# ACADEMIC REGULATIONS, COURSE STRUCTURE

# ANDDETAILED SYLLABUS

# UNDER

# CHOICE BASED CREDIT SYSTEM (CBCS)

# Effective from the Academic Year 2015-16

# ELECTRICAL & ELECTRONICS ENGINEERING(EEE)

## For

# B. Tech. Four Year Degree Course

**(MR-15 Regulations)**

# MALLAREDDY ENGINEERING COLLEGE (Autonomous)

**(An Autonomous Institution approved by UGC and affiliated to JNTUH, Approved by AICTE & Accredited by NAAC with 'A' Grade and NBA & Recipient of World Bank Assistance under TEQIP Phase – II, S.C 1.1)**

Maisammaguda, Dhulapally (Post & Via Kompally), Secunderabad-500 100

**www.mrec.ac.in E-mail: principal@mrec.ac.in**

## MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

## MR 15 – ACADEMICREGULATIONS (CBCS) FOR B. Tech. (REGULAR) DEGREE PROGRAMME

Applicable for the students of B. Tech. (Regular) programme from the Academic Year***2015-16*** and onwards

The B.Tech. Degree of Jawaharlal Nehru Technological University Hyderabad shall be conferred on candidates who are admitted to the programme and who fulfill all the requirements for the award of the Degree.

## INSTITUTE VISION

To establish a reputable professional education centre, to impart high quality trend setting technologies in an ambience of humanity, wisdom, intellect and innovation to nurture the students to become competent and committed professionals with disciplined ethical values.

## INSTITUTE MISSION

Commitment to progress in mining new knowledge by adopting cutting-edge technologies to promote academic growth by offering state-of-the-art undergraduate and postgraduate programmes based on well-versed perceptions of global areas of specialization to serve the nation with advanced technical knowledge.

## DEPARTMENT VISION

To strive and develop a learning centre in the field of electrical engineering and prepare the students to become talented and committed professionals with discipline and sincerity in serving the society.

## DEPARTMENT MISSION

To impart quality education with dedication to achieve academic excellence and offer state-of-the-art technology in the field of electrical engineering to enhance the knowledge and employability of the students.

## PROGRAMME EDUCATIONAL OBJECTIVES

**PEO 1.** To train students in core engineering knowledge with software skills, multi disciplinary approach, and make them capable to understand, analyze, design and control electrical machines, power systems and electronic products with solutions for real life applications.

**PEO 2.** To provide students an impressive academic environment for a successful career in industry/Technical profession and post graduate programmes, research and lifelong learning.

**PEO 3.** To instill in students professional and ethical attitude, team work skills, leadership qualities and improve oral and written communication skills.

## PROGRAM OUTCOMES (POs)

a) An ability to apply knowledge of mathematics, science, and engineering,

b) An ability to design and conduct experiments, as well as to analyze and interpret data,

c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,

d) An ability to function on multidisciplinary teams,

e) An ability to identify, formulate, and solve engineering problems,

f) An understanding of professional and ethical responsibility,

g) An ability to communicate effectively,

h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,

i) A recognition of the need for, and an ability to engage in life-long learning,

j) A knowledge of contemporary issues, and

k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**1.Under-Graduate Degree Programme in Engineering & Technology (UGP in E&T)**
MREC (Autonomous) offers 4 Year (8 Semesters) **Bachelor of Technology** (B.Tech.) Degree Programme, under Choice Based CreditSystem (CBCS) with effect from theAcademic Year 2015 - 16 onwards, in the following branchesof Engineering

| Serial Number | Branch Code | Branch |
|---|---|---|
| 1 | 01 | CIVIL ENGINEERING (CE) |
| 2 | 02 | ELECTRICAL AND ELECTRONICS ENGINEERING (EEE) |
| 3 | 03 | MECHANICAL ENGINEERING (ME) |
| 4 | 04 | ELECTRONICS AND COMMUNICATION ENGINEERING (ECE) |
| 5 | 05 | COMPUTER SCIENCE AND ENGINEERING (CSE) |
| 6 | 25 | MINING ENGINEERING (MinE) |

**2. Eligibility for Admission**

**2.1** Admission to the UGP shall be made either on the basis of themerit rank obtained by the qualifying candidate at an Entrance Test conducted by the Telangana State Government (TSEAMCET), or the University, or on the basis of any other order of meritapproved by the University, subject to reservations as prescribedby the Government from time to time.

