form), change of variables (Cartesian and polar coordinates)

Triple Integrals: Evaluation of triple integrals, Change of variables (Cartesian to Spherical and Cylindrical polar coordinates)

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelepipeds

Unit IV: VECTOR DIFFERENTIATION AND LINE INTEGRATION

Vector differentiation: Scalar and vector point functions, Concepts of gradient, divergence and curl of functions in cartesian framework, solenoidal fields, irrotational fields, potentials

Vector line integration: Evaluation of the line integral, concept of work done by a force field, Conservative fields

Unit V: SURFACE INTEGRATION AND VECTOR INTEGRAL THEOREMS

Surface integration: Evaluation of surface and volume integrals, flux across a surface

Vector integral theorems: Green’s, Gauss and Stokes theorems (without proofs) and their applications

Text/Reference Books:
GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

APPLIED PHYSICS

Course Code: GR18A1003
L/T/P/C: 3/1/0/4

Course Objectives: At the end of the course the student is expected to

- Demonstrate skills in scientific inquiry and problem-solving techniques.
- Identify the role of quantum mechanics and its applications on physical system.
- Summarize the use of semiconductors and optoelectronics devices.
- Interpret the properties of Laser light and its uses in optical fiber communication.
- Outline the properties of electric and magnetic materials.

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

- Outline the development of quantum mechanics and solve Schrodinger equation for simple potentials.
- Demonstrate the operation mechanism of electronic devices such as transistors and diodes.
- Explain the development and applications of optoelectronic devices.
- Analyze the properties of Laser and its propagation in optical fibers.
- Evaluate the properties of dielectric and magnetic materials for various applications

Unit I: QUANTUM MECHANICS

Introduction to quantum physics, Black body radiation, Planck’s law, photoelectric effect Compton effect, wave-particle duality, de Broglie hypothesis, Davisson and Germer experiment, Heisenberg’s
uncertainty principle, Born’s interpretation of the wave function, Schrodinger’s time independent wave equation, particle in one dimensional box, potential barrier.

Unit II: SEMICONDUCTOR PHYSICS


Unit III: OPTOELECTRONICS


Unit IV: LASERS AND FIBER OPTICS


Unit V: DIELECTRIC AND MAGNETIC PROPERTIES OF MATERIALS


Text/ References Books:

4. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand.
6. Richard Robinett, Quantum Mechanics
10. Online Course: “Optoelectronic Materials and Devices” by Monica Katiyar and Deepak Gupthaon NPTEL

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PROGRAMMING FOR PROBLEM SOLVING

Course Code: GR18A1007  L/T/P/C: 3/1/0/4

Prerequisite: Knowledge of Mathematics required.

Course Objectives:
- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes:
The Student will learn:
- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.

Unit I: INTRODUCTION TO PROGRAMMING

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program, Number systems

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators
Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O.

Unit II: ARRAYS, STRINGS, STRUCTURES AND POINTERS

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures.

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

Unit III: PREPROCESSOR AND FILE HANDLING IN C

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef
Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions. Introduction to stdin, stdout and stderr.

Unit IV: FUNCTION AND DYNAMIC MEMORY ALLOCATION

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series, Limitations of Recursive functions

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

Unit V: INTRODUCTION TO ALGORITHMS

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

Text/Reference Books:

4. Hall of India
5. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
Course Objectives:

- Provide basic conventions and standards used in Engineering Graphics
- Impart knowledge on various Engineering curves and their significance
- To draw orthographic, sectional and pictorial views of a given solid.
- To develop skills in three-dimensional visualization of engineering components
- To inculcate CAD packages on modelling and drafting

Course Outcomes:

- Familiarize with BIS standards and conventions used in engineering graphics.
- Draw various engineering curves e.g. ellipse, parabola, cycloids and involutes etc and construct various reduced scales e.g. plain, diagonal and vernier scales
- Differentiate between first angle and third angle methods of projection and distinguish parallel and perspective projection.
- Visualize different views like elevation and plan for a given line, plane figures or solid objects.
- Apply drafting techniques and use 2D software e.g. AutoCAD to sketch 2D plane figures.

Unit I: INTRODUCTION TO ENGINEERING DRAWING


Unit II: ORTHOGRAPHIC PROJECTIONS


Unit III: PROJECTIONS OF REGULAR SOLIDS
Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

**Unit IV: DEVELOPMENT OF SURFACES OF RIGHT REGULAR SOLIDS**
Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

**Unit V: ISOMETRIC PROJECTIONS**

**Introduction to CAD: (For Internal Evaluation Weightage only)**: Introduction to CAD Software Package Commands. - Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

**Text /Reference Books:**
1. Engineering Drawing by N.D. Bhatt/Charotar
2. Engineering Drawing/ N.S.Parthasarathy and Vela Murali/Oxford
Course Code: GR18A1011  

Course Objectives: At the end of the course the student is expected to

- Compare and tabulate the characteristics of Solar cells, LED and Laser sources.
- Analyze the behavior of semiconductors in various aspects.
- Apply the theoretical concepts of optical fibers in practical applications.
- Recall the basic concepts of LCR and RC circuits through hands on experience.
- Analyze the behavioral aspects of electric and magnetic fields.

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

- Compare the behavior of p-n junction diode, Solar cells and LED.
- Analyze the behavior of magnetic and electric fields with the help of graphs.
- Determine the work function of a material through photoelectric effect.
- Assess the characteristics of Lasers and infer the losses in optical fibers.
- Estimate the time constant of RC circuit and resonance phenomenon in LCR circuit.

