****

**REGULATION**

**FOR**

**B.TECH. COURSE**

 **RANCHI UNIVERSITY**

**REGULATION**

**FOR
B.TECH. COURSE OF RANCHI UNIVERSITY**

**Leading to Bachelor of Technology Degree**

1. **Introduction :**
	1. The Ranchi University, Ranchi, constituted the Board of studies, vides Notification, No. RU/R/8086/12 dated 12.03.2012 , to formulate the Curricula of B. Tech.Courses as well as regulations of the university. Several meetings of the committee were held chairmanship of the Dean, Faculty of Engineering of Ranchi University, Ranchi. The Board of studies considered the guidelines provided by AICTE, while formulating the regulation and syllabus of B.Tech Courses.
	2. All B.Tech Courses of 4-year duration shall consist of eight semesters. However, a student may be allowed to complete the course in maximum of six years.
	3. The regulation and curriculum of B.Tech Courses will come into force from the Academic Year 2012 for the students admitted in the session 2012-13 and onwards.
	4. The provision of this regulation shall also be applicable to any discipline that is introduced from time to time in the Engineering Colleges affiliated to Ranchi University.
	5. The University Senate on the recommendation of the Academic Council may change any or all parts of this Regulation at any time considered appropriate.
2. **Academic Calendar**

 2.1 The Academic Session shall be divided into two semesters each of approximately 17 weeks duration (90 working days including examination period).The odd semesters shall start from July and end in December, whereas even semesters will begin in January and end in May every academic year.

 2.2 A Co-ordination Committee shall be constituted consisting of Dean, Faculty of Engineering (Chairman), Controller of Examination of R.U (Member-Secretary) and Principals of all affiliated engineering colleges under Ranchi University (members).

The committee shall prepare the Examination Calendar at the beginning of each Academic Year for both odd as well as even semesters.

**3. Admission**

 3.1 Admission to all B. Tech. Courses will be made in the first semester of each academic year, at the first year level through the JECECE, AIEEE, and others as per the guidelines of AICTE/Government of Jharkhand. Lateral entry in IIIrd Semester will be permitted as per the guidelines of AICTE/ Government of Jharkhand.

 3.2 All students admitted to any of the B.Tech. courses shall deposit the requisite fees as prescribed by the institutes at the time of joining in each academic year.

 **4. Residence**

 4.1 The Residential requirement shall be as per rules of AICTE. There should be
 accommodation facility at least 25% for Boys & 50% for Girls Students.

 **5. Attendance**

 5.1 Minimum 70 % attendance is essential for any student to appear in the end semester examination. The balance 30% shall include absence for all other reasons including medical.

**6. Conduct & Discipline**

Following rules shall be in force to govern the conduct and discipline of students:

 6.1 Students shall show due respect to the teachers of the Institute, the wardens of Hostels, the sports officers and the officers of the National Cadet Corps; proper courtesy and consideration should also be extended to the employees of the institute and hostel. They shall also pay due attention and courtesy to visitors.

6.2 Students are required to develop a friendly relationship with fellow students. In particular, they are expected to show kindness and consideration to the new students admitted to the institute every year. Law bans ragging in any form to anybody. Any act of physical or mental pressurization of junior students, individually or in a group, will be considered as an act of ragging. Ragging also includes forcing junior students to meet seniors outside institute premises, or in places where student has no valid reason to be present, asking irrelevant questions or using abusive language. Ragging will be considered as gross indiscipline and will be severely dealt with, which may include expulsion from institute.

If junior student yields to any form of ragging by senior students and does not inform the institute or hostel authorities, or willfully withholds the information in an enquiry of ragging incident, the matter will be treated as indiscipline on part of junior student and will invite punishment comparable to those against whom ragging charge are framed. Willful withholding of complain by a junior student does not automatically exempt a senior from punishment.

 6.3 The following acts of omission and /or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures:

* Furnishing a false statement of any kind in the form of application for admission or for award of scholarship or prizes etc.
* Furnishing false statement to the Disciplinary Committee, or willfully withholding information relevant to an enquiry.
* Organising or participating in an activity that has potential for hurting fellow students along lines of religion, caste, home state, and batch of admission, hostel or any other unhealthy criterion.
* Physical or mental harassment of freshers through physical contact or oral abuse.
* Getting involved in a brawl or fight with persons outside the Institute, either alone or in a group, irrespective of who has initiated the conflict.
* Willfully damaging or stealthily removing any property that belonging to the institute, hostel or fellow students.
* Adoption of unfair means in the examinations.
* Possession, consumption or distribution of alcoholic drinks or any kind of hallucinogenic drugs.
* Organising or participating in any group activity except purely academic and scientific programms in the company with others in or outside the campus without prior permission of Dean of Student’s affairs /Principal of Institute.
* Mutilation or unauthorized possession of library books.
* Displaying lack of courtesy and decorum by resorting to indecent behavior anywhere within or outside campus.
* Resorting to noisy and unseemly behavior, disturbing studies of fellow students.
* Not intimating his/her absence to the warden before leaving the campus.

6.4 Commensurate with the gravity of offence, the punishment may be

1. Reprimand.
2. Additional work in the institute.
3. Debarment from student activities and elections and captaincy of sport teams.
4. Debarment from medals and prizes.
5. Partial ( 1 month or one semester ) or complete debarment from campus placement.
6. Reduction in grade in one or more subjects.
7. Expulsion from hostel.
8. Rustication for a specified period.
9. Outright expulsion from the Institute.

 Punishment under items v-ix will constitute major punishment and will debar a student from all academic medals & prizes as well important non academic awards.

* 1. For all such major acts of indiscipline, which may have serious repercussion on students in general and/or which may warrant a uniform and more formalized nature of investigation, the Institute will form Disciplinary Committee to examine available evidences and award punishment through Principal of the college.
	2. Cases of unfair means in the sessional examination may be dealt with Examination Disciplinary committee of the Institute
	3. In case any student is found using unfair means in any subject/paper for the End Semester for which the examination are in progress, the concerned student will be expelled from the course for which he was admitted. However, this would not preclude from his being readmitted to the next course in the series and such student may be readmitted to the next course from the beginning of concerned semester during which he was expelled from the course. As an example, if a student was found using unfair means during examination for second semester of the course, he may be readmitted from the beginning of second semester of next course in the series.

**7. Change of Branch**

7.1 Only those Students will be eligible for a change of Branch after the Second Semester, who has
 (a) Completed all the Credits prescribed in the First Two Semesters of their Studies in their

 first attempt.

 (b) Obtained a CGPA, at the end of the Second Semester, not lower than 8.25.

7.2 Students may *enlist their* *choice* of Branch, in order of preference, to which they wish to change over. It will not be permissible to alter the *choice* after the application has been submitted.

* 1. Change of Branch shall be made strictly on the basis of Merit of the applicants. For this purpose, the CGPA obtained at the end of second semester shall be considered.
	2. *All Change of Branch made in accordance with the above Rules will be effective from the 3rd
	 Semester of the applicants concerned.*
	3. *No changes of Branch shall be permitted here after.*
	4. Maximum branch change will be limited to 10% of branch intake, subject to condition that (a) strength of branch will not go below 90 % of sanctioned strength and (b) there is vacancy in the branch.
	5. The Institute will forward *the* recommendation for branch change to Dean, Faculty of Engineering, followed by approval *of* Vice-Chancellor *and the decision is* to be communicated to Controller of Examination, Ranchi University and the Institute concerned.

**8. Course Structure**

 8.1 Total credit point for B.Tech course should be between 200-212.

 8.2 The Curricula for the different Degree Programs as proposed by the respective
Departments *and* recommended by the Academic Committee of the Institute shall be approved by the Academic Council of the University and subsequently ratified by Ranchi University Senate.

 **9. Registration**

 9.1 Every Student of the B. Tech. Course is required to register, in person, at the
 commencement of each semester, on the day fixed for and notified in the Academic
 Calendar.

 9.2 Registration of students for all semesters will be centrally organized by the Academic
 section of the Institute.

 9.3 A student who failed to register on the day announced for the purpose may be
 permitted for late registration within next three working days on payment of additional late fee as prescribed by the Institute. Normally no Late Registration shall be permitted after the Third Working Day from the scheduled date of registration.

 9.4 Only those students will be permitted to register who have:

 (a) Cleared all dues of the previous semesters.

 (b) Paid all prescribed fee for the current semester.

 (c) Not been debarred from registering for a specified period on disciplinary or any
 other ground.

 **10. Performance Evaluation**

 10.1 Students’ performance will be measured on a 10 point Scale Grading System using Letter Grades.

 10.2 Grading System: A grade will be awarded to student in a subject based on his performance in end semester examination, practical examination and internal assessment through class tests, home assignments. Grades will be assigned and associated point values will be as follows:

|  |  |  |
| --- | --- | --- |
| Range of Marks(percentage) | Grade | Point of Value |
| 90-100 | Ex | 10 |
| 80-89 | A | 9 |
| 70-79 | B | 8 |
| 60-69 | C | 7 |
| 50-59 | D | 6 |
| 35-49 | P for theory courses  | 5 |
| 40-49 | P for Laboratory Courses(Practical) | 5 |
| Less than 35 | F for theory courses  | 0 |
| Less than 40 | F for Laboratory Courses(Practical)  | 0 |

The student must secure 35% marks in end semester examination (ESE) **and** 35% marks in sessional separately.

The Examination Section of Ranchi University will centrally conduct the End Semester Examinations in respect of the Theory component of the subjects. Each subject/paper will carry 100 marks. The sessional and practical will be assessed on 50 marks each.

The distribution of sessional marks will be as follows:

 Attendance: 10

 Class Test/Home assignment: 30

 Performance/Behavior: 10

 The distribution of practical marks will be as follows:

 Attendance: 10

 Timely submission of lab report: 05

 Lab oratory report: 15

 Viva-voce: 20

 10.3 Students who have failed in maximum of three theory subjects, but pass in all practical and sessional examination, will be promoted to next higher semester & they will be permitted to appear in those subjects, when semester examination of this subject takes place. The marks obtained by the students in practical/sessional examination in the relevant semester will be counted for publication of result.

 10.4 For registration in III rd Semester a student must have

 (a) Completed at least 35 Credits out of 57 Credits with minimum P grades in each Practical Examination.

 (b) Obtain a Cumulative Grade Point Average(35) (CGPA(35)) of not lower than 4.5 calculated on the basis of the best Grades obtained by him/her to attain in 35 Credits.

 10.5 Students who have failed in more than three subjects in a semester must register for all subjects including sessional /practical courses offered in the corresponding semester of the next year.

 10.6 No supplementary examination will be conducted for B. Tech I, II, III, IV and V semesters.

 10.7 There will a supplementary examination for promoted candidates only each for VI and VII semesters to enable candidates to clear backlog papers of these semester, if any. However, if the candidate fails to clear any of the subject/paper in supplementary examination, he/she will not be promoted to the next semester. Such candidate will have to repeat that particular semester again.

 10.8 However, if the student is successful in obtaining at least pass marks or more in the subjects, he/she has appeared then, only pass grade will be entered for publication of result.

 10.9 Only those candidates, who have cleared all the subjects of all previous semesters including those in VIIth semester, will be promoted to VIII semester.

 10.10 Only one supplementary examination will be conducted for VIII semester for those candidates only, who could not clear or could not appear ( due to compelling reasons like serious illness of himself/herself), subject to following conditions:

 a. If the candidate appears in all the papers and obtains at least pass marks or more in all the subjects he/ she has appeared, then marks obtained in all the papers along with the sessional and practical marks already secured, will be considered afresh for publication of result.

 b. If the candidate appears in failed papers & obtains at least pass marks or more, only pass grade will be entered for publication of result.

 10.11 Semester Grade Point average (SGPA) will be computed for each semester. The SGP will be calculated as follows:

$$SGPA=\frac{\sum\_{i=1}^{n}c\_{i} g\_{i} }{\sum\_{i=1}^{n}c\_{i} } $$

 Where ‘n’ is the number of subjects registered for the semester, ‘ci’ is the number of Credit allotted to particular subject, & ‘gi’ is the grade point carried by the Letter Grade corresponding to the subject. SGPA will be rounded off to the second place of decimal
 and recorded as such. The SGPA would indicate the performance of the student in the
 semester to which it refers.

 10.12 Starting from second Semester at the end of each semester , a cumulative Grade Point Average (CGPA) will be computed for every student as follows:$CGPA=\frac{\sum\_{i=1}^{m}c\_{i} g\_{i} }{\sum\_{i=1}^{m}c\_{i} } $

 Where ‘m’ is the total number of subjects the student has registered from the First Semester onwards up to & including the semester, ‘ci’ is the Number of Credits
allotted to a particular subject and ‘gi’ is the Grade –Point carried by the Letter Grade corresponding to the Grade awarded to the student for the subject . CGPA will be rounded off to the second place of Decimal & recorded as such.

The CGPA would indicate the cumulative Performance of the student from the First semester up to the end of the semester to which it refers.

 The CGPA, SGPA & the Grades obtained in all the subjects in a semester will be communicated to every student at the end of every semester.

 For determining the Inter se Merit Ranking of a group of students, only the rounded off values of the CGPAs will be used.

10.13 When a student gets the grade ‘F’ in any subject during a semester, the SGPA and the CGPA from that semester onwards will be tentatively calculated, taking only ‘Zero Point’ for each such ‘F’ Grade. After the ‘F’ Grade(s) has/have been substituted by Letter Grade during a subsequent/examination, the SGPA and the CGPA of all the semester, starting from the earliest Semester in which ‘F’ Grade has been updated, will be recomputed and recorded to take this Change of Grade into account.

 10.14 The six week Industrial training undergone by the students in summer vacation will be assessed within five weeks after commencement of the seventh semester. The students are required to submit a written report on training received & give a seminar. This will be evaluated along with project work of VII semester.

 10.15 Assessment of Project Work: Performance in the various activities involved in the Project would be assessed individually at the end of each semester in which it is being carried out as per the curriculum.

 10.16 The Chairman, Academic Affairs/Head of the Department of Institute will constitute
a committee for conducting the comprehensive Vive-Voce Examination, evaluation of project etc. as per the requirement of the Curriculum.

 10.17 A Student will be issued an Admit Card for appearing in the End Semester Examination, only if he/she has

 (a) requisite attendance.

 (b) paid all Institute & Hostel dues for the semester.

 (c) no disciplinary action is pending against him.

 (d) paid the requisite examination fee

**11. Graduation Requirement**

 11.1. In order to qualify for a B.Tech. Degree of Ranchi University covered under this regulation a student must:

 (a) Complete all the Credit requirements for the degree as laid down in the prescribed
 Curriculum of the Course with a minimum of Grade ‘P’ scored in every subject.

 (b) Obtain a minimum CGPA of 4.50 at the end of the semester in which he/she completes all the requirements for the degree.

 (c) In the final degree certificate CGPA obtained by the candidate will be mentioned.

***6.05.2012 (DRAFT)***

**B. TECH COURSE STRUCTURE**

**COMPUTER SCIENCE &**

**ENGINEERING**

**RANCHI UNIVERSITY, RANCHI**

**COMMON TO ALL B.TECH BRANCHES YEAR : I SEMESTER : I**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No.** | **Course No.** | **Subject** | **Periods** |  |
| **THEORY** | **L** | **T** | **P** | **Credit****Point** |
|
| 1. | HS 1101 | ENGLISH FOR PROFESSIONAL COMMUNICATION | 2 | - | - | 2 |
| 2. | CH 1101 | ENGINEERING CHEMISTRY | 2 | - | - | 2 |
| 3. | PH 1101 | ENGINEERING PHYSICS I | 3 | - | - | 3 |
| 4. | MH 1101 | MATHEMATICS I | 3 | 1 | - | 4 |
| 5. | ME 1101 | ENGINEERING MECHANICS | 3 | 1 | - | 4 |
| 6. | EE 1101 | BASIC ELECTRICAL ENGINEERING | 3 | 1 | - | 4 |
| **PRACTICAL/DRAWING/DESIGN** |
| 7. | CH1102-PPH1102-P | CHEMISTRY/ PHYSICS LAB(TO BE TAKEN IN ALTERNATE WEEKS) | - | - | 3 | 2 |
| 8. | ME1102-PEE 1102-P | ENGINEERING MECHANICS / ELECTRICAL LABORATORY(TO BE TAKEN IN ALTERNATE WEEKS) | - | - | 3 | 2 |
| 9. | ED1101-P | ENGINEERING GRAPHICS I | - | - | 3 | 2 |
| 10. | WP1101-P | WORKSHOP PRACTICE I | - | - | 3 | 2 |
| 11. | HS1102-P | GENERAL PROFICIENCY I | - | - | - | 2 |
| **TOTAL** | **16** | **3** | **12** | **29** |

**COMMON TO ALL B. TECH BRANCHES YEAR : I SEMESTER : II**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No.** | **Course No.** | **Subject** | **Periods** |  |
| **THEORY** | **L** | **T** | **P** | **Credit****Point** |
|
| 1. | CS 1201 | INTRODUCTION TO COMPUTING | 2 | - | - | 2 |
| 2. | CH 1201 | ENVIRONMENT & ECOLOGY | 2 | - | - | 2 |
| 3. | PH 1201 | ENGINEERING PHYSICS II | 3 | - | - | 3 |
| 4. | MH 1201 | MATHEMATICS II | 3 | 1 | - | 4 |
| 5. | ME 1201 | ENGINEERING THERMODYNAMICS | 3 | 1 | - | 4 |
| 6. | EC 1201 | BASIC ELECTRONICS | 3 | - | - | 3 |
| **PRACTICAL/DRAWING/DESIGN** |
| 7. | EC1202-P | BASIC ELECTRONICS LAB | - | - | 3 | 2 |
| 8. | CS1202-P | COMPUTER PROGRAMMING LAB | - | - | 3 | 2 |
| 9. | ED1202-P | ENGINEERING GRAPHICS II (M/C DRAWING) | - | - | 3 | 2 |
| 10. | WP1202-P | WORKSHOP PRACTICE II | - | - | 3 | 2 |
| 11. | HS1202-P | GENERAL PROFICIENCY II | - | - | - | 2 |
| **TOTAL** | **16** | **2** | **12** | **28** |

**COMPUTER SCIENCE & ENGINEERING YEAR: II SEMESTER: III**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SL.****NO.** | **Course****No** | **Subject** | **Periods** | **Credit Points** |
| **THEORY** | L | T | P |  |
|
| 1. | HS 1301 | ENGINEERING ECONOMICS  | 2 | - | - | 2 |
| 2 | CS 1301 | COMPUTER PROGRAMMING USING C | 2 | - | - | 2 |
| 3. | CS 1302 | COMPUTER ORGANISATION & ARCHITECTURE  | 3 | - | - | 3 |
| 4. | CS 1303 | SYSTEM SOFTWARE  | 3 | - | - | 3 |
| 5. | MH 1303 | MATHEMATICS III | 3 | 1 | - | 4 |
| 6. | ME 1303 | STRENGTH OF MATERIALS | 3 | 1 | - | 4 |
| **PRACTICAL/DRAWING/DESIGN** |
| 1. | CS 1304 – P | COMPUTER PROGRAMMING LAB | - | - | 3 | 2 |
| 2 | CS 1305 – P | COMPUTER ORGANISATION LAB | - | - | 3 | 2 |
| 3. | CS 1306 – P | SYSTEM SOFTWARE LAB | - | - | 3 | 2 |
| 4. | ME 1308 – P | STRENGTH OF MATERIAL LAB | - | - | 3 | 2 |
| 5. | HS 1303 – P | GENERAL PROFICIENCY III | - | - | - | 2 |
| **TOTAL** | **16** | **2** | **12** | **28** |

 **COMPUTER SCIENCE & ENGINEERING YEAR: II SEMESTER: IV**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SL.****NO.** | **Course****No** | **Subject** | **Periods** | **Credit Points** |
| **THEORY** | L | T | P |  |
|
| 1. | MH 1401 | DISCRETE MATHEMATICS  | 2 | - | - | 2 |
| 2. | CS 1401 | THEORY OF COMPUTATION | 2 | - | - | 2 |
| 3. | CS 1402 | SOFTWARE ENGINEERING | 3 | - | - | 3 |
| 4. | CS 1403 | DATA STRUCTURE & PROGRAMMING USING C | 3 | - | - | 3 |
| 5. | CS 1404 | MICROPROCESSOR AND MICROCONTROLLER | 3 | - | - | 3 |
| 6. | EC 1413 | ANALOG & DIGITAL COMMUNICATION  | 3 | 1 | - | 4 |
| **PRACTICAL/DRAWING/DESIGN** |
| 1. | CS 1405 – P | SOFTWARE ENGINEERING LAB | - | - | 3 | 2 |
| 2 | CS 1406 – P | DATA STRUCTURE & PROGRAMMING LAB | - | - | 3 | 2 |
| 3. | CS 1407 – P | MICROPROCESSOR LAB | - | - | 3 | 2 |
| 4. | EC 1408 – P | ANALOG & DIGITAL COMMUNICATION LAB | - | - | 3 | 2 |
| 5. | HS 1404 – P | GENERAL PROFICIENCY IV | - | - | - | 2 |
| **TOTAL** | **16** | **1** | **12** | **27** |

**COMPUTER SCIENCE & ENGINEERING YEAR: III SEMESTER: V**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SL.****NO.** | **Course****No** | **Subject** | **Periods** | **Credit Points** |
| **THEORY** | L | T | P |  |
|
| 1. | HS 1501 | INDUSTRIAL MANAGEMENT | 2 | - | - | 2 |
| 2 | CS 1501 | OPERATING SYSTEM  | 2 | - | - | 2 |
| 3. | CS 1502 | Computer Network | 3 | - | - | 3 |
| 4. | CS 1503 | COMPUTER PROGRAMMING USING C++ | 3 | - | - | 3 |
| 5. | CS 1504 | RELATIONAL DATABASE MANAGEMENT SYSTEM  | 3 |  - | - | 3 |
| 6. | CS 1505 | ANALYSIS DESIGN AND ALGORITHM | 3 | - | - | 3 |
| **PRACTICAL/DRAWING/DESIGN** |
| 1. | CS 1506 – P | OPERATING SYSTEM LAB | - | - | 3 | 2 |
| 2 | CS 1507 – P | Computer Network LAB | - | - | 3 | 2 |
| 3. | CS 1508 – P | COMPUTER PROGRAMMING LAB | - | - | 3 | 2 |
| 4. | CS 1509 – P | RELATIONAL DATABASE MANAGEMENT SYSTEM LAB | - | - | 3 | 2 |
| 5. | HS 1505 – P | GENERAL PROFICIENCY V | - | - | - | 2 |
| **TOTAL** | **16** | **-** | **12** | **26** |

