

Kandula Srinivasa Reddy Memorial College of Engineering, Kadapa  
(Affiliated to JNTUA, Anantapur, Accredited By NBA, Accredited By NAAC)  
(An ISO 9001-2000 Certified Institute)

## Regulations for UG Programs in Engineering (R14UG)

(Approved on 25-08-2014)

KSRM College of Engineering, Kadapa-516003, AP

Regulations for UG Programs in Engineering (R14UG)

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Regulations for UG Programs in Engineering

1.0 Nomenclature

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- 1.1 *Academic Term*: Extent of time during which academic instructions are initiated and completed
- 1.2 *Academic Year*: Academic Term of, approximately, one year duration that usually starts in June/July and ends in April/May next
- 1.3 *Semester*: Either of two Academic Terms that make up an Academic Year
- 1.4 *Major*: A specific field of study. Example: Civil Engineering
- 1.5 *Minor*: An area outside of, or complementary to, a Major. Example: For Civil Engineering major, Computer Science is a minor and vice versa
- 1.6 *Subject*: An area of knowledge that is studied as part of a Course
- 1.7 *Core*: A subject that is mandatory for a Major course of study
- 1.8 *Elective*: A subject that is selected for study to suit one's individual needs
- 1.9 *Audit Subject*: A subject that is studied to meet certain requirements but has no credits assigned to it
- 1.10 *Self-Study Subject*: A subject that is learnt by a student on own under the guidance of a Faculty member
- 1.11 *Humanities*: Subjects that describe and interpret human achievements, problems and historical changes at individual and societal levels covering the disciplines of literature, history, and philosophy
- 1.12 *Social Sciences*: Subjects that describe the mental and behavioural activities of individuals, groups, organizations, institutions, and nations covering the disciplines of anthropology, economics, linguistics, political science, and psychology
- 1.13 *Exam*: A test to measure one's progress, knowledge, or ability in a subject
- 1.14 *Credit*: A numerical weight given to a subject
- 1.15 *Grade*: A numerical or alphabetic designation measuring the level of achievement in an exam
- 1.16 *Attendance*: Physical presence of oneself in a classroom/laboratory for purpose of a scheduled academic instruction
- 1.17 *Course*: A series of subjects that constitute a Major field of study
- 1.18 *Branch*: Same as Course
- 1.19 *Program*: Same as Course
- 1.20 *Degree*: An academic title conferred to honour distinguished achievement

## 2.0 Short Title and Application

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- 2.1 These rules and regulations may be called as R14UG and come into force from Academic Year 2014-15 and exist until superseded by new regulations
- 2.2 These rules and regulations are applicable to all under graduate courses in engineering and technology leading to Bachelor's Degree in Technology (B. Tech)
- 2.3 The Major courses offered, at present, are:
  - 2.3.1 Civil Engineering
  - 2.3.2 Electrical and Electronics Engineering
  - 2.3.3 Mechanical Engineering
  - 2.3.4 Electronics and Communications Engineering
  - 2.3.5 Computer Science and Engineering
  - 2.3.6 Chemical Engineering
- 2.4 The Institute may offer new Majors in future to which these rules and regulations will be applicable

## 3.0 Suspension and Amendment of Rules

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- 3.1 Academic Council has the authority to suspend a rule temporarily
- 3.2 Academic Council has the authority to amend a rule
- 3.3 For affirmative action on any suspension or amendment of a rule, an affirmative vote of three-fifths of the members present and voting shall be required in Academic Council

## 4.0 Requirements for Admission

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- 4.1 At present, admissions into first-year class of various Majors are governed by Government and the Affiliating University. The eligibility criteria and procedure for admission are prescribed by Government and Affiliating University
- 4.2 A student is not allowed change of Major after admission into first-year
- 4.3 A student must fulfil medical standards required for admission
- 4.4 The selected students are admitted into first-year class after payment of the prescribed fees

## 5.0 Structure of the B. Tech course

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- 5.1 Duration: The duration of B. Tech degree course is four academic years
- 5.2 Terms: At present, the four academic years consists of one Academic Year term for First-year and two semester terms for each of second, third, and fourth academic years of study
- 5.3 Working Days: Calendar for any academic term shall be announced at least four weeks before its commencement. Minimum number of working days are 180 and 90 for year- and semester-terms respectively
- 5.4 Curriculum: Each Major shall have core, elective and audit subjects drawn from five categories of subject areas - i) Basic Sciences (BS), ii) Humanities and Social Sciences (HS), iii) Basic Engineering and Design (ED), iv) Professional Major (PJ), and v) Professional Minor (PN). The curriculum for each Major shall be approved by its corresponding Board of Studies and then by the Academic Council. First year curriculum is common to all Majors
- 5.5 Credits: All subjects that are assessed for marks have credits assigned to them. The credits assigned to subjects shall be given in curriculum. The total number of credits for entire course is 180 for all Majors. The distribution of total credits Academic Term-wise is given in Table 1

Table 1 Academic Term-wise Total Credits

| Academic Term                 | Total Credits |
|-------------------------------|---------------|
| First Year                    | 45            |
| Second Year – First Semester  | 22            |
| Second Year – Second Semester | 22            |
| Third Year – First Semester   | 22            |
| Third Year – Second Semester  | 22            |
| Fourth Year – First Semester  | 22            |
| Fourth Year – Second Semester | 25            |
| Total for entire course       | 180           |

- 5.6 The curriculum and syllabus for First Year is given in Annexure-1 and Annexure-2 respectively
- 5.7 Responsibility and Advising: It is the responsibility of the student to understand and know the regulations and requirements to earn the degree. Each student admitted in to the degree programs is assigned to a Faculty Advisor who assists the student in designing an effective program of study. Students should consult their Faculty Advisors for selection of electives and for general advice on academic program

## 6.0 Registration and Enrolment

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- 6.1 Prior to opening of each regular term, every student shall register for all the credit-bearing and audit subjects listed in curriculum of the term. Excepting first-year, the registration for a term shall be done during a specified week after end examinations of previous term. In first-year, the registration shall be done within six working days from date of joining. Recommendation of Faculty Advisor is needed for registration
- 6.2 A student can also register optionally for one self-study subject per term that does not carry any credits. A student can take any subject of any Major as self-study subject, satisfying any prerequisites if any, on the recommendation of concerned Faculty Advisor
- 6.3 Late registration will be permitted with a fine, decided from time to time, up to six working days from the last date specified for registration
- 6.4 A student will be eligible for registration for a term if she or he i) is promoted to that term, ii) has cleared all fees to the Institute, library and hostel of previous term, and iii) is not disqualified for registration by a disciplinary action of the Institute
- 6.5 A student will be enrolled and allowed to attend the classes on successful registration and payment of necessary fees to Institution, library, and hostel
- 6.6 Registration and enrolment will be controlled by the Office of the Controller of Examinations

## 7.0 Assessment Procedure – Internal Tests and End Examinations

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- 7.1 Performance of students in all subjects is assessed continuously through internal assessment tests and an End examination

- 7.2 Allocation of internal assessment and End examination marks
- 7.2.1 For theory subjects, the allocation is 30 marks for internal assessment and 70 marks for End examination totalling 100 marks
  - 7.2.2 For laboratory/drawing/project work subjects, the allocation is 50 marks for internal assessment and 50 marks for End examination totalling 100 marks
  - 7.2.3 For seminar/viva voce/industrial training subjects' total 100 marks are allocated for internal assessment. There shall be no end examination for these subjects
  - 7.2.4 For all audit subjects the allocation is 30 marks for internal assessment and no allocation for End examination
- 7.3 Internal Assessment Examinations
- 7.3.1 Internal assessment means performance evaluation of students by faculty members who teach the subjects
  - 7.3.2 For theory subjects, including audit subjects, the internal assessment shall be done by midterm tests. For a year-term subject three midterm tests shall be conducted. For a semester-term subject two midterm tests shall be conducted. The faculty member of the concerned subject will assess the marks in midterm tests.
- Each midterm test will be of one and half hour duration and evaluated for 30 marks. Internal assessment marks in a subject will be calculated as weighted average of individual midterm test marks in that subject. For a year-term subject the weights are: 20% for the least midterm mark and 40% weight for each of remaining two midterm marks. For a semester-term subject the weights are: 20% for the least midterm marks and 80% for the other midterm mark. Any fractional mark after adding all contributions is rounded up to next integer mark
- If any student abstains for any midterm test, she or he will be awarded zero marks for that midterm test.
- 7.3.3 For laboratory/practical/drawing subjects, the internal assessment will be based on regular laboratory work over full term. The assessment will be done by the faculty concerned. The students shall be informed sufficiently early of the procedure to be followed for internal assessment
  - 7.3.4 For self-study subjects, the assessment is through assignments, quizzes, seminars and/or viva-voce. The students shall be informed sufficiently early of the procedure to be followed for assessment
  - 7.3.5 For subjects like seminar, project-work, industrial training, and comprehensive viva-voce, the internal assessment will be done by a Department Committee consisting of two senior faculty members and faculty guide of concerned student. The assessment procedure will be informed sufficiently early to the students
- 7.4 End examinations
- 7.4.1 End examinations shall be conducted after completion of coursework in each term
  - 7.4.2 The question papers for theory subjects shall be set by faculty members outside of the Institute. The external faculty members for question paper setting shall be appointed by the Principal

- 7.4.3 Evaluation of answer scripts shall be done by faculty members from outside of the Institute appointed by the Principal
- 7.4.4 For laboratory subjects, end examination shall be conducted by a committee consisting of two internal examiners. One examiner shall be appointed by Head of Department of concerned Major, and the other examiner shall be appointed by the Principal
- 7.4.5 For project work viva-voce, end examination shall be conducted by a committee consisting of one internal examiner, one external examiner, and the concerned guide of the student. Internal examiner shall be appointed by Head of Department of concerned Major, and the external examiner shall be appointed by the Principal
- 7.4.6 If a student abstains from End examination of any subject, for any reason, she or he shall be awarded zero marks in that subject
- 7.4.7 There is no end examination for self-study and audit subjects

## 8.0 Method of Assigning Letter Grades and Grade Points

- 8.1 For all credit-bearing subjects, performance of a student in a subject is indicated by a letter grade that corresponds to absolute marks earned in that subject. Each letter grade is assigned a numeric Grade Point that is used to compute Grade Point Average on a scale of 0 to 10
- 8.2 Performance of a student in both internal assessment and End examination will be considered for awarding grades for credit bearing subjects. Total marks earned in a subject is the sum of marks obtained in internal and End examinations in that subject
- 8.3 Pass grade A+ to D- is assigned to a subject based on total marks earned in that subject provided that a student earns at least i) 35% of marks in End examination marks and ii) 40% of marks in internal and End examination marks put together; otherwise fail grade F will be assigned to that subject
- 8.4 Grade I will be assigned to a subject if a disciplinary action is pending and is not resolved before publication of results. Office of Controller of Examinations shall resolve the pending disciplinary action within six working days from the date of publication of results and change the grade to any of A+ to D- or F
- 8.5 Grade X will be assigned to a subject if a student abstains for End examination of that subject
- 8.6 The absolute marks and corresponding letter grade and grade points are given in Table 2

Table 2 Letter Grades and Grade Points

| Absolute Marks | Letter Grade | Grade Points | Remark |
|----------------|--------------|--------------|--------|
| 95-100         | A+           | 10.0         | Pass   |
| 90-94          | A            | 9.5          | Pass   |
| 85-89          | A-           | 9.0          | Pass   |
| 80-84          | B+           | 8.5          | Pass   |
| 75-79          | B            | 8.0          | Pass   |
| 70-74          | B-           | 7.5          | Pass   |
| 65-69          | C+           | 7.0          | Pass   |

|       |    |     |                     |
|-------|----|-----|---------------------|
| 60-64 | C  | 6.5 | Pass                |
| 55-59 | C- | 6.0 | Pass                |
| 50-54 | D+ | 5.5 | Pass                |
| 45-49 | D  | 5.0 | Pass                |
| 40-44 | D- | 4.5 | Pass                |
| 0-39  | F  | 0.0 | Fail                |
| -     | I  | 0.0 | Result Withheld     |
| -     | X  | 0.0 | Absent for End Exam |

- 8.7 SGPA: Semester Grade Point Average indicates the performance of a student in all credit-bearing subjects of a term. SGPA is calculated as the weighted average of Grade Points of all subjects of the term with corresponding credits of subjects as weights. Audit and self-study subjects are not considered for SGPA calculation
- 8.8 CGPA: Cumulative Grade Point Average indicates the performance of a student in all terms up to and including the current term under consideration. CGPA is calculated as the weighted average of SGPA's with total credits in each term as the weights
- 8.9 Grade Card: All students shall be issued Grade Cards after the publication of results of a term. Grade Card is a statement of performance of a student in a term. It contains information about each registered subject: type of subject, allocated credits, and letter grade earned. SGPA and CGPA will also be indicated

#### 9.0 Requirements for Completing Subjects

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- 9.1 A student shall complete all credit-bearing and audit subjects successfully to be eligible for award of degree
- 9.2 Credit-bearing subjects: A student is considered to have completed a credit-bearing subject successfully and earned credits if she or he obtains a pass grade from A+ to D- in that subject. If a student receives fail grade F or X in any subject, she or he must register for supplementary End examination for that subject as and when opportunity arises and improve grade to pass grade
- 9.3 Audit subjects: A student is considered to have successfully completed an audit subject if she or he earns at least 40% of marks in internal assessment marks. A student may request for makeup tests to satisfy this requirement by paying requisite fee
- 9.4 Self-study subjects: Based on internal assessment, the faculty guide concerned will certify whether a student has successfully completed the subject or not. Grade card will list successfully completed self-study subjects

#### 10.0 Requirements for taking End Examinations and Promotion

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- 10.1 A student is eligible to take regular End Examinations of current term if she or he full fills the attendance requirement
- 10.2 A student shall be promoted from current term to succeeding term on satisfying the attendance and total credits-earned requirements
- 10.3 Attendance Requirement



- 10.3.1 Attendance of students shall be recorded for credit-bearing and audit subjects as per the workload indicated in curriculum
  - 10.3.2 Total class-periods conducted shall be reckoned from beginning to end of a term as published in academic calendar
  - 10.3.3 Aggregate Percentage of Attendance is calculated using total number of class-periods attended as numerator and total number of class-periods conducted for the concerned class as the denominator
  - 10.3.4 A minimum aggregate attendance of 75% is required for promotion to succeeding term and be eligible to take End examinations of current term
  - 10.3.5 A student can appeal to the Principal for condoning deficiency in aggregate attendance if she or he gets 65% or more aggregate attendance presenting a valid reason for deficiency. Such a student will be granted promotion if the Principal pardons the deficiency. Principal has the right to reject the appeal if he/she is not satisfied with the performance of the student or the reason cited for deficiency of the attendance
  - 10.3.6 A student earning less than 65% aggregate attendance will be denied promotion. A student who is not promoted on basis of attendance shall be removed from the rolls and shall register for the same term when opportunity arises. The current term record of the student is cancelled automatically
- 10.4 Credits-Earned Requirement
- 10.4.1 This rule is applicable for promotion of a student from second-year second-semester to third-year first-semester, and from third-year second-semester to fourth-year first-semester
  - 10.4.2 A student who is denied promotion for want of requisite credits shall take supplementary examinations, as and when offered, and earn credits to be eligible for promotion
  - 10.4.3 For promotion from second-year second-semester to third-year first-semester, a student must earn at least 26 credits from first year and second year–first semester subjects
  - 10.4.4 For promotion from third-year second-semester to forth-year first semester, a student must earn at least 44 credits from first year, second year and third year–first semester subjects
- 10.5 A student can forego promotion and opt to repeat the current term on written request. Recommendation of the concerned Faculty Advisor is required for cancellation of promotion. This option shall be exercised before the commencement of the End examinations of the current term<sup>5</sup>

#### 11.0 Revaluation of End Examination Scripts

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- 11.1 Revaluation of End Examination scripts is allowed for theory subjects only by paying requisite fee
- 11.2 Procedure for Revaluation: The current valuation is annulled and the script will be sent for revaluation by an external examiner appointed by the Principal. Marks obtained in the revaluation will be awarded for that subject
- 11.3 A student can apply for revaluation in a subject only once

#### 12.0 Supplementary End Examinations

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- 12.1 Students are eligible to take Supplementary examinations in subjects with fail grade F or X only

- 12.2 Supplementary examinations for first year subjects will be conducted along with supplementary semester examinations of second, third and fourth year subjects
- 12.3 Supplementary examinations for even semester subjects will be conducted with regular examinations of odd semester subjects
- 12.4 Supplementary examinations for odd semester subjects will be conducted with regular examinations of even semester subjects
- 12.5 For subjects of second semester of fourth year special supplementary examinations will be conducted in second week following the results publication date of the current semester
- 12.6 A student will be allowed to improve grade in any theory subject provided she or he has completed coursework of all terms but before award of provisional/final degree<sup>§</sup>

### 13.0 Requirements for Award of B. Tech degree

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- 13.1 Time Limit for completion of requirements for award of degree is eight calendar years from the date of admission. A student who could not complete all the requirements in this time limit shall forego admission and will be removed from the rolls of the Institute
- 13.2 A student shall be eligible for award of B. Tech degree provided she or he has:
  - 13.2.1 Registered and successfully completed all required credit-bearing and audit subjects with a total of 180 credits
  - 13.2.2 Secured a CGPA of 4.5 or more
  - 13.2.3 Cleared all dues to the Institute, library and hostel
  - 13.2.4 No disciplinary action is pending against her or him
  - 13.2.5 Satisfied any other stipulation of the affiliating University
- 13.3 Award of Class: Each student will be given class in degree based on CGPA as follows:

Table 3 Class of Degree

| Class of Degree              | Range of CGPA          |
|------------------------------|------------------------|
| Pass Class                   | $\geq 4.5$ but $< 5.5$ |
| Second Class                 | $\geq 5.5$ but $< 6.5$ |
| First Class                  | $\geq 6.5$ but $< 7.5$ |
| First Class with Distinction | $\geq 7.5$             |

- 13.4 Consolidated Grade Card and Degree will issued under the seal of affiliating University

### 14.0 Transitory Regulations

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- 14.1 A student who initially joins the Institute in a previous Regulation and has to rejoin in an academic-term of the present Regulations, due to any reason, shall be bound by the rules of the current Regulations. Board of Studies of the concerned Major will specify, extra or otherwise, academic coursework to be undertaken by such students who rejoin the current Regulations