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

**3. B.Tech. Programme (UGP) Structure**

**3.1** The B.Tech. Programmes of MREC (A) are of SemesterPattern, with 8 Semesters. Each Semester shall be of 22Weeks duration (inclusive of Examinations), with a minimumof 90 Instructional Days per Semester.

**3.2** UGC/ AICTE specified Definitions/ Descriptions are adoptedappropriately for various terms and abbreviations used inthese Academic Regulations/ Norms, which are as listedbelow.

**3.2.1 Semester Scheme:**

Each UGP is of 8 Semesters, withthe academic year being divided into two Semesters of 22 weekseach, each Semester having - **'Continuous Internal Evaluation (CIE)'** and **'Semester End Examination (SEE)'**. Choice Based Credit System (CBCS) and Credit BasedSemester System (CBSS) as denoted by UGC, andCurriculum/ Course Structure as suggested by AICTE arefollowed.

**3.2.2 Credit Courses:**

All Subjects/ Courses are to be registered by a studentin a Semester to earn Credits. Credits shall be assignedto each Subject/ Course in a L: T: P: C (Lecture Periods:Tutorial Periods: Practical Periods: Credits) Structure, basedon the following general pattern

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

Other student activities like NCC, NSS, Study Tour,Guest Lecture etc., and identified Mandatory / Audit Courses willnot carry Credits.

**3.2.3 Subject/ Course Classification:**

All Subjects/ Courses offered for the UGP are broadlyclassified as :

**(a) Foundation Courses (FC),**
**(b) Core Courses (CC),**
**(c) Elective Courses (EC),**
**(d) Mandatory Courses (MC),**

**(e) Audit Courses (AC),**
**(f) Minor Courses (MiC)**

- **Foundation Courses (FC**) are further categorized as:
  (i) Humanities and Social Sciences (HS)
  (ii) Basic Sciences (BS)
  (iii) Engineering Sciences (ES).
- **Core Courses (CC) and Elective Courses (EC)** are categorized as Professional Subjects (PS), which are further subdivided as –
  (i) Professional/ Departmental Core (PC) Subjects,
  (ii) Professional/ Departmental Electives(PE),
  (iii) Open Electives (OE);
  (iv) Project Related (PR).
- **Mandatory Courses** (**MC** - Non-credit with evaluation).
- **Audit Courses** (**AC** – Non- credit without evaluation).
- **Minor Courses** (**MiC** – One or two credit courses)

### 3.2.4 Course Nomenclature:

The Curriculum Nomenclature or Course-Structure Groupingfor the each of the UGP in E&T (B.Tech. DegreeProgrammes), is as listed below (along with AICTEspecified % Range of Total Credits)

| Sl. No. | Classification | | Course Work – Subject Area | Distribution of credits | as per AICTE |
|---|---|---|---|---|---|
| | AICTE | UGC | | | |
| 1 | HS | Foundation Courses | Humanities and Social sciences including English, Environmental Sciences and Management subjects | 9.23 | 5- 10 % |
| 2 | BS | | Basic Sciences (BS) including Mathematics, Physics, Chemistry. | 13.58 | 15- 20% |
| 3 | ES | | Engineering sciences (ES), including Engineering Workshop, Engineering Graphics, Basics of Electrical Electronics / Mechanical / Computer Engineering | 19.02 | 15 – 20% |
| 4 | PC | Core Courses | Professional Core subjects are relevant to the chosen specialization/branch; (May be split into Hard (no choice) and Soft (with choice), if required. | 33.69 | 30 – 40% |
| 5 | PR | Project Related | Minor and Major Projects, Technical Seminar and comprehensive viva-voce. | 9.78 | 10 – 15% |
| 6 | PE | Professional Electives | Professional Electives are relevant to the chosen specialization/ branch; | 9.78 | 10– 15 % |
| **7** | OE | Open Electives | Open Electives are the courses from other technical and/or emerging subject areas | 4.89 | 5 – 10 % |
| **8** | MC | Mandatory Courses | These courses are non-credit courses with evaluation. | - | - |
| **9** | AC | Audit Courses | These courses are non-credit courses without evaluation | - | - |
| **10** | MiC | Minor Courses | These are one or two credit courses intended to improve the skills of the student in placements and entrepreneurship. | - | - |
| **Total credits for UGP (B.Tech.)** | | | | | **184 (100%)** |