TASK 1. Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.

TASK 2. Solar Cell: To study the V-I Characteristics of solar cell.

TASK 3. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.

TASK 4. Stewart – Gee’s experiment: Determination of magnetic field along the axis of a current carrying coil.

TASK 5. Hall effect: To determine Hall co-efficient of a given semiconductor.

TASK 6. Photoelectric effect: To determine work function of a given material.

TASK 7. LASER: To study the characteristics of LASER sources.

TASK 8. Optical fiber: To determine the bending losses of Optical fibers.

TASK 9. LCR Circuit: To determine the Quality factor of LCR Circuit.

TASK 10. R-C Circuit: To determine the time constant of R-C circuit.

Note: Any 8 experiments are to be performed
GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMING FOR PROBLEM SOLVING LAB

Course Code: GR18A1015 L/T/P/C: 0/0/3/1.5

Prerequisite: Basic operations of computer and knowledge of mathematics

Laboratory Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyse the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept and to create, read from and write to text and binary files.

Laboratory Outcomes: The candidate is expected to be able to:

- formulate the algorithms for simple problems and translate given algorithms to a working and correct program.
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures and use pointers of different types
- create, read and write to and from simple text and binary files and modularize the code with functions so that they can be reused

Task 1: (Practice sessions)

a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input.

b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Task 2: (Simple numeric problems)

a. Write a program for finding the max and min from the three numbers.

b. Write the program for the simple, compound interest.

c. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60%= Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.

Task 3: (Simple numeric problems)

a. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:

i. 5 x 1 = 5

ii. 5 x 2 = 10

iii. 5 x 3 = 15
b. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Task 4: (Expression Evaluation)

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula \( s = ut + \frac{1}{2}at^2 \) where \( u \) and \( a \) are the initial velocity in m/sec (= 0) and acceleration in m/sec\(^2\) (= 9.8 m/s\(^2\)).

b. 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)

c. Write a program that finds if a given number is a prime number

Task 5: (Expression Evaluation)

a. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

b. A 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.

c. Write a C program to generate all the prime numbers between 1 and \( n \), where \( n \) is a value supplied by the user.

Task 6: (Expression Evaluation)

a. Write a C program to find the roots of a Quadratic equation.

b. Write a C program to calculate the following, where \( x \) is a fractional value.
   \[
   1 - \frac{x}{2} + \frac{x^2}{4} - \frac{x^3}{6}
   \]

c. 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.

Task 7: (Arrays and Pointers and Functions)

a. Write a C program to find the minimum, maximum and average in an array of integers.

b. Write a function to compute mean, variance, Standard Deviation, sorting of \( n \) elements in single dimension array.

c. Write a C program that uses functions to perform the following:
   i. Addition of Two Matrices
   ii. Multiplication of Two Matrices
   iii. Transpose of a matrix

   with memory dynamically allocated for the new matrix as row and column counts may not be same.

Task 8: (Arrays and Pointers and Functions)

a. Write C programs that use both recursive and non-recursive functions
   i. To find the factorial of a given integer.
   ii. To find the GCD (greatest common divisor) of two given integers.
   iii. To find \( x^n \)

b. Write a program for reading elements using pointer into array and display the values using array.

c. Write a program for display values reverse order from array using pointer.

d. Write a program through pointer variable to sum of \( n \) elements from array.

Task 9: (Files)
a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.

**Task 10: (Files)**

a. Write a C program that does the following: It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using a to i function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function). The program should then read all 10 values and print them back.
b. 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).

**Task 11: (Strings)**

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. 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.

**Task 12: (Strings)**

a. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abeaba, etc.)
b. Write a C program that displays the position of a character ch in the string S or –1 if S doesn’t contain ch.
c. Write a C program to count the lines, words and characters in a given text.

**Task 13: (Miscellaneous)**

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
b. Write a C program to construct a pyramid of numbers as follows:

```
1  *  1  1  *
1 2  **  2 3  2 2  **
1 2 3  *** 4 5 6  3 3 3  ***
  4 4 4  **
   *
```

**Task 14: (Sorting and Searching)**

a. Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search method.
b. Write a C program that uses non-recursive function to search for a Key value in a given sorted list of integers using binary search method.
c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.

**Task 15: (Sorting and Searching)**
a. Write a C program that sorts the given array of integers using selection sort in descending order.
b. Write a C program that sorts the given array of integers using insertion sort in ascending order.
c. Write a C program that sorts a given array of names.

Text/Reference Books:

4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)

II Year I Semester

Course Objectives: The Objectives of this course is to provide the student:
- Comprehend different number systems including the binary system and Boolean algebraic principles.
- Create minimal realizations of single and multiple output Boolean functions;
- Design and analyze combinational circuits using medium scale integrated (MSI) components, including arithmetic logic units;
- Apply strategies for state minimization, state assignment, for the implementation of synchronous Finite State Machines
- Design of Combinational Programmable Logic Devices (CPLDs) like PROM, PAL, and PLA and develop HDL Models for Logic Circuits.

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

- Apply knowledge of fundamental Boolean principles and manipulation to design Logic Circuits.
- Apply various techniques of Boolean function simplification to create minimal expressions.
- Create combinational circuits for a specified behavior with minimal specification.
- Synthesize Sequential circuits with minimal states.
- Realize combinational circuitry using Combinational PLDs and develop & test HDL models of Logic Circuits.