<sup>§</sup> Decision is pending on this clause

**K.S.R.M. COLLEGE OF ENGINEERING, KADAPA**

**(AUTONOMOUS)**

**COMPUTER SCIENCE & ENGINEERING**

**COURSE STRUCTURE FOR B.TECH. COURSE (R14 REGULATIONS)**

**I B.TECH.**

| <b>S.No.</b> | <b>Subject Code</b> | <b>SUBJECT</b>                                | <b>SC</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>IM</b> | <b>EM</b> | <b>CR</b> |
|--------------|---------------------|---|-----------|----------|----------|----------|-----------|-----------|-----------|
| 1.           | 14211001            | Mathematics-1                                 | BS        | 3        | 1        | 0        | 30        | 70        | 5         |
| 2.           | 14211002            | Mathematics-2                                 | BS        | 3        | 1        | 0        | 30        | 70        | 5         |
| 3.           | 14221003            | Engineering Physics                           | BS        | 2        | 0        | 0        | 30        | 70        | 3         |
| 4.           | 14231004            | Engineering Chemistry                         | BS        | 2        | 0        | 0        | 30        | 70        | 3         |
| 5.           | 14241005            | English                                       | HS        | 2        | 0        | 0        | 30        | 70        | 3         |
| 6.           | 14031006            | Engineering Drawing                           | ED        | 1        | 0        | 3        | 30        | 70        | 5         |
| 7.           | 14051007            | Problem Solving & Programming in C            | ED        | 3        | 0        | 0        | 30        | 70        | 5         |
| 8.           | 14991008            | Engineering Workshop                          | ED        | 0        | 0        | 3        | 50        | 50        | 4         |
| 9.           | 14051009            | Programming in C Lab                          | ED        | 0        | 0        | 3        | 50        | 50        | 4         |
| 10.          | 14991010            | Engineering Sciences Lab                      | BS        | 0        | 0        | 3        | 50        | 50        | 4         |
| 11.          | 14241011            | English Language and Communication Skills Lab | HS        | 0        | 0        | 3        | 50        | 50        | 4         |
|              |                     | Total:  |           | 16       | 02       | 15       | 410       | 690       | 45        |



### III B. TECH. I SEM

| S.No. | Subject Code | SUBJECT   | SC | L  | T | P | IM  | EM  | CR |
|-------|--------------|---|----|----|---|---|-----|-----|----|
| 1.    | 14053101     | Operating Systems                                 | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 2.    | 14053102     | Computer Networks                                 | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 3.    | 14053103     | Software Engineering                              | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 4.    | 14053104     | Compiler Design                                   | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 5.    | 14053105     | Computer Graphics                                 | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 6.    | 14043106     | Micro Processors & Interfacing                    | PN | 4  | 0 | 0 | 30  | 70  | 3  |
| 7.    | 14253107     | Human Values & Professional Ethics (Audit Course) | HS | 2  | 0 | 0 | --  | --  | -- |
| 8.    | 14053108     | Computer Networks & Operating System Lab          | PJ | 0  | 0 | 3 | 50  | 50  | 2  |
| 9.    | 14043109     | Micro Processors Lab                              | PN | 0  | 0 | 3 | 50  | 50  | 2  |
|       |              | Total:  |    | 23 | 3 | 6 | 280 | 520 | 22 |

### III B. TECH. II SEM

| S.No. | Subject Code                     | SUBJECT   | SC | L  | T | P | IM  | EM  | CR |
|-------|----------------------------------|---|----|----|---|---|-----|-----|----|
| 1..   | 14053201                         | Object Oriented Analysis & Design   | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 2.    | 14053202                         | Design & Analysis of Algorithms   | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 3.    | 14053203                         | Web Technologies  | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 4.    | 14053204                         | Mobile Application Development  | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 5.    | 14033205                         | Artificial Intelligence   | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 6.    | 14053206<br>14053207<br>14053208 | Elective-I<br>1. Wireless Sensor Networks<br>2. Advanced Computer Architecture<br>3. Multimedia Systems | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 7.    | 14243209                         | Advanced English & Communication Skills Lab   | HS | 0  | 0 | 3 | 50  | 50  | 2  |
| 8.    | 14053210                         | Web Technologies lab  | PJ | 0  | 0 | 3 | 50  | 50  | 2  |
|       |                                  | Total:  |    | 21 | 3 | 6 | 280 | 520 | 22 |

**IV B.TECH. I SEM**

| S.No. | Subject Code                     | SUBJECT   | SC | L  | T | P | IM  | EM  | CR |
|-------|----------------------------------|---|----|----|---|---|-----|-----|----|
| 1.    | 14254101                         | Managerial Economics & Financial Analysis   | HS | 4  | 0 | 0 | 30  | 70  | 3  |
| 2.    | 14054102                         | Data Warehousing & Data Mining  | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 3.    | 14054103                         | Cloud Computing   | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 4.    | 14054104                         | Mobile Application Development  | PJ | 3  | 1 | 0 | 30  | 70  | 3  |
| 5.    | 14054105<br>14054106<br>14054107 | Elective-II<br>1. Software Testing<br>2. Digital Image Processing<br>3. Software Architecture                             | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 6.    | 14054108<br>14054109<br>14054110 | Elective-III<br>1. Information Retrieval System<br>2. Cryptography & Network Security<br>3. Service Oriented Architecture | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 7.    | 14054111                         | Mobile Application Development Lab  | PJ | 0  | 0 | 3 | 50  | 50  | 2  |
| 8.    | 14054112                         | Data Warehousing & Data Mining Lab  | PJ | 0  | 0 | 3 | 50  | 50  | 2  |
|       |                                  | Total:  |    | 22 | 2 | 6 | 280 | 520 | 22 |

**IV B.TECH. II SEM**

| S.No. | Subject Code                     | SUBJECT  | SC | L  | T | P | IM  | EM  | CR |
|-------|----------------------------------|--|----|----|---|---|-----|-----|----|
| 1.    | 14254201                         | Management Science   | HS | 4  | 0 | 0 | 30  | 70  | 3  |
| 2.    | 14054202                         | Big Data Analytics   | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 3.    | 14054203                         | Software Project Management  | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 4.    | 14054204<br>14054205<br>14054206 | Elective-IV<br>1. Principles of TCP/IP<br>2. Soft Computing<br>3. Internet of Things | PJ | 4  | 0 | 0 | 30  | 70  | 3  |
| 5.    | 14054207                         | Seminar  | PJ | -  | - | - | 100 | --  | 3  |
| 6.    | 14054208                         | Project Work   | PJ | -  | - | - | 50  | 50  | 10 |
|       |                                  | Total:   |    | 16 | 0 | 0 | 270 | 330 | 25 |

| Subject Code | Subject Category | Subject Title   | L | T | P | IM | EM | CR |
|--------------|------------------|-----------------|---|---|---|----|----|----|
| 14211001     | BS               | Mathematics - I | 3 | 1 | 0 | 30 | 70 | 5  |

Objectives: This course aims at providing the students with the concepts of Matrices, Differential, Integral and Vector calculus and Laplace Transforms.

#### Unit I

Matrices: Rank – Echelon form – Normal form – Solution of linear system of homogeneous and non-homogeneous equations – Eigen values, Eigen vectors for real matrices – Cayley- Hamilton theorem – Inverse and powers of a matrix. Linear transformations – Orthogonal transformations. Hermitian, skew-Hermitian and unitary matrices. Diagonalization of a matrix. Quadratic forms – Reduction of quadratic form to canonical form by orthogonal reduction and their nature.

#### Unit II

Taylor's series – Maclaurin's series – Functions of two or more variables Jacobians – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers. Radius of curvature, centre of curvature, Involute, Evolute and envelopes. Curve tracing – Cartesian, polar and parametric curves.

#### Unit II

Multiple Integrals: Evaluation of double integrals in Cartesian coordinates, and polar coordinates - Change of variables in double integrals - Change the order of integration in double integrals - Evaluation of triple integrals in Cartesian and polar coordinates - Change of variables in triple integrals – Areas by double integration- Volumes by triple integrals. Beta and Gamma functions.

#### Unit IV

Laplace transforms of standard functions – Properties of Laplace Transformations - Transforms of derivatives and integrals- Evaluation of integrals by Laplace transforms – Unit step function – Second shifting theorem – Dirac's delta function . Laplace transform of periodic functions – Convolution theorem. Inverse Laplace Transforms – Applications of Laplace transforms to ordinary differential equations.

#### Unit V

Vector calculus - Vector differentiation: Scalar point function - Vector point function - Vector operator Del – Gradient – Divergence - Curl and their related properties - Laplacian and Second order operators. Vector integration: Line, Surface and Volume integrals-Green's theorem in a plane, Stoke's theorem and Gauss-divergence theorems (statement only). Application of Green's Strokes and Gauss divergence theorems.

**Textbook:**

1. Higher Engineering Mathematics, Dr.B.SGrewal, Khanna Publishers-42 edition.

**Reference books:**

1. Higher Engineering Mathematics, B.VRamana, Mc. Graw Hill Education(India) Private Limited.
2. Engineering Mathematics Volume -1, Dr.D.S Chandra Sekharaiah, Prism Books Pvt. Limited.



| Subject Code | Subject Category | Subject Title    | L | T | P | IM | EM | CR |
|--------------|------------------|------------------|---|---|---|----|----|----|
| 14211002     | BS               | Mathematics - II | 3 | 1 | 0 | 30 | 70 | 5  |

#### Objectives:

- \* This course aims at providing the students with the concepts of Differential equations, Fourier series, Fourier Transforms and Partial Differential equations.
- \* Our emphasis will be more on logical and problem solving development in Numerical methods and their applications in solving Engineering problems when analytical methods fails.

#### Unit I

Differential equations of first order and first degree: Exact, Non exact, Linear and Bernoulli equations. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients with R.H.S term of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $x$ ,  $e^{ax} V(x)$ ,  $xV(x)$  - Method of variation of parameters – Cauchy's linear equation – Legendre's linear equation.

#### Unit II

Solution of algebraic and transcendental equations - False - position method - Newton - Raphson method.

Solution of System of equations: Gauss Elimination method- Gauss seidel iteration

method. Interpolation – Introduction - Finite differences - Forward differences - Backward differences - Newton's forward and backward difference formulae for interpolation - Lagrange's formula for unequal intervals- Inverse interpolation.

Numerical differentiation: Finding first and second order derivatives using Newton's formulae. Numerical integration – Newton - Cote's quadrature formula - Trapezoidal rule – Simpson's 1/3 rule – Simpson's 3/8 rule.

#### Unit III

Numerical solution of ordinary differential equations - Solution by Taylor's series – Picard's method of successive approximations –Runge - Kutta methods of second and fourth order – Milne's predictor - corrector method.

Curve fitting - Principle of least squares - Fitting a straight line, second degree curve, exponential curve, power curve by the method of least squares. Simple correlation & regression.

#### Unit IV

Fourier series: Determination of Fourier coefficients - Fourier series - Even and odd functions - Fourier series in an arbitrary interval - Functions having points of discontinuity- Half range Fourier sine and cosine expansions.

Fourier integral theorem(only statement) – Fourier integrals- Fourier sine and cosine integrals. Fourier transform, Fourier sine and cosine transforms – Properties - Inverse transforms.

#### Unit V

Partial Differential Equations: Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions - Method of separation of variables. Solution of one dimensional wave equation - Solution of one dimensional heat equation -Solution of Laplace's equation.

#### Text Books:

1. Higher Engineering Mathematics, Dr.B.SGrewal, Khanna Publishers-42 edition.
2. Introductory methods of Numerical Analysis, S.SSastry, 5th edition.

#### Reference books:

- 1.Engineering Mathematics – III B, Dr.M.KVenkata Raman, 13th edition.
- 2.Higher Engineering Mathematics, B.VRamana, Mc. Graw Hill Education(India) Pvt.Limited.
- 3.Numerical Methods, S. Arumugam, A.Thangapandi Isaac, A. Soma Sundaram, Second edition, Scitech Publications (India) Pvt. Limited.

| Subject Code | Subject Category | Subject Title       | L | T | P | IM | EM | CR |
|--------------|------------------|---------------------|---|---|---|----|----|----|
| 14221003     | BS               | Engineering Physics | 2 | 0 | 0 | 30 | 70 | 3  |

#### UNIT I

Physical Optics, Lasers and Fibre Optics: Introduction: Interference in thin films by reflection – Newton's Rings-Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Introduction – characteristics of laser-Spontaneous and stimulated emission of radiation- Einstein's coefficients-population inversion – Excitation mechanisms and optical resonator-Ruby laser – HeNe laser- Application of lasers.

Fiber Optics:- Introduction-Construction and working principle of optical fiber-

Numerical aperture and acceptance angle- Types of optical fibers- Attenuation and losses in fibers- Optical fiber communication system- Applications of optical fibers in communications sensors and medicine.

#### UNIT II

Crystallography and Ultrasonics: CRYSTALLOGRAPHY:- Introduction –Space lattice – unit Cell lattice parameters- Bravais lattice – Crystal systems- Packing fractions of SC, BCC and FCC – Structures of NaCl and diamond –Directions and planes in Crystals – Miller indices – InterPlanar spacing in cubic crystals – X-ray diffraction – Bragg's law- Laue and powder methods- Defects in solids: point defects, line defects(Qualitative) – Screw and edge dislocation, Burgers Vector.

Ultrasonics: Introduction- production of ultrasonics by piezoelectric method- properties and detection- applications in non –destructive testing.

#### UNIT III

Elements of Thermodynamics, Special Theory of Relativity: Elements of Thermodynamics: Introduction- concept of temperature- heat- thermodynamic-terminology –work-heat exchange-internal energy- law of conservation of energy- first law of thermodynamic- Carnot cycle- second law of thermodynamic –third law of thermodynamic.

Special Theory of Relativity: Introduction-space time and motion – frame of reference –Galileo's principle of relativity- Galilean transformation – Einstein's principle of relativity-Lorentz transformation –consequences of special relativity.

#### UNIT IV

Semiconductors and Magnetic Materials: Semiconductor Physics: Introduction- Intrinsic and extrinsic semiconductors- Drift and diffusion currents and Einstein's equation- Hall effect- Direct and Indirect band gap semiconductors- working principle of p-n junction diode, LED, Laser diode and photo diode.

Magnetic Materials:- Introduction and basic definitions- Origin of Magnetic moments- Bohr magneton- Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials- Hysteresis- Soft and hard magnetic materials and applications.

## UNIT V

Super Conductivity and Physics of Nano-Materials: Superconductivity: Introduction- Meissner effect- Properties of Superconductors- Type I and Type II Superconductors- Flux quantization- London penetration depth- ac and dc Josephson effects- BCS theory(Qualitative)- Higher T superconductors- Applications of superconductors. Physics of Nano-Materials: Introduction- Significance of Nano-scale- surface area and quantum confinement- physical properties: optical, thermal, mechanical and magnetic properties- Synthesis of nano-materials: ball mill, chemical vapour deposition , sol-gel, plasma arcing and thermal evaporation –Properties of carbon nanotubes- High strength applications- properties of graphene- Graphene-based field effect transistor- Applications of nano-materials.

### Text Books:

1. Engineering Physics by K. Thyagarajan, Tata Mac Graw Hill Publishing Co., New Delhi.
2. Engineering Physics by P. K. Palaniswamy, Scitech Publications.
3. Engineering Physics by S. Mani Naidu, Pearson Edition.
4. Classical Mechanics by J.C. Upadhaya.

### Reference Books:

1. Solid State Physics by S.O.Pillai
2. Engineering Physics by R.K.Gaur, S.L.Gupta.
3. Physics Volume-2 by Resnick, Halliday and Krane, John Wiley.
4. Introduction to Nano Science & Nano Technology by K.K.Chattapadhyay & A.N.Banarjee – Prentice Hall of India Private Limited.

| Subject Code | Subject Category | Subject Title         | L | T | P | IM | EM | CR |
|--------------|------------------|-----------------------|---|---|---|----|----|----|
| 14231004     | BS               | Engineering Chemistry | 2 | 0 | 0 | 30 | 70 | 3  |

#### Objectives:

- Knowledge in Chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depend on the outcome of basic sciences.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- An attempt has been made to logically correlate the topic with its application.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of water, Polymers with their applications, Energy sources, material chemistry and advanced chemistry.

#### UNIT I

Water: Introduction, Hardness: Causes, expression of hardness – units – Types of hardness, estimation of temporary & permanent hardness of water, analysis of water, numerical problems. Boiler troubles – Scale & Sludge formation, caustic embrittlement, corrosion, priming & foaming, Softening of water (Internal & External treatment – Lime soda, Zeolite, Ion exchange process) Reverse osmosis, electro dialysis

#### UNIT II

Polymers: Types of Polymerization, Mechanism (chain growth & Step growth). Plastics: Thermoplastic resins & Thermo set resins. Compounding of plastics, preparation, properties, engineering applications of polyethylene, PVC, Bakelite, Nylon. Conducting polymers: Poly acetylene, Polyaniline, conduction, doping, Applications. Rubber – Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol Rubbers, Fibres – Polyester fiber, Inorganic polymers – Silicones.

#### UNIT III

Energy sources: Batteries, fuels, classification – conventional fuels (solid, liquid, gaseous) Solid fuels – coal and their significance, Liquid fuels – primary – petroleum – refining of petroleum – cracking, knocking, synthetic petrol – Bergius and Fischer Tropsech's process; Gaseous fuels – natural gas, analysis of flue gas by Orsat's method, combustion – problems, Calorific value of fuel – HCV, LCV, determination of calorific value by Junker's gas calorie meter. Nuclear energy, Solar cells.

#### UNIT IV

Material Chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Refractories: Classification, Characteristics of a good refractory. Lubricants: Criteria of a good lubricant,

mechanism, properties of lubricants: Cloud, point, pour point, flash & fire point, Viscosity. Rocket Propellents – Classification and Characteristics of good propellents.

#### UNIT – V

Advance Chemistry: Green Chemistry: Introduction, Goals and Significance of green chemistry, basic components of green chemistry, industrial applications – products from natural materials, Green solvents, Green fuels and e-green propellents, Bio-catalysis.

PhotoChemistry: Introduction Fluorescence, Phosphorescence, Luminescent compounds, Photo and light responsive compounds.

Catalysis: Introduction, action of catalyst (Catalytic promoters and catalytic poisons) Types of Catalysis.

Instrumental Techniques: Chromatography, UV-visible spectroscopy, IR Spectrophotometry, AAS.

#### **Textbooks:**

A Text Book of Engineering Chemistry, Jain and Jain, DhanapathRai PublishingCompany, New Delhi, 15th Edition, 2010.

Text Book of Engineering Chemistry, Shashichawla, DhanapathRai PublicationsNew Delhi, 4th Edition, 2011.