**4. Course Work**

**4.1** A student, after securing admission, shall pursue the B.Tech. UGP in a minimum period of 4 Academic Years, and a maximum period of 8 Academic Years (starting from the Date of Commencement of I year course work). Further 2 years of extension is allowed for appearing examinations.

**4.2** Each student shall Register for and Secure the specifiednumber of Credits required for the completion of the UGPand Award of the B.Tech. Degree in respective Branch ofEngineering.

**4.3**Total number of credits to be secured are 184 out of 184 for the entire B.Tech. Programme.

**5.0 Course Registration**

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

**5.2** Academic Section of the College invites 'Registration Forms' from students within 15 days from the commencement of class work for the first semester through 'ON-LINE SUBMISSIONS', ensuring 'DATE and TIME Stamping'. The ON-LINE Registration Requests for any 'SUBSEQUENT SEMESTER' shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the 'CURRENT SEMESTER'.

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

**5.4** A Student may be permitted to Register for his Subjects/ Course of CHOICE with a typical deviation of ± 3 credits of the semester with minimum credits of 19 and maximum credits of 27, based on his PROGRESS and SGPA/CGPA, and completion of the 'PRE-REQUISITES' as indicated for various Subjects/Courses, in the Department Course Structure and Syllabus contents. It needs specific approval and signature of the Faculty Advisor/Counselor and Head of the Department.

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

**5.6** Subject/ Course Options exercised through ON-LINE Registration are final and CANNOT be changed, nor can they be inter-changed; further, alternate choices will also not be considered. However, if the Subject/ Course that has already been listed for Registration (by the Head of Department) in a Semester could not be offered due to any unforeseen or unexpected reasons, then the Student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing Subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of the Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

**5.7** For Audit Courses like Sports and NSS, Computational Mathematics Lab etc, a '**Satisfactory Participation Certificate**' from the concerned authorities for the relevant Semester is essential. No Marks or Credits shall be awarded for these activities.

5.8 For Mandatory Courses, a '**Satisfactory / Not Satisfactory' grade** is awarded based on the performance in both CIE and SEE.

**6. Subjects/ Courses to be offered**

**6.1** A typical Section (or Class) Strength for each Semestershall be 60.

**6.2** A Subject/ Course may be offered to the Students, ONLY IF a Minimum of 40 Students opt for the same. The Maximum Strength of a Section is limited to 70.

**6.3** More than ONE TEACHER may offer the SAME SUBJECT(Lab / Practical may be included with the correspondingTheory Subject in the same Semester) in any Semester.However, selection choice for students will be based on -'FIRST COME FIRST SERVE Basis and CGPA Criterion'(ie., the first focus shall be on early ON-LINE ENTRY fromthe student for Registration in that Semester, and thesecond focus, if needed, will be on CGPA of the student).

**6.4** If more entries for Registration of a Subject come intopicture, then the concerned Head of the Department shall takenecessary action, whether to offer such a Subject/ Coursefor TWO (or multiple) SECTIONS or NOT .

**6.5** In case of options coming from Students of otherDepartments/ Branches/ Disciplines (not considering OPENELECTIVES), PRIORITY shall be given to the student ofthe 'Parent Department' first.