 **COMPUTER SCIENCE & ENGINEERING YEAR: III SEMESTER: VI**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SL.****NO.** | **Course****No** | **Subject** | **Periods** | **Credit Points** |
| **THEORY** | L | T | P |  |
|
| 1. | CS 1601 | COMPUTER GRAPHICS & MULTIMEDIA | 2 | - | - | 2 |
| 2 | CS 1602 | WEB TECHNOLOGY | 2 | - | - | 2 |
| 3. | CS 1603 | LANGUAGE PROCESSOR | 3 | - | - | 3 |
| 4. | CS 1604 | ADVANCE COMPUTER ARCHITECTURE | 3 | - | - | 3 |
| 5. | CS 1605 | SOFTWARE PROJECT MANAGEMENT | 3 | - | - | 3 |
| 6. | CS 1606 | OBJECT ORIENTED AND SYSTEM DESIGN USING JAVA | 3 | - | - | 3 |
| **PRACTICAL/DRAWING/DESIGN** |
| 1. | CS 1607 – P | COMPUTER GRAPHICS LAB | - | - | 3 | 2 |
| 2 | CS 1608 – P | WEB TECHNOLOGY LAB | - | - | 3 | 2 |
| 3. | CS 1609 – P | LANGUAGE PROCESSOR LAB | - | - | 3 | 2 |
| 4. | CS 1610 – P | OBJECT ORIENTED AND SYSTEM DESIGN LAB | - | - | 3 | 2 |
| 5. | HS 1606 – P | GENERAL PROFICIENCY VI | - | - | - | 2 |
| **TOTAL** | **16** | **-** | **12** | **26** |

 **COMPUTER SCIENCE & ENGINEERING YEAR: IV SEMESTER: VII**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SL.****NO.** | **Course****No** | **Subject** | **Periods** | **Credit Points** |
| **THEORY** | L | T | P |  |
|
| 1. | CS 1701 | DATA MINING & DATA WARE HOUSING  | 3 | - | - | 3 |
| 2 | CS 1702 | VISUAL PROGRAMMING | 3 | - | - | 3 |
| 3. | CS 1703 | ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM | 3 | - | - | 3 |
| 4. |   | OPEN ELECTIVE- I. | 3 | - | - | 3 |
| 5. |   | PROFESSIONAL ELECTIVE –I | 3 | - | - | 3 |
| **PRACTICAL/DRAWING/DESIGN** |
| 1. | CS 1704 – P | DATA MINING LAB | - | - | 3 | 2 |
| 2 | CS 1705 – P | VISUAL PROGRAMMING LAB | - | - | 3 | 2 |
| 3. | CS 1706 – P  | ARTIFICIAL INTELLIGENCE LAB | - | - | 3 | 2 |
| 4. | CS 1707 – P | PROJECT- I | - | - | 3 | 2 |
| 5. | HS 1707 – P | GENERAL PROFICIENCY  | - | - | - | 2 |
| **TOTAL** | **15** | **-** | **12** | **25** |

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| --- | --- | --- |
| **ELECTIVES** | **SUBJECT CODE** | **SUBJECT NAME** |
| **OPEN ELECTIVE –I** | CS 2702 | SOFTWARE TECHNOLOGY  |
| HS 2720 | ENVIRONMENTAL ENGINEERING  |
| EC 2721 | DIGITAL SIGNAL PROCESSING  |
| CS2701  | E-COMMERCE & SECURITY |
| CS 2703 | ENTERPRISE RESOURSE PLANNING |
| EC 2720 | DIGITAL IMAGE PROCESSING |
| **PROFESSIONAL ELECTIVE –I** | CS 2711 | GRAPH THEORY |
| CS 2713 | SOFTWARE TESTING |
| CS 2715 | MULTIMEDIA TECHNOLOGY |
| CS 2710 | DISTRIBUTED OPERATING SYSTEM |
| CS 2712 | LINUX PROGRAMMING AND SYSTEM ADMINISTRATION |
| CS 2714 | NETWORK MANAGEMENT |

**COMPUTER SCIENCE & ENGINEERING YEAR: IV SEMESTER: VIII**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SL.****NO.** | **Course****No** | **Subject** |  **Periods** | **Credit Points** |
| **THEORY** | L | T | P |  |
|
| 1. | CS 1801 | CRYPTOGRAPHY & NETWORK SECURITY | 3 | - | - | 3 |
| 2 | HS 1801 | FINANCIAL MANAGEMENT AND ACCOUNTING | 3 | - | - | 3 |
| 3. |   | OPEN ELECTIVE II | 3 | - | - | 3 |
| 4. |   | PROFESSIONAL ELECTIVE II | 3 | - | - | 3 |
| 5. |   | PROFESSIONAL ELECTIVE III | 3 | - | - | 3 |
| **PRACTICAL/DRAWING/DESIGN** |
| 1. | CS 1802 – P | PROJECT II + COLLOQUIM | - | - | 12 | 6 |
| 2 | HS 1808 – P | GENERAL PROFICIENCY | - | - | - | 2 |
| **TOTAL** | **15** | **-** | **12** | **23** |

|  |  |  |
| --- | --- | --- |
|  **Electives** | **Subject Code** | **Subject Name** |
| **OPEN ELECTIVE –II** | HS 2811 | OPERATIONS RESEARCH & OPTIMIZATION TECHNIQUES |
| HS 2813 | VALUES & ETHICS PROFESSION  |
| HS 2810 | MANAGEMENT INFORMATION SYSTEM |
| CS 2801 | IT IN MARKETING MANAGEMENT |
| EC 2821 | WIRELESS COMMUNICATION |
| EC 2820 | BIO-INFORMATICS |
| **PROFESSIONAL ELECTIVE –II** | CS 2811 | SOFTWARE ARCHITECTURE |
| CS 2813 | COMPUTER VISION |
| CS 2810 | PRINCIPLES OF PROGRAMMING LANGUAGES |
| CS 2812 | CLOUD COMPUTING |
| CS 2814 | FIBRE NETWORKS |
| CS 2815 | PATTERN RECOGNITION  |
| **PROFESSIONAL ELECTIVE – III** | CS 2817 | PARALLEL & DISTRIBUTED COMPUTING  |
| CS 2816 | SOFT COMPUTING |
| CS 2819 | ADVANCE JAVA PROGRAMMING |
| CS 2818 | DECISION SUPPORT SYSTEM |
| CS 2821 | REAL TIME SYSTEMS  |
| CS 2820 | PARALLEL AND DISTRIBUTED SYSTEMS  |

**B. TECH COURSE STRUCTURE**

**COMMON TO ENGINEERING**

**BRANCHES**

**1ST & 2ND SEMESTER**

**RANCHI UNIVERSITY, RANCHI**

**HS 1101 ENGLISH FOR PROFESSIONAL COMMUNICATION**

 **UNITS NO. OF LECTURES**

**COMMUNICATION (5 LECTS)**

Role & Objectives Of Communication, Process of Communication, Element & Essentials of Communication, Flow of Communication, Barriers /Factors Inhibiting Communication, Verbal/Non-Verbal Communication, Kinesics/Body Languages, Style In Technical Communication, Communication Skills-Reading, Writing, Speaking, Listening& Talking.

**PROFESSIONAL WRITING (3 LECTS)**

Business Letters/Official Letters, Letter Writing Skills, Letter Writing Process, Letter Formats, Essentials of Letter Writing, Types Of Professional Letters, D.O Letter, Job Application and resume.

**GRAPHICS (1 LECT)**

Introduction, Planning of Graphics, Placing of Graphics, Construction of Graphics, Types of Graphics.

**PHONETICS & PHONOLOGY (8 LECTS)**

Organs of Speech/ Speech Mechanism, Phonetic Symbols, Consonant/Vowels/ Diphthongs-Classification, Stress Pattern/Intonation, Pronunciation Guidelines, Syllable/Syllable Division, Tones.

**REPORT WRITING (5 LECTS)**

Introduction & Important Features of Report, Types of Report, Structure &Layout Format, Language Style, Project Report, Laboratory Report, Industry Report, Socio Culture Report, Technical Report, Proposals –Nature,Significance Types,Structures.

**DISCUSSION SKILLS (3LECTS)**

Introduction, importance of group discussion, Process of group discussion Group discussion strategies, Interaction strategies, Individual, Contribution, Leadership skills, Team management, Creating a friendly co operative atmosphere.

**PRESENTATION SKILLS**

Nature And Importance of Presentation, Introduction And Meaning of Presentation, Planning Presentation, Objective With Central Idea, Main Ideas, Role of Supporting, Material –Steps, Handling Stages Fright

 **STUDY SKILLS (2LECTS)**

Note making, Mechanics of note making, Note writing techniques, Reduction device, Organizing techniques, Methods of sequencing, Summarizing & paragraph, Mechanics of summarizing, Summarizing techniques, Outlining & paraphrasing

**REFERENCING (2LECTS)**

Referencing Skills, Method of Referencing, Using Footnotes, Scanning Skills, Skimming Skills, Locating Books in the Library, Required Information/Meaning/Pronunciation.

 **SENTENCES (2LECTS)**

Requisites of Good Sentence Writing, Effective Sentence Structure, Sentence Building, Sentence Coherence, Use of Connectives, Sentence Emphasis/Sentence Theme, Development of Paragraph

 **PARAGRAPH WRITING (2LECTS)**

Paragraph Structure, Principles of Paragraph Writing, Paragraph length/ Coherence/ Division, Use of Modals/Connectives/Modifies, Punctuations & Spelling, Concord

**TELEPHONIC CONVERSATION** (**2LECTS)**

Introduction, Listening/speaking, Telephonic skills required Problems of telephonic conversations, Intensive listening

**LISTENING COMPHREHSION (2LECTS)**

To comprehend spoken materials in standard Indian, English/British English & American English, Current situation in India regarding English American English/British English

**INTERVIEW** (**2LECTS)**

The Interview process, Pre interview preparation techniques, projecting a positive image, Answering strategies.

**GENERAL PROFICIENCY**

G.P. classes are conducted for personality development of students. It includes Group Discussion, Presentation, Seminar, Quiz, C V Writing, Technical Report Writing and also inculcates Human Values and Professional Ethics. There will be assignments and class tests also.

**SYLLABUS OF ENGINEERING CHEMISTRY CH1101**

Adv. Atomic structure / Atoms

1. Basic ideas about de-Broglie’s ware equation, Heisenberg uncertainty principle, schrodinger wave equation (Derivation). Particle in a box illustrating energy quantization radial and angular part of H-atom. Wave functions/orbitals, probability and charge distribution.  **(4 period)**
2. Chemical bonding/chemical valency/ molecules.

Ionic bond, covalent bond, co-ordinate bond, vanderwalls forces & hydrogen bonding shape and geometry of species (Helfrich rule, VSEPERT & Hybridisation) and nature of species (VBT & MOT) of diatomic molecular.  **(4 period)**

1. Chemical kinetics / Reaction dynamics

Rate laws, molecularity & order of reaction, kinetic derivation of first and 2nd order of reaction with their half life period. Arrhenius equation for single and double temperature. Collision and transition state theory. **(3 period)**

1. Laser in chemistry

Explain laser in chemistry with their types **(2 period)**

1. Electrochemistry:

Nernst equation for electrode potential (Derivation), Application of electrode potentials to predicet redox reactions in solution with special reference in lattimer and frost diagrams. **(3 Period)**

1. Transition metal chemistry/Co-ordination chemistry

Nomenclature and isomerism of complex compounds. Theories of bonding in co-ordination compounds, Viz crystal field theory, Valence bond theory. Chelation. Application in organic synthesis. **(4 Period)**

1. Organometallic chemistry:

Introduction, structure and bonding in organometallic complexes. The eighteen and sixteen electron rules. **(3 period)**

1. Catalysis:

Introduction, types and characteristics of catalysis (Homogeneous, Heterogeneous, acid-base, auto and enzyme catalysis). The role of metals in catalysis cycles turning some chemical reaction (e. g. Hydrofirngalation, Hydrogenetion ) **(3Period)**

1. Role of metals in biology:

Oxygen carrier, electron transfer biologigical role of iron and copper.

**(2 Period)**

1. Structure and reactivity of organic molecules/organic chemistry:

Electron displacement effects (Inductive effect, Mesomeric effect or resonance hyper conjugation, electromeric effect, inductomeric effect)

Intermediate organic species based on carbon (free radicals, carbocations, carbanions, carbenes)

Types of organic reactions addition reaction, elimination reaction (E1 & E2 ) substitution reactions ( SN1 SN2, SNi)

Stereochemistry (introduction, Chirality, isomerism conformational analysis E-Z & R-S nomenclature) **(6 Period)**

1. Polymerisation;

Basic concepts, classification and industrial application **(2 Period)**

1. Photochemistry:

Introduction, fluorescence, phosphorescence, norrish type –I and II reaction, application of photosynthesis, photosynthem ( Z- diopram) chemistry of vision. Laws of phtochemistry. **(4 Period)**

**Reference Books:-**

1. Advance physical chemistry, Gurdeep Raj, Goel publishing house Meerut
2. Essentials of Physical Chemistry B. S. Bahal, S. chand and Company
3. Organic Chemistry Morrison Boyd
4. Advanced Inorganic Chemistry Gurdeep Raj
5. Engg. Chemistry Shashi Chawla, Dhanpat Rai and Com.
6. Engg. Chemistry Jain & Jain, Dhanpat Rai and Com.
7. Industrial Chemistry, B. K. Sharma, Goel publishing house Meerut

**PH 1101 ENGINEERING PHYSICS-I (3-1-0)**

**Module 1. Theory of Relativity**

Inertial frame of reference, Noninertial frames and fictitious forces, Outline of relativity, Michelson-Morley experiment, Lorentz transformation of space and time, Length contraction, variation of mass with velocity, Equivalence of mass and energy. **[6]**

**Module 2. Cardinal Points of Optical System**

Combination of thin lenses, Cardinal points of coaxial system of thin lenses, Thick lenses, Location and properties of cardinal points, Graphical construction of images. **[4]**

**Module 3. Interference of Light**

Analytical treatment of interference, Intensity distribution of fringes system, Coherent and Non-coherent sources, Fundamental conditions of interference, Fresnel’s biprism, Displacement of fringes, Wedge shaped films, Newton’s rings. **[5]**

**Module 4. Diffraction of Light**

Single slit and double slit diffraction, Diffraction grating, Limit of resolution, Resolving power of grating and image forming systems. **[4]**

**Module 5. Polarization of Light**

Brewster’s law, Double refraction, Geometry of calcite crystal, Optic axis, nicol prism, Circularly and elliptically polarized light, Retardation plates, Production and analysis of plane, circularly and elliptically polarized light, Polarimeter. **[5]**

**Module 6. Thermal Physics**

Kinetic theory of gases, Maxwellian distribution, Mean free path , Transport phenomena in gases, Imperfect gases and Vander waal’s equation of state. **[4]**

**Module 7. Accoustics**

Production and applications of Ultrasonics, Accousitcs of buildings. **[2]**

**Module 8. Dynamics of fluids**

Continuity equation, Bernoulli’s theorem and its applications, Torcelli’s theorem, Viscosity-flow of Liquid through a capillary tube , Capillaries in series and parallel, Stoke’s formula, Rotation viscometer. **[5]**

**Books Recommended**:

1. Optics, Ajoy Ghatak, Tata Mc: Graw- HILL Publising Company Co. , New Delhi.
2. Relativistic Mechanics, Satya Prakash , Pragati Prakasan , Meerut.
3. Heat and thermodynamics, P. K. Chakrawarty, Hindustan Publishing Concern.

MH 1101 **Mathematics-I**

**Unit-1**

Differentiation of functions of one variable:- Successive differentiation, Leibnitz Theorem( without proof), Rolle’s Theorem ,Lagrange’s Mean Value Theorem, Taylor’s Theorem and Expansions of functions into Taylor’s and Maclaurin’s Series. **(05 Classes)**

**Unit-2**

Calculus of function of several variables:-Partial Derivatives, Chain Rule, Differentiation of implicit function, Total Differentials, Euler’s Theorem. **(05 Classes)**

**Unit-3**

Maxima and Minima:-Maxima and Minima of function of two Variables, Method of Lagrange’s Multiplier’s. **(02 Classes)**

**Unit-4**

Integral Calculus:-Elementary Reduction formula for Integral, Integration as a Limit of Sum, Problems on Length, Area, Volume and surface area of revolutions. **(08 Classes)**

**Unit-5**

Multiple Integral:-Double and Triple Integral, Change of Order of Integration, Jacobian, Applications to Areas and Volume. **(05 Classes)**

**Unit-6**

Differentiation of Vector:- Scalar and Vector point Function, Gradient Divergence and Curl. **(03 Classes)**

**Unit-7**

Integration of Vectors:-Line Integral and surface Integral, Greens Theorem, Gauss Divergence Theorem and Stoke’s Theorem (without proof) and their simple applications. **(05 Classes)**

**Unit-8:**

Infinite Series:- Convergence and Divergence of Series, Comparison Test, Ratio Test, Cauchy’s root test, Leibnitz Rule, Absolute and Conditionally convergence. **(06 Classes)**

**Reference Books**:-

 1. Advanced Mathematics for Engineers, by “Erwin Kreyszig”(Wiley Eastern Publication)

 2. Higher Engineering Mathematics, by “B.S.Grewal” ( Khanna Publication)

 3. Engineering Mathematics, by “ S.S.Shastri” (PHI Publication)

 4.Advance Mathematics for Engineer,by’Gorakh Prasad”(Torrent Publication).

**1st Semester**

**ME 1101 ENGINEERING MECHANICS (3-1-0)**

**Fundamentals of Mechanics – Basic concepts (5 Lectures)**

**Force Systems and Equilibrium**Force,Moment and couple, Principle of Transmissibility, Varignon’s theorem, Resultant of force system- Concurrent and non- concurrent coplanar forces, Free body diagram, Equilibrium equations and their uses in solving elementary engineering problems. **(5 Lectures)**

**Plane Trusses (5 Lectures)**The structural model, simple trusses, analysis of simple trusses: method of joints, method of sections, graphical method.

**Friction (5 Lectures)**Introduction, laws of coulomb friction, simple contact friction problems, belt friction, the square screw thread, rolling resistance.

**Properties of Surfaces (5 Lectures)**First moment of an area and centroid, Second moment and product of area of a plane area, transfer theorems, relation between second moment and product of area, polar moment of inertia, principal axes, mass moment of inertia.

**Virtual work (5 Lectures)**Work of a force, Principle of Virtual work and its application.

**Kinematic of Rigid bodies (5 Lectures)**Plane motion, Absolute motion, Relative motion, Translating axes and rotating axes.

**Kinetics of Rigid bodies (5 Lectures)**Plane motion, Work energy, Impulse and momentum.

**Suggested Text Books & References:-**

* Mechanics for Engineering ,Beer F.P. and Johnson F.R. , Mc Graw Hill
* Engineering Mechanics, Timoshenko ,Young & Rao , TMH
* “Engineering Mechanics,Dr. R.K. Bansal ,Laxmi Publications
* “Engineering mechanics, R.S. Khurmi ,
* “Engineering Mechanics,Dr. V.M. Domkundwar , Dhanpat Rai Publications
* Engineering mechanics”, I.H Shames & Rao , Prentice Hall of India
* Engineering mechanics, Dr. D. S. Kumar , Kataria & sons

**Semester I**

**EE 1101 - BASIC ELECTRICAL ENGINEERING (3-1-0)**

**DC Networks**

Kirchoff’s laws, node voltage and mesh current methods; Delta-star and star-delta conversion; Classification of Network Elements, Superposition principle, Thevenin’s and Norton’s theorems. **4Hrs**

**Single Phase AC Circuits**

Single phase EMF generation, average and effective values of sinusoids; Solution of R,L,C series circuits, the j operator, complex representation of impedances; Phasor diagram, power factor, power in complex notation; Solution of series, parallel and series- parallel circuits. **6Hrs**

**Three Phase AC Circuits**

Three phase EMF generation, delta and Y- connection, line and phase quantities; Solution of three phase circuits balanced supply voltage and balanced load; Phasor diagram, measurement of power in three phase circuits; three phase four wire circuits.

 **6Hrs**

**Magnetic Circuits**

Ampere’s circuital law, B-H curve, solution of magnetic circuits, Hysteresis and eddy current losses. **4Hrs** **Transformers**

Construction, EMF equation, ratings; Phasor diagram on no load and full load; Equivalent circuit, regulation and efficiency calculations; Open and short circuit test,

 Three phase transformers. **4Hrs**

**Induction Motors**

The revolving magnetic field, principle of operation, ratings; Equivalent circuit; Torque-speed characteristics; **4Hrs**

**DC Machines**

Construction, EMF and Torque equations; Characteristics of DC generators and motors; Speed control of DC motors and DC motor stators; Armature reaction and communication. **4Hrs**

**Electrical Measuring Instruments**

DC PMMC instruments, shunts and multipliers, multi-meters, Moving iron ammeters and voltmeters, Extension of instrument ranges. **4Hrs**

**Power Supply Systems (Introductory)**

General structure of electrical power systems; power transmission and distribution via overhead lines and underground cables, steam, hydro, gas and nuclear power generation. **4Hrs**

**Suggested text books & references**

1 ”Basic Electrical” Mittal & Mittal, Tata McGraw Hill

2 “Theory and Practice of Basic Electrical Engg.” Kothari & Nagraaj ,Prentice Hall of India

3 “Basic Electrical Engg.” G.K. Lal, 3-D Publication

4 ”Fundamental of Electrical Engg.” Ashfaq Hussain, Dhanpat Rai Publication.

**SYLLABUS OF ENGINEERING CHEMISTRY OF PRACTICAL PAPERS**

**CH1102-P**

1. Acide – base titration (estimation of commercial caustic soda).
2. Redox titration (estimation of iron using permanganometry)
3. Perparation and analysis of a metal complex (for example thiourea/copper sulfate or nickel chloride/ammonia complexes.
4. Chemical kinetics (determination of relative rates of reaction of iodide with H2O2 at room temperature (clock reaction)
5. Heterogeneous equilibrium (determination of partition coefficient of acetic acid between n-butanol and water.
6. Photochemical oxidation-reduction(study of Photochemical reduction of ferric salt)
7. Viscosity of solutions (determination of percentage composition of sugar solution from viscosity)
8. Synthesis of aspirin
9. Synthesis of P-nitro aniline from acetanilide.
10. Detection of functional groups in organic compounds.
11. Radical polymerization of vinyl monomers such as styrene, acrylonitrile etc.
12. Conductometric titration (determination of the strength of a given HCL solution by titration against a standard NaOH solution.