#### **References Books:**

1. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V. Agarwal and Andra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
2. Engineering Chemistry by K.B. Chandra Sekhar, UN. Das and Sujatha Mishra, SCITECH, Publications India Pvt. Limited, Chennai, 2nd Edition, 2012.
3. Text Book of Engineering Chemistry by S.S. Dara&Mukkati S. Chand & Co Publishers, New Delhi, 2006.
4. Chemistry of Engineering Materials by C.V. Agarwal, C.P. Murthy, A. Naidu, BS Publications.

| Subject Code | Subject Category | Subject Title | L | T | P | IM | EM | CR |
|--------------|------------------|---------------|---|---|---|----|----|----|
| 14241005     | HS               | ENGLISH       | 2 | 0 | 0 | 30 | 70 | 3  |

Objectives:

- a) To improve the language proficiency of the students in English with an emphasis on LSRW skills.
- b) To develop an awareness in the students about the significance of silent reading and comprehension.
- c) To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.
- d) To develop study skills as well as communication skills in formal and informal situations.
- e) To enable students to express themselves fluently and appropriately in social and professional contexts.
- f) To develop an awareness in the students about writing as an exact and formal skill.

PART-1: DETAILED STUDY

- 1) A dissertation upon Roast pig – Charles Lamb
- 2) The post master – Rabindranath Tagore
- 3) Spoken English and Broken English – George Bernard Shaw
- 4) Building a New state - A.P. J Abdul Kalam
- 5) The wood Rose – AbburiChaya Devi

PART-II NON-DETAILED STUDY

- 1) My struggle for an education – Booker T. Washington
- 2) A city Night-piece – Oliver Goldsmith
- 3) Indian crowds – Nirad C. Chowdari
- 4) The worship of the wealthy – G.K. Chesterston
- 5) Mokshagundam Visveswaraya – An Autobiography

Grammar & Vocabulary

1. Exercises on Comprehension, Letter Writing, Technical Report writing, E-mail Writing, Curriculum Vitae
  2. Exercises on Remedial grammar covering common errors in English, Transformation covering interchange of parts of speech Active/Passive voice, Direct & Indirect Speech, Simple, Compound & Complex.
- Vocabulary development covering: Synonyms & Antonyms, One word substitutes, Prefixes and suffixes, Idioms & phrases, Words often confused and paragraph writing.

| Subject Code | Subject Category | Subject Title       | L | T | P | IM | EM | CR |
|--------------|------------------|---------------------|---|---|---|----|----|----|
| 14031006     | ED               | Engineering Drawing | 1 | 0 | 3 | 30 | 70 | 5  |

#### Objectives:

- By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.
- This course develops the engineering imagination i.e., so essential to a successful design. Learning techniques of engineering drawing changes the way one thinks about technical images.
- It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers and by studying this course, engineering students will eventually be able to prepare drawings of various objects being used in technology.

#### UNIT-I

Introduction: Principles of Engineering Graphics and their significance- Drawing instruments and their use- Conventions in Drawing- Lettering- BIS Conventions.

Curves: (a) Conic sections –General method only (b) Cycloid, Epicycloids and Hypocycloid and (c) Involutés

#### UNIT II

Projection of Points and Lines: Principles of orthographic projection- conventions- First and Third angle projections. Projections of points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces.

Projection of Planes: Projections of regular plane surfaces/figures, Projection of planes using auxiliary planes.

#### UNIT III

Projections of Solids: Projections of regular solids inclined to one or both planes.

Sections of Solids: Section planes and sectional views of right regular solids- Prism, Cylinder, Pyramid and Cone. True shape of sections.

#### UNIT IV

Development of Surfaces: Development of surfaces of Right regular solids- Prisms, Cylinder, Pyramid, Cone and their sectional parts.

Introduction to AutoCAD: Co-ordinate systems, Setting of Drawing space, Preparatory commands-limits, Snap, Grid and Ortho, Viewing commands -Zoom, Pan & Osnap; Geometry commands (Only Line, Circle and Arc) and editing commands.



## UNIT V

Isometric Projections: Principles of isometric projection -isometric views-Conventions-isometric views of Lines, Plane figures, Simple and Compound Solids-Isometric projection of objects having non isometric lines.

Orthographic Projections: Conversion of isometric projections/views to Orthographic Views- Conventions.

### Text Books

1. Engineering Drawing, N.D.Bhat, Charotar Publishers.
2. Engineering Drawing, K.L. Narayana,P.Khanniah, SCITECH Pub.
3. Engineering Drawing, BasantAgrawal,C.M.Agrawal, Tata McGraw-Hill.

### References:

1. Engineering Drawing, Shah and Rana, 2/e,Pearson Education.
2. Engineering Drawing,B.V.R. Guptha,J.K. Publishers.
3. Engineering Drawing and Graphics, Venugopal, New age Publishers.
4. Engineering Drawing, Johle, Tata McGraw-Hill.

| Subject Code | Subject Category | Subject Title                      | L | T | P | IM | EM | CR |
|--------------|------------------|------------------------------------|---|---|---|----|----|----|
| 14051007     | ED               | Problem Solving & Programming in C | 3 | 0 | 0 | 30 | 70 | 5  |

Objectives:

- Students will be able to understand the syntax and semantics of C programming language and other features of the language.
- To make the student solve problems, implement them using C language.

#### UNIT I

Introduction to Computers: Introduction, Computer Hardware, Computer Software, Algorithms, Flowcharts.

Introduction to C: Introduction, Basic structure of 'C' program, Character set, Tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables.

#### UNIT-II

Managing of Input/output operations, Reading a character, writing a character, Formatted input, Formatted output, Operators and Expressions.

Decision Making & Branching: If, Switch, Go To statements. Decision making and looping: While, Do, For, Break, Continue, Exit statements.

#### UNIT III

Functions: Introduction, Need for user define functions, Definition of function, Return values and their types, Function declaration, Category of functions, Recursion, Passing parameters to the function, Storage classes.

Arrays: Introduction, One dimensional arrays, Declaration of one dimensional arrays, Initialization of one-dimensional arrays, Two dimensional arrays, Initializing two-dimensional arrays, Multi dimensional arrays, Math function.

#### UNIT IV

Strings: Introduction, Declaration and initializing string variables, Reading strings and writing strings, Arithmetic operations on characters, String handling functions.

Pointers: Introduction, Understanding pointers, Accessing the address of a variable, Declaration and initialization of pointer variables, Accessing a variable through its pointers.

#### UNIT V

Structures and Unions: Introduction, Defining a structure, Declaring structure variables, Accessing structure members, Structure initialization, Arrays of structures, User defined data types, Unions.

File Management in C: Introduction, Defining and opening a file, Closing a file, I/O operations on files, Random access to files.

Text Books:

1. Programming in C & Data Structures, E.Balaguruswamy, 4<sup>th</sup>Edition, TMH.
2. Programming in C, ReemaThareja, Oxford University Press.

Reference Books:

1. Programming with C, Ron S Gottfried, 3<sup>rd</sup> Edition, TMH – Schuam Outline Series.
2. The C Programming Language, B.W.Kernigan& Dennis M. Ritchie, 2<sup>nd</sup> Edition,2003 PHI.
3. Let Us C, YashavanthP.Kenetkar, 7<sup>th</sup> Edition, BPB Publications, 2007.
4. Programming in C, Ajay Mittal, Pearson Education, 2010.

| Subject Code | Subject Category | Subject Title        | L | T | P | IM | EM | CR |
|--------------|------------------|----------------------|---|---|---|----|----|----|
| 14991008     | ED               | Engineering Workshop | 0 | 0 | 3 | 50 | 50 | 4  |

### Part A - Engineering Workshop

Objectives: The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering workshop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

#### 1. Trades for Exercises:

1. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock.
2. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.
3. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 gauge G.I. sheet.
4. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
5. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.
6. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint.

#### 2. Trades for Demonstration:

- a. Plumbing
- b. Machine Shop
- c. Metal

#### Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give

valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

Reference Books:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
2. Engineering Practices Lab Manual, Jeyapooan, SaravanaPandian, 4/eVikas.
3. Dictionary of Mechanical Engineering, GHFNayler, Jaico Publishing House.

## **Part B –Information Technology (I.T.) Workshop**

Objectives:

- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Windows on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 5: Spread sheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spread sheet application considered.

Task 6: Presentations: creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours,

creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Task 7: Browsing Internet: Students should access the internet browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Face Book, Skype etc.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams”, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
5. Trouble shooting, Maintaining & Repairing PCs”, Bigelows, TMH

| Subject Code | Subject Category | Subject Title        | L | T | P | IM | EM | CR |
|--------------|------------------|----------------------|---|---|---|----|----|----|
| 14051009     | ED               | Programming in C Lab | 0 | 0 | 3 | 50 | 50 | 4  |

Objectives:

To make the student learn C Programming language.

To make the students solve problems, implement them using C language.

LIST OF EXPERIMENTS:

1. Practice DOS and LINUX commands necessary for design of C programs.
2. Write, edit, debug, compile and execute sample C programs to understand the programming environment.
3. a) Write a C program to find the sum of the individual digits of a given number.  
b) Write a C program to check whether a given number is a palindrome or not.
4. a) Write a C program to generate & print first n terms of the Fibonacci sequence.  
b) Write a C program to find the roots of a quadratic equation.
5. a) Write a C program to compute the factorial of a given number.  
b) Write a C program to generate all the prime numbers within a given range
6. a) Write a C program to generate PASCAL triangle.  
b) Write a C program to find the GCD of two integers.
7. a) Write a C program to evaluate the function  $\sin(x)$  as defined by the infinite series expression
$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$
  
b) Write a C program to find the square root of a given number.
8. a) Write a C program to find both smallest and largest number in a list of integers.  
b) Write a C program to perform multiplication of two matrices.
9. Write a C program to read a matrix and perform the following operations.
  - i) Print transpose of a matrix.
  - ii) Removal of duplicates from an ordered array.
10. a) Write a C program to perform arithmetic operations using functions.  
b) Write a C program to find the factorial of a given number using recursive function.
11. a) Write a C program to count the number of vowels, constants, blank spaces, digits and special characters in a given string.  
b) Write a C program to check whether a given string is palindrome or not.
12. Write a C program to read two strings and perform the following operations without using built-in string library functions.
  - a. String length determination.
  - b. Comparison of two strings.
  - c. Concatenation of two strings.
  - d. String reversing.

13. a) Write a C program to swap the contents of two variables using pointers.  
b) Write a C program to understand the usage of pointer to pointer.
14. Write a C program to define a structure with the following members.  
Roll No., Name, and marks in Sub1, Sub2, and Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

| Roll No. | Name | Sub1 | Sub2 | Sub3 | Total Marks | Result      |
|----------|------|------|------|------|-------------|-------------|
| 1234     | XXX  | 40   | 50   | 90   | 180         | Distinction |

15. Write a C program to copy the contents of one file into another file.



| Subject Code | Subject Category | Subject Title            | L | T | P | IM | EM | CR |
|--------------|------------------|--------------------------|---|---|---|----|----|----|
| 14991010     | BS               | Engineering Sciences Lab | 0 | 0 | 3 | 50 | 50 | 4  |

#### PART A - Engineering Physics Lab

##### List of Experiments

1. Determination of radius of curvature of a plano-convex lens by forming newton's rings.
2. Determination of thickness of a thin object using parallel fringes
3. Determination of rigidity modulus of a material in the form of a wire using torsional pendulum.
4. Determination of magnetic field along the axis of a current carrying coil using Stewart-Gee's method
5. Determination of wavelengths of the prominent lines of mercury by a plane transmission diffraction grating using spectrometer
6. Determination of dispersive power of the material of a prism using spectrometer
7. Determination of energy gap of a material of p-n junction
8. Melde's experiment – transverse and longitudinal modes

#### PART B - Engineering Chemistry Lab

##### Objectives

1. This course on Chemistry Lab is designed with 12 experiments in an academic year.
2. It is common to all branches of Engineering in B.Tech 1st Year.
3. The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.
4. The experiments are selected from various areas of Chemistry like Conductometry, Polymers, Energy sources and water.
5. Also the student is exposed to various tools like Analytical Balance, pH meter, Viscometer, conductometer, Bomb calorimeter, etc.

##### List of Experiments

- I. Introduction to Lab – Analytical Balance, Molarity, Normality, Calculations, Glass ware.
- II. Water Analysis:
  1. Determination of total hardness of water by EDTA method.
  2. Estimation of Dissolved Oxygen present in given water sample by Winkler's method.
  3. Determination of Acidity of water.
  4. Estimation of chloride ions using Potassium Chromate Indicator.
- III. Conductometry
  1. Conductometric titrations of strong acid Vs strong base (Neutralization titration)
  2. Conductometric titrations of Barium Chloride Vs Sodium Sulphate (Precipitation titration)

#### IV. Physical Properties

1. Determination of viscosity of oils by Redwood viscometer I & II.
2. Determination of calorific value of fuel sample using Bomb Calorimetry

#### V. Titrimetry

1. Estimation of Iron by Diphenyl amine indicator
2. Determination of Copper by EDTA method
3. Determination of Copper by Iodometry

#### VI. Preparation of Phenol Formaldehyde resin (Bakelite)

#### References:

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et.al., Pearson Education, Sixth Edition, 2012.
2. Laboratory manual on Engineering Chemistry, Anupama Rajput, DhanpatRai& Co Publications.
3. Essentials of Experimental Engineering Chemistry, Shashichawla, DhanpatRai& Co Publications.

| Subject Code | Subject Category | Subject Title                           | L | T | P | IM | EM | CR |
|--------------|------------------|---|---|---|---|----|----|----|
| 14241011     | HS               | English Language & Communication Skills | 0 | 0 | 3 | 50 | 50 | 4  |

1. Listening skills

Low level

- a) Fun in the sun
- b) Home and family
- c) Snake in the house
- d) A horse is a horse of course e)  
The wonder of Wales.

High level

- a) Winter wonderland
- b) Great trip, Great country c)  
Keeping in shape
- d) Asia tour
- e) I like to use my hands.

2. Situational dialogues a)

Group discussion b)

Interviewing

- c) Making acquaintances
- d) Sight seeing e)  
Arguing

3. Phonetics

- a) Vowel sounds
- b) Consonant sounds
- c) Phonetic Transcription

(14042101) ELECTRONIC DEVICES AND CIRCUITS

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*Course Objectives:*

- To understand electronic devices, including diodes, bipolar junction transistors and FET
- To study various Op-Amp applications

**UNIT-I**

**Semiconductor Devices:** Intrinsic semiconductors-Electron-Hole Pair Generation, Conduction in Intrinsic Semiconductors, Extrinsic Semiconductors-N-Type and P-Type Semiconductors, Comparison of N-Type and P-Type Semiconductors. The p-n Junction -Drift and Diffusion Currents, The p-n Junction Diode-Forward Bias, Reverse Bias, Volt-Ampere Characteristics- Diode Specifications, Applications of Diode, Diode as a Switch. Diode as a Rectifier-Half-wave Rectifier, Full-Wave Rectifier, Full-Wave Bridge Rectifier, Rectifiers with Filters, Zener Diode- Volt-Ampere Characteristics, Zener Diode as Voltage Regulator.

**UNIT-II**

**BJT:** Bipolar Junction Transistor (BJT) – Types of Transistors, Operation of NPN and PNP Transistors, Input-Output Characteristics of BJT-CB, CE and CC Configurations, Relation between  $I_C$ ,  $I_B$  and  $I_E$ . Transistor Biasing- Fixed Bias, Voltage Divider Bias, Transistor Applications- Transistor as an Amplifier, Transistor as a Switch,.

**UNIT-III**

**Junction Field Effect Transistor (JFET):** Theory and Operation of JFET, Output Characteristics, Transfer Characteristics, Configurations of JFET-CD, CS and CG Configurations, JFET Applications- JFET as an Amplifier, JFET as a Switch, Comparison of BJT and JFET, MOSFET-The Enhancement and Depletion MOSFET, Static Characteristics of MOSFET, Applications of MOSFET.

**UNIT – IV**

**Oscillators and Op-Amps:** Sinusoidal Oscillators, Barkhausen Criteria for Oscillator Operation, Components of an Oscillator-Transistor Amplifier Circuits, Feedback Circuits and Oscillator Circuits, Classification of Oscillators, LC Tuned, RC Phase Shift Oscillator circuits.

**UNIT-V**

**Operational Amplifiers(Op-Amps)-**Symbol of an Op-Amp, single Input and Dual Input Op-Amps(Differential Amplifier), Characteristics of an Ideal Op-Amp, Basic Forms of Op-Amps-

Inverting & Non-Inverting Amplifiers, Applications of Op-Amps, summing, Differential, Integrator, differentiator Amplifier.

**Text Books:**

1. Electronic Devices and Circuits – S. Salivahana, N.Suresh Kumar, A. Vallavaraj, 2nd Edition, 2008, TMH.
2. Integrated Electronic - J.Millman and C.C.Halkias , 2<sup>nd</sup> edition, 1998, TMH.

**Reference Books :**

1. Basic Electrical and Electronics Engineering, M.S.Sukhija, T.K.Nagsarkar, Oxford University Press, 1st Edition, 2012.
2. Basic Electrical and Electronics Engineering, S.K Bhattacharya, Pearson Education, 2012.

(14052102) DATA STRUCTURES

L T C  
3 1 3

**Course Objectives:**

- To develop skills to design and analyze linear and non linear data structures
- To develop algorithms for manipulating linked lists, stacks, queues, trees and graphs
- To develop recursive algorithms as they apply to trees and graphs.

**UNIT-I**

**Introduction:** Data structures, Storage structures & File structures, Primitive & Non-primitive data structures, Linear & Non linear data structures, Abstract Data Type (ADT), **Linear Lists** : ADT , Array & Linked representations, **Arrays** : ADT, **Linked Lists:** Single Linked List- Insertion, Deletion, Double Linked List- Insertion, Deletion.

**UNIT-II**

**Stacks:** Definition, ADT, Array & Linked representations, Operations & Applications, **Queues:** Definition, ADT, Array & Linked representations, Operations, Circular Queues, Dequeues.

**UNIT-III**

**Trees:** Basic terminology, Binary Trees - Definition, Properties, Representation, ADT, Complete Binary Tree, Full Binary Tree, **Tree Traversal Algorithm:** Inorder, Preorder and Postorder, **Priority Queues:** Definition, ADT, Heaps, Left list Trees, **Binary Search Tree (BST):** Definition, ADT, Operations and Implementations, BST with Duplicates, Indexed BST.