**7. Attendance Requirements**

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

**7.2** Condoning of shortage of attendance in aggregate up to 10%(65% and above, and below 75%) in each Semester may begranted by the College Academic Committee on genuine and **valid grounds such as Medical, NSS, Sports and Games,**based on the student's representationwith supporting evidence.

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

**7.4** Shortage of Attendance below 65% in aggregate shall in NOcase be condoned.

**7.5** Students, whose shortage of attendance is not condoned in anySemester, are not eligible to register their Semester End Examinations, they get detained and their registration for thatSemester shall stand cancelled. They will not be promoted to thenext Semester. They may seek re-registration for all thoseSubjects registered in that Semester in which he gotdetained, by seeking re-admission for that Semester asand when offered; in case if there are any ProfessionalElectives and/ or Open Electives, the same may also be **re-registered**if offered, however, if those Electives are notoffered in later Semesters, then alternate Electives may bechosen from the **same** set of Elective Subjects offeredunder that category.

**8. Academic Requirements**

The following Academic Requirements have to be satisfied, inaddition to the Attendance Requirements mentioned in ItemNo.**7.**

**8.1** A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Subject/ Course, if he secures not less than 40% marks (24 out of 60 marks) in the Semester End Examination, and a minimum of 40% of the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) marks taken together (i.e. 40 marks); in terms of Letter Grades, this implies securing P Grade or above in that Subject/ Course.

**8.2** A student shall be deemed to have satisfied the AcademicRequirements and earned the Credits allotted to – Minor Project/Technical Seminar/Major Project, if he secures not less than40% of the total marks to be awarded for each.The student would be treated as failed, if he - (i) does notsubmit a report on his Minor Project / Technical Seminar / Major Project, ordoes not make a presentation of the same before theEvaluation Committee as per schedule, or (ii)secures less than 40% of marks in Minor Project/ Technical Seminar/Major Project evaluations.

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

**8.3 Promotion Rules:** Every Student has to fulfil the Attendance and Academic Requirements by securing the required creditsas shown below:

| S.No. | Semester | | Requirement |
|---|---|---|---|
| | From (Even) | To (Odd) | |
| 1 | II | III | **50%** of registered credits are required upto II Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not. |
| 2 | IV | V | **60%** of registered credits are required upto IV Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not. |
| 3 | VI | VII | **60%** of registered credits are required upto VI Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not. |

**8.4**A Student shall - register for all Subjects covering 184 Credits as specified and listed (with the relevant Course/ Subject Classifications as mentioned) in the Course Structure, put up all the Attendance and Academic requirements for 184 Credits securing a minimum of P Grade (Pass Grade) or above in each Subject, and 'earn all 184 Credits securing SGPA ≥ 5.0 (in each Semester), and CGPA (at the end of each successive Semester) ≥ 5.0, to successfully complete the UGP.

**8.5**After securing the necessary 184 Credits as specified forthe successful completion of the entire UGP, an exemption of 6 secured Credits (in terms of two of theircorresponding Subjects/Courses) may be permitted for optional drop out from these 184 Credits earned; resulting in 178 Credits for UGP performance evaluation, i.e., theperformance of the Student in these 178 Credits shall alonebe taken into account for the calculation of 'the final CGPA(at the end of UGP, which takes the SGPA of the VIII Semester into account)' , and shall be indicated in theGrade Card of VIII Semester; however, the Student'sPerformances in the earlier individual Semesters, with thecorresponding SGPA and CGPA for which already GradeCards are given, will not be altered. **Further, optional drop out for such 6 secured Credits shall be allowed only for professional and open electives**.

**8.6**If a Student registers for some more **'Extra Subjects'** (in the parent Department or other Departments/Branches of Engg.) other than those listed Subjects totaling to 184 Credits as specified in the Course Structure of his Department, the performances in those 'extra Subjects' (although evaluated and graded using the same procedure as that of the required 184 Credits) will not be taken into account while calculating the SGPA and CGPA. For such 'extra Subjects'registered, % marks and Letter Grade alone will be indicated in the Grade Card, as a performance measure, subject to completion of the Attendance and Academic Requirements as stated in Items 7 and 8.1 to 8.7 above.