**Unit I: BINARY SYSTEMS**

Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

**Boolean Algebra and Logic Gates:** Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits.

**Unit II: GATE-LEVEL MINIMIZATION**

The Map method, Four-variable map, Five-Variable map, Product of Sum’s simplifications, Don’t care conditions, NAND and NOR implementation, other two level implementations, Exclusive-OR Function.
**Unit III: Combinational Logic:** Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder - Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

**Unit IV: SYNCHRONOUS SEQUENTIAL LOGIC**
Sequential Circuits, Latches, Flip-Flops, Analysis of clocked sequential circuits, State Reduction and Assignment, Design Procedure.

**Registers and Counters:** Registers, shift registers, Ripple Counters, Synchronous Counters, other counters.

**Unit V: MEMORY AND PROGRAMMABLE LOGIC**
Introduction, Random Access Memory, Memory Decoding, Error Detection and Correction, Read Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

**Hardware Description Language:** Hardware Description Language, Definition, Structural Definition of HDL, HDL Models for Combinational circuits, HDL for Models for Sequential circuits.

**Text/Reference Books**

II Year I Semester

Course Objectives: The students will learn

- The basic concepts of Data structures.
- The techniques used to analyze the performance of various Searching and Sorting techniques.
- The various types of Linked lists over arrays.
- Basic concepts about stacks, queues, lists, trees and graphs.
- To write algorithms for solving problems with the help of fundamental data structures

Course Outcomes: Upon the successful completion of the course the students will be able to

- Implement searching techniques for a given problem.
- Write pseudo code for various sorting techniques.
- Implement various linear data structures and determine the time complexity.
- Understand the non-linear data structures like trees, graphs.
- Choose appropriate data structures to represent data items in real world problems

Unit I:

Searching: Linear Search and Binary Search Techniques and their complexity analysis.
Sorting: Quick Sort, Merge Sort.

Unit II:

Stacks and Queues: StackADT, operations, Applications of Stacks: Expression Conversion and Evaluation– corresponding algorithms and complexity analysis.
Queue ADT, Types of Queues: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

Unit III:

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion, Deletion; Linked representation of Stack and Queue.
Doubly linked list: operations and algorithmic analysis;
Circular Linked list: operations and algorithmic analysis.

Unit IV:

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded BinaryTree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees.
Unit V:

**B Tree:** Definition, Operations: Insertion, Searching and Deletion.

**Graph:** Basic Terminologies and Representations, Graph traversal algorithms: BFS and DFS

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**Text/Reference Books:**

II Year I Semester  Course objectives

On completion of this Course, the student shall be able to:

- State the fundamentals of Probability and Statistics.
- Describe the properties of random variables and distributions.
- Interpret the measures of central tendency, dispersion, and association.
- Distinguish between explanatory and response variables and analyze multi variable data using correlation and regression.
- Apply the tests of hypothesis.

Course Outcomes

The expected outcomes of the Course are:

- Estimate the chance of occurrence of various uncertain events in different random experiments with strong basics of probability.
- Compute and interpret descriptive statistics.
- Evaluate random processes which occur in engineering applications governed by the Binomial, Poisson, Multinomial, Exponential, Normal and Gamma distributions.
- Forecast the models using Regression Analysis.
- Apply Inferential Statistics to make predictions or judgments about the population from which the sample data is drawn.

Module 1: BASIC PROBABILITY AND RANDOM VARIABLES

Probability spaces, conditional probability, independence, Bayes' rule; Discrete random variables, Continuous random variables and their properties, Distribution functions and densities. Independent random variables, Sums of independent random variables; Expectation of Discrete and Continues Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.

Module 2: BASIC STATISTICS AND DISCRETE PROBABILITY DISTRIBUTIONS


Module 3: CONTINUOUS PROBABILITY DISTRIBUTIONS AND BIVARIATE DISTRIBUTIONS

Bivariate distributions and their properties, Distribution of sums and quotients, Conditional densities. Normal, Exponential and Gamma density functions, Evaluation of statistical parameters for Normal distribution.

Module 4: CURVE FITTING, CORRELATION AND REGRESSION

Curve fitting by the method of least squares- fitting of straight line, Second degree parabola, Exponential and Power curves.
Correlation (Karl Pearson’s Correlation coefficient and Spearman’s Rank correlation (Statements of their properties and problems) ), Regression (including Multiple regression with two independent random variables), (Statements of their properties and problems only).

Module 5: APPLIED STATISTICS

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.
Test for single mean, difference of means and correlation coefficient, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Text / References:

II Year I Semester

Course Objectives:

- To understand the different issues involved in the design and implementation of a database system.
- To understand Structured Query Language for manipulating the Data.
- To study the physical, conceptual and logical database designs
- To provide concepts of Transaction, Concurrency and Recovery Management Strategies of a DBMS
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

Course Outcomes:

- Identify the role of Database System Applications and the design issues related.
- Design the logical model for the applications and apply indexing techniques.
- Construct a Database Schema, manipulate data using a SQL.
- Can apply the Schema Refinement techniques for a database design for optimized access.
- For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.

Unit I: INTRODUCTION TO DATABASE AND SYSTEM ARCHITECTURE


Introduction to Database Design: ER Diagrams, Entities, Attributes and Entity sets, Relationships and Relationship set, Extended ER Features, Conceptual Design with the ER Model, Logical database Design.

Unit II: SQL:

Queries and Constraints: Form of Basic SQL Query, SQL Operators, Set Operators, Nested Queries, Aggregate Operators, NULL values, Integrity Constraints Over Relations, Joins, Introduction to View, Destroying / Altering Tables and Views, Cursors, Triggers and Active Databases.