**Reference Books:-**

1. Essentials of experimental Engg. Chemistry by Shashi Chawla & Dhanpat Rai & Company.

**PH1102-P ENGINEERING PHYSICS-1**

**List of Experiment**

* To determine the coefficient of viscosity of water by capillary flow.
* To determine the thermal conductivity of a bad and good conductor by Lee’s method and Searl’s methods respectively.
* To determine the wave length of light by Newton’s ring method.
* To determine the wave length of light by Fresnel’s biprism.
* To determine the dispersive power of the given material of the prism.
* To determine the focal length of light combination of two thin lenses by nodal slide assembly and its verification.
* Determination of c/m by J. J. Thomson’s method.
* Measurement of thermo emf between different types of thermocouples as a function of temperature difference between the junction, measurement of an unknown temperature.
* Use of Carry Foster Bridge.
* Study of electromagnetic Induction.
* Study of electromagnetic damping and determination of terminal velocity reached by magnet falling in a metallic tube.
* Study of electromagnetic damping and determination of terminal velocity reached by magnet falling in a metallic tube.
* Study of L.C.R circuits with AC circuits.
* Determination of Plancks’s constant using photocells.

**ME 1102-P ENGINEERING MECHANICS (0-0-3/2)**

**List of Experiments**

To determine the Newton’s second law of motion by Fletcher’s trolley apparatus.
To determine the moment of inertia of a flywheel about its axis of rotation.
To verify: (a) The condition of equilibrium of forces by parallel force apparatus.
 (b) The principal of moments by crank lever.
To determine the dry friction between inclined plane and slide boxes of different materials.
To determine the coefficient of friction between the belt and rope and the fixed pulley.
To determine the velocity ratio of a simple screw jack and to plot graph between
 (a) Effort- Load
 (b) Friction-Load
 (c) Efficiency- Load.
To measure the area of a figure with the help of a Polar Planimeter.

**Semester I**

**EE 1102-P – Basic Electrical Engineering (0-0-3/2)**

**List of Experiments**

* To measure the armature and field resistance of a DC machine.
* To calibrate a test (moving iron) ammeter and a (dynamometer) wattmeter with respect to standard (DCPMMC) ammeter and voltmeters.
* Verification of circuit theorems, Thevenin’s and Superposition theorems (with DC Sources only).
* Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of
fuse wire.
* Measurement of current, voltages and power in R-L-C series circuit excited by (single phase) AC
supply.
* Open circuit and short circuit tests on a single – phase transformer.
* Connection and starting of a three – phase induction motor using direct online (DOL) or star – delta starter.
* Connection & measurement of power consumption of a fluorescent lamp.
* Determination of open circuit characteristics (OCC) of a DC machine.
* Starting and speed control of a DC shunt motor.
* Connection andtesting of a single - phase energy meter (unity power factor load only).
* Two – wattmeter method of measuring power in three – phase circuit (resistive load only).

**1st semester**

**ED 1101-P ENGINEERING GRAPHICS – I (0-0-3)**

 **General**

Importance, Significance & scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, B.I.S. Specifications. **(5 Lectures)**

**Projections of Points & Lines**

Introduction of planes of projection, Reference and auxiliary planes, projections of points and lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on auxiliary planes,
shortest distance, intersecting and non- intersecting lines. **(5 Lectures)**

**Planes Other than the Reference Planes**

Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., projections of points and lines lying in the planes, conversion of oblique plane into auxiliary plane and solutions of related problems. **(5 Lectures)**

**Projections of Plane Figures**

Different cases of plane figures (of different shapes), making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one or both reference planes, Obtaining true shape of the plane figure by projection. **(5 Lectures)**

**Projection of Solids**

Simple cases when solid are placed in different positions, Axis faces and lines lying in the faces of the solid making given angles. **(5 Lectures)**

**Development of Surface (5 Lectures)**

Development of simple objects with & without sectioning.

**Isometric Projection (5 Lectures)**

Nomography

Basic concepts and uses

**1st and 2nd semester**

**WP 1101 – P WORKSHOP PRACTICE I & II (0-0-3)**

**Carpentry:** Definition, engineering applications, seasoning and preservation, plywood and plyboards.
**Foundry:**  Moulding sands, constituents and characteristics, Pattern, definition, materials, types, core prints Role of gate, runner, riser, core and chaplets, Causes and remedies of some common casting defects like blow holes, cavities, inclusions.
**Metal Joining:** Definition of welding, brazing & soldering processes and their applications, Oxy – acetylene gas welding process, equipment and techniques, types of flames and their applications, Manual metal are welding techniques and equipments, AC & DC welding, electrodes, constituents and functions of electrode coating, Welding positions, Type of weld joint, common welding defects such as cracks, undercutting, slag inclusions, porosity.
**Metal Cutting:** Introduction to machining and common machining operations. Cutting tool materials, Definition of machine tools, specification and block diagram of lathe, Shaper, drilling machine & grinder, Common
Lathe operations such as turning, chamfering and facing, Quick return mechanism of shaper, Difference between drilling and boring, Files – material and classification.
**Forging:** Forging principle, materials, operations like drawing, upsetting, bending and forge welding, use of forged parts.
**List of Jobs to be made in the workshop
Group A**1. T – Lap joint and Bridle joint (Carpentry shop)
2. Mould of any pattern (Foundry shop)
3. Casting of any simple pattern (Foundry shop)
**Group B**1. (a) Gas welding practice by student on mild steel flat
 (b) Lap joint by Gas Welding
2. (a) MMA Welding practice by students
 (b) Square butt joint by MMA Welding
3. (a) Lap joint by MMA Welding
 (b) Demonstration of brazing
4. Tin smithy for making mechanical joint and soldering of joints.
**Group C**
1. Job on lathe with one step turning and chamfering operations
2. Job on shaper for finishing two sides of a job
3. (a) Drilling two holes of size 5 & 12 mm diameter on job used/to be used for shaping
 (b) Grinding a corner of above job on bench grinder
4. Finishing of two sides of a square piece by filling

**(CS 1201) INTRODUCTION TO COMPUTING**

**Module I [5 Hrs]**

Fundamentals of Computer:

History of Computer, Generation of Computer, Classification of Computers

Basic Anatomy of Computer System, Primary & Secondary Memory, Processing Unit, Input & Output devices

**Module II [6 Hrs]**

Number systems representation of signed and unsigned numbers, BCD, ASCII, Binary, Arithmetic & logic gates.

Assembly language, high level language, compiler and assembler (basic concepts)

**Module III [4 Hrs]**

Basic concepts of operating systems like MS DOS, MS WINDOW, UNIX.

Introduction to typesetting software such as Microsoft office, Introduction to emails, FTP, R-login, Network Services, Internet.

**Module IV [20 Hrs]**

Concepts of Algorithm & flow chart, notion of programs, programmability and programming languages.

Structure of programs, object codes.

Introduction to Programming Languages - BASIC, FORTRAN and PASCAL.

**Text Books:**

Kerninghan, B.W. The Elements of Programming Style

Gottfried Programming with Pascal, Shaum Series, TMH

Rajaraman V. Fundamental of Computers

**Reference Books:**

Kerninghan B.W. & Ritchie D.M. The C Programming Language

Balaguruswamy Programming in C

M.M.Oka Computer Fundamentals, EPH

Leon Introduction to Computers, Vikas

Leon Fundamental of Information Technology, Vikas

*ENVIRONMENT & ECOLOGY* (CH1201)

***Unit – I*** **4 Lecture**

1. Environment:

Definition Components of Environment importance of study, Environmental degradation and human activity.

***Unit – II***

1. Ecology: **5 Lecture**

Definition elements of Ecology, Scope/object of Ecology, Different kind of Ecosystem (structure & function), Principles of Environmental impacts assessment.

***Unit – III*** **5 Lecture**

1. Air Pollution:

Atmospheric composition, energy balance, climate, weather, dispersion, soures and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures.

1. Water pollution:

Hydrosphere, natural water , pollutants their origin and effects river/lake/ground water pollution standards and control

***Unit – IV*** **4 Lecture**

1. Land pollution:

Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid waste) their origin and effects, collection and disposal of solid waste, recovery and conversion methods.

1. Noise Pollution

Sources, effects standards and control

***Unit – V*** **5 Lecture**

1. Energy:

Definition different kind of sources of energy (conventional & nonconventional) and its impact on environment. Solar, Biomass, Bio-gas, hydrogen as an alternative Future source of energy.

***Unit – VI*** **6 Lecture**

Current environmental issues of importance population growth, climate change and/or Global warming – definition and its effect, Acid Rain, ozone layer Depletion

***Unit – VII*** **3 Lecture**

Environmental protection – Role of Government and Civilians. Environmental education.

***Unit – VIII*** **3 Lecture**

 Solid Waste Management – Definition and methodology.

Reference:-

1. Environmental Chemistry B. K. Sharma
2. Environmental Studies by Ritu Bir, Vayu education of India.
3. Environmental Studies by S. Deswal, A. Deswal, Dhanpat Rai & company.

**PH 1201 ENGINEERING PHYSICS-II (3-0-0)**

**Module 1. Vector analysis**

Scalar and vector fields, Gradient of a scalar field, Divergence and curl of vector fields, Line integral of a vector field, Gauss-divergence theorem, Stoke’s theorem. **[5]**

**Module 2. Electrostatics**

Quantization & conservation of charge, Coulomb’s law (vectorial form) and superposition principle, Concept of electric field lines, flux of electric field, Gauss’s law, Electric Potential and potential energy, Conductors, Capacitors and dielectric materials. **[5]**

**Module 3. Electromagnetism**

Magnetic field, Force on a moving charge in a magnetic field, Force on a current element, Torque on current loop, Biot-Savart law, Ampere’s circuital law, Electromagnetic induction and Faraday’s law, Magnetism in materials, Maxwell’s equations, Electromagnetic Waves. **[7]**

**Module 4. Thermoelectricity**

Seebeck effect, Law of successive temperatures, Law of intermediate metals, Peltier effect, Thomson effect, Thermoelectric power, Application of thermodynamics on thermocouple. **[6]**

**Module 5. Matter waves**

Elements of wave properties of particles**,** Elements of particle properties of waves, Nuclear Energy. **[3]**

**Module 6. Laser**

Spontaneous and Stimulated emission of radiation, Einstein coefficient, Parts of laser, Types of laser and their application. **[3]**

**Module 7. Energy Bands and charge carrier in semiconductors**

Energy band diagram, Covalent bonds, Bound and free electrons, Holes, Electron and hole mobilities, Intrinsic and extrinsic semiconductors, Fermi and impurity levels. **[3]**

**Module 8. Conductivity in semiconductors**

Impurity compensation, Charge neutrality equation and semiconductors conductivity, Einstein relation, Drift and diffusion current, Photo conductivity and Hall effect. **[3]**

Books Recommended:

1. Mathew N.O. Sadiku ( SAD), Elements of Electromagnetics, Oxford University Press(2001).
2. Arthur Beiser (AB), Concept of Modern Physics, 6th edition 2009, Tata McGraw- Hill.
3. Halliday, Resnick, Walker , Fundamentals of Physics 6/e, John Wiley & Sons 2004.
4. Streetman and Banerjee, Solid State Electronic Devices, PHI Publication india.

MH 1201 **Mathematics-II**

**Unit-1**

Matrices and Determinant:-Review and operation on Determinant and Matrices, Rank of a Matrix, Elementary Transformations, Reduction to Normal form, Solution of simultaneous Equations, Gauss Jordan Method. Cayley Hamilton’s Theorem, Eigen Values and Eigen Vectors. **(05 Classes)**

**Unit-2**

Vector Space:- Definition, Linear dependence and linear independence of vectors. **(03 Classes)**

**Unit-3**

First Order Ordinary Linear differential Equation:- Method of solution of first order differential equations (Types: Variable Separable, Homogeneous and non Homogeneous differential equations, linear differential equations, Bernoulli’s differential equations and Exact differential equations. **(06Classes)**

**Unit-4**

Higher Order Linear differential equation:- Solution of Higher Order linear differential equations with constant coefficient, Method of Variation of Parameters, Cauchy’s Homogeneous and Legendre differential equations. **(06 Classes)**

**Unit-5**

Laplace Transformations:-Definition, Existence of Laplace Transform, Laplace Transform of Basic and Periodic function, Shifting Theorems, Properties of Laplace Transformations **(05 Classes)**

**Unit-6**

Laplace Inverse Transformation:- Laplace Inverse Transformation of basic functions, Convolution theorem, Laplace Transform of Unit Step function and Unit Impulse function, Application of Laplace Transformation to differential equations. **(05 Classes)**

**Unit-7**

Numerical Analysis:-Operators ($∆,∇,μ,δ$,*Е*) and relation between operators, Factorial Polynomial. **(03 Classes)**

**Unit-8:**

Interpolation and Extrapolation:- Newton’s Forward and Backward Formula, Lagrange’s Interpolation formula and Newton’s divided difference formula for unequal intervals, Numerical Differentiation and Numerical Integration (Newton’s cote’s Method, Trapezoidal rule, Simpson’s $\frac{1}{3}$rule and $\frac{3}{8}$rule). **(06 Classes)**

**Reference Books**:-

 1. Advanced Mathematics for Engineers, by “Erwin Kreyszig”(Wiley Eastern Publication)

 2. Higher Engineering Mathematics, by “B.S.Grewal”( Khanna Publication)

 3. Introductory Method of Numerical Analysis, by “ S.S.Shastri” (PHI Publication)

 4. Advance Mathematics for Engineer,by’Gorakh Prasad”(Torrent Publication).

**Semester II**

**ME1201 ENGINEERING THERMODYNAMICS (3-1-0)**

**Fundamentals and definition (5 Lectures)**System, properties, state, state change, diagram, Dimension and units

**Work mechanism and thermodynamics (6 Lectures)**Definitions, Displacement work at part of a system boundary, Engine indicator, Displacement work in various quasi static processes, Shaft work, electrical work, Heat, temperature, thermal equilibrium, Zeroth law of thermodynamics, sign convention for heat transfer.

**First law of thermodynamic (5 Lectures)**Statement, application to non cyclic and cyclic process, Energy, mode of energy, pure substances, specific heats, and first law applied to flow processes.

**Second law of thermodynamics (5 Lectures)**Direct and reversed heat engine, Kelvin – Plancks and clausius statement of second law and their equality, reversible and irreversible process, Carnot cycle, carnot Theorem, thermodynamic temperature scale.

**Entropy (5 Lectures)**Definition, calculation through T – ds relation, T – S diagrams, entropy as a measure of irreversibility, Clausius inequality

**Properties of pure substances including steam tables and Mollier diagram
 (5 Lectures)

Psychometrics: (5 Lectures)**Properties of ideal gas and ideal gas mixture with a condensable vapour.

Second law analysis of engineering processes, Avaibility and irreversibility and their application in thermal engineering. **(4 Lectures)**

**Suggested Text Books & References:-**

* Engineering Thermodynamics - R.K.Rajput ,Laxmi Publications
* Engineering Thermodynamics - P.K.Nag ,TMH
* Thermal Science & Engineering - Dr. D.S. Kumar , Kataria & sons
* Thermal Engineering-D r. P. L. Ballaney , Khanna Publication

**EC 1201**

**Semester - II**

**Basic Electronics**

**(3 – 0 – 0)**

**Module – I [10 Hrs]**

Introduction Ideal diode, Introduction to P – N Junction diodes, Characteristics of semiconductor diode, analysis of simple diode circuits, DC and AC load lines, Zener diodes its characteristics and application.

**Module – II [6 Hrs]**

Application of Rectifier diode, Half wave & Full wave Rectifier, L, C, L – C & π Filter clipper and clamper Circuits, Voltage multiplier Circuit

**Module – III [7 Hrs]**

Introduction to BJT, Transistor operation Common Base, Common Collector, Common Emitter configuration, Transistor dc load line, JFETs & MOSFETs, Depletion type MOSFET & Enhancement type MOSFET

**Module – IV [4 Hrs]**

OP – AMP: Introduction, Differential &Common mode operation, virtual ground, inverting & non inverting amplifier, Adder, Subtractor, integrator, differentiator, buffer

**Module - V [4 Hrs]**

Semiconductor Devices: Introduction to SCR, DIAC, TRIAC, GTO, UJT

**Module – VI [2 Hrs]**

CRO: Introduction, Cathode Ray tube – theory and construction

**Suggested Text Books and References Books:**

* Millman and Halkias, “ Integrated and Electronics”, Tata Mc Graw Hill
* Nashelesky & Boylstead, “ Electronic Devices & Circuit Theory”, Prentice Hall of India
* D. Chattopadhay & P.C. Rakshit, “ Electronics Fundamentals and Applications”, New Age International

**EC 1202 - P**

**Basic Electronics Lab**

 **(0-0-3)**

**List of Experiments:**

* Characteristics curve for Common Base, Common Emitter & Common Collector Transistors.
* Characteristics of Field Effect Transistor.
* Verification of properties of Operational Amplifiers (Inverting, Non Inverting, Differential, Adder, Integrator, Differentiator).
* Study of CRO. (Measurement of Frequency & Amplitude of Sinusoidal, Triangular & Square Wave Signals).
* Study of working of Data Acquisition system.

**(CS 1202 – P) LAB ASSIGNMENT**

1. DOS System commands and Editors

2. UNIX system commands and vi

3. Simple Programs: simple and compound interest. To check whether a given number is a palindrome or not, evaluate summation series, factorial of a number , generate Pascal’s triangle, find roots of a quadratic equation

4. Programs to demonstrate control structure: text processing, use of break and continue, etc.

5. Programs involving functions and recursion

6. Programs involving the use of arrays with subscripts and pointers

7. Programs using structures and files

**ED1202-P ENGINEERING GRAPHICS – II ( M/c Drawings) (0-0-3)**

**Shape Description (External)**

Multiplanar representation in first and third angle systems of projections, glass box concept, sketching of orthographic views from pictorial views, precedence of lines

Sketching of pictorial (isometric and oblique) views from Multiplanar orthographic views, Reading exercise, Missing line and missing view exercises.

**Shape Description (Internal)**

Importance of sectioning, principles of sectioning, types of sections, cutting plane representation, section lines, conventional practices.

**Size Description**

Dimensioning, tools of dimensioning, Size and location dimensions, Principles and conventions of dimensioning, dimensioning exercises.

**Computer Aided Drafting**

Basic concepts and use.

**Screw Threads**

Different type of threads , Assembly drawing of nut and bolt.

**Joints and couplings**

Cotter joints and Knuckle joint , Flanged coplings

**B. TECH COURSE STRUCTURE**

**COMPUTER SCIENCE & ENGINEERING**

**3RD SEMESTER**

**RANCHI UNIVERSITY, RANCHI**

**(HS1301) ENGINEERING ECONOMICS**

**Module 1 [5]**

**Microeconomics**

Demand Theory & Demand Forecasting. Production Theory, cast Theory, X – Inefficiency.

**Module II [8]**

**Market Dynamics**

Forms of Market, Elements of Competition, Perfect Competition, Monopoly & Prince Discrimination, Imperfect Competition Oligopoly.

**Module III [12]**

**Pricing Policies** Profit Concepts & Measurements, Entry Deterring Pricing, Predatory Pricing, Implicit Price Fixing, Multiproduct pricing, peak Load Pricing, Two part Tariff, Product Life Cycle., Information Problems and Associated cost.

**Firms as an Organization**

Objectives of the Firm, Type of the Form,. Firm versus markets, Uncertainty and Firm, Vertical and Horizontal Integration, Diversification, merges and Takeover’s

**Module IV [10]**

**Macroeconomics** Macroeconomics Aggregates and concepts, Simple macroeconomics Model, Business Cycle, Inflation , Unemployment, Input Output Analysis.

**Text Books :**

* Suma Damodaran “Managerial Economics” Oxford Publication
* Diwedi D.N “Managerial Economics” Vikas Publication

**Reference Books :**

* Gupta G.S “ Managerial Economics”
* Davis, H. “Managerial Economics”, ELBS – Pitman
* Mote. V. N Samual Paul & G.S Gupta “Managerial Economics: Concept and Cases”. Tata McGraw Hill Co. Ltd,. New Delhi
* Ramakrishnan Rao T.V.S. “Theory of Firms: Economics and Managerial Aspects “, Affiliated East West Press Pvt. Ltd. New Delhi
* Joel Dean, “Managerial Economics”, Prentice Hall

**(CS1301) COMPUTER PROGRAMMING**

**Unit 1 : [5 Hrs]**

***Introduction :*** Overview of computer components and their function, computer languages, problem analysis, flow-charts, decision tables, pseudo-codes algorithm, stepwise refinements.

***C fundamentals :*** The C character set, Token, Identifiers and Keywords, Constants, Variables and Data types, Declaration of variables, Assigning values to variables, Symbolic constants.

**Unit 2 : [4 Hrs]**

***Operators and Expression* :** Arithmetic operators, Unary operators, Relational and Logical operators, Assignment operators, Conditional operators, Bitwise operators, Special operators, Library functions.

***Data inputs and Output* :** Reading a character, Writing a character, Formatted Input/output.

**Unit 3 : [4 Hrs]**

***Decision Making, Branching and Looping :*** if statement, if..else statement, nesting of if..else statement , else..if ladder, switch statement, the ? operator, goto statement

**Unit 4 : [4 Hrs]**

WHILE statement, DO statement, FOR statement, Nested Loop control, the break statement, jumps in loops

**Unit 5 : [5 Hrs]**

***Arrays & Strings* :** Defining an array, Processing an array, Multidimensional array, Declaring and initializing a string, reading and writing a string, Arithmetic operations on characters, string handling function, Table of strings.

**Unit 6 : [5 Hrs]**

***Functions :*** A brief overview, defining a function, Accessing a function, Function prototype, Passing argument to a function, Recursion, Storage classes, Automatic variables, External(Global) variables, Static variables, Multifile programs.

**Unit 7 : [4 Hrs]**

***Structure and Pointers*** : Introduction to structure and pointers.

**Unit 8 : [4 Hrs]**

***File Management :*** Defining and opening a file, closing a file, input/output operations on files.

**Text Books :**

* Gottfried, B. S. “*Programming with C*”, Tata McGraw Hill Publication

**References Books :**

* Ritchie & Kernighan “C Programming Language” Prentice Hall
* Balaguruswamy, E. “*Programming in C*”, Tata McGraw Hill Publication.
* Venugopal, K.R “*Programming in C*” Tata McGraw Hill
* Theraja, Reema. “Programming in C” Oxford University Press

**(CS 1302) COMPUTER ORGANISATION & ARCHITECTURE**

**MODULE 1. [5 Hrs]**

Number systems, integer and floating point representation, character codes (ASCII, EBCDIC), Error detection & correction codes.