**8.7** When a Student is detained due to shortage of attendance inany Semester, he may be re-admitted into that Semester, asand when offered, with the Academic Regulations of that Batch into which he gets readmitted. However, no GradeAllotments or SGPA/ CGPA calculations will be done for thatentire Semester in which he got detained.

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

**8.9**A student eligible to appear in the Semester End Examination in any Subject/ Course, but absent at it orfailed (thereby failing to secure P Grade or above), mayreappear for that Subject/ Course at the supplementaryexamination as and when conducted. In such

cases,his Internal Marks (CIE) assessed earlier for that Subject/Course will be carried over, and added to the Marks to beobtained in the SEE supplementary examination, forevaluating his performance in that Subject.

**9. Evaluation - Distribution and Weightage of Marks**

The performance of a student in each Semester shall beevaluated Subject-wise (irrespective of Credits assigned) witha maximum of 100 marks for Theory or Practicals orSeminar or Drawing/Design or Minor Project or Minor Course, etc.,For all Subjects/ Courses, the distribution shall be 40 marks for CIE, and 60 marks for the SEE inclusive of minor and mandatory courses. However, the B.Tech. Major Project will be evaluated for 200 Marks. These evaluations shall be based on 20% CIE (Continuous InternalEvaluation) and 80% SEE (Semester End Examination), anda Letter Grade corresponding to the % marks obtained shallbe given.Students have to choose Open Electives from the givenlist. However, Students should not choose an Open Elective offered by their own (parent) Department, if it is already listed under any category of the courses offered by parent Department in any Semester.

**9.1 Theory Courses:**

**9.1.1 Continuous Internal Evaluation (CIE):**

During theSemester, there shall be **2 mid-term examinations** for 40 marks each. Each mid-term examination consists of online**objective paper** for 10 marks with duration of **20 minutes** and **subjective paper** for 20 marks withduration of **90 minutes**. Further, there will be anallocation of 5 marks each for Assignment and Attendance. Objective paper maybe set with multiple choice questions. Subjective paper shall contain 6 questions, out of which the Student has to answer 4 questions, each for 5 marks.

The allotment of 5 marks for attendance is as given below:

| S.No. | % of Attendance Range | Marks |
|---|---|---|
| 1 | > 90 and ≤ 100 | 5 |
| 2 | > 85 and ≤ 90 | 4 |
| 3 | > 80 and ≤ 85 | 3 |
| 4 | > 75 and ≤ 80 | 2 |
| 5 | ≥ 70 and ≤ 75 | 1 |

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

First Assignment should be submitted before the conduct ofthe first mid-term examinations, and the Second Assignmentshould be submitted before the conduct of the second midtermexaminations. The Assignments shall be as specifiedby the concerned subject teacher.

The first mid-term examination Marks, first AssignmentMarks and relative attendance marks shall make one set of CIE Marks, and the secondmid-term examination Marks, second Assignment Marks and relative attendance marks shall make second set of CIE Marks; and 70% of the best performed plus 30% of the other shall be taken as the final markssecured by the Student towards Continuous InternalEvaluation in that Theory Subject.

**9.1.2 Semester End Examination (SEE):**

The distribution of marks is as given below:

| Semester End Examination | | | | |
|---|---|---|---|---|
| **Part** | **Type of Questions** | **No. of questions to be answered** | **Marks per question** | **Total** |
| Part A | Compulsory Questions (One from each module) | 5 | 2 | 10 |
| Part B | Choice Questions (5 out of 8) (Minimum one from each module) | 5 | 10 | 50 |
| **Grand Total** | | | | 60 |

**9.2 Practical Courses:**

**9.2.1 Continuous Internal Evaluation (CIE):**

There will beCIEfor40 marks, shall be awarded with a distribution of 20 marks for day-to-day performance and timely submission of lab records, 5 marks for viva-voce,15 marks for internal lab exam (best out of two exams).