Unit III: RELATIONAL MODEL

Introduction to Relational Model, Basic Structure, Database Schema, Keys, Relational Algebra and Relational Calculus.

Storage and Indexing: File Organizations and Indexing-Overview of Indexes, Types of Indexes, Index Data Structures, Tree structured Indexing, Hash based Indexing.
Unit IV: SCHEMA REFINEMENT AND NORMAL FORMS

Unit V: TRANSACTION MANAGEMENT
Transactions

Concurrency Control: Lock based Protocols, Timestamp based protocols


Text/Reference Books
3. “Introduction to Database Systems”, C.J.Date Pearson Education.
II Year I Semester

Course Objectives: The Objectives of this course is to provide the student:

- Use mathematically correct terminology and notation.
- Construct correct direct and indirect proofs.
- Use division into cases in a proof.
- Use counterexamples.
- Apply logical reasoning to solve a variety of problems.

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

- For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
- For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference
- For a given a mathematical problem, classify its algebraic structure
- Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
- Develop the given problem as graph networks and solve with techniques of graph theory.

Unit I: MATHEMATICAL LOGIC
Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.


Unit II: SET THEORY
Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram.


Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups’ homomorphism, Isomorphism.

Unit III: ELEMENTARY COMBINATORY

Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.
Unit IV: RECURRENCE RELATION

Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, solving recurrence relation by substitution and Generating funds. Characteristics roots solution of in homogeneous Recurrence Relation.

Unit V: GRAPH THEORY

Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Text / Reference Books:

2. Discrete Mathematical Structures with applications to computer science Trembly J.P. & Manohar P. TMH
5. Discrete Mathematics with Applications, Thomas Koshy, Elsevier
II Year I Semester

Course Objectives: The Objective of this course is to provide the student

- Introduction to digital fundamental techniques and process in logic design
- Visualization of digital combinational circuits using VHDL
- Skill of seeing the equations and code developments in design of digital logic circuits
- To understand the concept of VHDL fundamentals
- To understand the counters and registers design with VHDL programming

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

- Comprehend the fundamentals digital theory to enable the process of logical design
- Analyze the concept of design of digital combinational circuits using VHDL programming
- Know the origin of sequential circuits design using VHDL
- Acquaint with binary to grey and parity checker
- Discriminate in digital counters and registers

LIST OF EXPERIMENTS

1. DESIGN AND SIMULATION OF COMBINATIONAL CIRCUITS USING VHDL

Experiment 1: Realization of Gates
Experiment 2: Half adder, Full adder
Experiment 3: Magnitude comparator
Experiment 4: Decoder
Experiment 5: Multiplexer
Experiment 6: Demultiplexer
Experiment 7: Binary to Grey Code Converter
Experiment 8: Parity Checker
2. DESIGN AND SIMULATION OF SEQUENTIAL CIRCUITS USING VHDL

Experiment 9: D and T Flip-Flops
Experiment 10: Frequency Divider
Experiment 11: Left Shift Register
Experiment 12: Serial to Parallel Shift Register
Experiment 13: Binary Counter
Experiment 14: Asynchronous BCD Up Counter
Experiment 15: Synchronous Down Counter

Note: A minimum of 12 (Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

Text Books


References Books

3. Switching and Logic Design – CVS Rao, Pearson Education
II Year I Semester

Course Objectives: The students will learn

- Efficient Searching and sorting techniques.
- To assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- To choose the appropriate data structure like Single, Double and Circular Linked list for a specific application.
- To introduce various techniques for representation of the data in the real world and to develop application using data structures.
- To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.

Course Outcomes: After completion of course, student will be able to:

- Analyze run-time execution of various sorting, searching methods.
- Apply the knowledge of various Linked lists in real time problems.
- To choose appropriate data structure as applied to specified problem definition
- Understand the applications of Stacks and Queues.
- To handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures

Task-1:
Write a C Program for implementing the following searching methods
  a. Linear Search  
  b. Binary Search

Task-2:
Write a C Program for implementing the following Sorting Algorithms
  a. Selection sort  
  b. Bubble sort  
  c. Insertion sort

Task-3
Write a C Program for implementing the following Sorting Algorithms
  a. Quick sort  
  b. Merge sort
Task-4:
Write a C Program for implementing the following using an array
   a. Stack ADT       b. Queue ADT

Task-5:
Write a C Program that reads an Infix expression and converts the expression to Postfix form (use Stack ADT).

Task-6: Write a C Program to implement Circular Queue ADT using an array

Task-7:
Write a C Program for implementing the following using a SinglyLinked List.
   a. Stack ADT       b. Queue ADT

Task-8: Write a C Program to implement the DoublyLinked List.

Task-9: Write a C Program to implement the Circular Linked List.

Task-10:
Write a C Program to perform the following operations.
   a. Construct a Binary search tree of elements
   b. Search for a key element in the above Binary search tree
   c. Delete an element from the above Binary search tree

Task-11:
Write a C Program to perform the following operations.
   a. Construct an AVL tree
   b. Search for a key element in the above AVL tree
   c. Delete an element from the above AVL tree

Task-12:
Write a C Program for implementing BFS and DFS for a given graph

Text/Reference Books

Course Code: GR18A2072

II Year I Semester

Course Objectives: The Objectives of this course is to provide the student:

- Develop the logical design of the database using data modeling concepts such as Relational model
- Infer the data models and use of queries in retrieving the data.
- Create a relational database using a relational database package.
- Manipulate a database using SQL.
- Render the concepts of database system structure.