 **MODULE 2. [8 Hrs]**

Basic building block, Boolean algebra, combinational logic design, Flip-flops, Counters, Registers.

**MODULE 3. [5 Hrs]**

ALU, Arithmetic and logic Operations, Faster algorithms and their implementations.

**MODULE 4. [6 Hrs]**

Memory Organization, Basic Concepts, Memory device characteristics, Organisation and characteristic of floppy disk, hard disk, magnetic tape and compact disk, Memory controllers.

**MODULE 5. [5 Hrs]**

Organisation of Control MODULE s (Hardwired and Micro-programmed), microprogramming organisation

**MODULE 6. [8 Hrs]**

Peripheral devices: I/O devices (tape and disks), Programmed and Interrupt control mechanisms, I/O Controllers, Bus bandwidths.

**MODULE 7. [10 Hrs]**

Assembly Language Programming : Programming model of a machine, Example of a typical 16 to 32 bit processor, Registers , addressing modes, instruction set, use of assembly language for specific programs for typical programs like : Table search, subroutine symbolic and numeric manipulations

* + - * **Text Books :**
* Hayes, “*Computer Architecture and Organization”*, McGraw Hill Pub.
* Zaky, “*Computer Organization”,* McGraw Hill Pub.
* Donovan J. J “*System programming*”, Tata McGraw Hill
* **Reference Books :**
	+ Henssey and Patterson, “*Computer Architecture a quantitative* *Approach”*

 Morgan and Kaufman Pub.

* + Moris Mano, “*Computer Architecture and Organization”*, PHI.
	+ Stone, “*Introduction to computer organization and Data Structure”,* McGraw

 Hill Pub.

**(CS1303) SYSTEM SOFTWARE**

**MODULE – I [4 Hrs]**

**Introduction :**

System Software, Goals of System Software, System Programs and System Programming, The Wonderland of System Software , Views of System Software.

**Overview of Language Processors :**

Programming Languages and Language Processors , Language Processing Activities , Fundamentals of Language Processing , Symbol Tables.

**MODULE –II [5 Hrs]**

**Assemblers:**

Elements of Assembly Language Programming , A Simple Assembly Scheme , Pass Structure of Assemblers , Design of a Two- Pass Assembler , A Single Pass Assembler For Intel ×86 Family Processors.

**Interpreters :**

Benefits and overview of Interpretation, Language Java Environment,

**MODULE –III [4 Hrs]**

**Macros And Macro Preprocessors :**

Introduction, Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design of a Macro Preprocessor.

**MODULE –IV [4 Hrs]**

**Linkers And Loaders :**

Introduction, Relocation And Linking Concepts, Design of A Linker, Self-Relocating Programs, Linking In Ms-Dos, Linking of Overlay Structured Programs, Dynamic Linking, Loaders.

**MODULE –V [5 Hrs]**

**Compilers :**

Causes of A Large Semantic Gap, Binding And Binding Times, Data Structures Used In Compilers, Scope Rules, Memory Allocation, Compilation Of Expression, Compilation Of Control Structures, Code Optimization.

**MODULE –VI [3 Hrs]**

**Software Tools :**

A Software Tools?, Software Tools For Program Development, Editors, Debug Monitors, Programming Environments, User Interfaces

**MODULE –VII [5 Hrs]**

**Overview of Operating System :**

Fundamental Principles of Os Operation, The Computer, Os Interaction With The Computer And User Programs, Structure of Operating Systems, Computing Environments and Nature of Computations, Classes of Operating Systems, Batch Processing Systems, Multiprogramming Systems, Time Sharing Systems, Real Time Operating System, Multiprocessor Operating System, Distributed Operating System, Virtual Machine Operating System, Modern Operating Systems.

**MODULE –VIII [5 Hrs]**

**Memory Management :**

Managing the Memory Hierarchy, Memory Allocation to a Process, Contiguous Memory Allocation, Virtual Memory, Virtual Memory Using Paging

**Text Books:**

* Donovan J. J “*System programming*” Tata McGraw Hill Publishers
* Dhamdhare, D.M., “*Introduction to System Software*”, Tata McGraw Hill Publishers Comp. 1986.

**Reference Book :**

* Dhamdhare “*System Programming & O.S*”, TMH

**MH 1303 Mathematics-III**  **(3-1-0)**

**(Common to C.Sc. and IT, Branch)**

**Unit-1**

Fourier series:- Periodic Functions, Euler’s Formula, Fourier Series of Periodic Function, Fourier Series of discontinuous functions, Change of Interval, Half range series, Harmonic Analysis.

**(05 Classes)**

**Unit-2**

Series solutions:-Series solution of Second order Ordinary differential Equation, Bessel’s functions and its solution, Recurrence relations of Bessel’s functions ,Orthogonality properties of Bessel’s functions. **(05 Classes)**

 **Unit-3**

Legendre Equations and its solutions, Rodrigue’s Formula, Recurrence relations of Legendre equations, Legendre’s Polynomial. Orthogonality properties of Legendre Equations. **(02 Classes)**

**Unit-4**

Complex Variable:- Differentiation, Analytic functions,Cauchy-Riemann’s Equations. **(03 Classes)**

**Unit-5**

Conformal mapping:- Bilinear Transformations, w=zn ,w=sinz,w=ez,w=z+$\frac{1}{z}$ . **(02 Classes)**

**Unit-6**

Complex Integration:- Complex Integration, Cauchy’s Integral Theorem, Cauchy’s Integral Formula, Taylor’s and Lorentz’s Expansion, Zeros ,Poles and Residues, Cauchy’s residues Theorem, Contour Integration of trigonometric functions and algebraic functions without a pole on real axis. **(06 Classes)**

**Unit-7**

Partial differential equation:-Linear and non-linear partial differential equations of first order, four standard forms.  **(04 Classes)**

**Unit-8:**

Fourier Transform:- Fourier Integral Transform, Fourier Transform, Convolution theorem and Inversion .Formula of Fourier transform. **(06 Classes)**

**Reference Books**:-

 1. Advanced Mathematics for Engineers, by “Erwin Kreyszig”(Wiley Eastern Publication)

2. Higher Engineering Mathematics, by “B.S.Grewal”( Khanna Publication)

3. Engineering Mathematics, by “ S.S.Shastri” (PHI Publication) or by N.P.Bali (Laxmi Publicaton)

4. Advance Mathematics for Engineer,by’Gorakh Prasad”(Torrent Publication).

**(ME 1303) STRENGTH OF MATERIALS**

**Module I: [3 HRS]**

Stress – axial load – safety concept, general concepts, stress analysis of axially loaded bars member strength of design criteria.

**Module II: [5 HRS]**

Axial strain and deformation; strains and deformation in axially loaded bars- stress-strain relationship, Poison’s ratio thermal strain and deformation strain concentration.

**Module III: [4 HRS]**

Generalized Hooke’s Law, Pressure vessels, constitutive relationship – generalized concepts, relationships between elastic constants, thin wall pressure vessel.

**Module IV: [5 HRS]**

Torsion – tensional stress and deformation in circular members, design of circular members in torsion, closed coil helical spring.

**Module V: [7 HRS]**

Axial force, shear and bending moment diagram, introduction – direct approach for axial force, shear and bending, bending of beams with symmetrical cross section.

**Module VI: [4 HRS]**

Shear stress in beams; introduction – shear flow share stress in beams.

**Module VII: [5 HRS]**

Transformation of stress and strain; analysis for combined loading; transformation of stress and strain – Mohr’s rule for stress transformation.

**Module VIII: [4 HRS]**

Deflection of beams- introduction – deflection by integration – deflection by moment – area introduction to beam column.

**Text books :**

* R.K. Rajput “Strength of Material” S. Chand Publication
* Young and Tinoshenko, “Strength of Materials” Tata McGraw Hill Publication

**Reference Books :**

* Popova, E. “Engineering mechanics of Solids”.
* Singer, Harper & Roy‘ Strength of Materials”
* S. Ramamurthan “Strength of Material”
* Khurmi, R.S, “Strength of Materials” S. Chand Publication

**(cS 1304-P) LAB assignment**

1. WAP in C to print “Hello World”.

2. WAP in C to add two numbers.

3. WAP in C to find the mod of a given number.

4. WAP in C to convert temperature in centigrade to Fahrenheit.

5. WAP in C to find the largest of the three numbers.

6. WAP in C to find the roots of the quadratic equation.

7. WAP in C to find the sum of the series of n odd numbers.

8. WAP in C to find the prime numbers between 1 to n.

9. WAP in C to find the sum of a given series 1-1/2+1/3-1/4+1/5…………..

10. WAP in C to generate the Fibonacci series using function.

11. WAP in C to find the GCD of a given number using recursion.

12. Write a menu driven program in C to find whether the number is Armstrong

 or not and also find the reverse of the same number. Use **CASE** statement.

13. WAP in C to generate

 1

 1 2 1

 1 2 3 2 1

 1 2 3 4 3 2 1

14. WAP in C to add two matrices.

15. WAP in C to multiply two matrices.

16. WAP in C to print upper and lower triangle of the matrices.

17. WAP in C to sort the elements in ascending order.

18. WAP in C to search a given element in the array.

19 WAP in C to create a record of students with the following fields.

 Student name, roll no, marks and address

20. WAP in C to create a file to input 10 records and print the same.

**(CS 1305-P) LAB ASSIGNMENT:**

1. Write an assembly language program to print “Hello World”
2. Write an assembly language program to add two numbers.
3. Write an assembly language program to find the larger of two 8-bit number.
4. Write an assembly language program to move a block of data (8-bit) from one section of memory to another section of memory.
5. Write an assembly language program to add 16-bit number.
6. Write an assembly language program to find two’s compliment of 16-bit number.
7. Write an assembly language program to find the maximum of n numbers.
8. Write an assembly language program to find the factorial of a given number.
9. Write an assembly language program to calculate the value x**n**.

**(CS 1306 – P) Lab Assignment**

WAP in C to find the factorial of any number using recursive function?

WAP in C language to create a linked list and display all ?

WAP in C language to reverse a linked list and display all?

WAP to count total number of node in a linked list?

WAP in C language to display all content of a file.

WAP in C language to count total number of lines within a file.

WAP in C to calculate total size of the file in byte?

Design a copy command in C that could copy one file to another.

Design a Type command in C that could display content of the file.

Design a cat command in C that could concatenate two file into one.

Design a delete command in C that could delete a file from the memory?

WAP in C to check whether a given number is odd or even with the help of bit-wise operator?

WAP in C to make a number its twice with the help of bit-wise operator?

WAP in C to make the number its half with the help of bit-wise operator?

WAP in assembly language to store two values in registers and store the result in another register?

WAP in assembly language to swap two values within register?

WAP in assembly language to find the factorial of any number?

WAP in assembly language to find the sum of first nth natural number?

Define a macro that could increment the memory variable by a constant value.

Define a macro having name EVAL that could compute (A-B+C) and store the value of C directly into resultant register if A and B are identical.

**ME 1308-P STRENGTH OF MATERIALS LAB (0-0-3)**

**List of Experiments**

1. Tensile Test: -To prepare the tensile test upon the given specimen (Mild Steel).
 2. Compression Test: -To determine the compressive strength of the given specimen.

 3. Torsion Test: - To perform the Torsion test on given specimen.
 4. Impact Test: - To determine the impact toughness of the given material.
 5. Brinell Hardness Test: - To determine the hardness of the given specimen.
 6. Vicker’s Hardness Test: - To determine he hardness of the given specimen.
 7. Rockwell Hardness Test: - To determine he hardness of the given specimen.

**B. TECH COURSE STRUCTURE**

**COMPUTER SCIENCE & ENGINEERING**

**4th SEMESTER**

**RANCHI UNIVERSITY, RANCHI**

**MH 1401 Discrete Mathematics**

 **(C.S.E. Branch)**

**Unit – I**

**Sets: -** Sets, Operation on sets, Venn Diagram. **(03Clasess)**

**Unit – II**

**Relation and Function: -** Definition, Equivalence relation, Classification of function, composition of function, hash function and some special function. **(04Clasess)**

**Unit – III**

**Formal Logic**: - Introduction to formal logic, formulas of preposition logic, Boolean variable and truth sets, predicate calculus, quantification, validity, consistency. **(06Clasess)**

**Unit – IV**

**Lattice Theory:** - Partially ordered set, Hasse Diagram, Lattices. (**04 Classes)**

**Unit – V**

**Algebraic Structure**: - Group, semi-group, subgroup, rings, field. **(04 Classes)**

**Unit – VI**

**Graph Theory**: - Incidence, Degree, Walks, Paths, Circuits, Euler Graphs, Hamiltonian Graphs. **(03 Classes)**

**Unit – VII**

**Tree**: - Introduction, Tree, Spanning Tree, Network Flow, Cut- Sets, Planar Graph. **(03 Classes)**

**Unit – VIII**

**Combinatories**: - Counting techniques-pigeon-hole principle, infinite sets, mathematical induction, permutation, Generating functions, Recurrence relation and their solution. **(06 Classes)**

**Text Books: -**

1. Tremblay J.P. and Manohar, R. “Discrete Mathematical Structure with Application to Computer Science”, Mcgraw Hill, 1975.
2. Kolamn, B.Busby R.C and Ross. S.C., “Discrete Mathematics Structure” Prentice Hall, 1996.

**Reference Book: -**

1. Mott. J.L. Kandel A. and Baker, T.P. “Discrete Mathematics for Computer Scientist and Mathematician”, Prentice Hall, 1986.
2. Smullyan, R.M. “First Order Logic”, Springer Verlag, 1968.
3. S.K. Chakraborty and B.K. Sarkar, “Discrete Mathematics”, Oxford University Press.
4. Deo, N. “Graph Theory with Application to Engineering and Computer Science”, Prentice Hall of India, 1980.

**(CS 1401) THEORY OF COMPUTATION**

**MODULE 1: [3 Hrs]**

**INTRODUCTION TO AUTOMATA, FORMAL LANGUAGES, COMPUTABILITY**: Formal Languages-Phrase structure grammars, Sentential Forms; Chomsky classification of Grammars; Computability

**MODULE 2: [5 Hrs]**

**FINITE AUTOMATA:** Finite Automata-String Processing by Finite Automaton, Language of Finite Automaton; Extended Transition function & its properties; Deterministic & Non-Deterministic Finite Automata-Acceptance of String by NFA; Equivalence of NFA and DFA-Converting NFA to its Equivalent DFA, Equivalence of DFAs; Level Equivalence and Reduction in Finite Automata; Finite Automata with Outputs-Moore and Mealy Machines & their interconversion; Finite Automata with Null Moves-Removal of Null moves.

**MODULE 3: [5 Hrs]**

**REGULAR GRAMMAR AND REGULAR SETS:** Regular Expression; Correspondence between Regular Expression and Regular set; Identities Related to Regular Expressions; Relation between Regular Language and Finite Automata- Finite Automaton Corresponding to Regular Expression, Regular Expression Corresponding to Finite Automata; Closure Properties of Regular Sets; Automata for Union, Intersection, and Difference of Language; Pumping Lemma for Regular Languages-Applications of Pumping Lemma, Suitability of Pumping Lemma; Production system Associated with Regular Grammar; Myhill- Nerode Theorem; Decision problem related to Finite Automata and Regular Languages.

**MODULE 4: [5 Hrs]**

**CONTEXT – FREE GRAMMARS AND LANGUAGES**: Some Examples of Recursive Grammars; Context-Free Grammars- Leftmost and Rightmost of strings, Some Examples of context-free Languages and Grammars, Ambiguity in context-free Grammars and Parse Tree, Possible Defects in CFG’s and their Removal; Context-Free Languages as Superset of Regular Languages; Closure properties of CFL,-Non-closure properties; CNF,GNF; Pumping lemma for CFG-Application to Pumping lemma, Ogden’s lemma.

**MODULE 5: [4 Hrs]**

**PUSHDOWN AUTOMATA**: Basic Structure of PDA; Two types of acceptance by PDA; Correspondence between PDA &CFL; Parsing and PDA-Removal of Left factoring, Removal of Left Recursion, Parsing process

**MODULE 6: [4 Hrs]**

**TURING MACHINES & LINEAR BOUNDED AUTOMATA**: Turing machine Model; Representation of Turing machines; Language acceptability by Turing Machines; Design of Turing Machines; Description of Turing Machines; Techniques for TM construction; Variants of Turing Machines; LBA

**MODULE 7: [4 Hrs]**

**UNDECIDIBILITY & COMPUTABLE FUNCTIONS:** Decidibility; Recursive & Non- Recursive Language-Recognition & Acceptance; language of TM-Decision problems related to TM & CFG, Reduction, PCP; Primitive Recursive Functions;$μ$-Recursive functions, Godel Numbering.

**MODULE 8: [4 Hrs]**

**COMPUTATIONAL COMPLEXITY**: Growth rates of Functions, Languages And Complexity Classes; Decision and Optimization Problem; classes P and NP- CNF Satisfiability problem, Hamiltonian Cycle Problem; NP-complete problems; Church-Turing thesis.

**TEXTBOOKS:**

Introduction to Automata theory, Languages, and Computation(3rd Edition): J.E.Hopcroft, R.Motwani, J.D.Ullman, Addison Wesley, 2007

Formal Languages and Automata Theory(1st Edition): C.K. Nagpal, Oxford University Press, 2011

**REFERENCE BOOKS:**

Theory of Computer Science(3rd Edition)-Automata, Languages & Computer Science: K.L.P.Mishra & N. Chandrasekaran, PHI, 2007

**(CS 1402) SOFTWARE ENGINEERING 1.0**

**MODULE – I**

**Introduction:** Some Definitions, FAQs about software engineering, The evolving role of software, Software characteristics, SW applications

**Software Processes:** Software process models, Waterfall model, the prototyping model, spiral model, RAD and Incremental model.

**MODULE – II**

**Project Management:** Management activities, Project planning, Project scheduling, Risk Management.

**MODULE – III**

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, The software requirements document. IEEE standard of SRS, Quality of good SRS.

**Requirement Engineering Process:** Feasibility study, Requirements elicitation and analysis, Requirements validation, Requirement management.

**MODULE – IV**

**Software Design:** Design Concepts and Principles, Architectural Design, Object oriented Design, User interface design

**UML:** Class diagram, Sequence diagram, Collaboration diagram

**MODULE – V**

**Verification and Validation:** Verification and Validation Planning, S/W inspection, static analysis.

**Software Testing:** Testing functions, Test care design, White Box testing, Black box testing, Unit testing, Integration Testing, System testing, Reliability.

**MODULE – VI**

**Management: SW cost estimation:** Estimation techniques, Algorithmic cost modelling, Project duration and staffing.

**Quality Management:** Quality assurance and standards, Quality planning, Quality control.

**MODULE – VII**

**Software Change**: Program Evolution Dynamic, S/W Maintance in detail.

**Text Book:** 1. I. Sommerville: Software Engineering, Pearson Education Publication, 7th ed.

**Reference Book:**

1. R. S. Pressman: Software Engineering: A Practiioners Approach, 5th Edn., TMA, New Delhi.

2. J. F. Peters & W. Pedrycz– Software Engineering, John Wiley & Sons,Inc. 2000

3. A.Behforooz & F.J. Hudson– Software Engineering Fundamentals, Oxford Univ. Press, New York, 2000.

**(CS1403) DATA STRUCTURE & PROGRAMMING USING C**

**Unit 1 :**  [**5 Hrs]**

***Introduction :*** Data Type, Data Structures, Data Structure Operations, Algorithm-complexity in Time & Space, Asymptotic Notations, ADT, Functions & Pointers.

**Unit 2 :**  [**4 Hrs]**

***Arrays :*** Operations on One Dimensional array, Two-Dimensional array, Multi-Dimensional array, Ordered Arrays, Sparse Matrix

**Unit 3 :**  [**7 Hrs]**

***Linked List :*** Operations, Circular Link List operations, Doubly Link List, Applications of Link List.

**Unit 4 :**  [**5 Hrs]**

***Stack :*** Array & Linked representation, Operations on stack, Polish Notations, Recursion, Applications of Stack.

**Unit 5 :**  [**5 Hrs]**

***Queue* :** Array & Linked representation, Insertion & Deletion operation, Circular queue, Dequeue, Priority queue, Applications of queue

**Unit 6 :**  [**5 Hrs]**

***Non-linear Data Structures :***

Tree - General concept, binary tree, binary tree traversal, Threaded Binary Tree, Binary Search tree, Avl Tree, B-Tree, Applications of Tree.

**Unit 7 :**

***Graph*** - Properties, Representation, Depth first search, Breadth first search, Minimum Cost Spanning Tree- Kruskal’s, Prim’s Algorithm, Dijkstra’s algorithm.

**Unit 8 :**

***Sorting & Searching :*** Internal & External sorting, Bubble sort, selection sort, Insertion sort, Merge sort, Quick sort, Heap sort. Searching Technique-sequential, Binary, Hashing

# Text Book :

* Lipschutz “*Data Structures*”, Schaum Series, Tata McGraw Hill
* ByronGottfried, *Schaum's Outline of Programming with C*, McGraw-Hill.

## References Books :

* Horwitz, E., and Sahni, S. “*Fundamentals of Data Structures”, Computer Science Press,* 1978.
* Tanenbaum *“Data Structures using C & C+*+”, Pearson & Anderson

 Publication.

* *“Data Structure using C”* - ISRD Group, Tata McGraw Hill.
* A. K Sharma “*Data structure using C*” Pearson
* Reema Theraja “*Data structure using C*” Oxford University Press

**(CS 1404) MICROPROCESSOR AND MICROCONTROLLER**

**MODULE - I [4 Hrs]**

Revision of logic circuits with emphasis on control lines, SAP concepts with stress on timing diagrams, Microinstructions, Microprogramming, Variable machine cycle, Architecture of 8085 Processor , Functions of all signals, Bus concepts, Multiplexed and De-multiplexed Bus, Minimum system.

**MODULE - II [5 Hrs]**

Instruction set, Addressing modes, Stack operation, Timing diagrams, Programming examples like Time delay, Looping, Sorting, Code conversions like BCD to Binary, Binary to BCD, HEX to ASCII, ASCII to HEX, BCD Arithmetic etc.

**MODULE - III [5 Hrs]**

8085 based Microcomputer system, Memory Organization, Memory Interfacing, Memory Mapped I/O, I/O Mapped I/O, Interrupts, Hardware and Software Interrupts, Interrupt instructions, Programmed I/O, Interrupt driven I/O, DMA.