**9.2.2 Semester End Examination (SEE):**

There will beSEEfor 60 marks, shall be awarded with a distribution of 20 marks for write-up on the given experiment, 20 marks for proficiency in the exam, 10 marks for results and 10 marks for viva-voce.For conducting SEE, one internal examiner and one external examiner will be appointed by the Chief Controller of Examinations of the College. The external examiner should be selected from outside the College among the autonomous/reputed institutions from a panel of three examiners submitted by the concerned Head of the Department.

**9.3 Design and/or Drawing:**

For these Subjects, (such asEngineering Graphics, Machine Drawing,Production Drawing Practice, and Estimation), the distribution shall be 40 marks for **CIE** (20 marks for day-to-day work, 20 marks for internal test with a duration of 120 minutes(better out of two exams)).There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marksfor internal tests. The **SEE** will be evaluated for 60 marks.

**9.4 Gender Sensitization:**

**9.4.1 Continuous Internal Evaluation (CIE):**

There will beCIEfor40 marks shall be awarded with a distribution of 25 marksfor day-to-day performance and 15 marks for internal practical exam in the form of assignments shall be given and evaluated by the teacher concerned.

**9.4.2 Semester End Examination (SEE):**

TheSEEfor 60 marks shall be conducted with an external examiner and the laboratory teacher.To reduce the burden on the students, the External Lab Exam should be conducted as an open-book system for the duration of 120 minutes. Eight questions have to be given from **Essential Reading "Towards a World of Equals: A Bilingual Textbook on Gender"**, out of which students should answer only 5. Each question carries 12 marks. So, each answer will take nearly 24 minutes.

**9.5 Projects:**

**9.5.1 Minor Project:**

Minor Project has tobe taken up for about eight weeks including summer vacation after VI semester.**CIE** of 40 marks are awarded based on the performance in two presentations and **SEE** of 60 marks will be evaluated by a committee consisting of Head of the Department, supervisor and an external examiner. The external examiner should be selected from outside the College among the autonomous/reputed institutions from a panel of three examiners submitted by the concerned Head of the Department. The Minor Project shall be evaluated in the VII Semester.

**9.5.2 Major Project:**

Major Project has to be carried out during the VIII Semester, as per the instructions of the Project Supervisor assigned by the Head of the Department. Out of total 200 marks allotted for the Major Project, 40 marks shall be for **CIE** (Continuous Internal Evaluation) and 160 marks for the **SEE** (Semester End Viva-voce Examination). CIE 40 marks shall be awarded by a Departmental Committee consisting of Head of the Department, a senior faculty member and Project Supervisor, based on the work carried out and the presentation made by the Student during the Major Project. The Major Project Viva-voce shall be conducted by a Committee comprising of an External Examiner, Head of the Department and Project Supervisor. The external examiner should be selected from outside the College among the autonomous/reputed institutions from a panel of three examiners submitted by the concerned Head of the Department.

**9.6 Technical Seminar:**

ForTechnical Seminar Presentation, the student shall collect theinformation on a specialized topic, prepare a Technical Reportand submit to the Department at the time of SeminarPresentation. The Seminar Presentation (along with theTechnical Report) shall be evaluated by a committee consisting of Head of the Department and Two Faculty Membersfor 100 marks. Thereshall be no external evaluation.

**9.7 Comprehensive Viva-Voce:**

The Comprehensive Viva-Voce shall be conducted in VIII Semester for 100 marks. This Viva-Voce is intended to assess the students' understanding of various subjects studied during the B. Tech. programme of study and will be evaluated by a Committee, consisting of the Head of the Department and two senior faculty members.Thereshall be no external evaluation.

**9.8 Non-Credit Courses:**

**9.8.1 Audit Courses:**

For Audit Courses offered in any Semester, a '**Satisfactory Participation Certificate**' shall be issued to the Student from the concerned authorities, only after securing ≥ 65% attendance in such a Course. No marks or Letter Grade shall be allotted for these activities.