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

- Construct the schema of the database and modify it.
- Compile a query to obtain the aggregated result from the database.
- Speculate the concepts of various database objects.
- Compare the use of procedure and function in database.
- Use triggers and packages to create applications in the database.

Task-1:

DDL commands (Create, Alter, Drop, Truncate)

1. Create a table EMP with the following structure.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPNO</td>
<td>NUMBER(6)</td>
</tr>
<tr>
<td>ENAME</td>
<td>VARCHAR2(20)</td>
</tr>
<tr>
<td>JOB</td>
<td>VARCHAR2(10)</td>
</tr>
<tr>
<td>MGR</td>
<td>NUMBER(4)</td>
</tr>
<tr>
<td>DEPTNO</td>
<td>NUMBER(3)</td>
</tr>
<tr>
<td>SAL</td>
<td>NUMBER(7,2)</td>
</tr>
</tbody>
</table>

2. Add a column commission to the emp table. Commission should be numeric with null values allowed.

3. Modify the column width of the job field of emp table.

4. Create dept table with the following structure.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPTNO</td>
<td>NUMBER(2)</td>
</tr>
<tr>
<td>DNAME</td>
<td>VARCHAR2(10)</td>
</tr>
<tr>
<td>LOC</td>
<td>VARCHAR2(10)</td>
</tr>
</tbody>
</table>

DEPTNO as the primary key
5. Add constraints to the emp table that is empno as the primary key and deptno as the foreign key.
6. Add constraints to the emp table to check the empno value while entering (i.e) empno > 100. Salary value by default is 5000, otherwise it should accept the values from the user.
7. Add columns DOB to the emp table. Add and drop a column DOJ to the emp table.

Task-2: DML COMMANDS (Insert, Update, Delete)
1. Insert 5 records into dept Insert few rows and truncate those from the emp1 table and also drop it.
2. Insert 11 records into emp table.
3. Update the emp table to set the value of commission of all employees to Rs1000/- who are working as managers.
4. Delete only those who are working as supervisors.
5. Delete the rows whose empno is 7599.

Task-3: DQL COMMAND (Select)- SQL Operators and Order by Clause
1. List the records in the emp table order by salary in descending order.
2. Display only those employees whose deptno is 30.
3. Display deptno from the table employee avoiding the duplicated values.
4. List all employee names, salary and 15% rise in salary. Label the column as pay hike.
5. Display the rows whose salary ranges from 15000 to 30000.
6. Display all the employees in dept 10 and 20 in alphabetical order of names.
7. List the employee names who do not earn commission.
8. Display all the details of the records with 5-character names with ‘S’ as starting character.
9. Display joining date of all employees in the year of 1998.
10. List out the employee names whose salary is greater than 5000 and less than 6000

Task-4: SQL Aggregate Functions, Group By clause, Having clause
1. Count the total records in the emp table.
2. Calculate the total and average salary of the employee.
3. Determine the max and min salary and rename the column as max-salary and min_salary.
4. Find number of departments in employee table.
5. Display job wise sum, average, max, min salaries.
6. Display maximum salaries of all the departments having maximum salary > 2000
7. Display job wise sum, avg, max, min salaries in department 10 having average salary is greater than 1000 and the result is ordered by sum of salary in descending order.

Task-5: SQL Functions
1. Display the employee name concatenate with employee number.
2. Display half of employee name in upper case and half in lower case.
3. Display the month name of date “14-jul-09” in full.
4. Display the Date of joining of all employees in the format “dd-mm-yy”.
5. Display the date two months after the Date of joining of employees.
6. Display the last date of that month in “05-Oct-09”.
7. Display the rounded date in the year format, month format, day format in the employee
8. Display the commissions earned by employees. If they do not earn commission, display it as “No Commission”.
Task-6: Nested Queries

1. Find the third highest salary of an employee.
2. Display all employee names and salary whose salary is greater than minimum salary of the company and job title starts with ‘M’.
   4. Write a query to display information about employees who earn more than any employee in dept 30.
   5. Display the employees who have the same job as Jones and whose salary is greater than or equal to the salary of Ford.
   6. List out the employee names who get the salary greater than the maximum salaries of dept with dept no 20, 30.
   7. Display the maximum salaries of the departments whose maximum salary is greater than 9000.
   8. Create a table employee with the same structure as the table emp and insert rows into the table using select clauses.
   9. Create a manager table from the emp table which should hold details only about the managers.

Task-7: Joins, Set Operators.

1. Display all the employees and the departments implementing a left outer join.
2. Display the employee name and department name in which they are working implementing a full outer join.
3. Write a query to display their employee names and their managers’ name and salary for every employee.
4. Write a query to output the name, job, empno, deptname and location for each dept, even if there are no employees.
5. Display the details of those who draw the same salary.

Task-8: Views

1. Create a view that displays the employee id, name and salary of employees who belong to 10th department.
2. Create a view with read only option that displays the employee name and their department name.
3. Display all the views generated.
4. Execute the DML commands on views created and drop them.

Task-9: Practices on DCL commands, Sequence and indexes.

Task-10: PL/SQL

1. Write a PL/SQL code to retrieve the employee name, join date and designation of an employee whose number is given as input by the user.
2. Write a PL/SQL code to calculate tax of employee.
3. Write a PL/SQL program to display top ten employee details based on salary using cursors.
4. Write a PL/SQL program to update the commission values for all the employees’ with salary less than 2000, by adding 1000 to the existing values.