**UNIT-IV**

**Balanced Search Trees:** AVL, Red-Black & Splay Trees, **Graphs:** Terminology, Representations, **Graph Traversal:** Depth First Search (DFS) & Breadth First Search (BFS), Minimum spanning Trees.

## **UNIT-V**

**Sorting:** Selection, Insertion, Bubble, Merge, Quick, Heap, Radix **Searching:** Sequential & Binary Search

### **TEXT BOOKS:**

1. An introduction to Data Structures with Applications - Jean-Paul Tremblay and Paul G.Sorenson, TMH.
2. Data Structures, Algorithms and Applications in C++ - Sahni, McGraw-Hill.

### **REFERENCE BOOKS:**

1. Data Structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.
2. Data Structures and Algorithms, G A V Pai, TMH
3. Data Structures, Lipschutz,, Schaum's Outline series, TMH
4. Data Structures and Program Design in C, R. Kruse etal, Pearson Education.

**(14052103) DIGITAL LOGIC DESIGN**

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| <b>3</b> | <b>1</b> | <b>3</b> |

**Course Objectives:**

- Acquire the skills to manipulate and examine Boolean algebraic expressions,
- To understand the fundamental principles of digital design
- To acquaint with classical hardware design for both combinational and sequential logic circuits.

**UNIT I**

**BINARY SYSTEMS:** Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Binary codes, Binary Storage and Registers.

**BOOLEAN ALGEBRA AND LOGIC GATES:** Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic Gates, integrated circuits.

**UNIT II**

**OPTIMIZED IMPLEMENTATION OF LOGIC FUNCTION:** The Karnaugh map method, minimization of Product of Sum forms, incompletely specified functions, Multi level NAND and NOR circuits, Exclusive – Or and Equivalence functions ,A tabular method for minimization.

**UNIT III**

**COMBINATIONAL LOGIC:** Combinational Circuits, Design procedure, Code converters, Binary parallel adder, Decimal Adder, Binary multiplier, Magnitude comparator, Decoders, demultiplexers, Encoders, Multiplexers, Read Only Memory (ROM), PLA.

**UNIT IV**

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

**UNIT V**

**REGISTERS AND COUNTERS:** Registers, shift Registers, Ripple counters synchronous counters, Johnson counter

**ASYNCHRONOUS SEQUENTIAL LOGIC:** Introduction, Analysis of asynchronous sequential circuits, Synthesis of asynchronous sequential circuits, State Reduction , Hazards.



**TEXT BOOKS:**

1. Digital Design – Third edition, M.Morris Mano, Pearson Education/PHI.
2. Fundamentals of digital logic design with VHDL By Stephen Brown and I Zvonko Vranesic, second edition, The McGraw-Hill.
3. Fundamentals of logic design, Roth, 5th edition, Thomson.

**REFERENCES:**

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic & Micro Computer Design, 5TH Edition, M. Rafiquzzaman  
John Wiley

**(14052104) MATHEMATICAL FOUNDATIONS OF  
COMPUTER SCIENCE**

**L T C**  
**3 1 3**

**Course Objectives:**

- To make the students learn logical thinking and be able to apply enumerating techniques.
- To develop an understanding of functions and relations.
- To enable the students understand graph theoretic techniques.

**UNIT-I**

**Mathematical Logic:** Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.

**UNIT-II**

**Relations:** Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram.

**Functions:** Inverse Function, Composition of functions, recursive Functions, Lattice and its Properties,

**UNIT-III**

**Algebraic structures:** Algebraic systems examples and general properties, Semi groups and monads, groups, sub-groups, homomorphism, Isomorphism.

**UNIT-IV**

**Elementary Combinatorics:** Basis of counting, Enumerating Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application

**UNIT-V**

**Graph Theory:** Basic Concepts, Representation of Graph, Isomorphism and Sub graphs, planar Graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Spanning Trees, Chromatic Numbers

**TEXT BOOKS:**

1. Discrete Mathematics for Computer Scientists & Mathematicians, 2/e, J.L.Mott, A. Kandel, T.P. Baker, PHI
2. Discrete mathematical structures with applications to computer science - J P Tremblay and Manohar Mc Graw Hill

**REFERENCE BOOKS:**

1. Elements of Discrete Mathematics- A Computer Oriented Approach, C.L.Liu, D.P. Mohapatra, 3/e, TMH.
2. Discrete and Combinatorial Mathematics- An Applied Introduction, Ralph. P. Grimaldi, 5/e, Pearson Education.
3. Discrete Mathematics and its applications, 6th edition, K.H. Rosen, TMH.
4. Discrete Mathematical Structures, Mallik and Sen, Cengage Learning.
5. Discrete Mathematical Structures, Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, PHI/ Pearson Education.
6. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
7. Discrete Mathematics, Lovasz, Springer.

(14022105) ELECTRICAL ENGINEERING

L T C  
3 1 3

**Course Objectives:**

- To get exposed to the basic laws in circuit analysis
- To understand the operation of electrical machines
- To acquire knowledge about illumination and earthing.

**UNIT I**

**Basics of Electrical Circuits:** Ohm's law, Kirchhoff's laws, types of elements, types of sources, resistive networks, inductive network, Capacitive network, series -parallel Circuits, star – delta and delta – star transformations – problems

**Network Theorems:** Superposition, Thevinin's, Maximum power transfer theorems – problems

**UNIT II**

**Alternating quantities:**

Principles of ac Voltages, waveform and basic definitions, root mean square and average values of alternating currents and voltages, form factor and peak factor, analysis of ac circuits with single basic network elements, single phase series and parallel circuits – problems.

**UNIT III**

**DC Generator:**

Principle of operation, Constructional details, emf equation, types of D.C Generators - problems

**D.C Motor:**

Principle of operation, Constructional details, torque equation, losses and efficiency, testing – Swinburne's test, Load test

**UNIT IV**

**1- $\Phi$ Transformer:**

Principle of operation, constructional details, losses, efficiency, Regulation, Testing: OC and SC test.

I -  $\Phi$  Induction Motors, Principle of operation – Starting methods.

**UNIT V**

**Rectifier and power supplies:** Half – Wave and full wave rectifiers ,C- Filler, Series and Shunt regulators, Principle of operation of buck – boost and servo voltage regulators, Spike Suppressors. Introduction to Switched mode power supplies (SMPS) and uninterruptible power supplies (Only Concepts).

**TEXT BOOKS:**

1. Basic Electrical Engineering – M.S. Naidu and S. Kamakshaiah -TMH
2. Principles of Electrical Engineering - V.K. Mehta, S.Chand Publications.
3. Electrical Technology – B.L Thereja, S. Chand
4. Basic Electronics - Grob B, 8<sup>th</sup> Editions, Tata McGraw hill ,2000

**REFERENCE BOOKS:**

1. Basic Electrical Engineering – T.K. Nagasarkar and M.S. Sukhji Oxford university press.
2. Electrical and Electronics Technology – Huges pearson education.
3. Theory and problems of basic electrical engineering – D.P.Kothari and I.J.Nagrath PHI.
4. Fundamentals of Electrical Electronics Engineering - T.Thyagarajan, SCITECH publications 5<sup>th</sup> Edition-2007.

II B.Tech. I Sem

**(14052106) OBJECT ORIENTED PROGRAMMING THROUGH C++**

**L T C**  
**3 1 3**

**Course Objectives:**

- To make the students understand the features of object-oriented design and familiarize them with virtual functions, templates and exception handling.
- To enable the students solve various engineering problems in C++ programming language.

**UNIT I**

**Principles of Object-Oriented Programming:** Object-Oriented Programming Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of OOP, Applications of OOP.

**Beginning with C++:** Comments, Output Operator, The iostream File, Variables, Input Operator, Cascading of I/O Operators, Structure of C++ program.

**UNIT II**

**Tokens, Expressions and Control Structures:** Tokens, Keywords, Identifiers and Constants, Basic Data Types, Declaration of variables, Dynamic initialization of variables, Reference variables, Operators in C++, Scope resolution operator, Memory management operators, Manipulators, Control Structures,

**Functions in C++:** Function Prototyping, Call by reference, Return by reference, Inline Functions, Function Overloading.

**UNIT III**

**Classes and Objects:** Specifying a Class, Defining Member Functions, Memory allocation for objects, Static data members, Static member functions, Arrays of objects, Friendly functions,

**Constructors and Destructors:** Constructors, Parameterized constructors, Multiple constructors in a class, Constructors with default arguments, Copy constructor, Dynamic constructor, Destructors.

**UNIT IV**

**Operator Overloading:** Defining operator overloading, Overloading Unary operators, Overloading Binary operators, Overloading Binary operators using Friends.

**Inheritance:** Introduction, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual base classes, Abstract classes.

**UNIT V**

**Pointers, Virtual Functions and Polymorphism:** this Pointer, Virtual Functions, Pure virtual functions.

**Managing Console I/O Operations:** Unformatted I/O operations, Formatted console I/O operations.

**Templates:** Class Templates, Function Templates, Overloading Template functions, Member function Templates.

**Exception Handling:** Basics of Exception handling, Exception handling mechanism.

**TEXT BOOK:**

1. The Complete Reference C++, Herbert Schildt, TMH 4<sup>th</sup> Edition.
2. Object Oriented Programming With C++, E. Balagurusamy, TMH 6<sup>th</sup> edition.
- 3.

**REFERENCE BOOKS:**

1. Object oriented programming with ANSI and TURBO C++, Ashok N Kamathane, Pearson education.
2. Object oriented programming with C++, Saurav Sahay, Oxford.
3. Learning C++ Programming :From Problem Analysis To Program Design, Malik, Thomson
4. Learning - Computer Science :A Structured Approach Using C++,2nd Ed., Forouzan, Thomson

II B.Tech. I Sem

**(14052107) OBJECT ORIENTED PROGRAMMING & DATA STRUCTURES LAB**

**L P C**  
**0 3 2**

**Course Objective:**

- To make the students learn the implementation of insertion, deletion and display operations on various linear and non-linear data structures.

The Student is expected to solve at least 10 experiments from covering 5 experiments from Object Oriented Programming and Data Structures courses each (every year 10 different experiments).

**Sample List of Experiments from Objected Oriented Programming Course**

1. Simple Programs without using Classes.
2. Programs using classes.
3. Programs using Constructor and Destructor.
4. Program illustrating Operator Overloading.
5. Program illustrating function overloading.
6. Program that the concepts of different forms of inheritance
7. Program that uses file concept.
9. Program that uses the concept of friend functions.
10. Program that uses concept of polymorphism.

**Sample List of Experiments from Data Structure Course**

1. Write a program to implement stack operation by using arrays.
2. Write a program to implement stack operation by using linked lists.
3. Write a program that uses stack operations to convert a given infix to postfix conversion.
4. Write a program that uses stack operations to evaluate postfix expression.
5. Write a program to implement queues operations by using arrays.
6. Write a program to implement queues operations by using linked lists.
7. Write a program to implement operations on circular queues by using arrays.
8. Write a program to implement operations on circular queues by using linked lists.
9. Write a program to implement operations on single linked list.
10. Write a program to implement operation on double linked list.
11. Write a program to implement insertion, deletion, and traversal operations on trees.
12. Write a program to implement the following graph traversal algorithms.  
(i) Depth first traversal (ii) Breadth first traversal



13. Write programs to sort list of elements using

(i) Selection sort (ii) Bubble sort (iii) Merge sort (iv) Quick sort

14. Write programs to implement the following searching techniques.

(i) Linear search (ii) Binary search.

**(14992108) ELECTRICAL & ELECTRONICS  
ENGINEERING LAB**

**L P C**  
**0 3 2**

**Course Objectives:**

- To get exposed to the basic laws in circuit analysis
- To understand the operation of electrical machines
- To introduce the basic design concepts and conduct experiments on CRO, CDS, FG, half and full wave, transistor characteristics, shift registers, Summing and difference amplifiers.

**PART – A ELECTRICAL LAB:**

1. Verification of KCL and KVL.
2. Verification of Superposition theorem.
3. Verification of Thevenin's theorem.
4. Verification of Maximum power Transfer Theorem.
5. Load test on DC shunt motor.
6. OC & S.C Test on 1- $\emptyset$  Transformer ( Predetermination of efficiency and regulation at given power Factor )

**PART – B- ELECTRICAL LAB:**

1. V-I Characteristics of a PN – Junction diode.
2. V-I Characteristics of a Zener diode.
3. Input – output Characteristics of a BJT in CB Configuration.
4. Frequency response of CE amplifier.
5. Load Characteristics of Half wave rectifier with and without filter.
6. Op-amp non-inverting amplifier.

**(14212201) PROBABILITY AND STATISTICS**

**L T C**  
**4 0 3**

**Course Objective:**

- To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, Statistical Quality Control and Queuing theory

**UNIT I**

Random variables - Discrete random variables - Continuous random variables –Probability distribution function – Discrete and continuous probability distribution – Mathematical Expectation, Variance and standard deviation of probability distribution. Binomial , Poisson and Geometric distributions - Related properties.

**UNIT II**

Continuous distributions: Uniform – Exponential- Gamma – Normal – Log normal- Weibull distributions and related properties.

**UNIT III**

Test of Hypothesis - Population and sample - Confidence interval of mean from normal distribution- Statistical hypothesis - null and alternative hypothesis – level of significance. Test of significance - Tests based on normal distribution –z -test for means and proportions. Small samples - t-test for one sample, two sample problem and paired t-test - F-test - Chi-square test (testing of goodness of fit and independence).

**UNIT IV**

Correlation and regression – Correlation – Co-efficient of correlation – lines of Regression- Relation between correlation and Regression co-efficients- rank correlation – Fitting of a straight line using the method of least squares - Multiple linear regression and its applications.

**UNIT V**

Statistical quality control: Concept of quality of a manufactured product - defect and defectives - Causes of variation - Random and assignable causes -The principle of Shewhart control chart – Charts for attributes and variable quality characteristics - Construction and operation of p-chart, c-chart, X-bar chart and R-chart.

**TEXT BOOKS:**

1. Higher Engineering Mathematics, Dr. B.SGrewal, Khanna Publishers-42 edition.
2. Walpole and Myrs, Probability & Statistics for Engineers & Scientists, Seventh edition, Pearson Education Asia, 2002,
3. Johnson, Probability & Statistics for Engineers, Fifth edition, Prentice Hall of India.

**REFERENCE BOOKS:**

1. Probability & Statistics by E. Rukmangadachari& E. Keshava Reddy Pearson Publisher
2. Statistical Methods by S.PGuptha, S Chand Publications.

**(14012202) ENVIRONMENTAL STUDIES**

**L T C**  
**4 0 3**

**Course Objective:**

- To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

**UNIT 1**

Multidisciplinary nature of environmental studies: Definition, scope and importance – Need for public awareness

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

**UNIT II**

Ecosystems: Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystems (a) Forest ecosystem, (b) Grassland ecosystem, (c) Desert ecosystem, (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**UNIT III**

Biodiversity and its conservation: Introduction – Definition : genetic, species and ecosystem diversity; Bio-geographical classification of India; Value of biodiversity : consumptive use,

productive use, social, ethical, aesthetic and option values; Biodiversity at global, National and local levels; India as a mega-diversity nation; Hot-spots of biodiversity; Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts; Endangered and endemic species of India; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity

#### **UNIT IV**

Environmental Pollution: Definition – Cause, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g). Nuclear hazards; Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution – Pollution case studies; Disaster management: floods, earthquake, cyclone and landslides

#### **UNIT V**

Social 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; • 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 Protection Act; Air (Prevention and Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislation; Public awareness

Human Population and the Environment: Population growth, variation among nations – Population explosion – Family Welfare Programme; Environment and human health; Human Rights; Value Education; HIV/AIDS; Women and Child Welfare; Role of Information Technology in Environment and human health, case studies; Field work: Visit to a local area to document environmental assets river/forest/grassland/hill/mountain - Visit to a local polluted site-Urban/Rural/Industrial/Agricultural; Study of common plants, insects, birds; Study of simple ecosystems-pond, river, hill slopes, etc.

#### **TEXT BOOKS:**

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Benny Joseph, Mc.Graw Hill Publications.

3. Principles and a basic course of Environmental science for under graduate course by Kousic, KouShic.
4. Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.

**REFERENCE BOOKS:**

1. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
2. Environmental Studies by Anindita Basak – Pearson education.
3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Prentice Hall of India Private limited.

**(14052203) DATA BASE MANAGEMENT SYSTEMS**

**L T C**  
**3 1 3**

**Course Objectives:**

- To make the students confident in maintaining huge amounts of data by creating tables and accessing them.
- To apply concurrency control and recovery techniques during transaction execution.

**UNIT I**

**Introduction** - Database-System Applications, Purpose of Database Systems, View of Data, Database languages, Database Users and Administrators, History of Database Systems.

**Introduction to the Relational Model** - Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

**Database Design and the E-R Model** - Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data.

**UNIT II**

**Introduction to SQL** - Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database .

**Intermediate SQL** - Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization

**Advanced SQL** - Functions and Procedures, Triggers.

**Formal Relational Query Languages** - The Relational Algebra, the Tuple Relational Calculus, the Domain Relational Calculus.

**UNIT III**

**Schema Refinement and Normal Forms** - Schema Refinement – Problems Caused by Redundancy, Decompositions, Problems related to decomposition. Reasoning about Functional Dependencies, First, Second, Third Normal forms, BCNF. Lossless join Decomposition, Dependency- preserving Decomposition. Schema refinement in Data base Design, Multi valued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal Form, Inclusion Dependencies.

**UNIT IV**

**Query Processing** - Overview, Measures of Query Cost, Selection Operation, Sorting,



Join Operation, Other Operations, Evaluation of Expressions

**Query Optimization** - Overview, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans.

**Transactions** - Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements .

## **UNIT V**

**Concurrency Control** - Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multi version Schemes, Snapshot Isolation, Insert Operations, Delete Operations, and Predicate Reads, Weak Levels of Consistency in Practice.

**Recovery System** - Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations, Remote Backup Systems.

### **TEXT BOOKS:**

1. Silberschatz, Korth, *Database system Concepts*. 5<sup>th</sup> Edition, McGrawhill.
2. Raghurama Krishnan, Johannes Gehrke, *Data base Management Systems. 3<sup>rd</sup> Edition*, Tata McGrawHill.

### **REFERENCE BOOKS:**

1. Elmasri, Navathe, *Fundamentals of Database Systems*, Pearson Education.
2. Peter Rob, Ananda Rao and Carlos Corone, *Database Management Systems*, Cengage Learning.
3. C.J.Date, *Introduction to Database Systems*, Pearson Education.

(14052204) FORMAL LANGUAGES AND AUTOMATA THEORY

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|---|---|---|
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**Course Objectives:**

- To be able to construct finite state machines and the equivalent regular expressions and prove the equivalence of languages described by finite state machines and regular expressions.
- To be able to construct pushdown automata and the equivalent context free grammars, Turing machines and Post machines.