**9.8.2 Mandatory Courses:**

For Mandatory Non-Credit Courses offered in any semester, a 'Satisfactory / Not Satisfactory' shall be awarded to the student based on the performance in both CIE and SEE

**10. Grading Procedure**

**10.1** Marks will be awarded to indicate the performance of eachstudent in each Theory Subject, or Lab/ Practical, or Seminar, or Project, or Minor-Project or Minor Course etc., based on the %marks obtained in CIE + SEE (Continuous Internal Evaluation+ Semester End Examination, both taken together) asspecified in Item 9 above, and a corresponding Letter Gradeshall be given.

**10.2** As a measure of the student's performance, a 10-point AbsoluteGrading System using the following Letter Grades (UGCGuidelines) and corresponding percentage of marks shall befollowed

| % of Marks | Grade Points | Letter Grade |
|---|---|---|
| ≥80 | 10 | O ( Out Standing) |
| ≥70 to < 80 | 9 | $A^+$ (Excellent) |
| ≥60 to < 70 | 8 | A (Very Good) |
| ≥55 to < 60 | 7 | $B^+$ (Good) |
| ≥50 to < 55 | 6 | B ( Above Average) |
| ≥45 to < 50 | 5 | C (Average) |
| ≥40 to < 45 | 4 | P (Pass) |
| < 40 | 0 | F (Fail) |
| Absent | Ab | Ab |

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

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

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

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

**Credit Points (CP) = Grade Point (GP) x Credits …For a Course**

**10.7** The Student passes the Subject/ Course only when he getsGP ≥ 4 (P Grade or above).

**10.8** The Semester Grade Point Average (SGPA) is calculated bydividing the Sum of Credit Points (ΣCP) secured from ALLSubjects/ Courses registered in a Semester, by the TotalNumber of Credits registered during that Semester. SGPA isrounded off to TWO Decimal Places. SGPA is thuscomputed as

$\text{SGPA} = \left\{\sum_{i=1}^{N} C_i G_i\right\} / \left\{\sum_{i=1}^{N} C_i\right\}$ … for each Semester

where 'i' is the Subject indicator index (takes into accountall Subjects in a Semester), 'N' is the no. of Subjects'REGISTERED' for the Semester (as specifically requiredand listed under the Course Structure of the parentDepartment), is the no. of Credits allotted to the ithSubject, and represents the Grade Points (GP)corresponding to the Letter Grade awarded for that ithSubject.

**10.9** The Cumulative Grade Point Average (CGPA) is a measureof the overall cumulative performance of a student over allSemesters considered for registration. The CGPA is theratio of the Total Credit Points secured by a student in ALLregistered Courses in ALL Semesters, and the TotalNumber of Credits registered in ALL the Semesters. CGPAis rounded off to TWO Decimal Places. CGPA is thuscomputed from the II Semester onwards, atthe end of each Semester, as per the formula

$\text{CGPA} = \left\{\sum_{j=1}^{M} C_j G_j\right\} / \left\{\sum_{j=1}^{M} C_j\right\}$ … for all S semesters registered

(i.e., upto and inclusive of S semesters, S ≥ 2)

where 'M' is the TOTAL no. of Subjects (as specificallyrequired and listed under the Course Structure of the parentDepartment) the Student has 'REGISTERED' from the 1st Semester onwards upto and inclusive of the Semester S (obviously M > N ), 'j' is the Subject indicator index (takesinto account all Subjects from 1 to S Semesters), is theno. of Credits allotted to the jth Subject, andrepresents the Grade Points (GP) corresponding

to theLetter Grade awarded for that jth Subject. After registrationand completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, asthere are no cumulative effects.

**10.10** For Merit Ranking or Comparison Purposes or any otherlisting, ONLY the 'ROUNDED OFF' values of the CGPAswill be used.

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

**10.12 Passing Standards:**

**10.12.1** A student shall be declared successful or 'passed' in aSemester, only when he gets a SGPA ≥ 5.00 (at the endof that particular Semester); and a student shall bedeclared successful or 'passed' in the entire UGP, onlywhen he gets a CGPA ≥ 5.00; subject to the condition that hesecures a GP ≥ 4 (P Grade or above) in every registeredSubject/ Course in each Semester (during the entire UGP) forthe Degree Award, as required.