Task-11:

1. Write a trigger on employee table that shows the old and new values of employee name after updating on employee name.
2. Write a PL/SQL procedure for inserting, deleting and updating the employee table.
3. Write a PL/SQL function that accepts the department number and returns the total salary of that department.
Task-12:
1. Write PL/SQL program to handle predefined exceptions.
2. Write PL/SQL program to handle user defined exception.
3. Write a PL/SQL code to create
   a. Package specification
   b. Package body to insert, update, delete and retrieve data on emp table.

Text/Reference Books
2. SQL & PL/SQL for Oracle 10g, Black Book, Dr. P. S. Deshpande.
Course Code: GR18A2002

Course objectives

- To understand about the importance of ethical values
- To understand the significance of human conduct and self-development
- To enable students to imbibe and internalize the value and Ethical behaviour in personal and professional lives.
- To provide a critical perspective on the socialization of men and women.
- To create an awareness on gender violence and condemn it.

Course Outcomes

- To enable the student to understand the core values that shapes the ethical behaviour.
- Student will be able to realize the significance of ethical human conduct and self-development
- Students will be able to inculcate positive thinking, dignity of labour and religious tolerance.
- Students will attain a finger grasp of how gender discrimination works in our society and how to counter it.
- Students will develop a better understanding on issues related to gender and Empowering students to understand and respond to gender violence.

Unit I: VALUES AND SELF DEVELOPMENT—social values and individual attitudes, Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Unit II: PERSONALITY AND BEHAVIOUR DEVELOPMENT—positive thinking, punctuality, avoiding fault finding, Free from anger, Dignity of labour, religious tolerance, Aware of self-destructive habits.

Unit III: INTRODUCTION TO PROFESSIONAL ETHICS: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.
Unit IV: INTRODUCTION TO GENDER - Definition of Gender, Basic Gender Concepts and Terminology, Attitudes towards Gender, Social Construction of Gender.

Unit V: GENDER-BASED VIOLENCE - The concept of violence, Types of Gender-based violence, the relationship between gender, development and violence, Gender-based violence from a human rights perspective.

Text Books


2. Ethics in Engineering Practice & Research, Caroline Whit beck, 2e, Cambridge University Press 2015.

3. 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 and published by Telugu Akademi, Hyderabad, Telangana State in the year 2015.

Reference Books


II Year II Semester

Course Objectives: The students will learn the following:

- The Java programming language: its syntax, idioms, patterns, and styles.
- Object oriented concepts in Java and apply for solving the problems.
- How exception handling and multithreading makes Java robust.
- Explore Java Standard API library such as io, util, applet, swing.
- Building of applications using applet and swing.

Course Outcomes: Upon the successful completion of the course, the student will be able:

- Write java programs and differentiate between object-oriented programming and procedure-oriented programming.
- Apply object-oriented programming features for solving a given problem.
- Incorporate exception handling mechanism.
- Implement Use java standard API library to write complex programs.
- Develop interactive programs using applet and swing.

Unit I: INTRODUCTION TO OOP
Introduction, Need of object-oriented programming, principles of object-oriented languages, C++ Vs JAVA, Applications of OOP, history of JAVA, Java Virtual Machine, Java features, Program structures, Installation of JDK.

Unit II: PROGRAMMING CONSTRUCTS
Variables, Primitive data types, Identifiers- Naming Conventions, Keywords, Literals, Operators- Binary, Unary and Ternary, Expressions, Primitive Type conversion and casting, flow of control-branching, conditional, loops.

Classes and Objects- Classes, Objects, creating objects, methods, constructors- constructor overloading, cleaning up unused objects- Garbage collector, class variable and methods- static keyword, this keyword, arrays, Command line arguments.

Unit III: INHERITANCE
Types of Inheritance, deriving classes using extends keyword, method overloading, super keyword, final keyword, abstract class.

Interfaces: Interface, Extending interface, interface Vs Abstract classes.

Packages- Creating Packages, using Packages, Access protection, java I/O package.

Exceptions - Introduction, Exception handling techniques-try…catch, throw, throws, finally block, user defined Exception.

Unit IV: MULTITHREADING
java.lang.Thread, the main Thread, creation of new Threads, Thread priority, multithreading- using isalive() and join(), Synchronization, suspending and resuming Threads, Communication between Threads. Exploring java.io, Exploring java.util.
Unit V: APPLETS
Applet class, Applet structure, an example Applet program, Applet life cycle.

Event Handling: Introduction, Event Delegation Model, Java.awt.event Description, Adapter classes, Inner classes.


Swing: Introduction, JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScroll Pane, Split Pane, JTabbed Pane, Dialog Box, Pluggable Look and feel.

Text/Reference Books:
3. Java for Programming, P.J.Dietel Pearson Education
5. Thinking in Java, Bruce Eckel, Pearson Education
II Year II Semester

Course Objectives: The Objectives of this course is to provide the student

- Comprehend operational concepts and understand register organization within a basic computer system
- Analyze the basic computer organization and understand the concepts of Micro programmed control
- Understand the design aspects of Central processing unit organization
- Understand various algorithms for arithmetic operations within a computer system and communication with I/O devices and standard I/O interfaces.
- Study the hierarchical memory system including cache memory and virtual memory along with the design of Multiprocessor systems using various interconnection structures.

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

- Demonstrate knowledge of register organization of a basic computer system
- Incorporate In-depth understanding of control unit organization and micro programmed control.
- Understand the performance of central processing unit of a basic computer system.
- Apply various algorithms to perform arithmetic operations and propose suitable hardware for them.
- Analyze and emphasize various communication media in the basic computer system using design of various memory structures and Multiprocessor systems.