**MODULE - IV [5 Hrs]**

Architecture of 8255 I/O peripheral chip, Modes of operation, Hand shake mode operation, BSR mode, ADC 0801 and ADC 0808 Interfacing with microprocessor, Analogue multiplexed ADC, DAC 0808 specifications, DAC Interfacing, Programming examples for Generation of square wave, positive and negatives ramps, triangular and sine waves, Sample and Hold circuit, LF 398 and its applications in Data Acquisition.

**MODULE - V [4 Hrs]**

8253 timer, Modes of operation, Applications, 8279 Keyboard/Display Interface, Different modes of operation, Interfacing, Programming examples, 8237 DMA Controller.

**MODULE - VI [3 Hrs]**

Evolution of Microprocessors, Introduction (Architecture and Instruction set only) of 8086 and 8088, Evolutionary steps and Additional features of 80186, 80286, 80386, 80486 and Pentium Processors, Concept of CISC and RISC processors.

 **MODULE - VII [4 Hrs]**

Introduction to Microcontrollers, 8051 Microcontroller, Memory Organization, Programming techniques, Addressing modes, Instruction set, Interrupt structure, Port structure, Different modes of operation, Programming examples.

**Text Books:**

1. “Microprocessor Architecture, Programming and Applications with 8085” by R. S. Gaonkar.
2. "Microprocessors and Microcontrollers Architecture, Programming & Interfacing Using 8085, 8086 and 8051” by [Soumitra Mandal](http://www.tatamcgrawhill.com/cgi-bin/same_author.pl?author=Soumitra+Mandal), TMH

**Reference Books:**

1. “Advanced Microprocessors and Microcontrollers” by S. K. Venkata Ram.

2. “Microprocessor, Microcomputer and their Applications”, 2/e. by A, K. Mukhopadhyay.

3. “Advanced Microprocessors” by Y. Rajasree.

4. “Microprocessor and Peripherals” by S. P. Chowdhury and Sunetra Chowdhury.

**(EC 1413 )ANALOG AND DIGITAL COMMUNICATION**

**Module I [6 Hrs]**

Modulation of Signals: Principles of Analog modulation technique like AM, FM, PM, SSB, Generation & detection.

Frequency division multiplexer: Pulse modulation: Pulse transmission over band-limited signals, sampling theory, pulse amplitude modulation.

**Module II [8 Hrs]**

Digital Communication: PCM, DCSM, DM, ADM, comparison of above systems on the basis of performance criteria such as bit transmission, signalling rate, error probability, S/N ratio, bandwidth requirement. ISI & Eye diagram.

**Module III [6 Hrs]**

Digital Modulation technique: Data transmission using techniques such as PSK, FSK, QFSK (QAM), MSK Inter system comparison.

**Module IV [8 Hrs]**

Introduction to communication channel: Transmission line-primary and secondary line constant, telephone lines and cable, public switch telephone network (Electronic exchange). Introduction of fiber optic communication- Principle of light communication in fiber, losses in fiber, dispersion, light source and photo detector, connector and splicer.

**Module V [6 Hrs]**

Introduction to coding technique: Information theory, channel capacity, Shannon’s theorem, source coding, error control coding, error detection and correction, block code, cycle code, line code channel throughput and efficiency.

* + - **Text Books:**
* Haykin, S., “*Digital Communication*”, Wiley, New York
* Shanmovgan, K.S. “*Digital and Analog Communication System*”, John Wiley and Sons.
* Taub, H., and Schilling, D.L., “*Principles of Communication Systems*”, McGraw Hill, New York.
	+ - **Reference Books:**
		- Chakrabarti, P. “*Principles of Digital Communication”*.
		- Scheber,W.L. “*Data communication*”, MGH.
		- Roden, M.S. “*Analog and Digital Communication System*”, PHI

**(CS 1405 - P) LAB ASSIGNMENT**

Experiment 1: Develop requirements specification for a given problem (The requirements specification should include both functional and non-functional requirements. For a set of about 20 sample problems, see the questions section of Chap 6 of Software Engineering book of Rajib Mall)

Experiment 2: Develop DFD Model (Level 0, Level 1 DFD and data dictionary) of the sample problem (Use of a CASE tool required)

Experiment 3: Develop Structured design for the DFD model developed

Experiment 4: Develop UML Use case model for a problem (Use of a CASE tool any of Rational rose, Argo UML, or Visual Paradigm etc. is required)

Experiment 5: Develop Sequence Diagrams

Experiment 6: Develop Class diagrams

Experiment 7: Develop code for the developed class model using Java

Experiment 8: Use testing tool such as Junit

Experiment 9: Use a configuration management tool

Experiment 10: Use any one project management tool such as Microsoft Project or Gantt Project, etc.

 **(CS 1406-P) Data Structure using C**

1. WAP in c for factorial of a given number using recursion method?
2. WAP in C for divide and conquer search?
3. WAP in C for selection sort Quick sort and Merge sort?
4. WAP in C for stack and perform operation like PUSH and POP?
5. WAP in C for linked list and perform operation like creation of nodes and deletion of nodes?
6. WAP in C for circular and double linked list?
7. WAP in C for DFS and BFS ?
	* 1. WAP in C for implementation of Pattern matching algorithm.
		2. WAP in C for implementation of Stack.
		3. WAP in C for conversion of Infix to Postfix using stack.
		4. WAP in C for solving Tower of Hanoi Problem.
		5. WAP in C for implementation of Insertion & Deletion in a Queue.
		6. WAP in C for insertion in Sorted linked list.
		7. WAP in C for deletion of given node from linked list.
		8. WAP in C for implementation of doubly linked list.
		9. WAP in C for preorder traversal in Binary Tree.
		10. WAP in C for inorder traversal in Binary Tree.
		11. WAP in C for postorder traversal in Binary Tree.
		12. WAP in C for searching in Binary Tree.
		13. WAP in C for inserting a node in Binary Tree.
		14. WAP in C for implementation of Quick Sort.
		15. WAP in C for implementation of Binary Search.
		16. WAP in C for reading, Writing, Displaying the contents in a file.

**(CS 1407 – P) LAB ASSIGNMENT**

**List of Experiment:**

**8085**

1. Addition, subtraction, multiplication and division of two 8 bit numbers

2. Smallest/largest number among n numbers in a given data array, Binary to Gray code, Hexadecimal to decimal conversion

**Interfacing**

1. Study of traffic light controller

2. Study of elevator simulator

3. Generation of square, triangular and saw tooth wave using D to A Converter

4. Study of 8253 and its operation (Mode0, Mode2, Mode3)

5. Study of Mode0, Mode1 and BSR Mode operation of 8255

6. Study of 8279 (keyboard and display interface)

7. Study of 8259 Programmable Interrupt Controller

8. Generate square wave on all lines of 8255 with different frequencies

9. Study of stepper motor and its operations

**8051 Microcontroller**

1. Initialize data to registers and memory using immediate, register, direct and indirect Addressing mode.

2. Addition and subtraction of 16 bit numbers

3. Multiplication and division of two 16 bit numbers

4. Transfer a block of data to another memory location using indexing

5. Operation of 8255 using 8051 microcontroller

1. Addition , subtraction ,multiplication and division of 16 bit numbers, 2’s complement of a 16 bit number

2. Finding a particular data element in a given data array

3. Marking a specific bit of a number using look-up table

4. Largest/smallest number of a given data array

5. To separate the odd and even numbers from a given data array

6. Sorting an array of numbers in ascending/descending order

**(EC 1408 – P) LAB ASSIGNMENT**

1. Study of Amplitude modulation & Demodulation technique.

2. Study of Double Side Band Suppressed Carrier (DSB-SC) & Demodulation technique.

3. Study of Single Side Band Suppressed Carrier (SSB-SC) & Demodulation technique.

4. Study of Frequency Modulation & Demodulation.

5. Study of Time Division Multiplexing (TDM) & Demultiplexing.

6. Study of Frequency Shift Keying (FSK).

7. Study of Pulse Amplitude Modulation (PAM).

8. Study of Pulse Width Modulation (PWM).

9. Study of VCO (Voltage controlled oscillator) & PLL (Phase Locked Loop).

**B. TECH COURSE STRUCTURE**

**COMPUTER SCIENCE & ENGINEERING**

**5TH SEMESTER**

**RANCHI UNIVERSITY, RANCHI**

**(HS 1501) INDUSTRIAL MANAGEMENT**

**Module I**

Human Resource Management:

Recruitment and selection, performance appraisal, Industrial relations, Trade Union, Collective Bargaining.

**Module II**

Organizational Behaviour:

Different schools of Management Thought: scientific Management, Administrative Theory, Theory of Bureaucracy, Human Relations theory (Elton Mayo).

Motivation: Concept, Different Theories (Maslow, ERG, Herzberg,)

Communication: Purpose, Barriers to effective communication, Guidelines to make communication effective.

Perception: Process, Importance, Factors influencing perception, Shortcuts for judging people-Halo effect, Stereotyping, Projection.

**Module III**

Quality Management:

Concept, Dimensions for goods and services, cost of Quality, Statistical Quality Control, Control Charts, Acceptance Sampling (single).

Total Quality Management: Concept, benefits, Criticism.

New Quality Tools: Kaizen, Six Sigma, Quality Circles.

**Module IV**

Productions Management:

Concept, Difference from Operations Management, Types of Production ( Mass, Batch, Project),

Functions of Production Management:

Productivity: Concept, Different Inputs and Productivity Measures, Efficiency and Effectiveness, Measures to increase productivity.

**Module V**

Marketing Management:

Basic Concepts of Marketing, Difference Between Selling and Marketing, Elements of Marketing Mix- the 4 p’s.

Marketing Environment: Mega Environment. Micro Environment, internal Environment, Relevant Environment.

**Module VI**

Materials Management:

Concept, Functions, EOQ Models- Wilson model, model with shortage, model with quantity discount, model without shortage, Selective Inventory Control –ABC, VED, FSN analysis

**(CS1501) OPERATING SYSTEM**

**Module 1:- (4hours)**

**Introduction:-**

What is an operating system, Mainframe systems, Desktop systems, Multiprocessor systems, Distributed systems, Clustered systems, Real Time systems, Handheld systems.

**Computer system structure:-**

Computer system operation, I/O Structure, Storage structure, Storage Hierarchy, Hardware protection, Network Structure.

**Operating system Structures**

System components, Operating system Services, System calls, System programs, System structure, Virtual Machines.

**Module 2:- (5hours)**

**Process Management**

**Processes:-**

Process concept, Process Scheduling, Operation on Processes, Cooperating processes, Interposes Communication, Communication in Client-Server System,

**Threads**

Overview, Multithreading Modules, Threading Issues, P-threads, Solaris 2 Threads

**Module 3:- (8hours)**

**CPU Scheduling**

Basic Concept, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real Time Scheduling.

**Process Synchronization**

Background, The critical Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Critical Regions, Monitors

**Module 4:- (5 hours)**

**Deadlocks**

System Models, Deadlock Characterization, Methods if Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

**Module 5:- (10 hours)**

**Memory Management**

Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging.

**Virtual Memory**

 Background, Demand Paging, Process Creation, Page Replacement, Allocation of frames, Thrashing.

**Module 6:- (4 hours)**

**File System**

File concept , Access Methods, Directory Structure, File system Mounting, File Sharing, Protection

**File System Implementation**

File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management.

**Module 7:- (4hours)**

**I/O Systems**

Overview ,I/O Hardware ,Application I/O Interface, Kernel I/O Subsystems.

**Mass Storage Structure**

Disk Structure, Disk Scheduling, Disk Management , Swap space Management

**Text Book:**

Galvin, Gagne & Silberchatz “Operating System & Concept” John Wiley & Sons

**Reference Books:**

1. Milankovic “Operating System” Tata McGraw Hill

2. William Stallings “Operating System” Pearson

3. Dietel and Dietel “Operating System” Prentice Hall

**(CS1502) COMPUTER NETWORK**

**Module 1 [4 Hrs]**

Introduction and Network Models - Use of Computer networks, Types of Networks, Data communication, Protocols and Standards, OSI model, TCP/IP Protocol suite, Addressing, Topology.

**Module 2 [4 Hrs]**

Physical Layer and Media-Analog and Digital, Digital Signals, Digital Transmission- Digital to Digital Conversion, Analog to Digital, Transmission Mode, Bandwidth utilization- Multiplexing, spread spectrum, Transmission Media- Guided, Unguided media.

**Module 3 [5 Hrs]**

Data Link Layer - Block coding, checksum, Switching - Circuit switching & packet switching, Data link control- Framing, Flow and error control, Noiseless channel, noisy channel, HDLC.

**Module 4 [4 Hrs]**

**SONET/SDH**- Architecture SONET Layers, SONET Frames, ATM Architecture, ATM LANs,

**Module 5 [5 Hrs]**

Multiple Access- Random access, controlled access, channelization.

**Module 6 [6 Hrs]**

**Network Layer**- IPv4 and IPv6 address, forwarding, unicast and multicast routing protocols.

**Module 7 [4 Hrs]**

**Transport layer** - Process to process delivery, TCP, UDP, Congestion control- Congestion, congestion control.

**Module 8 [4 Hrs]**

**Network management**- Network Management System, SNMP.

**Text Books**

* Behrouz A. Forouzan,” Data Communications and Networking”, Tata McGraw-Hill Pub.

**References Books**

* William Stallings. Data and Computer Communication, PHI Publication.
* Tanenbaum, A.S. “*Computer networks*”, Latest edition, PHI Publication.
* Black,” *Computer Networks*”.
* Sanjay Sharma, “Computer Networks” KATSONS

**(CS 1503) COMPUTER PROGRAMMING**

**Module I [6 Hrs]**

**PROGRAMMING BASICS**

Basic Program Construction, Functions , Program Statements , White Space , Output Using *cout*, String Constants , Preprocessor Directives , Header Files , Integer Variables , Defining Integer Variables , Character Variables , Input with *cin,* Type Float, Manipulators , arithmetic Operator , Library Functions

Relational Operators, Loop: *for* Loop , The *while* loop, The *do* loop , Decisions: The *if* ….Statement , The *if ………..else* Statement, The *switch* Statement , Logical Operators , Other Control Statements: The break Statement , The break Statements , The continue Statement

**MODULE II [6 Hrs]**

**STRUCTURES:**

Structures, Accessing Structure Members, Structures within Structures, Structures and Classes, Enumerated Data Types

**FUNCTIONS:**

Simple Functions: The Function Declaration , Calling the Function , The Function Definition , Comparison with Library Functions , Passing Arguments of Functions: Passing Constants , Passing Variables , Passing by Value , Passing Structure Variables , Returning Values from Functions: The return Statement , Passing Simple Data Types by Reference , Overloaded Functions , Inline Functions , Default Argument, Variables and Storage Classes: Automatic Variables , External Variables , Static Variables , Storage

**MODULE III: [5 Hrs]**

**OBJECTS AND CLASSES:**

A Simple Class: Classes and Objects , Specifying the Class , Constructors , Destructors , Objects as Function Arguments: Overloaded Constructors , Member Function Defined Outside the class, Objects as Arguments , Classes Objects and Memory.

**MODULE IV: [5 Hrs]**

 **ARRAYS:**

Array Fundamentals: Defining Arrays, Accessing Array Elements , Initializing Arrays , Multidimensional Arrays, Passing Arrays to Functions , Arrays of Structures , Arrays of Structures , Arrays of Objects , Strings

**MODULE V: [5 Hrs]**

**OPERATOR OVERLOADING:**

Overloading Unary Operators**:** The operator Keyword , Operator Arguments , Operator Return Values , Nameless Temporary Objects , Limitation of Increment Operators , Overloading binary operators: Arithmetic Operators , Adding Polar Coordinates , Concatenating Strings, Multiple Overloading , Comparison Operators , Arithmetic Assignment Operators

**MODULE VI: [5 Hrs]**

**INHERITANCE:**

Derived Class and Base Class: Specifying the Derived Class , Accessing Base Class Members , The protected Access Specifier , Derived Class Constructors, Overriding Member Functions , Scope Resolution with Overridden Functions , Class Hierarchies: “Abstract” Base Class , Constructors and Member Functions , Multiple Inheritance , Member Functions in Multiple Inheritance , Constructors in Multiple Inheritance

**Virtual Functions and other Subtitles**

 Virtual Functions, Friend Functions , Static Functions , Assignment and copy initialization , The This pointer ,

**MODULE VII: [4 Hrs]**

**pointers**

Addresses and Pointers: The Address of Operator & , Pointer Variables, Accessing the variable pointed to , Pointer to void , Pointers and Arrays: Pointer constants and pointer variable , Pointer and Functions: Passing Simple Variables , Passing Arrays , Sorting Arrays Elements , Pointer and strings: Pointer to string Constants : String and Functions arguments , Copying a string using pointers, Library string Functions , Pointers to pointer , Sorting pointers .

**MODULE VIII: [4 Hrs]**

**FILES AND STREAMS**

Streams: The streams class Hierarchy, The string classes, header files, String I/O: Writing Strings , Reading Strings , Detecting End of file, Character I/O, Object I/O, I/O with Multiple Objects , File Pointers , Disk I/O with member Functions , Closing files , Error handling .

Text Books:

* Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia Publication.

Reference Books:

* Object Oriented Programming with C++, E. Balaguruswamy, TMH Publication
* C++ and Object Oriented Programming, Jana, PHI
* Ashok N. Kamthave – Object oriented Programming with ANSI & Turbo C++, Pearson.

**(CS 1504) DATABASE MANAGEMENT SYSTEMS**

**MODULE 1: [4 Hrs]**

**Introduction:** Purpose of Database System; View of Data, Data Models, Database Languages, Transaction Management, Storage Management, Database Users Administrator, History of Database Systems.

**MODULE 2: [5 Hrs]**

**Database Design and Entity - Relational Model:** Overview of design process, E-R model, Constraints, E – R Diagram, Weak Entity Sets, Extended E – R Features, Reduction to E – R Schemas.

**MODULE 3: [5 Hrs]**

**Relational Model:** Structure of Relational Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Domain Relational Calculus, Tuple Relational calculus, Query by Examples.

**MODULE 4: [5 Hrs]**

**SQL & Advanced SQL:** Data definition, Basic structure of SQL queries, Set Operations, Aggregate Functions, Null Values, Nested Sub Queries, complex queries, views, modification of database, SQL data types & schemas, Integrity constraints, authorization, Embedded SQL.

**MODULE 5: [6 Hrs]**

**Relational Database Design:** Atomic domains & first normal form, Decomposition using functional dependencies, Functional dependency theory, Decomposition using functional dependencies, Decomposition using multivalued dependencies, more normal forms.

**MODULE 6: [4 Hrs]**

**Query Processing:** Measure of Query Cost, Selection Operation, Evaluation of Expressions.

**MODULE 7: [5 Hrs]**

**Transaction & Concurrency Control:** Transaction Concepts & ACID Properties, Transaction States, Concurrent Executions, Serializability & Its Testing, Recoverability, Introduction to Concurrency Control, Locked Base Protocol & Deadlock Handling.

**MODULE 7: [5 Hrs]**

**File Organization & Index Structures**

File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree .

**Text Book:**

1. R. Elmasri, Fundamentals of Database Systems, Pearson Education, New Delhi, 2005.

2. A.Silberschatz et.al - Database System Concepts, 5th Edn, Tata Mc-Graw Hill, New Delhi – 2000.

**Reference Books:**

1. Date C.J.- An Introduction to Database System, Pearson Education, New Delhi- 2005

# (CS1505) ANALYSIS DESIGN AND ALGORITHM

**Module 1 : [5 Hrs] *Introduction*** *:*Algorithm-characteristics, Analysis, complexity-Time & Space. Growth of Functions, Asymptotic notations, Recurrences. Algorithm design methods. Analysis of Quick sort, Heap Sort, Insertion sort, Merge sort**.**

**Module 2 : [5 Hrs]**

***Greedy Method* :** Introduction, characteristics and features of greedy algorithm, Basic structure of greedy algorithm, Feasible & Optimal Solutions,0/1Knapsack Problem, Topological sorting, Single source shortest Path, Minimum cost spanning Trees-Krushkal’s & Prim’s Algorithm.

**Module 3 : [4 Hrs]**

***Divide and Conquer* :** Introduction, Binary Search, Merge sort, Strassen’s Matrix Multiplication**.**

**Module 4 : [5 Hrs] *Dynamic Programming* :** Introduction, Principles of Optimality, 0/1 Knapsack Problem, Matrix Chain Multiplication, All Pairs Shortest Path**.**

**Module 5 : [4 Hrs] *Backtracking* :** Introduction,0/1 Knapsack Problem, Travelling Salesman Problem, n-queen Problem**.**

**Module 6 : [4 Hrs] *Branch and Bound* :** Introduction, 0/1-Knapsack Problem, Travelling Salesman Problem, Lower Bound Theory**.**

**Module 7 : [4 Hrs]**

***Graph Problems* :** DFS, BFS, Minimum spanning tree**.**

**Module 8 : [5 Hrs]**

***Computability* :** Approximation Algorithm, Randomized Algorithm, String Matching Algorithm-Robin –Karp, Knuth-Morris, Pratt Algorithm, NP-completeness**.**

## Text Books :

## Corman , *Computer Algorithm*, PHI

* Elise Horowitz , Sartaj Sahani, “*Fundamentals of Computer Algorithms”* Galgotia Pub.

## Reference Books :

* Sahni *“Data structure, Algorithms and Applications”,* Tata McGraw Hill Publications.
* Sara Base , *Computer algorithms: Introduction to Design and Analysis*,Addison Wesley
* Ano, Ullman, “*Data Structure and Algorithm”*
* Hari Mohan Pandey*, “Design And Analysis of Algorithm”,* University Science

 Press (Laxmi Publications), 2008.

* S.K.Basu*, “Design And Analysis of Algorithm” ,*PHI Publication, 2007.

**Background, demand Paging, Process**

**(CS 1506 – P) Lab Assignment**

1. Basic UNIX Commands.

2. UNIX Shell Programming.

3. Programs on process creation and synchronization, inter process communication including shared memory, pipes and messages.( Dinning Philosopher problem / Cigarette Smoker problem / Sleeping barber problem)

4. Programs on UNIX System calls.

5. Simulation of CPU Scheduling Algorithms. (FCFS, RR, SJF, Priority, Multilevel Queuing)

6. Simulation of Banker’s Algorithm for Deadlock Avoidance, Prevention

7. Program for FIFO, LRU, and OPTIMAL page replacement algorithm

**(CS 1507 – P) LAB ASSIGNMENT**

1. Write all the devices required to configure a network. Explain each one of them in brief.
2. Write the different tools used in networking. Explain them briefly.
3. What is hub and switch. Write their differences also.
4. Explain the different protocols used in the network.
5. Write all the steps involved in configuration of a peer-to-peer network.
6. Write all the steps required to share a printer on the network.
7. What is DNS, User name, password, license?
8. Write all the steps involved in installation and configuration of a client (for eg. Win Xp).
9. Write all the steps involved in installation and configuration of a server (for eg. Win Sever 2003).
10. Write all the steps involved in configuration of a client to a server.