**UNIT I**

**Fundamentals:** Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.

**Finite Automata:** NFA with  $\epsilon$  transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without  $\epsilon$  transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Mealy machines.

**UNIT II**

**Regular Languages:** Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (**proofs not required**).

**UNIT III**

**Grammar Formalism:** Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms. Right most and leftmost derivation of strings.

**Context Free Grammars:** Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (**proofs omitted**).

**UNIT IV**

**Push Down Automata:** Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (**Proofs not required**). Introduction to DCFL and DPDA.

## UNIT V

**Turing Machine:** Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required).

**Computability Theory:** Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of problems, Universal Turing Machine, undecidability of post's Correspondence problem, Turing reducibility, **Definition of P and NP problems, NP complete and NP hard problems.**

### TEXT BOOKS:

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation - Sipser 2nd edition Thomson

### REFERENCE BOOKS:

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation ,John C Martin, TMH
3. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
- 4 Theory of Computer Science and Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI.
5. Theory of Computation, By K.V.N. Sunitha and N.Kalyani

(14052205) JAVA PROGRAMMING

L T C  
3 1 3

**Course Objectives:**

- To give the students a firm foundation on Java concepts like Primitive data types, Java control flow, Methods, Object-oriented programming, Core Java classes, packages and interfaces, multithreading.
- To provide the students with an understanding of Java applets, Abstract Window Toolkit and exception handling.

**UNIT I**

**Object Oriented Programming basics:** Need for OOP paradigm, summary of OOP concepts,

**Java Basics:** History of Java, Java buzzwords, Simple java program, classes and objects – concepts of classes, objects, constructors, methods, Introducing access control, **this** keyword, overloading methods and constructors.

**UNIT II**

**Inheritance :** Hierarchical abstractions, Base class object, subclass, subtype, benefits of inheritance, **super** uses, using **final** with inheritance, **polymorphism**- method overriding, abstract classes.

**Packages and Interfaces:** Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing

interface, applying interfaces, variables in interface and extending interfaces.

**UNIT III**

**Exception handling and multithreading:** Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads.

**UNIT IV**

**Event Handling :** Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, The AWT class hierarchy, user interface components- labels, button, scrollbars, text components, check box, check box groups, choices, graphics, layout manager types – boarder, grid, flow, card and grid bag.

**UNIT V**

**Applets :** Concepts of Applets, differences between applets and applications, life cycle of an applet, creating applets, passing parameters to applets.

**Swings** : Introduction, JApplet, JFrame and JComponent, Icons and Labels, text fields, JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, and Tables.

**TEXT BOOKS :**

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

**REFERENCE BOOKS:**

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

**(14052206) COMPUTER ORGANIZATION**

**L T C**  
**4 0 3**

**Course Objectives:**

- To make the students understand the structure of computers and internal organization of different units like memory, I/O devices, registers.
- To study in detail the operation of arithmetic unit including the algorithms and implementation of fixed and floating point addition, subtraction, multiplication and division operations.

**UNIT I**

**Basic concepts of computers:** Computer Types, Functional units, Basic operational concepts, Bus Structures, Performance, Multiprocessors and multi computers, Data Representation- Fixed Point Representation, Floating – Point Representation.

**UNIT II**

**Register Transfer:** Register Transfer language, Register Transfer, Bus and memory transfers,

**Micro operations :** Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit, instruction codes, Computer instructions, memory – reference instructions , Input – Output and Interrupt, Addressing modes.

**UNIT III**

**Micro programmed control:** Control memory, Address sequencing, micro program example, design of control unit, Hard wired control, Micro programmed control.

**Computer Arithmetic:** Addition and subtraction, multiplication Algorithms, Division Algorithms.

**UNIT IV:**

**Memory:** Basic concepts, Cache memory, performance considerations, Virtual memory

**Input-Output Organization:** Peripheral Devices, Input- Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access.

**UNIT V**

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

**Multiprocessors:** Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Inter Processor Communication and Synchronization.

**TEXT BOOKS:**

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI.

**REFERENCE BOOKS:**

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.
3. Fundamentals of Computer Organization and Design, - Sivaraama Dandamudi, Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition, Elsevier.
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

II B.Tech. II Sem

**(14052207) DATABASE MANAGEMENT SYSTEMS LAB**

**L P C**  
**0 3 2**

**Course Objectives:**

- To create database and query it using SQL queries and design forms using forms designer.
- To understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

Student is expected to implement at least 10 experiments from Database Management System Course covering various concepts (Every year 10 different experiments).

**List of Sample Experiments:**

1. Practicing DDL Commands
2. Practicing DML Commands.
3. Implementation of Aggregate operations
4. Implementation of special operators such as LIKE, BETWEEN, IN, EXISTS etc.
5. Implementation of SET operations (UNION, INTERSECTION, MINUS, JOIN etc)
6. Implementation of Oracle Functions
7. Creating Views, Updatable views
8. Creation of Triggers
9. Creation of Cursors
10. Writing sample programs in PL/SQL



**(14052208) JAVA PROGRAMMING LAB**

**L P C**  
**0 3 2**

**Course Objective:**

- To be able to understand and implement Java applications and applets, Primitive data types, Java control flow, Methods, classes, packages, multithreading and exception handling.

Student is expected to implement at least 10 experiments from Java Programming Course covering various concepts (Every year 10 different experiments).

**List of Sample Experiments:**

1. Write a Java program that prints all real solutions to the quadratic equation . Read in a, b, c and use the quadratic formula. If the discriminant is negative, display a message stating that there are no real solutions.
2. Write a Java program that prints the Fibonacci series.
3. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
4. Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers
5. Write a Java program to multiply two given matrices.
6. Write a Java program that checks whether a given string is a palindrome or not.
7. Write a Java program for sorting a given list of names in ascending order.
8. Write a Java program to make frequency count of words in a given text.
9. Write a Java program to find the factorial of a given number using recursion
10. Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
11. Write a Java program that implements stack ADT
12. Write a Java program that evaluates the postfix expression
13. Write a Java program to implement packages
14. Write a Java program to implement interfaces
15. Write a Java program to implement exception handling
16. Write a Java program to implement multithreading
17. Write a Java program to implement abstract methods and abstract classes

- 18.** Write a Java program to develop an applet that displays a simple message
- 19.** Write a Java program to develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.
- 20.** Write a Java program for handling mouse events.
- 21.** Write a Java program for handling keyboard events.
- 22.** Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result.

(14053101) OPERATING SYSTEMS

L T C  
3 1 3

**Course Objectives:**

- To have an overview of functions of operating systems.
- To know the components of an operating system.
- To have a thorough knowledge of process management.
- To have a thorough knowledge of storage management.
- To know the concepts of file systems

**UNIT I**

**Operating Systems Basics:** Operating systems functions, Overview of computer operating systems, distributed systems, operating system services and systems calls, system programs, operating system structure.

**UNIT II**

**Process Management:** Process concepts, scheduling-criteria, algorithms, their evaluation.

**Concurrency:** Process synchronization, the critical-section problem, Peterson's Solution, semaphores, classic problems of synchronization, monitors.

**UNIT III**

**Memory Management:** Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement, algorithms, Allocation of frames.

**UNIT IV**

**Deadlocks:** system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

**Files:** The concept of a file, Access Methods, Directory structure, File system mounting, File sharing, protection.

**UNIT V**

**Protection:** Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix.

**Security:** The Security problem, program threats, user authentication.

**TEXT BOOKS:**

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Operating Systems, A Concept based Approach-D.M.Dhamdhare, Second Edition, TMH.

**REFERENCE BOOKS:**

1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.
2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
5. Operating Systems, A.S.Godbole, Second Edition, TMH.
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
8. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.

**(14053102) COMPUTER NETWORKS**

**L T C**  
**4 0 3**

**Course Objectives:**

- Study the evolution of computer networks and future direction
- Study the concepts of computer networks from layered perspective
- Study the issues open for research in computer networks

**UNIT I**

Introduction: Networks, Network Types, Internet History, Standards and Administration, Network Models: Protocol Layering, TCP/IP Protocol Suite, The ISO Model.

Introduction to physical layer: Data and Signals, Transmission impairment, Data rate limits, Performance, Transmission media: Introduction, Guided Media, Unguided Media, Switching: Introduction, Circuit Switched Networks, Packet switching.

**UNIT II**

Introduction to Data Link Layer: Introduction, Link layer addressing, Error detection and Correction: Cyclic codes, Checksum, Forward error correction, Data link control: DLC Services, Data link layer protocols, HDLC, Point to Point Protocol, Media Access control : Random Access, Controlled Access, Channelization, Connecting devices and virtual LANs: Connecting Devices.

**UNIT III**

The Network Layer: Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of service, Internetworking, The network layer in the Internet: IPV4 Addresses, IPV6, Internet Control protocol, OSPF, BGP, IP, ICMPv4, IGMP.

**UNIT IV**

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP, Performance problems in computer networks, Network performance measurement.

**UNIT V**

Introduction to Application Layer: Introduction, Client Server Programming, WWW and HTTP, FTP, e-mail, TELNET, Secure Shell, Domain Name System, SNMP.

**TEXT BOOKS:**

1. "Data communications and networking" 5<sup>th</sup> edition, 2012, Behrouz A. Forouzan, TMH.
2. "Computer Networks", 5<sup>th</sup> edition, 2010, Andrew S. Tanenbaum, Wetherall, Pearson.

**REFERENCE BOOKS:**

1. "Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, Douglas E. Comer, 5 th edition, PHI
2. "Computer Networks", 5E, Peterson, Davie, Elsevier.
3. "Introduction to Computer Networks and Cyber Security", Chawan- Hwa Wu, Irwin, CRC Publications.
4. "Computer Networks and Internets with Internet Applications", Comer.

**(14053103) SOFTWARE ENGINEERING**

**L T C**  
**4 0 3**

**Course Objectives:**

- To understand the software life cycle models.
- To understand the software requirements and SRS document.
- To understand the importance of modeling and modeling languages.
- To design and develop correct and robust software products.
- To understand the quality control and how to ensure good quality software.
- To understand the planning and estimation of software projects.
- To understand the implementation issues, validation and verification procedures.
- To understand the maintenance of software

**UNIT I**

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

**UNIT II**

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling.

**UNIT III**

Design Concepts: Design within the Context of Software Engineering, Design Process, Design Concepts, The Design Model.

Architectural Design: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design.

Component-Level Design: What is a Component, Designing Class-Based Components, Conducting Component-Level Design, Component-Level Design for WebApps.

#### **UNIT IV**

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

Coding and Testing: Coding, Code Review, Software Documentation, Testing, Testing in the Large versus Testing in the Small, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tools, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

#### **UNIT V**

Software Project Management: Responsibilities of a Software Project Manager, Project Planning, Metrics for Project Size Estimation, Project Estimation Techniques, Empirical Estimation Techniques, COCOMO-A Heuristic Estimation Technique, Halstead's Software Science-An Analytical Technique, Staffing Level Estimation, Scheduling, Organization and Team Structures, Staffing, Risk Management, Software Configuration Management. .

Software Maintenance: Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models, Estimation of Maintenance cost.

#### **TEXT BOOKS :**

1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition, 2009, McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, 2009, PHI.

#### **REFERENCE BOOKS:**

1. Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition , 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications,2008.
8. Software Engineering Principles and Practice, Hans Van Vliet,3<sup>rd</sup> edition, John Wiley & Sons Ltd.
9. Software Engineering 3:Domains,Requirements,and Software Design, D.Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J.Leach, CRC Press.



**(14053104) COMPILER DESIGN**

**L T C**  
**3 1 3**

**Course Objectives:**

- To understand the basic principles of the compiler, Compiler construction tools and lexical analysis.
- To understand the Concept of Context Free Grammars, Parsing and various Parsing Techniques.
- To understand the process of intermediate code generation.
- To understand the process of Code Generation.
- To understand various Code optimization techniques and runtime environment.

**UNIT 1**

Introduction to Compiling: Compilers, Analysis of the Source program. The phases of a compiler, the cousins of the Compiler. The grouping of phases, Compiler construction tools.

Lexical Analysis: The role of the analyzer. Input buffering, Specification of tokens, Recognition of tokens, A language for Specifying Lexical analyzer.

**UNIT II**

Syntax Analysis: The role of the parser, Context-free grammars, writing a grammar, Top-down parsing, Bottom-up parsing, Operator-precedence parsing, LR parsers. Using ambiguous grammars Parser generators.

**UNIT III**

Syntax Directed Translation: Syntax-directed definitions, Construction of syntax trees, Bottom-up evaluation of S-attributed definitions. L-attributed definitions. Top-down translations. Bottom-up evaluation of inherited attributes.

Type Checking: Type systems, Specification of simple type checker. Equivalence of type expressions, type conversions.

**UNIT IV**

Run-Time Environments: Source Language issues, storage organization, Storage-allocation strategies. Access to non local names. Symbol tables, Language facilities for dynamic storage allocation. Dynamic storage allocation techniques

Intermediate Code generation: Intermediate languages, Three address code, quadruple, triple and indirect triple.

## **UNIT V**

Code Generation: Issues in the Design of a code generator, The target machine, Run-time storage management, Basic blocks and flow graphs, Next-use information. A simple code generator, Register allocation and assignment, DAG representation of basic blocks, peephole optimization.

Code Optimization: Introduction. The principle source of optimization.

### **TEXT BOOK:**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman. Compilers-Principles, Techniques and Tools, Pearson Education 2004.

### **REFERENCE BOOKS:**

1. Alfred V. Aho, Jeffrey D. Ullman, Principles of Compiler Design. Narosa Publications.
2. J.P.Benne, Introduction to Compiling Techniques, Second Edition, Tata McGraw-Hill.

**(14053105) COMPUTER GRAPHICS**

**L T C**  
**4 0 3**

**Course Objectives:**

- To apply the rules and algorithms in generating graphical outputs.
- To develop multi-dimensional objects using suitable transformations.
- To Develop real-time rendering graphics.

**UNIT I**

**Introduction:** Usage of Graphics and their applications, Presentation Graphics- Computer Aided Design- Computer Art- Entertainment- Education and Training- Visualization- Image Processing- Graphical User Interfaces.

**Overview of Graphics systems:** Video Display Devices- Raster Scan systems-random scan systems- Graphics monitors and workstations-Input devices-hard copy devices- Graphics software.

**UNIT II**

**Scan Converting Lines** – Basic Incremental algorithm, Midpoint algorithm and additional issues; Scan converting Circles, Scan Converting Ellipses, Solid Filling, Pattern Filling, Thick Primitives, Cohen – Sutherland line clipping algorithm, Parametric line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm, Generating characters.

**UNIT III**

**Geometrical transformations** – 2D transformations, Homogeneous coordinates, Matrix representation of 2D transformations, Composition of 2D transformations, Window to view-port transformation, Matrix representation of 3D transformations, Composition of 3D transformations.

**Representing Curves and Surfaces** – Polygon meshes, Parametric cubic curves, Parametric bicubic surfaces and Quadratic surfaces.

**UNIT IV**

**Viewing in 3D** – Projections, Specifying an arbitrary 3D view.

**Solid Modeling** – Representing Solids, Regularized Boolean set operations, Primitive instancing, Sweep Representation, Boundary Representations, Spatial-Partitioning Representations.

**Achromatic and Colored Light** – Achromatic light, Chromatic color, Color models for raster graphics, Reproducing color, Using color in computer graphics.

## **UNIT V**

**Illumination Models** – Ambient light, Diffuse reflection, Atmospheric attenuation.

**Shading Models** – Constant shading, Interpolated shading, Polygon mesh shading, Gouraud shading, Phong shading.

**Animation** – Conventional and Computer-Assisted animation, Animation languages, Methods of controlling animation, Basic rules of animation, Problems peculiar to animation.

### **TEXT BOOKS:**

1. Foley, Van Dam, Feiner and Hughes, Computer Graphics – Principles and Practice, 2<sup>nd</sup> Edition in C, Pearson Education, 2004
2. Donald Hearn and M. Pauline Baker, Computer graphics, C version, Prentice – Hall, 1997.

### **REFERENCE BOOKS:**

1. William M. Newman, Robert F. Sproull, Principles of interactive computer graphics, 12<sup>th</sup> Edition, McGraw – Hill, 1986
2. David F. Rogers, Rae A. Earnshaw, Computer Graphics Techniques : Theory and Practice, Springer-Verlag, 1990
3. Computer Graphics using Open GL by Francis S Hill Jr Pearson Education, 2004

**(14143106) MICROPROCESSORS & INTERFACING**

**L T C**  
**4 0 3**

**Course Objectives:**

- To learn the architecture and instruction set of 16 bit Microprocessors
- To learn the instruction set of 16 bit microprocessor and solve problems using the same

**UNIT-I**

Development of microprocessors 8086 microprocessors – Architecture, Pin configuration, Instruction set, Addressing modes, Interrupt system.

System timing of 8086 – clock cycle, machine cycle and instruction cycle, timing diagram for simple instructions, generation of delays.

**UNIT-II**

Assembler, Assembler directives, Assembly language programs (8086) with Assembler directives for addition, subtraction, multiplication, division etc., sorting and searching, bit manipulation, programs using look-up tables, stages of software development, modular programming, debugging and documentation.

**UNIT-III**

Data transfer schemes – Synchronous, Asynchronous, Interrupt driven and DMA type schemes, USART (8251) and its interfacing, Programmable interrupt controller (8259) and its interfacing, Programmable DMA controller and its interfacing, Data communication standards, RS – 232 Serial interface standard, IEEE – 488 GPIB standard.

**UNIT-IV**

Memory interfacing to 8086 – Interfacing various types of RAM and ROM chips, Address decoding techniques.

Interfacing ADC and DAC to 8086 systems, Data acquisition, Waveform generation, Traffic light controller, Stepper motor control, temperature measurement and control.

**UNIT-V**

Introduction to 80386 and 80486 microprocessors, different modes of operation – protected mode, virtual mode.

Introduction to Pentium processor – special Pentium registers, Pentium memory management, introduction to the Pentium pro– microprocessor.

**TEXT BOOKS:**

1. Barry B Brey: The INTEL Microprocessors 8086/8088, 80186/80188/80286, 80386, 80486, Pentium and Pentium processor, Architecture, Programming and Interfacing 4<sup>th</sup> edition (PHI).
2. Hall Douglas V. Microprocessor and Interfacing TMH.
3. Ram B : Fundamentals of Microprocessors and Micro Computers, Dhanpat Rai & sons.
4. Mukhopadhyay, Microprocessor, Microcomputer and their Applications, Narosa Publishing House.
5. J.Uffembeqe, the 8086/8088 family – Design, Programming and Interfacing, PHI.