Unit I: BASIC STRUCTURE OF COMPUTERS

Computer Types, Functional unit, Data Representation, Fixed Point Representation, Floating Point Representation, Error Detection codes.

Register Transfer Language and Micro operations: Register Transfer language, RegisterTransfer, Bus and memory transfers, Arithmetic Micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

Unit II: BASIC COMPUTER ORGANIZATION AND DESIGN

Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.
Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit, Micro program Sequencer, Hard wired control Vs Micro programmed control.

Unit III: CENTRAL PROCESSING UNIT ORGANIZATION

General Register Organization, STACK organization, Instruction formats, addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer.


Unit IV: INPUT-OUTPUT ORGANIZATION


Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, Dependencies, Vector Processing.

Unit V: MEMORY ORGANIZATION

Memory Hierarchy, Main memory- RAM and ROM chips, Memory Address map, Auxiliary memory – Magnetic Disks, Magnetic Tapes, Associative Memory – Hardware Organization, Match Logic, Cache Memory – Associative mapping, Direct mapping, Set associative mapping, Writing into cache and cache initialization, Cache Coherence, Virtual memory – Address Space and Memory Space, Address mapping using pages, Associative Memory page table, Page Replacement.

Multi Processors: Characteristics or Multiprocessors, Interconnection Structures, Cache Coherence, Shared Memory Multiprocessors.

Text/Reference Books

Course Objectives:

- To provide the student with a clear understanding of demand analysis, elasticity of demand and demand forecasting;
- To provide the insight on theory of production and cost analysis.
- To describe different types of markets and competition, forms of organization and methods of pricing.
- To make the students understand various capital budgeting techniques.
- To describe fundamentals of accounting.

Course Outcomes: After studying this course, students will be in a position to:

- The student will be able to scan the economic environment and forecast demand of products through demand forecasting techniques.
- The student will be able to plan the production levels in tune with maximum utilization of organizational resources and with maximum profitability and list out various costs associated with production and able to compute breakeven point.
- To outline the different types markets and competition, forms of business organization and methods of pricing.
- To analyze the profitability of various projects using capital budgeting techniques.
- The students will be able prepare the financial statements.

Unit I: INTRODUCTION & DEMAND ANALYSIS DEFINITION AND SCOPE


Unit II: PRODUCTION & COST ANALYSIS: PRODUCTION FUNCTION

Unit III: MARKETS AND FORMS OF BUSINESS ORGANIZATIONS


Unit IV: CAPITAL BUDGETING

Capital and its significance, Types of Capital, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value (NPV) Method and Internal Rate of Return (IRR) (simple problems) and Profitability Index (PI)

Unit V: INTRODUCTION TO FINANCIAL ACCOUNTING


Text Books


Reference Books

1. Peterson, Lewis and Jain: Managerial Economics, Pearson, 2009
2. Mithani : Managerial Economics , HPH, 2009
II Year II Semester

Course Objectives: The objectives of this course are to

- Explain the evolution of computer networks and the concepts data communication;
- Illustrate the general principles of network design and compare the different network topologies;
- Introduce to the digital and analogue representations and channels and techniques of encoding;
- Explain the general principles of circuit and packet switching;
- Explain about the wireless Local Area Networks, types of protocols.

Course Outcomes: After completing this course the students will be able to

- Independently understand basic computer network technology, Data Communications System and its components;
- Identify the different types of network topologies and protocols;
- Identify the different types of network devices and their functions within a network;
- Understand and building the skills of subnetting and routing mechanisms;
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Unit I: DATA COMMUNICATIONS


Unit II: DATA LINK LAYER


Unit III: NETWORK LAYER

Unit IV: TRANSPORT LAYER
Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT – V: Application Layer
Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP.

Text/Reference Books:

3. Data communications and Computer Networks, P.C .Gupta, PHI.
II Year II Semester

Course Objectives: The Objectives of this course is to provide the student

- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To understand the concepts of Input/Output, storage and file management.

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

- Explain functions, structures of operating system
- Determine various process management concepts including scheduling and synchronization.
- Demonstrate the concepts of memory management and I/O systems.
- Solve issues related to file system interface and implementation of disk management.
- Classify protection and security mechanisms.

Unit I: COMPUTER SYSTEM AND OPERATING SYSTEM OVERVIEW
Overview of computer operating systems, operating systems functions, protection and security, distributed systems, special purpose systems, operating systems structures and system calls, operating systems generation

Unit II: PROCESS MANAGEMENT
Process concepts, threads, scheduling-criteria, algorithms with evaluation, Thread scheduling, case studies: Linux, Windows
Concurrency: Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies: Linux, Windows

Unit III: MEMORY MANAGEMENT
Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page replacement algorithms, Case studies: Linux, Windows.
Deadlocks: Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.
I/O systems: Hardware, application interface, kernel I/O subsystem, Transforming I/O requests, Hardware operation, performance.
Unit IV: FILE SYSTEM INTERFACE


Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

Unit V: PROTECTION


Text/Reference Books:
5. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
6. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates
II Year II Semester

Course Objectives: The students will learn the following

- Working with java compiler and eclipse platform.
- Writing of java programs using object-oriented concepts.
- Developing java applications and handle the exceptions.
- Building java GUI based applications using swing.
- To handle the events.