**(CS 1508- P) LAB ASSIGNMENT**

1. Programs on concept of classes and objects.

2. Programs using inheritance.

(i) Single inheritance

(ii) Multiple inheritance

(iii) Multi level inheritance

(iv) Use of virtual base classes

3. Programs using static polymorphism.

(i) Function overloading

(ii) Ambiguities while dealing with function overloading

4. Programs on dynamic polymorphism

(i) Use of virtual functions

(ii) Use of abstract base classes

5. Programs on operator overloading

(i) Operator overloading using member operator functions.

(ii) Operator overloading using non member operator functions.

(iii) Advantages of using non member operator functions.

6. Programs on dynamic memory management using new, delete operators.

7. Programs on copy constructor and usage of assignment operator.

8. Programs on exception handling .

9. Programs on generic programming using template function and template class.

Programs on file handling.

**(CS 1509 – P) LAB ASSIGNMENT**

Structured Query Language

1. Creating Database

* Creating a Database
* Creating a Table
* Specifying Relational Data Types
* Specifying Constraints
* Creating Indexes

2. Table and Record Handling

* INSERT statement
* Using SELECT and INSERT together
* DELETE, UPDATE, TRUNCATE statements
* DROP, ALTER statements

3. Retrieving Data from a Database

* The SELECT statement
* Using the WHERE clause
* Using Logical Operators in the WHERE clause
* Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING
* Clause
* Using Aggregate Functions
* Combining Tables Using JOINS
* Subqueries

4. Database Management

* Creating Views
* Creating Column Aliases
* Creating Database Users
* Using GRANT and REVOKE
* Cursors in Oracle PL / SQL
* Writing Oracle PL / SQL Stored Procedures

**B. TECH COURSE STRUCTURE**

**COMPUTER SCIENCE & ENGINEERING**

**6TH SEMESTER**

**RANCHI UNIVERSITY, RANCHI**

**(CS1601) COMPUTER GRAPHICS & MULTIMEDIA**

**Unit 1 : [2 Hrs]**

***Basic concepts* :** Graphics hardware and display devices, input devices.

**Unit 2 : [7 Hrs]**

***Graphics primitives* :** Drawing lines and curves-line-drawing Algorithm, DDA Algorithm, Breshemham’s line Algorithm, Circle-generative Algorithms (Breshemham’s) Midpoint circle Algorithms, Ellipse-generating, Filled Area Primitives

**Unit 3 : [5 Hrs]**

***Two–Dimensional geometric Transformations* :** Basic Transformation, Homogeneous coordinates , composite Transformation, Reflection, shear candidate Transformations. Two Dimensional viewing –clipping

**Unit 4 : [5 Hrs]**

***Three-Dimensional transformation segments & their applications*** **:** Generating carves, surfaces and volumes in 3d, wire-frame models, Bezier and spline curves and surfaces, hidden surfaces.

**Unit 5 : [5 Hrs]**

***Geometric modeling* :** Elementary geometric algorithms for polygons boundary representations, constructive solid geometry, spatial data structures, composite transformation, Basic transformation.

**Unit 6 : [5 Hrs]**

***Illumination Model & Surface-Rendering Methods* :** Rendering, shading, lights models, textures and image-based rendering.

**Unit 8 : [4 Hrs]**

***Multimedia*** **:** Introduction to multimedia systems. Definition and Main properties of Multimedia System. Definition of terms and concepts related to multimedia. Trends in the development and the use of multimedia. Tools, techniques, and guidelines facilitating the planning, design, production, and implementation of multimedia products. Traditional Data streams characteristics, Characteristics of continuous media data based on time, space and continuity.

**Unit 7 : [3 Hrs]**

***Video-Games & Animation*** **:** Introduction to Computer Animation.

**Text Books :**

* Newman & Sproull, “*Principles of Interactive Computer Graphics*”, McGraw Hill.

 1987.

* Henary Baper,”*Computer Graphics*”.
* Ze Nian and Mark S Drew “*Fundamentals of Multimedia*” PHI.

**References Books :**

* Rogers “*Procedural Elements of Computer Graphics*”, McGraw Hill.
* Harringtones. S., “*Computer Graphics*”, A Programming Approach 2nd Edition,

 McGraw Hill 1987

* Rogers & Adams “*Mathematical Elements of computer Graphics”*, 2nd Edition, McGraw Hill

**(CS1602) WEB TECHNOLOGY**

**MODULE I**

**INTRODUCTION [7 Hours]**

History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. Introduction to JAVA [Scripts](http://www.indiastudychannel.com/resources/35403-IT-WEB-TECHNOLOGY-Syllabus-Anna-University.aspx) – Object Based Scripting for the web. Structures – Functions – Arrays – Objects.

**MODULE II**

**DYNAMIC HTML [10 Hours]**

Introduction – Object refers, Collectors all and Children. Dynamic style, Dynamic position, frames, navigator, [Event Model](http://www.indiastudychannel.com/resources/35403-IT-WEB-TECHNOLOGY-Syllabus-Anna-University.aspx) – On check – On load –Form process – Event Bubblers – Filters – Transport with the Filter – Creating Images – Adding shadows – Creating Gradients – Creating Motion with Blur – Data Binding – Simple Data Binding – Moving with a record set – Sorting table data – Binding of an Image and table.

**MODULE III**

**DATABASE- ASP – XML [9 Hours]**

Database, Relational Database model – Overview, SQL – ASP – Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from [ASP](http://www.indiastudychannel.com/resources/35403-IT-WEB-TECHNOLOGY-Syllabus-Anna-University.aspx) – [Server side](http://www.indiastudychannel.com/resources/35403-IT-WEB-TECHNOLOGY-Syllabus-Anna-University.aspx) Active-X Components – Web Resources – XML – Structure in Data – Name spaces – DTD – Vocabularies – DOM methods .

**MODULE IV**

**SERVLETS AND JSP [9 Hours]**

Introduction – Servlet Overview Architecture – Handling HTTP Request – Get and post request – redirecting request – multi-tier applications – JSP – Overview – Objects – scripting – Standard Actions – Directives.

**TEXT BOOK :**Deitel & Deitel, Goldberg, “Internet and world wide web – How to Program”, Pearson Education Asia, 2001.

**REFERENCES BOOKS :**1. Eric Ladd, Jim O’ Donnel, “Using HTML 4, XML and JAVA”, Prentice Hall of India – QUE, 1999.
2. Aferganatel, “Web Programming: Desktop Management”, PHI, 2004.
3. Rajkamal, “Web Technology”, Tata McGraw-Hill, 2001.

**(CS1603) LANGUAGE PROCESSORS**

**MODULE 1 : [5 Hrs]**

***Compiler Structure*** **:** Analysis - Synthesis model of complication, various phases of a compiler, cousins of the compiler, compiler construction tools**.**

**MODULE 2 : [5 Hrs]**

***Lexical Analysis*** **:** the role of lexical analyzer parser and symbol table, taken, lexeme and patterns difficulties in lexical analysis, error reporting regular definition & expression, Recognition of tokens and implementing a transition diagram LEX compiler.

**MODULE 3 : [5 Hrs]**

***Syntax Analysis*** **:** Role of parser, context free grammas, Ambiguity, associability, precedence. Top-down parsing, recessing descent parsing, predictive pressing No recursive predictive parsing, FIRST and Follow bottom –up passing, hands, operator precedence parsing LR pareses (SLR, LALR ,LR)

**MODULE 4 : [5 Hrs]**

***Syntax directed definitions*** **:** Inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes I and S-attributes definitions.

**MODULE 5 : [4 Hrs]**

***Type checking*** **:** Type system, type expression structuring and name equivalence of types, type conversion, overloading of function and operators polymorphic function.

**MODULE 6 : [4 Hrs]**

***Run time system*** **:** Activation tree, storage organization, activation records, parameter passing, symbol table, dynamic storage allocation.

**MODULE 7 : [4 Hrs]**

***Intermediated code generation*** **:** Intermediate representation, three-Address code, types of three address statements, decelerations assignment, control flow, Boolean expression.

**MODULE 8 : [4 Hrs]**

***Code generation & instruction selection*** **:** Issue in the design of a code generator register allocation, basic block & and flow graphs A simple code generator, dag representation of basic blocks, peephole optimization, generating code from DAGS

**Text Books :**

* Aho, A.V. Seth R. and Ullman, J.D.”*Compilers Principles, Techniques and Tools*” Adision-Wesley, 1988..

**References Books :**

* Fischer, C. and LeBlanc, RJ.” *Crafting a Compiler with C, Benjjamin Commings*” 1991.
* Holub, A.C.”*Compiler Design in C*” Prentice Hall Of India, 1993.

**(CS1604) ADVANCE COMPUTER ARCHITECTURE**

**Unit 1. [6 Hrs]**

**Scalable compute platforms and models**

Overview of von Neumann architecture: Instruction set architecture; The Arithmetic and logic, Unit, The Control Unit, Memory and I/O Devices and their interfacing to the CPU; Measuring and reporting performance; CISC and RISC processors,

Evolution of computer architecture, dimensions of scalability, parallel computer models, basic concepts of clustering, scalable design principles, Basics of parallel programming: overview, parallelism issues, interaction/communication issues semantic issues in parallel programs.

**Unit 2. [6 Hrs]**

**Performance metrics and benchmarks**

System and application benchmarks, performances versus cost, basic performance metrics, performance of parallel computers, performance of parallel programs, scalability and Speedup Analysis.

**Unit 3. [6 Hrs]**

**Vector and pipelined processors**

Scalar & vector pipelines, classification of pipelined processors, performance evaluation factors, performance modeling, Vector processing concepts, pipelined vector processors, carry type vector processor design example, Associative memory processors issues and solutions Multithreaded architecture-latency hiding techniques principles of multithreading, Multiprocessor and Multicomputer systems.

**Unit 4. [6 Hrs]**

**Interconnection Networks:**

Various topologies like crossbar, multistage interconnection network, static & dynamic type of network, loosely coupled & tightly coupled architecture, Network topologies for MIMD system like star, mesh, tree hypercube etc.

**Unit 5. [6 Hrs]**

**Support for clustering and availability**

Challenges in clustering, availability support for clustering, support for single system image, single system image in solaris-MC, Clusters of servers and workstations: Microsoft wolfpack for Windows NT clusters, the IBM SP system, the Berkley NOW project, trademarks.

**Unit 6. [6 Hrs]**

**Parallel paradigms and programming models**

Paradigms and programmability, parallel programming models, shared memory programming, Message passing paradigms and MPI, Data parallel programming, the data parallel model, paradigm and high performance FORTRAN.

**(CS 1605) Software Project Management**

**MODULE – I**

Managing Software Project: Process & Project Management, Project Management and the CMM, Project Management at Infosys, Introduction to CMMI, PCMM.

The Project Planning Infrastructure: The process data base, The process capability Baseline, Process Assets and the Body of Knowledge System.

**MODULE – II**

Process Planning: The Infosys Develelopment Process, Requirement Change Management Effort Estimation & Scheduling: Estimation and Scheduling Concepts, Effort – Estimation, Scheduling.

**MODULE – III**

Quality Planning: Quality Concepts, Quantitative quality Management Planning, Defect Prevention Planning.

Risk Management: Concepts of Risks and Risk Management, Risk Assessment, Risk Control, Examples.

**MODULE – IV**

Measurement and Tracking Planning: Concepts in measurement, Measurements, Project tracking.

Project Management Plan: Team Management, Customer Communication and Issue Resolution, Structure of the Project Management Plan.

**MODULE – V**

Configuration Plan: Concepts in Configuration Management, Configuration Management Process.

Reviews: The Reviews, Review process Data Collection, Monitoring & Control, Introduction of Reviews & the NAH Syndrome.

**MODULE – VI**

Project Monitoring & Control: Project tracing, Milestone Analysis, Activity Level Analysis using SPC, Defect Analysis & Prevention Process Monitoring & audit.

**MODULE – VII**

Project Closure: Project closure Analysis.

**Text Book:**

1. Pankaj Jalote – Software Project Management in Practice, Pearson Education, New Delhi, 2002

**Reference Books:**

1. B.Huges and M.Cotterell – Software Project Management, 3/e, Tata Mcgraw Hill,New Delhi, 2004.

2. Pankaj Jalote – CMM in Practice, Pearson Education, New Delhi, 2002

3. W. Humph Grey – Managing the Software Process, Addition – Wesley, 1989.

**(CS1606) Object Oriented System Design**

**Module 1: (2 HRS)**

Fundamental of object-oriented programming- introduction, object oriented paradigm, basic concept of object oriented programming, Objects and classes, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding.

**Module 2: (10 HRS)**

Arrays, Strings and Vectors, String Buffer class, wrapper class, java API package, user defined package, interface, multithreaded programming.

**Module 3: (3 HRS)**

Methodology- what is object oriented programming, characteristics of objects, object- oriented methodology, object-oriented theme, modeling as a design technique, the object modeling technique.

**Module 4: (5 HRS)**

Object modeling, object and classes, links and association, advanced link and association concepts, generalization as extension and restriction, multiple inheritance.

**Module 5: (3 HRS)**

Dynamic modeling, events and states, operation, nested state diagram, concurrency, relation of object and dynamic model.

**Module 6: ( 2 HRS)**

Functional modeling, data flow diagram, relation of functional to object and dynamic model.

**Module 7: (4 HRS)**

Methodology preview, the OMT methodology, analysis, ATM example, Object modeling, functional modeling and dynamic modeling, overview of system design, breaking system into subsystem, architecture of ATM system.

**Module 8: (6 HRS)**

History of UML, creating use cases, system behavior, actors, use-case relation, use-case diagram, sequence diagram, collaboration diagram.

 **Text Book**

1. J. Rambaugh, Michel blaha -“ Object Oriented Modeling and Design” with UML/2e pearson education 2007
2. E. BalaguruSamy -“Programming with Java” (Tata Mc-Graw Hill)

Reference Book

1. “Java Complete reference” Tata Mc-Graw-Hill.
2. Bennett, S.Mc Roobb and R.Farmer- Object Oriented System and Design using UML/2e TMH 2007.

**(CS 1607– P ) LAB ASSIGNMENT**

* Point plotting, line & regular figure algorithms
* Raster scan line & circle drawing algorithms
* Clipping & Windowing algorithms for points, lines & polygons
* 2-D / 3-D transformations
* Simple fractals representation
* Filling algorithms
* Web document creation using Dreamweaver.
* Creating Animation using Flash.

**(CS 1608 – P) LAB ASSIGNMENT**

1. Java Fundamentals, Classes, Objects.

2. Inheritance, Polymorphism.

3. Interfaces, Exception handling.

4. I/O, AWT.

5. Socket Programming.

6. Applets, Swings.

7. Database connectivity.

8. RMI.

9. XML, Style sheet, Parser.

10. Client side scripting.

11. JSP, Servlets.

12. Session Management.

**(CS 1609 – P ) LAB ASSIGNMENT**

1. Scanner

2. Parser

3. Type checker

4. Intermediate code generator

a. Assignment statements

b. Expressions with subscripted variables

c. Boolean expressions

d. Control structures

Use any high level language to do the following.

5. Flow graph construction from intermediate code

6. Code generation for the given machine specification

**(CS 1610- P) LAB ASSIGMENT**

i) Introduction, Compiling & executing a java program.

ii) Data types & variables, decision control structures: if, nested if etc.

iii) Loop control structures: do, while, for etc.

iv) Classes and objects.

v) Data abstraction & data hiding, inheritance, polymorphism.

vi) Threads, exception handlings and applet programs

vii) Interfaces and inner classes, wrapper classes, generics

**B. TECH COURSE STRUCTURE**

**COMPUTER SCIENCE & ENGINEERING**

**7TH SEMESTER**

**RANCHI UNIVERSITY, RANCHI**

**(CS 1701) Data Mining & DATA Warehousing**

**MODULE – I [4 Hrs]**

Data Mining: Introduction, Relational Databases, Data Warehouses, Transactional databases, Advanced database Systems and Application, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

**MODULE – II [4 Hrs]**

Data Warehouse: Introduction, A Multidimensional data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology, From Data warehousing to Data Mining.

**MODULE – III [6 Hrs]**

Data Processing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and concept Hierarchy Generation.

Data Mining Primitives, Languages and System Architecture: Data Mining Primitives, DMQL, Architectures of Data Mining Systems.

**MODULE – IV [4 Hrs]**

Concept Description: Data Generalization & Summarization – Based Characterization, Analytical Characterization, Mining class Comparisons, Mining Descriptive Statistical Measures in Large Databases.

**MODULE – V [5 Hrs]**

Mining Association Rules in Large Databases : Association Rule Mining, Single – Dimensional Boolean Association Rules, Multilevel Association Rules from Transaction Databases, Multi Dimensional Association Rules from Relational Databases, From Association Mining to Correlation Analysis, Constraint – Based Association Mining.

**MODULE – VI [6 Hrs]**

Classification and Prediction: Classification & Prediction, Issues Regarding Classification & Prediction, Classification by decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification based on concepts & Association Rule, Other Classification, Prediction, Classification Accuracy.

**MODULE – VII [7 Hrs]**

Cluster Analysis: Types of Data in Cluster Analysis, Partitioning methods, Hierarchical methods, Density – Based Methods, Grid – Based Methods, Model – Based Clustering Methods, Outlier Analysis. Mining Complex Types of Data.

**Text Books:**

1. Jiawei Han & Micheline Kamber - Data Mining Concepts & Techniques Publisher Harcout India. Private Limited.

**Reference Books:**

1. G.K. Gupta – Introduction to Data Mining with case Studies, PHI, New Delhi – 2006.

2. A. Berson & S.J. Smith – Data Warehousing Data Mining, COLAP, TMH, New Delhi – 2004

3. H.M. Dunham & S. Sridhar – Data Mining, Pearson Education, New Delhi, 2006.

**(CS1702) VISUAL PROGRAMMING**

**UNIT I**

**WINDOWS PROGRAMMING 8 Hours**Windows environment – a simple windows program – [windows](file:///C%3A%5CDocuments%20and%20Settings%5CAdministrator%5CDesktop%5CCS1253%20VISUAL%20PROGRAMMING%20Syllabus-%20Anna%20university.htm) and messages – creating the window – displaying the window – message loop – the window procedure – message processing – text output – painting and repainting – introduction to GDI – device context – basic drawing – child window controls

**UNIT II**

**VISUAL C++ PROGRAMMING – INTRODUCTION 8 Hours**Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – colors – fonts – modal and modeless dialog – windows common controls – bitmaps

**UNIT III**

**THE**[**DOCUMENT**](file:///C%3A%5CDocuments%20and%20Settings%5CAdministrator%5CDesktop%5CCS1253%20VISUAL%20PROGRAMMING%20Syllabus-%20Anna%20university.htm)**AND VIEW ARCHITECTURE 8 Hours**Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI and MDI documents – splitter window and multiple views

**UNIT IV**

**ACTIVEX AND OBJECT LINKING AND EMBEDDING (OLE) 8 Hours**ActiveX controls Vs. Ordinary Windows Controls – Installing ActiveX controls – Calendar Control –Component Object Model (COM) – containment and aggregation Vs. inheritance – OLE drag and drop – OLE embedded component and containers – sample applications

**UNIT V**

**ADVANCED CONCEPTS 8 Hours**Database Management with Microsoft ODBC – Structured Query Language – MFC ODBC classes – sample database applications – filter and sort strings – DAO concepts – displaying database records in scrolling view – Threading

 **TEXT BOOKS :**1. Charles Petzold, “Windows Programming”, Microsoft press, 1996 (Unit I – Chapter 1-9)
2. David J.Kruglinski, George Shepherd and Scot Wingo, “Programming Visual C++”, Microsoft press, 1999 (Unit II – V)

**REFERENCE BOOKS :**
1. Steve Holtzner, “Visual C++ 6 Programming”, Wiley Dreamtech India Pvt. Ltd., 2003.

**(CS 1703) Artificial Intelligence and Expert System**

**MODULE – I [4 Hrs]**

Overview of Artificial Intelligence: Definition & Importance of AI.

Knowledge: General Concepts: Introduction, Definition and Importance of Knowledge,

Knowledge-Based Systems, Representation of Knowledge, Knowledge Organization, Knowledge

Manipulation, Acquisition of Knowledge.

 **MODULE – II [4 Hrs]**

Functions, Predicates and Conditionals, Input, Output and Local Variables, Iteration and Recursion, Property Lists and Arrays,

**MODULE – III [5 Hrs]**

Knowledge Representation : Introduction, Syntax and Semantics for Propositional logic,

Syntax and Semantics for FOPL, Properties of Wffs, Conversion to Clausal Form, Inference

Rules, The Resolution Principle, No deductive Inference Methods, Representations Using Rules.

**MODULE – IV [5 Hrs]**

Dealing With Inconsistencies and Uncertainties: Introduction, Truth Maintenance

Systems, Default Reasoning and the Closed World Assumption, Predicate Completion and

Circumscription, Modal and Temporal Logics.

Probabilistic Reasoning : Introduction, Bayesian Probabilistic Inference, Possible World

Representations, Dumpster-Shafer Theory, Ad-Hoc Methods.

**MODULE – V [4 Hrs]**

Structured Knowledge: Graphs, Frames and Related Structures: Introduction, Associative

Networks, Frame Structures, Conceptual Dependencies and Scripts.

Object-Oriented Representations: Introduction, Overview of Objects, Classes, Messages

and Methods, Simulation Example using an OOS Program.

**MODULE – VI [4 Hrs]**

Search and Control Strategies: Introduction, Preliminary Concepts, Examples of Search

Problems, Uninformed or Blind Search, Informed Search, Searching And-Or Graphs.

Matching Techniques: Introduction, Structures Used in Matching, Measures for Matching,

Matching Like Patterns, Partial Matching.

**MODULE – VII [4 Hrs]**

Knowledge Organization and Management: Introduction, Indexing and Retrieval

Techniques, Integrating Knowledge in Memory, Memory Organization Systems.

**MODULE – VIII [4 Hrs]**

Expert Systems Architectures: Introduction, Rule Based System Architecture, Non-

Production System Architecture, Dealing with uncertainty, Knowledge Acquisition and

Validation, Knowledge System Building Tools.

**Text Book:**

1. Artificial Intelligence by Elaine Rich and Kevin Knight ( Tata McGraw- Hill edition)

Reference Book:

1. Introduction to Artificial Intelligence and Expert systems by Dan W. Patterson (PHI Learning)
2. Artificial intelligence and neural networks by K.Uma Rao (Pearson education)

**(Cs 1704- P) LAB ASSIGNMENT**

1. Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.

2. Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.

3. Using Teradata Warehouse Miner – Create mining models that are executed in SQL.

4. Publish and analyze a business intelligence portal.

5. Import metadata from specific business intelligence tools and populate a meta data repository.

6. Publish metadata stored in the repository.

7. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.

**(CS 1705 – P) LAB ASSIGNMENT**

1. Writing code for keyboard and mouse events.

2. Dialog Based applications

3. Creating MDI applications

4. Threads

5. Document view Architecture, Serialization

6. Dynamic controls

7. Menu, Accelerator, Tool tip, Tool bar

8. Creating DLLs and using them

9. Data access through ODBC

10. Creating ActiveX control and using it

**CS 1706-P) LAB ASSIGNMENT**

**List of Experiments:**

1. Implement 8 puzzle problem using A\* algorithm.

2. Implement AO\* algorithm for tower of Hanoi.

3. Implementation of Unification Algorithm.

4. Implementation of Truth maintenance system using prolog

5. Implementation of Min/MAX search procedure for game Playing

6. Parsing Method Implementation using Prolog.

7. Development of mini expert system using Prolog.

**(CS 2701) E- COMMERCE & SECURITY**

**Module 1 : [4 Hrs]**

**E-commerce** - E-commerce doing business on the Internet, The scope of internet and the web, using web to reach customers, Benefits of E-commerce market, E-commerce Technology, The internet environment.

**Module 2 : [4 Hrs]**

**E-business Models and Markets** : E-business Models, E-business markets, Traditional bye build approach and vendors, online sales channels, Advantages of outsourcing an infrastructure to an ECIP.

**Module 3 : [6 Hrs]**

**E-commerce website creation :** The elements of E-commerce, Website Server, Developing a commerce site, Requirement of your site, Building the site, Implementation.

**Module 4 : [5 Hrs]**

**Building Shopping cart Applications :** A shopping cart scenario, A customer Servlet, A Real world Application Model, Loose component coupling.

**Module 5 : [6 Hrs]**

**Mobile E-commerce** : Wireless industry standards, wireless communication Platforms for LANs, wireless WANS, Facilities for wireless Environment, Concerns for Mobile Enterprise

**Module 6 : [6 Hrs]**

**Security Issues :** Security Solutions: Symmetric and Asymmetric Cryptosystems, RSA, DES, and Digital Signature, Protocols for secure messaging, Secure Electronic Transaction (SET) Protocol, Electronic cash over internet, Internet Security.

**Module 7 : [4 Hrs]**

**Electronic Payments Technology** : Issues, smart cards, Digital currencies

**Text Books :**

* Electronic Commerce – Pete Loshin & John Vacca

**(CSS 2703) ENTERPRISE RESOURCE AND PLANNING**

**MODULE-l [6 Hrs]**

**Conceptual foundation of Business Process reengineering:** Role of information Technology and BPR; Process improvement and Process redesign, Process identification and mapping; Role/Activity diagrams, Process Visioning, and benchmarking.

**MODULE -2 [6 Hrs]**

**Enterprise Resource Planning:** Evolution of ERP- MRP and MRP II, structure of ERP- two tier architecture, three tier architecture, Electronic data processing, management information system, Executive information system, ERP as an integrator of information needs at various Levels.

**MODULE -3 [8 Hrs]**

**Typical Business Processes:** Core processes, Product control, Sales order processing, Purchases, Administrative processes, Human resource, Finance support processes, Marketing, Strategic planning, Research and development, Problems in traditional view.

**MODULE -4 [8 Hrs]**

**ERP models/functionality:** Sales order processing, Production scheduling, forecasting, distribution, finance, features of each of the models, description of data flow across each module, overview of supporting databases & packages.

**MODULE -5 [6 Hrs]**

**ERP implementation issues:** Opportunities and problems in ERP selection, and implementation; ERP implementation: identifying ERP benefits, team formation, Consultant intervention, Selection of ERP, Process of ERP.

**Text Books:**

1. V.K. GARG & N .K. VENKATKRISHNAN:, ERP, Concepts and Practices, PM

2. Rahul V. Altekar, Enterprise wide Resource Planning-theory and practice, PHI

**References:**

1. ALEXIS LEON: Enterprise Resource Planning, TMH

2. S. SADAGOPAN: MIS, PM

3. V. RAJARAMAN: Analysis and Design of Information Systems, PHI

4. **MONK' & BRADY: Concepts in ERP, Vikas pub, Thomson**

**(CS 2711) Graph Theory**

**MODULE I: [9 Hrs]**

Introduction to Graph Theory: Definitions and Examples, Subgraphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits

**MODULE II: [9 Hrs]**

Introduction to Graph Theory contd.: Planar Graphs, Hamilton Paths and Cycles, Graph Colouring, and Chromatic Polynomials

**MODULE II1: [9 Hrs]**

Trees: Definitions, Properties, and Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes

**MODULE IV: [9 Hrs]**

Optimization and Matching: Dijkstra’s Shortest Path Algorithm, Minimal Spanning Trees – The algorithms of Kruskal and Prim, Transport Networks – Max-flow, Min-cut Theorem, Matching Theory

**MODULE V: [9 Hrs]**

Fundamental Principles of Counting: The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition, The Catalon Numbers

**Text Book**

1. Discrete and Combinatorial Mathematics, Ralph P. Grimaldi, 5th Edition, PHI/Pearson Education, 2004.

**Reference Books**

1. Graph Theory and Combinatorics, Dr. D.S. Chandrasekharaiah, Prism, 2005.

2. Introduction to Graph Theory, Chartrand Zhang, TMH, 2006.

3. Introductory Combinatorics, Richard A. Brualdi, 4th Edition, Pearson Prentice Hall, 2004.

4. Graph Theory Modeling, Applications, and Algorithms, Geir Agnarsson & Raymond Geenlaw, Pearson Prentice Hall, 2007.

**(CS 2713) SOFTWARE TESTING**

**MODULE I :**

Introduction : Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

**MODULE II :**

Flow graphs and Path testing : Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**MODULE III :**

Transaction Flow Testing : Transaction flows, transaction flow testing techniques. Dataflow testing:-Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**MODULE IV :**

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

**MODULE V :**

Paths, Path products and Regular expressions : Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

**MODULE VI :**

Logic Based Testing : Overview, decision tables, path expressions, KV charts, specifications.

**MODULE VII :**

State, State Graphs and Transition testing : State graphs, good & bad state graphs, state testing, Testability tips.

**MODULE VIII :**

Graph Matrices and Application : Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.

Usage of JMeter and Win runner tools for functional / Regression testing, creation of test script for unattended testing, synchronization of test case, Rapid testing, Performance testing of a data base application and HTTP connection for website access.

**TEXT BOOKS :**1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

**REFERENCES :**1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

**(CS2714) NETWORK MANAGEMENT**

**UNIT – I [6 Hours]**

Data communications and Network Management Overview : Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System

Platform, Current Status and future of Network Management.

**UNIT – II [5 Hours]**

SNMPV1 Network Management : Organization and Information and Information Models.
Managed network : Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model.

**UNIT – III [4 Hours]**

SNMPv1 Network Management : Communication and Functional Models. The SNMP Communication Model, Functional model.

**UNIT – IV [4 Hours]**

SNMP Management: SNMPv2 : Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1.

**UNIT – V [4 Hours]**

SNMP Management : RMON : What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON

**UNIT – VI [5 Hours]**

Telecommunications Management Network : Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, implementation Issues.

**UNIT – VII [5 Hours]**

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

**UNIT – VIII [5 Hours]**

Web-Based Management: NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network: , Future Directions.

**TEXT BOOK :**

 1. Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

**REFERENCE BOOKS :**

 1. Network management, Morris, Pearson Education.

 2. Principles of Network System Administration, Mark Burges, Wiley Dreamtech.

 3. Distributed Network Management, Paul, John Wiley.

**(CS 2715) MULTIMEDIA TECHNOLOGY**

**Module 1 [4 hours]**

Multimedia Systems: Introduction to multimedia systems. Definition and Main properties of Multimedia System. Definition of terms and concepts related to multimedia. Trends in the development and the use of multimedia. Tools, techniques, and guidelines facilitating the planning, design, production, and implementation of multimedia products. Traditional Data streams characteristics, Characteristics of continuous media data based on time, space and continuity.

**Module 2 [5 hours]**

Text: About fonts and faces - text in multimedia - computers and text - Font editing and design tools – Hypermedia and Hypertext.
Sound/Audio: Basic sound concepts, MIDI devices and MIDI messages. MIDI versus digital audio. Quantization and Transmission of Audio.

**Module 3 [5 hours]**

Image: Digital image representation, Image Format, Graphics format, Computer Image Processing: Image Synthesis, Image Analysis and Image Transmission. Video: Video Signal Representation, Computer Video format, Television.

**Module 4 [7 hours]**

Data Compression: Source, Entropy and Hybrid Encoding, Some basic compression techniques, JPEG, MPEG, H.261, DVI.

**Module 5 [5 hours]**

Multimedia Operating Systems: Process Management-Real time Scheduling System Model, Rate Monotonic & Earliest Deadline First Algorithm, Process Utilization, Multimedia File System Paradigm, Disk Scheduling. Synchronization: Notion of Synchronization, Presentation Requirements, Reference model for Multimedia Synchronization, Synchronization Specification.

**Module 6 [7 hours]**

Computer and Multimedia Networks: Basics of Computer and Multimedia Networks, Multiplexing Technologies, LAN and WAN, Access Networks, Common Peripheral Interfaces. Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Application Subsystem, Transport Subsystem, QOS and Resource Management.

**Module 7 [6 hours]**

Multimedia Databases: Design and Architecture of a Multimedia Database, Organizing Multimedia Data based on the Principal of Uniformity, Media Abstractions, Query Languages for Retrieving Multimedia Data , Indexing SMDSs with Enhanced Inverted Indices, Query Relaxation/ Expansion, Conclusions and Selected Commercial Systems.

**Module 8 [6 hours]**

Multimedia Authoring Tools, Multimedia Systems Frameworks: Multimedia Information System: Multimedia Information Model and Multimedia Distributed Processing Model. Multimedia Communication System: Multimedia Conferencing Model and Multimedia Network Model. QOS layer Architecture, Distributed Multimedia Systems: Features of Distributed Multimedia System, Types of Distributed Multimedia Application, QOS in Distributed Multimedia System.

**Text Book :**

1. Multimedia: Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education.

2]  Fundamentals of Multimedia- Ze Nian and Mark S Drew [PHI].

**Reference Books**

1. “Principles of Multimedia Database Systems”, S. Subrahmanian, Morgan Kaufmann Publication.
2. Multimedia Systems, P.K.Buford, Pearson Education

3] “Multimedia: Computing, Communication & Applications, R. Steinmetz and K. Nahrstedt,
 Pearson Education.

**(EC 2720) DIGITAL IMAGE PROCESSING**

**Module 1**Image representation and modeling – Characteristics of a digital image – Elements of digital image processing systems – Image digitizers & scanners – Elements of visual perception – Brightness & contrast

**Module 2**

Image sampling & Quantization – Two dimensional Sampling theorem – Reconstruction of image from its samples – Aliasing.

**Module 3**Image Transforms – Two dimensional orthogonal & unitary transforms – Properties of unitary transforms – Two dimensional DFT & its properties – Cosine – Hadamard – Haar – Sine – KL Transforms & their properties.

**Module 4**Image Enhancement – Point processing – Histogram modeling & Equalization – Spatial Filtering – Filtering in the frequency domain – color Image processing.

**Module 5**Image Restoration – Degradation model – Inverse filtering – Wiener Filter – Interactive restoration

**Module 6**Image analysis & vision – Principles of Image analysis & vision

**Module 7**Image Coding & Compression- basic principles – run length coding – variable length coding – bit plane coding – loss-less predictive coding – lossy predictive coding – Transform coding

**Module 8**

Image compression standards.

Mg

**Text & Reference Books:**

1. Digital image Processing I.Gonzalez Rafel C, Pearson Education.
2. Fundamentals of digital image processing  Jain Anil K, PHI.
3. Digital Image Processing  Pratt William K, John Wiley.

**(HS 2720) ENVIRONMENTAL ENGINEERING**

**MODULE I [12 Hrs]**

**ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY**

Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – bio-geographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds Field study of simple ecosystems – pond, river, hill slopes, etc.

**MODULE II [8 Hrs]**

**ENVIRONMENTAL POLLUTION**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

**MODULE III [10 Hrs]**

**NATURAL RESOURCES**

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

**MODULE IV [7 Hrs]**

**OCIAL ISSUES AND THE ENVIRONMENT**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of nongovernmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

**TEXT BOOKS:**

1. Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, 2nd

 edition, Pearson Education (2004).

2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill, New Delhi, (2006).

**REFERENCES:**

1. R.K. Trivedi, “Handbook of Environmental Laws, Rules, Guidelines, Compliances

and Standards”, Vol. I and II, Enviro Media.

2. Cunningham, W.P. Cooper, T.H. Gorhani, “Environmental Encyclopedia”, Jaico Publ., House, Mumbai, 2001.

3. Dharmendra S. Sengar, “Environmental law”, Prentice hall of India PVT LTD, New Delhi, 2007.

**(EC 2721) DIGITAL SIGNAL PROCESSING**

**MODULE- I [6 Hrs]**

Introduction: Discrete-Time Signals, Shanon's sampling theorem, Difference equation description, characteristics of digital filters and time domain analysis, properties of discrete time system (linearity, time-variance, convolution), BIBO stability, Z-transformation and their application in solving difference equations, Relationship between Laplace and Z-transforms.

**MODULE- II [6 Hrs]**

Frequency domain analysis: Discrete Time Fourier Transform (DTFT) and Discrete Fourier Transform (DFT), Periodic convolution, Direct evaluation of DFT, FFT algorithms- decimation in time and frequency, Relationship between Fourier and Z-transforms

**MODULE- III [5 Hrs]**

Digital Filter Structures: Direct form I&II, cascade, parallel and ladder realizations.

**MODULE- IV [6 Hrs]**

Filter Function Approximations and Transformations: Review of approximations of ideal analog filter response, Butterworth filter, Chebyshev Type I & II.

**MODULE- V [4 Hrs]**

Frequency Transformations: Frequency transformation in analog domain, frequency transformation in digital domain.

**MODULE- VI [5 Hrs]**

Design of IIR Filter: Design based on analog filter approximations, Impulse invariantce method, Matched Z-transformation, Bilinear transformation.

**MODULE- VII [6 Hrs]**

Design of FIR filters: Symmetric and antisymmetric FIR filters, design of linear phase FIR filters using windows and frequency– sampling methods, design of optimum equiripple linear phase FIR filters, comparison of FIR and IIR filters.

**Text Books:**1. “Digital Signal Processing, Principles, Algorithms and Applications” ,John G. Proakis, Dimitris G. Mamalakis,

2. “Digital Signal Processing”, Alan V. Oppenheim Ronald W. Schafer, PHI, India.

**Reference Book:**

1. “Digital Filter Design”, Antonious, Mc-Graw-Hill International Editions.

**B. TECH COURSE STRUCTURE**

**COMPUTER SCIENCE & ENGINEERING**

**8TH SEMESTER**

**RANCHI UNIVERSITY, RANCHI**

**(cs 1801) Cryptography & Network Security**

**MODULE – I [12 Hrs]**

Security Services, Mechanisms and Attacks, The OSI Security Architecture, A Model for Network Security. Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor machines, Steganography.

Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operation.

**MODULE - II [12Hrs]**

Finite Fields and Confidentiality: Groups, Rings, and Fields, Modular Arithmetic, Euclid’s Algorithm, Finite Fields of the Form GF (p), Polynomial arithmetic, Finite Fields of the Form GF(2”), Placement of Encryption Function, Traffic Confidentially, Key Distribution, Random Number Generation.

Encryption Standard and Ciphers: Evaluation criteria for AES, AES cipher, Multiple encryption and Triple DES, Block ciper Modes of operation, Stream ciphers and RCG.

**MODULE - III [12 Hrs]**

Number Theory and Public-Key Cryptography: Prime Numbers, Fermat’s and Euler’s Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms, Principles of Public-Key Cryptosystems, The RSA Algorithm,

**MODULE – IV [12 Hrs]**

Message Authentication, Function, Algorithms and Digital System: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Secure Hash Algorithm, HMAC, Digital Signatures, Authentication Protocols.

**Text Book:**

1. W.Stallings : Cryptography and Network Security : Principles and Practice, 4/e Pearson

Education, New Delhi, 2006.

**Reference Books:**

1. B.A. Forouzan – Cryptography and Network Security, TMH, New Delhi, 2007

2. B. Schneier – Applied Cryptography, John Wiley, Indian Edition, 2006.

3. Atul Kahate – Cryptography and Network Security, TMH

**(HS 1801) FINANCIAL MANAGEMENT & ACCOUNTING**

**MODULE . I** [2 HRS]

Introduction :

Financial Management, Financial Planning and capitalization- definition, objectives, changing roles and functions, financial decision.

**MODULE . II**  [15 HRS]

Introduction to Accounting :

Basic accounting concepts, important definitions, uses, Imitations, advantages; types of Accounting, Financial statements, introduction to journal Accounting; different types of vouchers, double entry bookkeeping, different types of transactions related to Financial Accounting. Financial Control.

Posting of Ledgers and preparation of Trial Balance; preparation of Balance Sheet and Profit and loss Accounts; Controlling other departments by Financial Accounting ( A practical Approach).

**MODULE . III** [8 HRS]

Capital Budgeting :

Nature of Investment decision, Importance of Capital Budgeting, The Capital. Budgeting Process, Investment Criterion, Pay-back period, Accounting, ROR ( Rate of Return) Method, Discounting Case flow method, Net- present value method, IRR (Internal Rate of Return) method, The benefit-Cost ratio method.

**MODULE . IV** [3 HRS]

Management of Working Capital :

Various concepts, Elements, Classification, Financing and importance of working capital, Investment analysis, Case flow determination, cost of capital budgeting methods.

**MODULE . V** [4 HRS]

Budgeting Control Technique :

Concepts of Budget, Budgeting and budgetary control, Objectives, Functons, Uses, Advantages, Limitations; Master Budget and Report.

**MODULE . VI** [8 HRS]

Cost – Volume- Profit Analysis :

Classification of costs, Allocation, apportionment and absorption, Cost centers, different costing systems, cost analysis for managerial decisions, Meaning of Linear CVP analysis, Objectives, Assumptions, Break- Even analysis, determining the Break-Even point profit, Volume graph profit, Volume ratios margin of Safety.

**Text Books & Reference Books** :

1. Financial Management and Accounting - P. K. Jain, S. Chand & Co.

2. Management & Accounting: Principles and Practice - R. K. Sharma & Shashi Kumar

 Gupta, Kalyani Publishers.

3. Advanced Management Accounting - Kaplan & Atkinson, PHI.

4. Fundamentals of Financial Management - Van Home, PE.

5. Financial Mgmt Accounting, Gupta,Pearson

6. Financial Mgmt, I.M. Pandey, Vikas

7. Financial Mgmt., Khan & Jain, TMH

8. Financial Mgmt , Mcmenamin, OUP

9. Financial Mgmt & Policy, Van Horne, PHI

10. Financial Mgmt,Kulkarni & Satyaprasad, Himalaya

**(CS2801) IT IN MARKETING MANAGEMENT**

**MODULE – I [5Hours]**

Introduction to computers-Basic parts-hardware parts and its functions- Input and output devices

Software and Hardware-Differences –Types of Software-Various application software : Word, Excel, Power point, Paint brush, General overview of these and latest application software

**MODULE – II [6Hours]**

Operating systems-Function, Types: Single user and Multi user-DOS and Windows Operating system-How to use operating systems

Networking-Concept, Advantages, Disadvantages.

**MODULE - III [5Hours]**

Introduction to world wide web – Internet operations - Online marketing - Advantages and disadvantages-Problems in online transactions -Indian Scenario

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**MODULE - IV [3Hours]**

Relationship between Study of Consumer’s Behaviour and IMC Plan

Sales promotion- Relationship between Sales promotion and advertising - Types and Techniques of Sales Promotion

**MODULE - V [5Hours]**

Advertising- Objectives and Perspective: AIDA & DAGMAR- Classification of advertising- Functions of advertising.

Advertising Media - Media Types and Media mix - Media Selection, Planning and Strategy

**MODULE - VI [5Hours]**

Creativity in Advertising- Concept of Copy, Theme and Appeal - Copy Writing and Copy Research- Message: Design and Evaluation

Advertising Appropriation- Factors influencing Advertising Budget - Methods of Advertising Budgeting

**MODULE - VII [5Hours]**

Advertising Business- Ad agency, Types of agency- Functions and Selecting an Ad Agency- Agency-client relationship

Other Marketing Communication Media - Public Relations - Personal Selling-Online Marketing - Event management- Movies and Documentaries

**MODULE - VIII [5Hours]**

Social Implications of Advertising, Moral and Ethical Issues in Advertising. Emphasis on Case Studies on Marketing Communication Mix designed by various organizations. Visit to various Advertising Agencies and understanding flow of Advertising Process. Carrying out Research Activities on Media Types, Media Planning, Media Mix.

**TEXT BOOK:**

1. Fundamentals of Information Technology: V. Rajaraman.
2. Introduction to Networks: A. Tannenbaum
3. Integrated Advertising, Promotion and Marketing Communication- By Clow Baack
4. Advertising Management- Manendra Mohan
5. Advertising and Promotion: S.A.Chunawalla

**REFERENCES BOOKS :**

1. Computer Studies : C.French

2. Introduction to operating system : Milan Milen Kovic

3. Introduction to computer science : ITL Solution series

4 Introduction to Computers : Peter Norton

5 Foundations of Advertising : S.A.Chunawalla and Sethia

7 Advertising Management : Batra, Myers & Aaker

9. Sales Promotion : M.N.Mishra

10. Advertising and Promotion : George Belch and Michael Belch

11. Advertising Sales and Promotion Management : S.A.Chunawala

**(CS 2809) MANAGEMENT INFORMATION SYSTEMS**

**Module 1 [4 hrs]**

Information systems in the enterprise : Why information systems, perspectives on information
systems, contemporary approaches to information systems, four major types of systems in organizations, transaction processing systems, management information systems, decision support systems, executive support systems.

**Module 2 [6 hrs]**

Systems from a functional perspective- Sales and Marketing Systems, Manufacturing and
Production Systems, Financial and Accounting Systems, Human Resources Systems. Integrating functions and business processes.