III B.Tech. I Sem

**(14253107) HUMAN VALUES & PROFESSIONAL ETHICS**

**L T C**  
**2 0 0**

**Course Objective:**

- This course deals with professional ethics which includes moral issues and virtues, social responsibilities of an engineer right qualities of moral Leadership.

**UNIT I**

**ENGINEERING ETHICS**

Senses of Engineering Ethics – Variety of Moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg’s Theory – Consensus and Controversy – Professions and Professionalism – Professional ideals and virtues.

**UNIT II**

**ENGINEERING AS SOCIAL EXPERIMENTATION**

Engineering as experimentation – Engineers as Responsible Experimenters – Research Ethics – Codes of Ethics – Industrial Standards – A Balanced Outlook on Law – The Challenger Case Study.

**UNIT III**

**ENGINEER’S RESPONSIBILITY FOR SAFETY**

Safety and Risk – Assessment of Safety and Risk – Risk benefit Analysis – Reducing Risk – The Government Regulator’s Approach to Risk – Chernobyl Case and Bhopal Case studies.

**UNIT IV**

**RESPONSIBILITIES AND RIGHTS**

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property (IPR) – Discrimination.

**UNIT V**

**GLOBAL ISSUES**

Multinational Corporations – Business Ethics – Environmental Ethics – Computer Ethics – Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Leadership – Sample Code of conduct.

**TEXT BOOKS :**

1. Mike martin and Roland Schinzinger. “ Ethics in Engineering ”, McGraw Hill, New York 2005
2. Charles E Harris. Michael S Pritchard and Michael J Rabins. “ Engineering Ethics – Concepts and Cases ”, Thompson Learning 2000.

**REFERENCE BOOKS :**

1. Charles D Fleddermann, “ Engineering Ethics”, Prentice Hall, New Mexico, 1999.
2. John R Baatright. “Ethics and the Conduct of Business”, Pearson Education 2003.
3. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University press 2001.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, “ Business Ethics – An Indian Perspective”, Biztantra, New Delhi, 2004.
5. David Ermann and Michele S Shauf, “ Computers, Ethics and Society”, Oxford University Press, 2003.



**(14053108) COMPUTER NETWORKS &  
OPERATING SYSTEMS LAB**

**L P C**  
**0 3 2**

**Course Objectives:**

- This course should enable the students to understand and simulate the behaviour of network environment.
- This course should enable the students to understand OS concepts.

**Computer Networks Lab Experiments:**

1. Implementation of Character Stuffing
2. Implementation of Bit Stuffing
3. Implementation of Character Count
4. Implementation of Cyclic Redundancy Check
5. Implementation of Shortest Path Routing Algorithm

**Operating Systems Lab Experiments:**

1. Implementation of FCFS Scheduling Algorithm
2. Implementation of SJF Scheduling Algorithm
3. Implementation of round robin Scheduling Algorithm
4. Implementation of Priority Scheduling Algorithm
5. Implementation of LRU Page replacement
6. Simulate Bankers Algorithm for Dead Lock Avoidance
7. Simulate Bankers Algorithm for Dead Lock Prevention
8. Implementation of multiple variable partition technique
9. Implementation of multiple fixed partition technique

**(14043109) MICROPROCESSORS LAB**

**L P C**  
**0 3 2**

**Course Objectives:**

- To solve various problems using microprocessor kits and assembly language
- To study the interface circuits to microprocessors.

**LIST OF EXPERIMENTS:**

**GENERAL PROBLEMS**

1. Addition and Subtraction of two 8-bit/16 bit numbers
2. Multiplication of two 8-bit & two 16-bit numbers
3. Division of 16-bit by 8-bit and 32-bit by 16-bit number
4. Interchange of two data words using 'xchg' instruction.
5. Interchange of 10-data bytes with another 10-data bytes of another location.
6. Addition of 6 data bytes with 6-data bytes of another location.
7. Counting of 0's and 1's in a given data.
8. Check the given number is logical palindrome or not.
9. Finding the maximum and minimum numbers in a given string of data.
10. Sorting the given numbers in ascending and descending order.
11. Conversion of bcd to hexadecimal number.
12. Multiplication of two 3x3 matrices.

**INTERFACING**

1. Dual dac interface (waveform generation).
2. Stepper motor control.
3. Display of flags using logic controller.
4. Traffic light controller.

**(14053201) OBJECT ORIENTED ANALYSIS & DESIGN**

|          |          |          |
|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>C</b> |
| <b>3</b> | <b>1</b> | <b>3</b> |

**Course Objectives:**

- To understand the Object oriented life cycle.
- To know how to identify objects, relationships, Services and attributes through UML.
- To understand different UML diagrams.
- To know object oriented design process, software quality and usability.

**UNIT I**

Introduction to UML: Importance of Modeling, Principles of Modeling, Object Oriented Modeling, Conceptual Model of the UML, Architecture.

**UNIT II**

Basic Structural Modeling : Classes, Relationships, Common Mechanisms, and Diagrams  
Advanced Structural Modeling : Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages.

Class and Object Diagrams : Terms, Concepts, Modeling Techniques for Class and Object Diagrams.

**UNIT III**

Basic Behavioral Modeling-I : Interactions, Interaction Diagrams.

Basic Behavioral Modeling-II : Use Cases, Use Case Diagrams, Activity Diagrams.

**UNIT IV**

Advanced Behavioral Modeling : Events and Signals, State Machines, Processes and Threads, Time and Space, State Chart Diagrams.

**UNIT V**

Architectural Modeling : Component, Deployment, Component Diagrams and Deployment Diagrams, Systems and Models.

Artifact Diagrams.

Case Study : The Unified Library Application.

**TEXT BOOKS:**

1. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.
2. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.

**REFERENCES:**

1. Fundamentals of Object Oriented Design in UML, Meilir Page- Jones, Pearson Education.
2. Modeling Software Systems Using UML2, Pascal Roques, Wiley- Dreamtech India Pvt. Ltd.
3. Object Oriented Analysis and Design, Atul Kahate, The McGraw- Hill Companies.
4. Object-Oriented Analysis and Design with the Unified Process, John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
5. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.
6. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
7. UML and C++, R.C.Lee and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis, Design and Implementation, B.Dathan and S.Ramnath, Universities Press.
9. OO Design with UML and Java, K.Barclay, J.Savage, Elsevier.
10. Mark Priestley: Practical Object-Oriented Design with UML, TMH.

III B.Tech. II Sem

**(14053102) DESIGN AND ANALYSIS OF ALGORITHMS**

**L T C**  
**3 1 3**

**Course Objectives:**

- To introduce the basic concepts of algorithms.
- To introduce the mathematical aspects and analysis of algorithms.
- To introduce sorting and searching algorithms.
- To introduce various algorithmic techniques.
- To introduce algorithm design methods.

**UNIT-I**

Introduction: Algorithm, Performance analysis.

Asymptotic Notations: Big Oh Notation, Omega Notation, Theta Notation, Little Oh Notation, Basic efficiency classes, Performance Measurement.

Brute Force Method: Selection sort, Bubble sort, Sequential search, Brute force string matching.

**UNIT-II**

Divide-and Conquer: The general method, Binary search, Finding the maximum and minimum, Merge sort, quick sort, Strassen's matrix multiplication.

Greedy Method: The general method, Knapsack problem, Job sequencing with deadlines, Minimum Spanning trees, Huffman codes.

**UNIT-III**

Dynamic Programming: Multistage graph, Single source shortest path, All Pair Shortest Path, Optimal Binary Search trees, 0/1 Knapsack, Reliability Design, Traveling Salesman Problem.

**UNIT-IV**

Search and Traversal techniques: Techniques for binary tree, Techniques for Graphs, Connected components and spanning tree, Biconnected components and DFS.

Backtracking: The general method, 8-Queens Problem, sum of subsets, Graph Coloring, Hamilton cycles.

**UNIT-V**

Branch and Bounds: General method, 0/1 Knapsack, LC Branch and Bound solution FIFO Branch and Bound solution, Traveling salesperson problem.

Limitations of Algorithm power: Lower bound arguments, decision trees, P, NP.

NP-Hard and NP-Completeness: Basic concepts, Nondeterministic algorithms, The Classes –NP – hard and NP complete, Cook's theorem.

**TEXT BOOKS:**

1. Horowitz E. Sahani S and Rajasekaran S: "Fundamentals of Computer Algorithm", Galgotia Publications.
2. Anany Levitin, "Introduction to the Design & Analysis, of Algorithms", Pearson Education, 2<sup>nd</sup> Edition, 2000.

**REFERENCE BOOKS:**

1. Aho, Hopcroft, Ulman, "The Design and Analysis of Computer Algorithm", Pearson Education, 2000.
2. Parag H. Dave, Himanshu B. Dave "Design and Analysis of Algorithms" Pearson Education, 2008.
3. Cormen T H, Leiserson C.E, Rivest R.L, and Stein C, Introduction to Algorithms, 2<sup>nd</sup> edition, Prentice –Hall of India, 2001.
4. R.c.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, Introduction to Design and analysis of Algorithms A strategic approach, MC Graw Hill.

**(14053203) WEB TECHNOLOGIES**

**L T C**  
**3 1 3**

**Course Objectives:**

- Learn to access data bases using java
- Learn to communicate over a network using java
- Learn do design server side programs and access them from client side

**UNIT I**

Introduction to Web Technologies: Introduction to Web servers like Apache1.1,IIS XAMPP(Bundle Server), WAMP(Bundle Server), Handling HTTP Request and Response, installations of above servers.

**UNIT II**

**HTML Common tags:** List, Tables, images, forms, Frames; Cascading Style sheets;

**Introduction to Java Script:** Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

**UNIT III**

**Overview of PHP Data types and Concepts:** Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.

**Overview of Classes, Objects, and Interfaces:** Creating instances using Constructors, Controlling access to class members, Extending classes, Abstract classes and methods, using interfaces, Using class destructors, File Handling and Using Exceptions.

**UNIT IV**

**PHP Advanced Concepts:** Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables, Working with Date and Time.

**UNIT V**

**Using Creating and Forms:** Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.

**PHP and Database Access:** Basic Database Concepts, Connecting to a MYSQL database, Retrieving and Displaying results, Modifying, Updating and Deleting data. MVC architecture.

**TEXT BOOKS:**

1. Beginning PHP and MySQL, 3rd Edition , Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.
3. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech.

**REFERENCE BOOKS:**

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
3. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
4. PHP and MySQL by Example, E.Quigley, Prentice Hall (Pearson).  
PHP Programming solutions, V.Vaswani, TMH.



**(14053204) MOBILE APPLICATION DEVELOPMENT**

|          |          |          |
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**Course Objectives:**

- To introduce the Android technology and its application.
- Design & program real working education based mobile application projects.
- Become familiar with common mobile application technologies and platforms, open files, savefiles, create and program original material, integrate separate files into a mobile application project, create and edit audio sound effects & music.

**UNIT I**

**J2ME Overview:** Java 2 Micro Edition and the World of Jaa, Inside J2ME, J2ME and Wireless Devices, Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

**J2ME Architecture and Development Environment:** J2ME Architecture, Small Computing Device Requirements, Run – Time Environment, MIDlet programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME-Style, Multiple MIDlets in a Midlet Suite, J2ME Wirelss Toolkit.

**UNIT II**

**J2ME Best Practices and Patterns:** The Reality of Working in a J2ME World, Best Practices, Commands, Items, and Event Processing: J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

High-Level Display: Screens, Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class.

**UNIT III**

**Low Level Display:** The Canvas, User Interactions, Graphics, Clipping Regions, Animation. Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

**UNIT IV**

**JDBC Objects:** The concept of JDBC, JDBC driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, Statement Objects, Result Set, Transaction Processing, Metdata, Data Types, Exceptions.

**JDBC and Embedded SQL:** Model programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Updating Tables, Deleting Data from a table.

Introduction Android Programming: What is Android, Linking Activities using Intents, Fragments, Calling Built –in Applications using intents, Displaying Notifications.

#### **UNIT V**

**Android User Interface:** Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilization the Action Bar, Listening for UI Notifications.

**Designing User Interface with Views:** Basic Views, Picker Views, Using Views to Display Long Lists.

#### **TEXT BOOKS:**

1. J2ME: The Complete Reference, James Keogh, TMH.

Beginning Android 4 Applications Development, Wei-Meng Lee, Wiley India.

#### **REFERENCE BOOKS:**

1. Enterprise J2ME Developing Mobile Java Applications, Michael Juntao Yuan, Pearson Education, 2004.
2. Android Application Development for Java Programming by James C Sheusi, George Learning.
3. Android A Programmers Guide by Jerome DiMargio, TMH.

**(14053205) ARTIFICIAL INTELLIGENCE**

**L T C**  
**4 0 3**

**Course Objectives:**

- To understand how a computer making intelligent decisions.
- To understand the searching techniques
- To know the knowledge representation and learning
- To enable the students to apply these techniques in application which involve perception, reasoning and learning
- To know the features of expert systems.

**UNIT I**

Introduction to Artificial Intelligence; Problem, Problem Spaces and Search; Heuristic Search Techniques.

**UNIT II**

Knowledge Representation Issues, Predicate Logic, Representing Knowledge using Rules.

**UNIT III**

Symbolic Reasoning under Uncertainty, Statistical Reasoning.

**UNIT IV**

Weak Slot-and-Filler Structures, Strong Slot-and-Filler Structures, Knowledge Representation Summary.

**UNIT V**

Game Playing, Natural Language Processing, Expert Systems

**TEXT BOOKS:**

1. Elain Rich, Kevin Knight and Shivashankar B Nair, Artificial Intelligence, 3<sup>rd</sup> Edition, Tata McGraw Hill, 2009.

**REFERENCE BOOKS:**

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2<sup>nd</sup> Edition, Pearson Education, 2003.
2. Padhy N P, Artificial Intelligence and Intelligent Systems, Oxford University Press, 2005.

**(14053206) WIRELESS SENSOR NETWORKS  
(ELECTIVE-I)**

**L T C**  
**4 0 3**

**Course Objectives:**

- Realize the challenges of wireless sensor networks.
- Learn the architecture of WSN
- Understand the networking of sensors to form the network.
- Understand the infrastructure of WSN.
- Learn programming of wireless sensor networks.

**UNIT I**

WLAN: Infrared vs. RadioTransmission, Infrastructure and Ad Hoc Networks, IEEE 802.11.  
Bluetooth: User Scenarios, Physical Layer,MAC layer, Networking, Security, LinkManagement.  
GSM: Mobile Services, System Architecture, RadioInterface, Protocols, Localization and calling, Handover, Security, and New Data Services.

**UNIT II**

MobileComputing (MC): Introduction to MC, Novel Applications, Limitations and Architecture.  
Motivation for a Specialized MAC (Hidden and Exposed Terminals, Near and Far Terminals),  
SDMA, FDMA, TDMA, CDMA.  
IP and Mobile IP Network Layers, Packet Delivery and HandoverManagement, Location  
Management, Registration, Tunneling and Encapsulation, Route Optimization.

**UNIT III**

Basics of Wireless Sensors and Applications, The Mica Mote, Sensing and Communication Range,  
Design Issues, Energy consumption, Clustering of Sensors, Applications.  
Data Retrieval in Sensor Networks, Classification of WSNs, MAC layer, Routing layer, High-level  
application layer support, Adapting to the inherent dynamic nature of WSNs.

**UNIT IV**

Sensor Network Platforms and Tools, Sensor Network Hardware,Sensor Network Programming  
Challenges, Node-Level Software Platforms.

**UNIT V**

Operating System – TinyOS, Imperative Language: nesC, Dataflow style language: TinyGALS,  
Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM.

**TEXT BOOKS:**

1. Raj Kamal, Mobile Computing, Oxford University Press, 2007,ISBN: 0195686772
2. Jochen Schiller, Mobile Communications, Addison-Wesley, Second Edition, 2004
3. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P.Aggarwal, World Scientific Publications /Cambridge University Press, March 2006
4. Wireless Sensor Networks: An Information Processing Approach,Feng Zhao, Leonidas Guibas, Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp2009

**REFERENCES:**

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu,Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, Charles E.Perkins, Pearson Education, 2001.
5. Wireless Ad hoc Networking, Shih-Lin Wu, Yu-Chee Tseng,Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al.,World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K.Tonguz, Gialuigi Ferrari, Wiley India,2006,rp2009.
9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

III BTech. II Sem

**(14053207) ADVANCED COMPUTER ARCHITECTURE  
(ELECTIVE-III)**

**L T C**  
**4 0 3**

**Course Objectives:**

- Discuss the concept of parallel processing and the relationship between parallelism and performance
- Understand the organization of computer structures that can be electronically configured and reconfigured
- Discuss the performance advantages that multithreading can offer along with the factors that make it difficult to derive maximum benefits from this approach

**UNIT I**

Parallel Computer Models - The State of Computing, Multiprocessors and Multicomputer, Multivector and SIMD Computers, PRAM and VLSI Models, Architectural Development Tracks. Program and Network Properties - Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanisms, System Interconnect Architectures.

**UNIT II**

Principles of Scalable Performance - Performance Metrics and Measures, Parallel Processing Applications, Speedup Performance Laws, Scalability Analysis and Approaches. Multiprocessors and Multicomputers - Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Three Generations of Multicomputers, Message-Passing Mechanisms.

**UNIT III**

Multivector and SIMD Computers - Vector Processing Principles, Multivector Multiprocessors, Compound Vector Processing, SIMD Computer Organizations, The Connection Machine CM-5.

**UNIT IV**

Scalable, Multithreaded, and Dataflow Architectures - Latency-Hiding Techniques, Principles of Multithreading, Fine-Grain Multicomputers, Scalable and Multithreaded Architectures, Dataflow and Hybrid Architectures.

**UNIT V**

Parallel Models, Languages, and Compilers - Parallel Programming Models, Parallel Languages and Compilers, Dependence Analysis of Data Arrays, Code Optimization and Scheduling, Loop Parallelization and Pipelining.

Parallel Program Development and Environments - Parallel Programming Environments, Synchronization and Multiprocessing Modes, Shared-Variable Program Structures, Message-Passing Program Development, Mapping Programs onto Multicomputers.

**TEXT BOOK:**

1. Kai Hwang, ADVANCED COMPUTER ARCHITECTURE: Parallelism, Scalability, Programmability, McGraw - Hill, Inc.2001.

**REFERENCE BOOK:**

1. M J Quinn, Designing efficient algorithms for parallel computers, McGraw-Hill, Inc.

(14053208) MULTIMEDIA SYSTEMS  
(ELECTIVE-1)

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**Course Objectives:**

- To adapt the architecture for design of multimedia system.
- To solve issues related to multimedia file handling.
- To adopt hypermedia standards in developing multimedia applications.
- Know the basics of creating multimedia applications.