Course Out Comes: Upon the successful completion of the course, the student will be able to:

- Implement object-oriented programming concepts.
- Analyze a problem, identify and define the computing requirements appropriate to its solution.
- Explore the java standard API library to write complex programs.
- Implement and manage multithreading.
- Develop graphical user interface in Java programs.

Task-1: Write java programs that implement the following

a) Constructor
b) Parameterized constructor
c) Method overloading
d) Constructor overloading.

Task-2:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
b) Write a Java program for sorting a given list of names in ascending order.
c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use StringTokenizer class of java.util)

Task-3: Write java programs that uses the following keywords

a) this  b) super  c) static  d) final

Task-4:

a) Write a java program to implement method overriding
b) Write a java program to implement dynamic method dispatch.
c) Write a Java program to implement multiple inheritance.
d) Write a java program that uses access specifiers.

Task-5:
a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
c) Write a Java program that displays the number of characters, lines and words in a text file.

Task-6:

a) Write a Java program for handling Checked Exceptions.
b) Write a Java program for handling Unchecked Exceptions.

Task-7:

a) Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

Task-8:

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

Task-9:

Write a Java program that works as a simple calculator. Use a grid layout to arrange button for the digits and for the +, -, *, % operations. Add a text field to display the result.

Task-10:

a) Write a Java program for handling mouse events.
b) Write a Java program for handling key events.

Task-11:

a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields Num1 and Num 2.
b) The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception and display the exeption in a message dialog box.

Task-12:

a) Write a java program that simulates traffic light. The program lets the user select one of three lights: red, yellow or green. When a radio button is selected, the light is turned on, and only one light can be on at a time. No light is on when the program starts.
b) Write a Java program that allows the user to draw lines, rectangles and ovals.
Task -13:

Create a table in Table.txt file such that 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 JTable component.

Text/Reference Books:
3. Java for programming, P.J.Dietel Pearson education (OR) Java: How to Program P.J.Dietel and H.M.Dietel, PHI
5. Thinking in Java, Bruce Eckel, Pearson Education
Course Objectives:

- Demonstrate the core features of Operating Systems and Sci Lab.
- Evaluate various Scheduling algorithms, memory management techniques.
- Understand the file storage and organization concepts.
- Explain of the syntax, semantics, data-types and library functions of numerical computing using SCILAB.
- Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.

Course Outcomes:

- Understand and analyze the various file organization techniques.
- Implementation of CPU scheduling algorithms, page replacement techniques.
- Understand the need for simulation/implementation for the verification of mathematical functions.
- Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.
- Interpret and visualize simple mathematical functions and operations thereon using plots/display.

PART I:

Task-1: Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority

Task-2: Simulate all file allocation strategies
   a) Sequential b) Indexed c) Linked

Task-3: Simulate MVT and MFT

Task-4: Simulate all File Organization Techniques
   a) Single level directory b) Two level directory

Task-5: Simulate all page replacement algorithms
   a) FIFO b) LRU c) LFU

Task-6: Simulate Paging Technique of memory management.

PART II
Task-7: Scilab environment
Task-8: The Workspace and Working Directory
Task-9: Matrix Operations
Task-10: Sub-matrices
Task-11: Statistics
Task-12: Plotting Graphs
Task-13: Plotting 3D Graphs
Task-14: Scilab Programming Language
Task-15: Script Files and Function Files
Task-16: Functions in Scilab
Task-17: File Operations
Task-18: Reading Micros

Text/Reference Books:
Course Objectives: The objectives of this course are to

- Introduces the architecture, structure, functions, components, and models of the data communication, devices and configurations
- Develop network using different topologies and protocols
- Understanding the working of wired and wireless networks
- Illustrate various framing techniques, error correction and detection methods
- Simulate the routing algorithms

Course Outcomes: After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology, Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Understanding the working of wired and wireless networks
- Understand the implementation of different framing techniques, Error detecting and correcting techniques
- Implementation of various routing algorithms.

PART I

Task-1: Introduction to Cisco Packet tracer Simulator
Task-2: Initial Configuration of switch and router
Task-3: Working with static and dynamic IP addressing
Task-4: Design star, bus, ring topology using packet tracer
Task-5: Design a network using NAT and tunnelling concept.
Task-6: Design a wireless LAN

PART II

Task-7: Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
Task-8: Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.

Task-9: Implement Hamming code

Task-10: Implement Dijkstra’s algorithm to compute the Shortest path through a graph.

Task-11: Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm.

Task-12: Take an example subnet of hosts. Obtain broadcast tree for it.

Text/reference Books:

3. Data communications and Computer Networks, P.C. Gupta, PHI.
Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations.
- Integrate human ecology and science of environmental problems.
- The effect of human activities on atmospheric pollution.

Course Outcomes:

Based on this course, the Engineering graduate will:

- Understand the harmonious co-existence in between nature and human being.
- Recognize various problems related to environment degradation.
- Develop relevant research questions for environmental investigation.
- Generate ideas and solutions to solve environmental problems due to soil, air and water pollution.
- Evaluate and develop technologies based on ecological principles and environmental regulations which in turn helps in sustainable development.

Unit I: ECOSYSTEMS

Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Bio magnification, ecosystem value, services and carrying capacity.

Unit II: NATURAL RESOURCES

Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

Unit III: BIODIVERSITY AND BIOTIC RESOURCES

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss,

Unit IV: ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES


Unit V: ENVIRONMENTAL POLICY, LEGISLATION & EIA


TEXT BOOKS:
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

REFERENCE BOOKS:
5. Introduction to Environmental Science by Y. Anjaneyulu, BS Publications.