**Module 3 [7 hrs]**

The Digital Firm, Electronic Business and Electronic Commerce: Internet technology and
the digital firm, categories of electronic commerce, customer centred retailing, business-to-business
electronic commerce, commerce payments, electronic business, management opportunities, challenges and solutions.

**Module 4 [6 hrs]**

The wireless revolution: business value of wireless networking, wireless transmission media
and devices, cellular network standards and generations, wireless computer networks and internet access, M-commerce and Mobile computing, wireless technology in the enterprise.
**Module 5 [5 hrs]**

Security and control: system vulnerability and abuse, business value of security and control,
establishing a management framework for security and control, technologies and tools for security and control.

**Module 6 [6 hrs]**

Enterprise Applications and Business Process Systems: What are enterprise systems,
How enterprise systems work, supply chain management systems, customer relationship management systems, enterprise integration trends.

**Module 7 [5 hrs]**

Redesigning the organizations with information systems: systems as planned
organizational change, business process reengineering and process improvement, overview of system
development, alternative systems building approaches – traditional systems life cycle, prototyping, end use development, application software package and outsourcing.

**Module 8 [6 hrs]**

Managing change and international information systems: The importance of change
management in information systems success and failure, managing implementation, the growth of
international systems, organizing international information systems, managing global systems, technology issues and opportunities for global value chains.

**TEXT BOOK**1. “Management Information Systems”, Kenneth C. Laudon, Jane P. Laudon & VM Prasad, PearsonEducation,2005.

2. “Introduction to Information Systems”, James A. O’Brien, TMH, New Delhi, 2002.

**REFERENCE books**
1. Management Information Systems - Effy Oz, Third Edition, Thomson, 2002.
2. Information Technology-Strategic Decision Making for Managers - M Henry C.Lucas, Jr., John
Wiley & Sons, Inc, 2005.

3. Information Systems Today - Jessup &Velacich, PHI, 2004.
4. Management Information Systems - Sadagopan, PHI, 2004.

**(CS 2810) PRINCIPAL OF PROGRAMMING LANGUAGE**

**Module 1:**

The Role of Programming Languages: Toward Higher-level Languages, Problems of Scale, Programming Paradigms.

**Module 2:**

 Language Implementation Bridging the Gap Language Description:- Syntactic Structure: Expression Notations, Abstract Syntax Trees, Lexical Syntax, Context -Free Grammars, Grammars for Expressions,

**Module 3:**

Variants of Grammars Statements: Structured Programming, Types: Data Representation, Procedure Activations.

**Module 4:**

Object Oriented Programming: Groupings of Data and Operations:- Constructs fro Program Structuring, Information Hiding.

**Module 5:**

 Program Design with Modules, Modules and Defined Types, Class Declarations in C++, Dynamic Allocation In C++.

**Module 6:**

 Templates: Parameterized Types, Implementation of Objects in C++. Object-Oriented Programming:- What is an Object?, Object-Oriented Thinking.

**Module 7:**

Inheritance, Object-Oriented Programming in C++, An extended C++ example, Derived Classes and information Hiding, Objects in Smalltalk, Smalltalk Objects have self.

**Module 8:**

Functional programming: Elements of Functional Programming, functional Programming in a Typed Languages, functions as First-Class Values, ML, Functional Programming with Lists

Other Paradigms: Logic Programming, an Introduction to Concurrent ProgrammingEssential Reading:

**Text Books**

1. R. Sethi, Programming Languages – Concepts & Constructs, Pearson Education.

**Reference Books:**

1. R. W. Sebesta, Concepts of Programming Languages, 8th edition, Addison-Wesley, 2007.

2. M. L. Scott, Programming Language Pragmatics, 2nd edition, Morgan Kaufmann, 2005.

3. T. W. Pratt and Marvin V. Zelkowitz Programming Languages: Design and Implementation, 4th edition, Prentice-Hall, 2001.

4. S. Krishnamurthi, Programming Languages: Application and Intepretation, Creative Commons Attribution-Non Commercial-Share Alike 3.0, Version: http*://www.cs.brown.edu/~sk/Publications/Books/ProgLangs/2007-04-26*

**(CS 2812) Cloud Computing**

**Module 1:**

Introduction to cloud computing, Virtualization concepts: Types of Virtualization & its benefits

Data Centre foot prints & Concepts, Introduction to data centers: servers, data storage, networking and virtualization

**Module 2:**

Types of Virtualization OS:

Vmware, KVM etc, HA/DR using Virtualization, Moving VMs, SAN backend concepts, Cloud Fundamentals: Cloud Building Blocks, Understanding Public & Private cloud environments

**Module3:**

Cloud as IaaS:

Private Cloud Environment: Basics of Private cloud infrastructure, QRM cloud demo

Public Cloud Environment:

Understanding & exploring Amazon Web services, Managing and Creating Amazon EC2 instances

Managing and Creating Amazon EBS volumes, Tata Cloud details & demo

**Module 4:**

Managing Hybrid Cloud environment, Virtual machine management: provisioning, placement, resource allocation, Fault tolerance, etc.

**Module 5 :**

Data center networking: Ethernet, network topologies, routing, addressing, transport layer protocols Midterm and spring break Platform as a Service (PaaS)

**Module 6:**

The Map Reduce programming model, Mobile cloud computing, Class project presentations by students

**Module 7:**

Setting up your own Cloud, How to build private cloud using open source tools, Understanding various cloud plugins, Setting up your own cloud environment, Auto provisioning, Custom images, Integrating tools like Nagios, Integration of Public and Private cloud

**Module 8:**

Future directions, Cloud Domain and scope of work, Cloud as PaaS, SaaS, Cloud Computing Programming Introduction, Trends and market of cloud

**Text Book:**

Tom White,Hadoop: The Definitive Guide, O'Reilly Media, 2009.

**Reference Books**

* Tanenbaum and van Steen, Distributed Systems: Principles and Paradigms, Pearson, 2007.
* Jean Dollimore, Tim Kindberg, George Coulouris, Distributed Systems: Concepts and Design, Fourth Edition, Addison Wesley, 2005.
* Randal E. Bryant and David R. O'Hallaron, Computer Systems: A Programmer's Perspective, Prentice Hall, 2003.
* Patterson and Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fourth Edition, Morgan Kaufmann/Elsvier.
* Jason Venner, Pro Hadoop, Apress, 2009.
* Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011, ISBN: 0470887990.

**(CS 2813) Computer Vision**

**Module 1**:

Recognition Methodology: Conditioning, Labeling, Grouping, Extracting, Matching.

**Module 2:**

Morphological Image Processing: Introduction, Dilation, Erosion, Opening, Closing, Hit-or-Miss transformation, Morphologicalalgorithm operations on binary images, Morphological algorithmoperations on gray-scale images, Thinning, Thickining, Regiongrowing, region shrinking.

**Module 3:**

Image Representation and Description: Representation schemes, Boundary descriptors, Region descriptors.

Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchal segmentation, spatialclustering, Split& merge, Rule-based Segmentation, Motion-basedsegmentation.

**Module 4:**

Area Extraction: Concepts, Data-structures, Edge, Line-Linking, Hough transform,

Line fitting, Curve fitting (Least-square fitting).

Region Analysis: Region properties, External points, Spatialmoments, Mixed spatial gray-level moments

 Boundary analysis: Signature properties, Shape numbers.

**Module 5:**

Facet Model Recognition: Labeling lines, Understanding linedrawings,

Classification of shapes by labeling of edges, Recognition ofshapes, consisting labeling problem, Back-tracking Algorithm

**Module 6:**

Perspective Projective geometry, Inverse perspectiveProjection, Photogrammetry - from 2D to 3D,

Image matching: Intensity matching of ID signals, Matching of 2D image, Hierarchical image matching.

**Module 7:**

Object Models And Matching: 2D representation, Global vs. LocalFeatures

General Frame Works for Matching: Distance relational approach, ordered structural matching, View class matching, ModelsDatabase organization

General Frame Works: Distance -relational approach, Ordered -Structural matching, View class matching, Models database organization.

**Module 8:**

Knowledge Based Vision: Knowledge representation, Control strategies, Information Integration

Object recognition: Hough transforms and other simple object recognition methods,

Shape correspondence and shape matching, Principal component analysis, Shape priors for recognition

**Text Books:**

1. Robert Haralick and Linda Shapiro, "Computer and Robot Vision", Vol I, II, Addison-esley, 1993.

2. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach"

**References:**

1. Milan Sonka,Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis, andMachine Vision"

Thomson Learning

1. *Computer Vision - A modern approach*, by D. Forsyth and J. Ponce, Prentice Hall

**(CS 2815) PATTERN RECOGNITION**

**MODULE – I**

Pattern Recognition Overview: Overview, Pattern Recognition, Classification and Description, Patterns and Feature Extraction, Training and Learning in PR Systems, Pattern Recognition Approaches.

**MODULE – II**

Statistical Pattern Recognition: Introduction, The Gaussian case and Class Dependence Discriminate Functions, Extensions, Classifier Performance, RISK and Errors.

**MODULE – III**

Supervised Learning: Parametric Estimation and Supervised Learning, Maximum Likelihood, Estimation Approach, Bayesian Parameter Estimation Approach, Non – Parametric Approaches, Parzen Windows, K-nn Non-Parametric Estimation. Nearest Neighbour Rule.

**MODULE – IV**

Linear Discriminate Functions and The Discrete and Binary Feature Cases : Introduction, Discrete and Binary Classification Problems, Techniques to Directly Obtain Linear, Classifiers.

**MODULE – V + VI**

Syntactic Pattern Recognition: Overview Quantifying Structure in Pattern Description and Recognitions, Grammar Based Approach and Application, String Generation as Pattern Description. Recognition by String Matching and Parsing. The Cocke-Younger Kasami ((ck) parsing algorithm.

**MODULE – VII**

Neural Pattern Recognition : Introduction to Neural Networks, Neural Network Structure from Pattern Recognition Applications. Physical Neural Network. The Artificial Neural Network Model, Neural Network Based Pattern Associators.

**Text Book:**

1. Robort Schalkoff - Pattern Recognition, Statistical, Structural and Neural Approach,

 John Wiley, Indian Edition, 200.

**Reference Books :**

1. R. U. Duda – Pattern Classification, John Wiley, Indian Edition, 2006.

**(CS 2816) SOFT COMPUTING**

**FUZZY LOGIC**

**MODULE -I**

**Fuzzy Set Theory:** Basic Definition and Terminology, Set Theoretic Operations, MF Formulation and Parameterization, MF of two dimensions, Fuzzy Union, Intersection and Complement.

**MODULE -II**

**Fuzzy Rules and Fuzzy Reasoning:** Extension Principles and Fuzzy Relations, Fuzzy IF THEN Rules, Fuzzy Reasoning.

MODULE –III

Fuzzy Inference System **Introduction, Mamdani Fuzzy Models, Other Variants, Sugeno Fuzzy Models, Tekamoto Fuzzy Models.**

**GENETIC ALGORITHMS**

**MODULE –IV**

**Fundamentals of Genetic Algorithms:** Basic Concepts Creation, Offspring’s Encoding, Fitness functions, Reproduction, Genetic Modelling: Inheritance Operators, Cross over, Inversion and detection, Mutation operator, Bitwise operators.

**ARTIFICIAL NEURAL NETWORKS**

**MODULE -V**

Introduction, Architecture, Back Propagation and feed Forward Networks, Offline Learning, Online Learning.

**MODULE -VI**

Supervised Learning of Neural Networks: Introduction, Perceptrons, Adaline, Back Propagation Multilayer Perceptrons, Back Propagation Learning Rules, Methods of Speeding. Radical Basis Function Networks, Functional Expansion Networks.

**MODULE -VII**

**Unsupervised Learning :** Competitive Learning Networks, Kohonen self-organising networks, Hebbian Learning, The Hopfield Network

**Text Book :**

1. J.S.R. Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing” PHI/Pearson Education, New Delhi

 2004.

1. S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI, New Delhi 2003

**Reference Books:**

1. T. J. Ross, “Fuzzy Logic with Engineering Applications.” TMH, New York, 1997.

**(CS 2818) DECISION SUPPORT SYSTEM**

**MODULE-I [8 Hrs]**

Overview of different types of decision-making**:** Strategic, tactical and operational. Consideration of organizational structures. Mapping of databases, MIS, EIS, KBS, expert systems, OR modeling systems and simulation, decision analytic systems onto activities within an organization. Extension to other 'non organizational' areas of decision making. Relationship with knowledge management systems

**MODULE-II [7 Hrs]**

Studies of human cognition in relation to decision making and the assimilation of information. Cultural issues. Implications for design of decision-making support. Communication issues.

**MODULE –III [5 Hrs]**

Normative, descriptive and prescriptive analysis: requisite modeling. Contrast with recognition primed decision tools.

**MODULE –IV [7 Hrs]**

Database, MIS, EIS, KBS, Belief nets, data mining. OR modeling tools: simulation and optimization. History, design, implementation: benefits and pitfalls. Risk assessment. Decision analysis and strategic decision support.

**MODULE –V [8 Hrs]**

Group decision support systems and decision conferencing. Intelligent decision support

systems: tools and applications. Cutting-edge decision support technologies. History, design, implementation: benefits and pitfalls. Deliberative e-democracy and e-participation

**Text Books**

1. P.R. Kleindorfer, H.C. Kunreuther, P.J.H. Schoemaker “Decision Sciences: an integration

 perspective' Cambridge University Press 1993

2. G.M. Marakas, Decision support Systems in the 21st Century, Prentice Hall, 1999.

**Reference Books**

1. E. Turban and J.E. Aronson (2001) Decision support Systems and Intelligent Systems. 6th Edition. Prentice Hall

2. V.S.Janakiraman and K.Sarukesi, Decision Support Systems, PHI

3. Efrem G. Mallach, Decision Support and Data Warehouse Systems, tata McGraw-Hill

 Edition

**(CS 2819) ADVANCED JAVA PROGRAMMING**

**Module 1:** (5 Hrs)

**BASIC JAVA FUNDAMENTALS**

Use a Java IDE, Create and use Java packages , Create and use Java classes, Create and use interfaces and abstract, final and anonymous classes, Use Java GUI components, their events and layout managers, Throw and catch exceptions, Use Java collection, file I/O and database connectivity packages, Use JDBC to connect to and query a database, Create and use Java applets and application.

**Module 2:** (5 Hrs)

**ADVANCED JAVA FUNDAMENTALS**

Java I/O streaming – filter and pipe streams – Byte Code interpretation - reflection – Dynamic Reflexive Classes – Threading – Java Native Interfaces- Swing.

**Module 3:** (7 Hrs)
**NETWORK PROGRAMMING IN JAVA**

Sockets – secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes – Reading Data from the server – writing data – configuring the connection – Reading the header – telnet application – Java Messaging services

**Module 4:** ( 8 Hrs)
**APPLICATIONS IN DISTRIBUTED ENVIRONMENT**

Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming Services – CORBA programming Models - JAR file creation

**Module 5:** ( 5 Hrs)
**MULTI-TIER APPLICATION DEVELOPMENT**

Server side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication - JDBC – Using BLOB and CLOB objects – storing Multimedia data into databases – Multimedia streaming applications – Java Media Framework.

**Module 6:** ( 5 Hrs)
**ENTERPRISE APPLICATIONS**

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

 **TEXT & REFERENCE BOOKS**

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

2. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley & Sons Inc., 1999. (UNIT III and UNIT V)

3. Hortsmann & Cornell, “CORE JAVA 2 ADVANCED FEATURES, VOL II”, Pearson Education, 2002. (UNIT I and UNIT IV)

**(CS 2821) REAL TIME SYSTEMS**

**Module 1**Introduction to Real Time Systems – Structure of real time systems, real time computer, task classes.

**Module 2**

Periodic, Aperiodic, critical, Non-critical, definition of real time systems – real time systems, embedded systems – Hard real time systems, soft real time systems, real time design issues.

**Module 3**Real time kernel – polled loop systems, co-routines, interrupt driven systems – sporadic, fixed rate systems, hybrid systems, task control block – task status.

**Module 4**

Scheduling – uniprocessor scheduling – traditional rate monotonic, rate monotonic deferred server, EDF, IRIS tasks – multiprocessor scheduling – utilization balancing algorithm, next-fit, bin- packing algorithm, myopic offline, buddy strategy (no need of proofs) fault tolerant scheduling.

**Module 5**
Communication – Communication Media and message sending topologies, network architecture issues, protocols – contention – based, token – based, stop and go multiloop, polled bus, hierarchal, round robin.

**Module 6**

Fault tolerant routing – clocks and synchronization – fault tolerant synchronization in hardware, synchronization in software.

**Module 7**Fault tolerance – definition, cause of failure, fault types, fault detection and containment, redundancy – hardware, software, time, information, integrated failure handling – reliability – parameter values – series – parallel systems, NMR clusters, combinational model, master chain model, fault latency, transient faults, software error models.

**Module 8**
Programming Languages – Desired language characteristics, Real time databases, characteristics, main memory databases, Transaction, Disk schedule algorithms, Databases for hard real time systems, maintaining serialization constituency.

**Text Book:**

* Real Time Systems – C.M Krishna, Kang G. Shini (Tata McGraw Hill)

**Reference Books:**

* Real Time Systems, Design & Analysis – Philip Laplante (IEEE)
* Real Time Systems- Krishna, Tata McGraw Hill

**(EC 2820) BIOINFORMATICS**

**MODULE: I:**

Introduction to Bioinformatics

Scope of Bioinformatics, Elementary commands and protocols, ftp, telnet, http.

Primer on information theory.

**MODULE: -II:**

Introduction to Homology

Introduction to Homology (with special mention to Charles Darwin, Sir Richard Owen,Willie Henning, Alfred Russel Wallace).

**MODULE: III:**

Special Topics In Bioinformatics

DNA mapping and sequencing, Map alignment, Large scale sequencing methods Shotgun and Sanger method.

**MODULE: IV :**

Sequencing Alignment and Dynamic Programming

Heuristic Alignment algorithms. Global sequence alignments-Neddleman-WunschAlgorithm Smith-Waterman Algorithm-Local sequence alignments (Amino acid substitution Matrices (PAM, BLOSUM).

**MODULE: V:**

Primary Database and their Use

Databases (MMDB). PrimaryDatabases NCBL,EMBL, DDBJ.

**MODULE: -VI:**

Secondary Databases

Introduction to Secondary Databases Organization and management of databasesSwissprot, PIR,KEGG

**MODULE: -VII:**

Bio Chemical Data Bases

Introduction to BioChemical databases-organization and Management of databases.KEGG, EXGESCY, BRENDA, WIT.

**MODULE: VIII:**

Evolutionary Trees and Phylogeny

Multiple sequence alignment and phylogenetic analysis.

**TEXT BOOKS:**

1. Bioinformatics Basics. Applications in Biological Science and Medicine by

Hooman H. Rashidi and Lukas K.Buehler CAC Press 2000.

2. Algorithms on Strings Trees and Sequences DanGusfiled. Cambridge University Press 1997.

**REFERENCES:**

1. Bioinformatics: A Machine Learning Approach P. Baldi. S. Brunak, MIT Press 1988.

2. Bioinformatics. David Mount, 2000. CSH Publications

3.Developing Bioinformatics Skills.Cynthia Gibbas& Per Jamberk

4.Genomics and Proteomics-Functional and Computational aspects.Springer Publications.Editior-SandorSuhai.

5. Bioinformatics- Methods and Protocols-Human Press. Stephen Misener, Stephen A. Krawetz.

**(EC 2821) Wireless Communication**

**MODULE – I**

Introduction to wireless telecommunication systems and Networks, History and Evolution Different generations of wireless cellular networks 1G, 2g,3G and 4G networks.

**MODULE – II**

Common Cellular System components, Common cellular network components, Hardware and software, views of cellular networks, 3G cellular systems components, Cellular component identification Call establishment.

**MODULE – III**

Wireless network architecture and operation, Cellular concept Cell fundamentals, Capacity expansion techniques, Cellular backbone networks, Mobility management, Radio resources and power management Wireless network security

**MODULE – IV**

GSM and TDMA techniques, GSM system overview, GSM Network and system Architecture, GSM channel concepts, GSM identifiers

**MODULE – V**

GSM system operation, Traffic cases, Cal handoff, Roaming, GSM protocol architecture. TDMA systems

**MODULE – VI**

CDMA technology, CDMA overview, CDMA channel concept CDMA operations.

**MODULE – VII**

Wireless Modulation techniques and Hardware, Characteristics of air interface, Path loss models, wireless coding techniques, Digital modulation techniques, OFDM, UWB radio techniques, Diversity techniques, Typical GSM Hardware.

**MODULE – VIII**

Introduction to wireless LAN 802.11X technologies, Evolution of Wireless LAN Introduction to 802.15X technologies in PAN Application and architecture Bluetooth Introduction to Broadband wireless MAN, 802.16X technologies.

TEXT BOOK:

1. Wireless Telecom Systems and networks, Mullet: Thomson Learning 2006.

REFERENCE BOOKS:

1. Mobile Cellular Telecommunication, Lee W.C.Y, MGH, 2002.

2. Wireless communication - D P Agrawal: 2nd Edition Thomson learning 2007.

3. Fundamentals of Wireless Communication, David Tse, PramodViswanath, Cambridge 2005.

**(CS2817)** **Parallel and Distributed Computing**

**Module I: SCALABILITY AND CLUSTERING** [5 **Hrs]**
Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

**Module II: ENABLING TECHNOLOGIES** [**5 Hrs]**
System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.

**Module III: SYSTEM INTERCONNECTS** [**5 Hrs]**
Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

**Module IV: PARALLEL PROGRAMMING** [**5 Hrs]**
Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

**Module V: MESSAGE PASSING PROGRAMMING** [**5 Hrs]**
Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

**Module VI: Distributed Computing** [5 **Hrs]**

Introduction, Interprocess Communication, Distributed Computing Paradigms, The Socket API.

**Module VII:  Client –Server Paradigm** [5 **Hrs]**

Introduction ,Group Communications, Distributed objects.

 **Module VIII: Remote methods** [**9Hrs]**

Advanced Remote Method Invocations (RMI), Internet applications, The Common Object Request Broker Architecture (CORBA).

**TEXT BOOK**
1.Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.
2. Sunita Mahajan and Seema shah,“Distributed computing”,Oxford University Press,New Delhi
3. 1/e -M.L. Liu,” Distributed Computing : Principles and Applications”,Pearson Education

**REFERENCES**
1.David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.
2.Michael J. Quinn, “Parallel Programming in C with MPI & OpenMP”, Tata McGraw-Hill, New Delhi, 2003.
3.Kai Hwang, “Advanced Computer Architecture” Tata McGraw-Hill, New Delhi, 2003.