**UNIT I**

**Multimedia:** Definition, Where to use multimedia, Medium, Main properties of multimedia system, Traditional data stream characteristics, Data stream characteristics for continuous media, Information units, **Sound/Audio:** Basic sound concepts, Music, Speech, **Images/Graphics:** Basic concepts, Computer image processing.

**UNIT II**

**Video and Animation:** Basic concepts, Television, Computer based animation, **Data Compression:** Storage space, Coding requirements, Source, Entropy and Hybrid coding, Some basic compression techniques, JPEG, H.261,(Px64), MPEG, DVI.

**UNIT III**

**Computer Technology:** Communication Architecture, Multimedia Workstation, **Multimedia Operating Systems:** Introduction, Real time, Resource management, Process management, **Multimedia Communication systems:** Application Subsystem, Transport subsystem.

**UNIT IV**

**Database Systems:** Multimedia Database Management System, Characteristics of an MDBMS, Data Analysis, Data Structure, Operations on data, Integration in a Database model, **Documents, Hypertext and MHEG:** Documents, Hypertext and Hypermedia, Document Architecture ODA, MHEG.

**UNIT V**

**Synchronization:** Introduction, Notion of Synchronization, Presentation requirements, Reference model for multimedia synchronization, Synchronization specifications, **Multimedia Applications:** Introduction, Media Presentation, Media Composition, Media Integration, Media Communication, Media Consumption, and Media Entertainment.



**TEXT BOOKS :**

1. “ Multimedia: Computing, Communications and Applications”, Ralf Steinmetz and Klara Nahrstedt, Pearson Education.
2. “Multimedia: Making It work:, Tay Vaughan, Pearson Education.

**REFERENCE BOOKS:**

1. “ Multimedia System design “, Prabhat K. Andheigh, Kiran Thakrar, THM
2. “ Multimedia Systems”, Koegel Buford, Pearson Education
3. “ Fundamentals of Multimedia , Ze-Nian Li, Mark.S.Drew
4. “ Multimedia Communication Systems: Techniques, standards and networks, K.R.Rao,D.Milovanovic

B.Tech. V Sem

**(1524510) ADVANCED ENGLISH & COMMUNICATION SKILLS LAB**

**L P C**  
**0 3 2**

**Course Objectives:**

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

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

**I. Language Lab Syllabus**

1. Listening Skills
2. Communication Skills – Reading Comprehension
3. Group Discussion
4. Interview Skills
5. Resume Writing
6. Technical Report Writing & Project Report

**II. Communication Skills Lab Syllabus**

1. Self – Introduction
2. Individual presentation (or) Elocution (or) Oral Presentation
3. Seminar – General or Technical Topics
4. Mock Group Discussion
5. Mock Interviews
6. Power Point Presentations.

**Suggested Software - Globarena**

**Course Objectives:**

The course should enable the student to create programs to demonstrate the skills learned in Web Technology such as

- Internet applications.
- Create applications using HTML, DHTML,
- Write scripts using CSS and Java Script.
- Develop applications using Servlets.

**HARDWARE AND SOFTWARE REQUIRED:**

1. A working computer system with either Windows or Linux
2. A web browser either IE or Firefox
3. Apache web server or IIS Web server
4. XML editor like Altova Xml-spy [[www.Altova.com/XMLSpy](http://www.Altova.com/XMLSpy) – free], Stylus studio, etc.,
5. A database either Mysql or Oracle
6. JVM (Java virtual machine) must be installed on your system
7. BDK (Bean development kit) must be also be installed

**LIST OF EXPERIMENTS**

1. Write a program in HTML to display different styles of heading text.
2. Write a program to display the processes to be followed for a patient when he enters for a complete checkup. Use ordered lists and unordered lists.
3. Write a program to display a traditional Newspaper with the use of table tags.
4. With the help of “IMAGE” tags write a program to display the image along with some contents.
5. Use “Anchor” tag to write a program for displaying various Menus.
6. Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**

The static home page must contain three **frames**.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame: At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link —CSE|| the catalogue for CSE Books should be displayed in the Right frame.

Right frame: The pages to the links in the left frame must be loaded. Validate the registration, user login pages using JavaScript.

## **2) LOGIN PAGE**

## **3) CATOLOGUE PAGE**

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

## **4) CART PAGE**

The cart page contains the details about the books which are added to the cart.

## **5) REGISTRATION PAGE:**

Create a —registration form —with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)
- 5) Sex (radio button)
- 6) Date of birth (3 select boxes)
- 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
- 8) Address (text area)

7. Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).

2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).
8. Design a web page using **CSS (Cascading Style Sheets)** which includes the following:

- 1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

- 2) Set a background image for both the page and single elements on the page.

- 3) Control the repetition of the image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

- 4) Define styles for links as

A:link

A:visited

A:active

A:hover

- 5) Work with layers

9. Write an XML file which will display the Book information which includes the following:

- 1) Title of the book

- 2) Author Name

- 3) ISBN number

- 4) Publisher name

- 5) Edition

- 6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

10. Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click.
11. Install IIS web server and APACHE.

While installation assign port number 4040 to IIS and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

Access the above developed static web pages for books web site, using these servers by putting the web pages developed in program-6.

12. User Authentication :

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (program 6) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display — you are not an authenticated user “. Use init-parameters to do this.

13. Install a database (Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page

14. Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site by using registration. Authenticate the user when he submits the login form using the user name and password from the database.

IV BTech. I Sem

**(14254101) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

**L T C**  
**4 0 3**

**Course Objectives:**

1. To equip the budding engineering student with an understanding of concepts and tools of economic analysis.
2. Provide knowledge of managerial economics through differential economics concepts, accounting concepts are necessary to analyze and solve complex problems relating financial related matters in big industries.
3. An understanding of professional and ethical responsibility and ability to communicate effectively.
4. The broad education necessary to understand the impact of engineering solutions in a global and societal context.
5. Recognition of the need for, and an ability to engage in life-long learning and to meet contemporary issues.

**UNIT I**

**MANAGERIAL ECONOMICS AND DEMAND ANALYSIS:**

Definition, Nature and Scope of Managerial Economics- relation with other disciplines. Demand analysis – Determinants, Law of Demand and its exceptions – Elasticity of Demand – Types and Measurement of Elasticity of Demand – Methods of Demand Forecasting.

**UNIT II**

**THEORY OF PRODUCTION AND COST ANALYSIS:**

Production Function – Isoquants and Isocost, MRTS, least cost combination of inputs, Cobb-Douglas production function, laws of returns, internal and external economies of scale.

**Cost Analysis:** Cost concepts and classification. Break-Even Analysis (BEA), determination of Break Even Point – Managerial significance and limitation of BEA.

**UNIT III**

**INTRODUCTION TO MARKET AND PRICING POLICIES:**

Markets Structures: Types of competition, features of perfect competition, Monopoly, Monopolistic competition. Price- Output determination under perfect competition and monopoly – Methods of

pricing – cost plus pricing, marginal cost, limit pricing, skimming pricing, bundling pricing, sealed bid pricing and peak load pricing.

#### **UNIT – IV**

##### **BUSINESS ORGINATIONS AND CAPITAL BUDGETING:**

Characteristic features of business, features of Sole Proprietorship, Partnership, Joint Stock Company and Public Enterprises. Changing business environment in post- liberalization scenario.

**Capital:** Significance, Types, Method and Sources and raising finance – Capital Budgeting Methods – Pay back Method, Accounting Rate of return (ARR) and Net Present Value Method (simple problems).

#### **UNIT – V**

##### **FINANCIAL ACCOUNTING AND ANALYSIS:**

Double Entry Book keeping, Journal, Ledger, Trail Balance – Final Accounts (Trading, Profit and loss Account and Balance sheet with simple adjustments) – Analysis and interpretation of financial statements through Liquidity, Profitability and Capital structure Ratios.

##### **TEXT BOOKS:**

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, sultan chand, 2009.

##### **REFERENCE BOOKS:**

1. Premchand babu, Madan Mohan : Financial Accounting and Analysis, Himalaya,2009
2. Joseph G. Nellis and David parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
3. M.Sugunatha Reddy: Managerial Economics and Financial Analysis, Research India Publication, New Delhi, 2013.



**(14054102) DATA WAREHOUSING AND DATA MINING**

**L T C**  
**4 0 3**

**Course Objectives:**

- This course helps the students to understand the overall architecture of a data warehouse and techniques and methods for data gathering and data pre-processing using **OLAP tools**. The different **data mining models** and techniques will be discussed in this course. Data mining and data warehousing applications in bioinformatics will also be explored.

**UNIT I**

**Introduction:** Why Data Mining? What Is Data Mining? What Kinds of Data Can Be Mined? What Kinds of Patterns Can Be Mined? Major issues in Data Mining.

**Data Preprocessing:** Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

**UNIT II**

**Data Warehousing and Online Analytical Processing:** Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage,

Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction.

**UNIT III**

**Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods:** Basic Concepts, Frequent Itemset Mining Methods, From Association Analysis to Correlation Analysis, Pattern Mining in Multilevel, Multidimensional Space, Constraint-Based Frequent Pattern Mining

**UNIT IV**

**Classification:** Basic Concepts , Decision Tree Induction, Baye's Classification Method, Rule-Based Classification, Classification by Back propagation.

**Prediction:** Basic concepts, Accuracy and Error measures, Evaluating the accuracy of a classifier or a predictor.

**UNIT V**

**Cluster Analysis:** Cluster Analysis basic concepts, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods.

**Outlier Detection** - Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches .

**TEXT BOOK:**

1. Data Mining : Concepts and Techniques, Jiawei Han , Micheline Kamber and Jian Pei,  
Morgan Kaufmann Publishers, Elsevier, Third Edition, 2012.

**REFERENCE BOOKS:**

1. Data Mining Techniques, Arun K Pujari, Second Edition, Universities Press.
2. Data Warehousing in the Real world, Sam Aanhory & Dennis Murray , Pearson Education,  
Asia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar , V.Ajay, PHI 2008

**(14054103) CLOUD COMPUTING**

|          |          |          |
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**Course Objectives:**

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud computing.
- To describe the security aspects in cloud computing.

**UNIT I**

**Systems Modeling, Clustering and Virtualization**

Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

**UNIT II**

**Foundations**

Introduction to Cloud Computing, Migrating into a Cloud, Enriching the ‘Integration as a Service’ Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

**UNIT III**

**Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS)**

Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing. Aneka, Comet Cloud, T-Systems’, Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

**UNIT IV**

**Monitoring, Management and Applications**

An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

**UNIT V**

**Governance and Case Studies**

Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

**TEXT BOOKS:**

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M.Goscinski, 2011, Wiley.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, 2012, Elsevier.

**REFERENCE BOOKS:**

1. Cloud Computing: A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010. 116
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

**(14054104) MOBILE APPLICATION DEVELOPMENT**

Course Objectives:

- To Understand fundamentals of android operating systems.
- To learn the internals of the Android OS
- To learn the Mobile application development using the Android SDK.

**UNIT 1**

**Android Introduction and Basics:** The Android 4.1 jelly Bean SDK, Understanding the Android Software Stack, installing the Android SDK, Creating Android Virtual Devices, Creating the First Android Project, Using the Text view Control, Using the Android Emulator, The Android Debug Bridge(ADB), Launching Android Applications on a Handset.

**UNIT 2**

**Basic Widgets:** Understanding the Role of Android Application Components, Understanding the Utility of Android API, Overview of the Android Project Files, Understanding Activities, Role of the Android Manifest File, Creating the User Interface, Commonly Used Layouts and Controls, Event Handling, Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons

**UNIT 3**

**Building Blocks for Android Application Design:** Introduction to Layouts, Linear Layout, Relative Layout, Absolute Layout, Using Image View, Frame Layout, Table Layout, Grid Layout, Adapting to Screen orientation.

**Utilizing Resources and Media:** Resources, Creating Values Resources, Using Drawable Resources, Switching States with Toggle Buttons, Creating an Images Switcher Application, Scrolling Through Scroll View, playing Audio, Playing Video, Displaying Progress with Progress Bar, Using Assets.

**UNIT 4**

**Using Selection widgets and Debugging:** Using List View, Using the Spinner control, Using the GridView Control, Creating an Image Gallery Using the ViewPager Control, Using the

Debugging Tool: Dalvik Debug Monitor Service(DDMS), Debugging Application, Using the Debug Perspective.

**Displaying And Fetching Information Using Dialogs and Fragments:** What Are Dialogs?, Selecting the Date and Time in One Application, Fragments, Creating Fragments with java Code, Creating Special Fragments

## **UNIT 5**

**Building Menus and Storing Data:** Creating Interface Menus and Action Bars, Menus and Their Types, Creating Menus Through XML, Creating Menus Through Coding, Applying a Context Menu to a List View, Using the Action Bar, Replacing a Menu with the Action Bar, Creating a Tabbed Action Bar, Creating a Drop-Down List Action Bar.

**Using Databases:** Using the SQLiteOpenHelperclasss, Accessing Databases with the ADB, Creating a Data Entry Form,

### **Text Books**

1. Android Programming by B.M Harwani, Pearson Education, 2013.

### **Reference Text Books:**

1. Android application Development for Java Programmers, James C Sheusi, Cengage Learning
2. Android In Action by w.Frank Ableson, Robi Sen, Chris King, C. Enrique Ortiz., Dreamtech.
3. Beginning Android 4 Application Development, by Wei-Meng Lee , Wiley India.

**(14054105) SOFTWARE TESTING**  
**(ELECTIVE-II)**

**L T C**  
**4 0 3**

**Course Objectives:**

- Basic software debugging methods.
- Various testing methodologies.
- The procedure for designing test cases.
- The significance of software testing

**UNIT I**

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

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

**UNIT II**

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

Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**UNIT III**

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

Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

**UNIT IV**

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

Transaction Flow Testing: transaction flows, transaction flow testing techniques.

**UNIT V**

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

**TEXT BOOKS:**

1. Software Testing techniques, Boris Beizer, Dreamtech, Second Edition.
2. Software Testing Tools, Dr.K.V.K.K.Prasad, Dreamtech.

**REFERENCE BOOKS:**

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, Third Edition, P.C.Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann and J.Offutt, Cambridge Univ. Press.
5. Effective methods of Software Testing, Perry, John Wiley, Second Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, Dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham and Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.



**(14054106) DIGITAL IMAGE PROCESSING  
(ELECTIVE-II)**

**L T C**  
**4 0 3**

**Course Objectives:**

- Develop an overview of the field of image processing.
- Understand the Image segmentation, enhancement, compression etc., approaches and how to implement them.
- Prepare to read the current image processing research literature.
- Gain experience in applying image processing algorithms to real problems.

**UNIT I**

**Introduction, Digital Image and its properties** – Basic concepts, Image Digitization, Digital Image properties Data structures for Image analysis-Levels of image data representation, Traditional image data structures, Hierarchical structures.

**UNIT II**

**Image Preprocessing** – Pixel brightness transformations, Geometric transformation.

**Image Restoration** -- A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

**UNIT III**

**Color Image Processing** -- Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation

**Morphological Image Processing** -- Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

**UNIT IV**

**Segmentation** - Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

**UNIT V**

**Linear discrete image transforms** – basic theory, fourier transform, Hadamard transform, Discrete cosine transform, Wavelets, Applications of discrete image transforms.

**Image data compression** – Image data properties, Discrete image transform in image data compression, predictive compression methods, Vector quantization, hierarchical and progressive compression methods, Comparison of compression methods, JPEG and MPEG image compression.

**TEXT BOOKS:**

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, Image processing, Analysis and Machine Vision, Second Edition, Thomson, Vikas Publishing House.
2. Digital Image Processing 2<sup>nd</sup> Edition, Rafael C. Gonzalvez and Richard E. Woods.  
Published by: Pearson Education.

**REFERENCE BOOKS:**

1. Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: John Wiley and Sons, NY.
2. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle River, NJ

**(14054107) SOFTWARE ARCHITECTURE  
(ELECTIVE-II)**

**L T C  
4 0 3**

**Course Objectives:**

- To understand interrelationships, principles and guidelines governing architecture and evolution over time.
- To understand various architectural styles of software systems.

**UNIT I**

Introduction To Software Architecture: An Engineering Discipline for Software, Status of S/W Arch. Architecture Business Cycle, Where do Architectures Come from. Software Processes and the Architecture Business Cycle, Features of Good Architecture.

**UNIT II**

Architecture Styles: Pipes and Filters, Data Abstraction and Object Oriented organization, Event-based Implicit Invocation, Layered Systems, Registers, Interpreters, Process Control, Other Familiar Architectures, Heterogeneous Architectures.

Shared Information Systems: Database Integration, Interpretation in Software Development Environments, Architectural Structures for Shared Information Systems.

**UNIT III**

Architectural Design Guidance: Guidance for User Interface Architectures, Case Study in Inter Operability: World Wide Web.

Pattern Types: Architectural Patterns, Structural Patterns, Patterns for Distribution, Patterns for Interactive Systems.

**UNIT IV**

Formal Models and Specifications: Finalizing the Architectural of a Specific System, Architectural Style. Architectural Design Space, Case Study of an Industry Standard Computing. Infrastructure: CORBA

Architectural Description Languages: ADL's today, capturing Architectural Information in an ADL, Application of ADL's in system Development, Choosing an ADL, Example of ADL.

**UNIT V**

Reusing Architectural Assets within an Organization: Creating Products and Evaluating a Product Line, Organizational Implications of a Product Line, Component Based Systems. Software Architectures in Figure: Legacy Systems. Achieving an Architecture, from Architecture to System.

**TEXT BOOKS:**

1. S/W Arch. Perspective: on an Emerging Discipline, Mary Show, David Garlan, 1996, PHI.
2. Software Architecture in Practice, Len Bass, Paul Elements, Rick Kazman, 1998, PEA.

**REFERENCE BOOKS:**

1. Measuring the Software Process: A Practical Guide to Functional Measure, Garmus, Herros, 1996, PHI.
2. Meas. Software Process: Stat. Proce. Cont. for Software process Improvemnts, Florac, Carleton, 1999, PEA.
3. Introduction to Team Software Process, W.Humphery, 2002, PEA.
4. Software Design: Methods and Techniques, Peters, 1981, Yourdon.
5. Pattern Oriented Software Architecture, Buschmann, 1996, Wiley.
6. Design Patterns, Gamma et al, 1995, PEA.
7. An Introduction to Software Architecture, Gamma, Shaw, 1995, World Scientific.
8. Software Architecture, Shaw, gamma, 1996, PHI.

## IV B.Tech. I Sem

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### (15054108) INFORMATION RETRIEVAL SYSTEMS

#### (ELECTIVE-III)

#### Course Objectives:

- To learn the different models for information storage and retrieval
- To learn about the various retrieval utilities
- To understand indexing and querying in information retrieval systems
- To expose the students to the notions of structured and semi structured data
- To learn about web search

#### Learning Outcome:

At the end of the course students will be assessed to determine whether they are able to

- store and retrieve textual documents using appropriate models
- use the various retrieval utilities for improving search
- do indexing and compressing documents to improve space and time efficiency
- formulate SQL like queries for unstructured data

#### UNIT I

##### Introduction to Information Retrieval

**Retrieval Strategies:** Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models

#### UNIT II

**Retrieval Utilities:** Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

#### UNIT III

**Retrieval Utilities:** Semantic networks, Parsing.

**Cross-Language Information Retrieval:** Introduction, Crossing the language barrier.

#### UNIT IV

**Efficiency:** Inverted index, Query processing, Signature files, Duplicate document detection

#### UNIT V

**Integrating Structured Data and Text:** A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

**Distributed Information Retrieval:** A Theoretical model of distributed retrieval, Web search.

**Text Books :**

1. *Information Retrieval – Algorithms and Heuristics*, David A. Grossman, Ophir Frieder, 2<sup>nd</sup> Edition, 2012, Springer, (Distributed by Universities Press)

**Reference Books :**

1. *Modern Information Retrieval Systems*, Yates, Pearson Education

2. *Information Storage and Retrieval Systems*, Gerald J Kowalski, Mark T Maybury, Springer, 2000

3. *Mining the Web : Discovering Knowledge from Hypertext Data*, Soumen Chakrabarti Morgan-Kaufmann Publishers, 2002

4. *An Introduction to Information Retrieval*, Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, , Cambridge University Press, Cambridge, England, 2009

**(14054109) CRYPTOGRAPHY & NETWORK SECURITY  
(ELECTIVE-III)**

**Course Objectives:**

- Extensive, thorough and significant understanding of the concepts, issues, principles and theories of computer network security
- Identifying the suitable points for applying security features for network traffic
- Understanding the various cryptographic algorithms and implementation of the same.
- Understanding the various attacks, security mechanisms and services.

**UNIT I**

Computer Security concepts, The OSI Security Architecture, Security attacks, Security services and Security mechanisms, A model for Network Security, Classical encryption techniques-symmetric cipher model, substitution ciphers, transposition ciphers, Steganography, Modern Stream ciphers.

**UNIT II**

**Modern Block Ciphers:** Block ciphers principles, Data encryption standard (DES), Strength of DES, Block cipher modes of operations, AES, RC4

**Introduction to Number theory :** Integer Arithmetic, Modular Arithmetic, Linear Congruence, Algebraic Structures,  $GF(2^n)$  Fields, Primes, Factorization, Chinese remainder Theorem, Quadratic Congruence.

**UNIT III**

**Public-key cryptography :** Principles of public-key cryptography, RSA Algorithm, Diffie-Hellman Key Exchange, ElGamal cryptographic system.

**Cryptographic Hash functions:** Applications of Cryptographic Hash functions, Requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA).

**UNIT IV**

**Message Authentication Codes:** Message authentication Requirements, Message authentication functions, Message authentication codes, security of MACs, HMAC.

**Digital Signatures:** Digital Signatures, Schnorr Digital Signature Scheme, Digital Signature Standard

**UNIT V**

**User Authentication:** Remote user Authentication Principles, Kerberos

**Electronic mail security:** Pretty Good Privacy (PGP), S/MIME  
Worms, Viruses, Firewalls

**TEXT BOOKS:**

1. Cryptography and network Security by Fourth edition, Stallings, PHI/Pearson
2. Cryptography & Network Security by Behrouz A. Forouzan, TMH.

**REFERENCE BOOKS:**

1. Network Security: The complete reference by Robert Bragg, Mark Rhodes, TMH
2. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD  
O'REILLY.



**(14054110) SERVICE ORIENTED ARCHITECTURE  
(ELECTIVE-III)**

**L T C**  
**4 0 3**

**Course Objectives:**

- Understand SOA and evolution of SOA.
- Understand web services and primitive, contemporary SOA.
- Understand various service layers.
- Understand service-oriented analysis and design based on guidelines

**UNIT I**

Fundamental SOA, Common Characteristics of contemporary SOA, Benefits of SOA, A SOA timeline(from XML to Web Services to SOA), The continuing evolution of SOA (Standards organizations and Contributing vendors),The roots of SOA (comparing SOA to Past architectures).

**UNIT II**

The Web services framework, Services (as Web Services), Service descriptions (with WSDL), Messaging (with SOAP), coordination, Transactions, Business Activities, Security, Notification and Eventing.

**UNIT III**

Services-orientation and the enterprise, Anatomy of a service-oriented architecture, Common Principles of Service-orientation, Service orientation and Object orientation, Service layer abstraction, application service layer, Business service layer, Orchestration service layer.

**UNIT IV**

SOA delivery strategies: SOA delivery lifecycle phases, the top-down strategy, the bottom-up strategy ,the agile strategy.

Service-Oriented Design: Introduction to service oriented design, WSDL-related XML Schema language basics, WSDL-language basics.

**UNIT V**

Business Process Design: WS-BPEL language basics, WS-Coordination overview, Service oriented business process design.

SOA Platforms : SOA platform basics, SOA support in J2EE, SOA support in .NET, integration considerations.

**TEXT BOOKS:**

1. Service-Oriented Architecture Concepts and Technology and Design, Thomas Erl, Pearson Education, 2005.

**REFERENCE BOOKS:**

1. IT Architecture and Middleware, Strategies for Building Large Integrated Systems, Chris Britton, ISBN 0-201-70907-4.
2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomow, Pearson Education, 2005.
3. Developing Enterprise Web Services: An Architect's Guide, Sandeep Chatterjee, James Webber, Pearson Education, ISBN 81- 297-0491-9.

## IV B.Tech. I Semester

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### (14054111) MOBILE APPLICATION DEVELOPMENT LABORATORY

#### Course Objectives:

- To understand fundamentals of android operating systems.
- Illustrate the various components, layouts and views in creating android applications.
- To understand fundamentals of android programming.

#### 1. Setting up the Development Environment

1.1 Installation of JDK and Setting path

1.2 Downloading and Installing Android Studio

#### 2. Creating "Hello World" Application and viewing the output through emulator.

#### 3. Creating the Application by using Activity class

i) onCreate()

ii) onStart()

iii) onResume()

iv) onPause()

v) onStop()

vi) onDestroy()

vii) onRestart()

#### 4. Create the Application using the Edit Text control.

#### 5. Create the Application Choosing options.

i) CheckBox

ii) RadioButton

iii) RadioGroup

iv) Spinner

6. Create the applications using different layouts.

i) Linear Layout

ii) Relative Layout

iii) Absolute Layout

7. Create the application for doing arithmetic operations. (Calculator)

8. Create the application to play the audio and video clips.

9. Create the application by using menus and action bar.

(14054112) DATA WAREHOUSING AND DATA MINING LAB

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**Course Objective:**

- This course helps the students to understand the overall architecture of a data warehouse and techniques and methods for data gathering and data pre-processing using **OLAP tools**. The different **data mining models** and techniques will be discussed in this course. Data mining and data warehousing applications in bioinformatics will also be explored.

**Credit Risk Assessment**

**Description:** The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the bank's profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable text book on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

**The German Credit Data:**

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data (Download from web).

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the cents Canadian (but looks and acts like a quarter).
- Owns telephone. German phone rat so fewer people own telephones.
- foreignhere\_areworkermillionsofthese. Tin Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in the classify the applicant into one of two categories, good or bad.

**Subtasks : (Turn in your answers to the following tasks)**

1. List all the categorical (or nominal) attributes and the real-valued attributes seperately.
2. What attributes do you think might be crucial in making the credit assesment ? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly ? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy ?
5. Is testing on the training set as you did above a good idea ? Why or Why not ?
6. One approach for solving the problem encountered in the previous question is using cross validation ? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease ? Why ? (10 marks)
7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees ? How does the complexity of a Decision Tree relate to the bias of the model ?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain ? Also, report your accuracy using the pruned model. Does your accuracy increase ?
12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules.PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

**Task Resources:**

Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)

Decision Trees (Source: Tan, MSU), Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)

***Weka Resources:***

Introduction to Weka (html version) (download ppt version)

Download Weka, Weka Tutorial , ARFF format using Weka from command line

**(14254201) MANAGEMENT SCIENCE**

**L T C**  
**4 0 3**

**Course Objectives:**

- The objective of this course is to equip the student the fundamental knowledge of Management Science and its application to effective management of human resources, materials and operations of an organization. It also aims to expose the students about the latest and contemporary developments in the field of management.

**UNIT I**

**INTRODUCTION TO MANGEMENT:**

Concept of Management-Administration, Organization-Function of Management, Evolution of Management Thought-Organization: Principles of Organisation-Types-Organisation charts-managerial objectives and Social responsibilities of Management.

**UNIT II**

**STRATEGIC AMNAGEMENT:**

Corporate Planning-mission, objectives and programmes-SWOT Analysis-Strategy Formulation and Implementation.-Plant location and Plant Layout concepts-Production control.

**UNIT III**

**HRM AND INVENTORY MANAGEMENT:**

Human Resource Management –Manpower Planning-Personnel Management-Basic functions of Personnel Management, Job Evaluation and Merit Rating-Incentive plans.

**Inventory Management:** Need for Inventory Control; EOQ,ABC Analysis, Purchase Procedure, Maintaining Store Records.

**UNIT IV**

**OPERARIONS MANAGEMENT:**

Productivity- Job, Batch and Mass Production-Work Study-Basic procedure involved in Method Study and Work Measurement. Statistical Quality Control-c chart, p chart, R chart, Acceptance sampling Deming's contribution to Quality.

**UNITV**

**PROJECT MANAGEMENT:**

Network Analysis to project management- PERT/CPM- Application of network techniques to engineering problems-Cost Analysis-Project Crashing.



**TEXT BOOK:**

1.Aryasri: Management Science, TMH, 2008.

**REFERENCE BOOKS:**

1.Koontz& Wehrich:Essentials of Management, 6/e, TMH, 2005

2.Kanishka Bedi:Production and Oerations Management, Oxford University Press, 2004

3.Parnell:Strategic Management, Biztantra, 2003.

4.LS Srinath: PERT/CPM, Affiliated East-West Press, 2005

**(14054202) BIG DATA ANALYTICS**

**L T C**  
**4 0 3**

**Course Objectives:**

- Identify common tools and technologies that can be used to create big data solutions
- Understand the MapReduce programming framework, including the map, shuffle and sort, and reduce components
- Distinguish options available for creating a big data solution using the Hive programming framework

**UNIT I**

Introduction to Big Data, What is Big Data Why Big Data is Important. Meet Hadoop, Big Data Storage and Analysis, Comparison with other systems, Grid Computing. A brief history of Hadoop. Apache Hadoop and the Hadoop Eco system. Linux refresher VM Ware Installation of Hadoop.

**UNIT II**

The design of HDFS, HDFS concepts. Command line interface to HDFS Hadoop File Systems. Interfaces Java Interface to Hadoop. Anatomy of a file read. Anatomy of a File Write. Replica placement and Coherency Model. Parallel copying with distcp, Keeping an HDFS cluster balanced.

**UNIT III**

Introduction. Analyzing data with unix tools. Analyzing data with Hadoop. Java Map Reduce classes (New API). Data flow, combiner functions. Running a distributed MapReduce Job. Configuration API. Setting up the development environment. Managing configuration. Writing a unit test with MRunit. Running a Job in local job runner. Running on a cluster. Launching a job. The MapReduce WebUI.

**UNIT IV**

Classic Mapreduce. Job submission, Job Initialization. Task Assignment. Task execution. Progress and status updates, Job Completion. Shuffle and sort on Map and reducer side. Configuration tuning. Map Reduce. Types, Input formats, Output formats, Sorting Map side and Reduce Side joins.

**UNIT V**

The Hive Shall. Hive services. Hive clients. The meta store. Comparison with traditional databases. Hive QL. Hbasics, Concepts, Implementation. Java and Map reduce clients. Loading data, Web queries.

**TEXT BOOK:**

1. Tom White, Hadoop, “the Definitive Guide”, 3<sup>rd</sup> Edition, O’Reilly Publications, 2012.
2. Data deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutch,
3. “Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data”, 1<sup>st</sup> Edition, TMH, 2012.

**(14054203) SOFTWARE PROJECT MANAGEMENT**

**Course Objectives:**

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows:

- Understanding the specific roles within a software organization as related to project and process management.
- Describe the principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management).
- Understanding the basic infrastructure competences (e.g., process modeling and measurement)
- Understanding the basic steps of project planning, project management, quality assurance, and
- process management and their relationships

**UNIT I**

Conventional Software Management: The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

**UNIT II**

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

Life cycle phases: Engineering and production stages, Inception, Elaboration, Construction, Transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, pragmatic artifacts.

Model based software architectures: A Management perspective and technical perspective.

**UNIT III**

Work Flows of the process: Software process workflows, Iteration workflows.

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

#### **UNIT IV**

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building blocks, The Project Environment.

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

#### **UNIT V**

Tailoring the Process: Process discriminates.

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

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R). Process Improvement and Mapping to the CMM.

#### **TEXT BOOK:**

1. Software Project Management, Walker Royce: Pearson Education, 2005.

#### **REFERENCE BOOKS :**

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.

2. Software Project Management, Joel Henry, Pearson Education.

3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

4. Software Project Management, Shere K.D, 1998,PHI.

**(14054204) PRINCIPLES OF TCP/IP  
(ELECTIVE-IV)**

**L T C**  
**4 0 3**

**Course Objectives:**

- To understand the internals of the TCP/IP Protocols.
- To understand how TCP/IP is actually implemented.
- To understand the interaction among the protocols in the protocol stack.
- To understand about routing protocols .
- To understand about subnets and super nets.

**UNIT I**

The OSI Model and the TCP/IP Protocol suite: TCP/IP Protocol Suite, Addressing. Internet Protocol Version 4 (IPv4): Datagrams, Fragmentation, Options, Checksum.

**UNIT II**

IPv4 Addresses: Introduction, Classful Addressing, Classless Addressing, Special Addresses, NAT. Address Resolution Protocol (ARP): Address Mapping, The ARP Protocol, ATMARP, ARP PACKAGE.

**UNIT III**

Internet Control Message Protocol Version 4: Introduction, Messages, Debugging Tools, ICMP Package. Unicast Routing Protocols (RIP, OSPE, and BGP): Introduction, Intraand Inter-Domain Routing, Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP.

**UNIT IV**

User Datagram Protocol (UDP): Introduction, User Datagram, UDP Services, UDP Applications, UDP Package. Transmission Control Protocol (TCP): TCP Services, TCP Features, Segment, A TCP Connection.

**UNIT V**

Ipv6 Protocol: Introduction, Packet format, transition from IPv4 to IPv6

IPv6 addressing: Introduction, Address space allocation, Global unicast addresses, auto configuration renumbering.

**TEXT BOOK:**

1. TCP/IP Protocol Suite, Behrouz A.Forouzan- Fourth Edition- TATA McGraw-Hill.

**REFERENCE BOOKS:**

1. Internetworking with TCP/IP, Second Edition, Douglas E. Comer, Stevens, PHI.
2. TCP/IP Network Administration, Third Edition, Craig Hunt, O'Reilly.

**(14054205) SOFT COMPUTING  
(ELECTIVE-IV)**

**L T C**  
**4 0 3**

**Course Objectives:**

- To familiarize with soft computing concepts.
- To introduce the ideas of Neural networks, fuzzy logic and use of heuristics based on human experience.
- To introduce the concepts of Genetic algorithm and its applications to soft computing using some applications.

**UNIT I**

Introduction to Artificial Intelligent Systems, Fundamentals of Neural Networks, Back-Propagation Networks.

**UNIT II**

Associative Memory, Adaptive Resonance Theory, Fuzzy logic

**UNIT III**

Fuzzy Systems, Fundamentals of Genetic Algorithms, Genetic Modeling

**UNIT IV**

Integration of Neural Networks, Fuzzy Logic and Genetic Algorithms, Genetic Algorithm based Back-Propagation Networks, Fuzzy back propagation Networks.

**UNIT V**

Simplified Fuzzy ARTMAP, Fuzzy Associative Memories, Fuzzy Logic Controlled Algorithms.

**TEXT BOOKS:**

1. Rajasekaran S, and Vijayalakshmi Pal G A, *Neural Networks, Fuzzy Logic and Genetic Algorithms – Synthesis and Application*, Prentice-Hall of India Pvt Ltd, 2003.

**REFERENCE BOOKS:**

1. Walker E A, *A First Course in Fuzzy Logic*, 2<sup>nd</sup> Edition, CRC Press, 1999.
2. Lu, *Fuzzy Logic with Engineering Application*, John Wiley, 2004.
3. Haupt, *Genetic Algorithms*, John Wiley, 1999.
4. Yegnanarayana B, *Artificial Neural Networks*, Prentice-Hall of India Pvt Ltd, 1999.
5. Satish Kumar, *Neural Networks - A Classroom Approach*, Tata McGraw-Hill, 2004.



IV B.Tech. II Sem

**(14054206) INTERNET OF THINGS  
(ELECTIVE-IV)**

**L T C**  
**4 0 3**

**Course Outcomes:**

- Understand the basic principles of IoT.
- Differentiate the features of various IoT platforms.

**UNIT I**

**INTRODUCTION TO IoT:**

Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Development Templates

**UNIT II**

**DOMAIN SPECIFIC IoTS**

Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle

**UNIT III**

**IOT and M2M:**

Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT

**IoT Platform Design Methodology:**

Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring

**UNIT IV**

**Logical Design using Python:**

Introduction, Installing Python, Python Data types and Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Data/Time Operations, classes, Python packages of Internet for IoT.

**Unit V**

**IOT Physical Devices:**

What is an IOT device, basic building blocks of an IOT device, Exemplary device: Raspberry Pi, about the board, linux on raspberry Pi, raspberry Pi interfaces.

**TEXT BOOK:**

1. Arshdeep Bahga, Vijay Madisetti “ Internet of Things, A hands on approach, 1<sup>st</sup> edition, University press, 2014.

**REFERENCE BOOK:**

1. Raj Kamal, “Internet of Things”, McGraw Hill, 1<sup>st</sup> Edition, 2016.