**10.12.2** Inspite of securing P Grade or above in some (or all)Subjects/ Courses in any Semester, if a Student receives aSGPA < 5.00 and/ or CGPA < 5.00 at the end of such aSemester, then he 'may be allowed' (on the 'specificrecommendations' of the Head of the Department andsubsequent approval from the Principal) -(i) to go into the next subsequent Semester (subject tofulfilling all other attendance and academic requirements as listed under Items 7&8);(ii) to 'improve his SGPA of such a Semester (and henceCGPA) to 5.00 or above', by reappearing for ONE orMORE (as per Student's choice) of the same Course(s) in which he has secured P Grade(s) in thatSemester, at the Supplementary Examinations to be heldin the next subsequent Semester(s). In such cases, hisInternal Marks (CIE Marks) in those Subject(s) willremain same as those he obtained earlier. In these considerations, the newly secured Letter Gradeswill be recorded and taken into account for calculation ofSGPA and CGPA, only if there is an improvement.

**10.12.3** A Student shall be declared successful in anyNon-Credit Course, if he secures a 'SatisfactoryParticipation Certificate' for that Audit Course and "Satisfactory Certificate' for Mandatory Course.

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

**11. Declaration of Results**

**11.1** Computation of SGPA and CGPA are done using theprocedure listed in 10.6 – 10.10.

**11.2** For Final % of Marks equivalent to the computed finalCGPA, the following formula may be used …

**% of Marks = (final CGPA – 0.5) x 10**

**12. Award of Degree**

**12.1** A Student who register for all the specified Courses as listed in the Course Structure, satisfies all the Course Requirements, passes all the examinations prescribed in the entire UG Programme (UGP) within the specified period (refer 4.1), and secures the required number of 184 Credits (with CGPA ≥ 5.0), shall be declared to have 'QUALIFIED' for the Award of the B.Tech. Degree in the chosen Branch of Engineering as selected at the time of Admission.

**12.2** A Student who qualifies for the Award of the Degree aslisted in Item 12.1, shall be placed in the following Classes:

| Class Awarded | CGPA |
|---|---|
| First Class with Distinction | ≥ 8.00 |
| First Class | ≥ 6.50 and < 8.00 |
| Second Class | ≥ 5.50 and < 6.50 |
| Pass Class | ≥ 5.00 and < 5.50 |

**12.3**A student with final CGPA (at the end of the UGP) <5.00 will not be eligible for the Award of the Degree.

**13. Withholding of Results**

If the student has not paid fees to College atany stage, or has pending dues against his name due toany reason whatsoever, or if any case of indiscipline ispending against him, the result of the student may bewithheld, and he will not be allowed to go into the nexthigher Semester. The Award or issue of the Degree mayalso be withheld in such cases.

**14. Transitory Regulations**

Student who has discontinued for any reason, or has beendetained for want of attendance or lack of required creditsas specified, or who has failed after having undergone theDegree Programme, may be considered eligible for readmissionto the same Subjects/ Courses (or equivalent Subjects/Courses, as the case may be), and same ProfessionalElectives/ Open Electives (or from set/category of Electivesor equivalents suggested, as the case may be) as andwhen they are offered (within the time-frame of 8 yearsfrom the Date of Commencement of his I Semester).

**15. Student Transfers**

There shall be no Branch transfers after the completion ofAdmission Process.

**16. Scope**

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

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

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

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

## MALPRACTICES RULES

## DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

| | **Nature of Malpractices/Improper conduct** | **Punishment** |
|---|---|---|
| | *If the candidate:* | |
| 1. (a) | Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the SEE) | Expulsion from the examination hall and cancellation of the performance in that course only. |
| (b) | Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter. | Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him. |
| 2 | Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to that course of the examination (theory or practical) in which the candidate is appearing. | Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester. The Hall Ticket of the candidate shall be cancelled. |
| 3 | Impersonates any other candidate in connection with the examination. | The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and |

| | | |
|---|---|---|
| | | forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester. The candidate is also debarred for two consecutive semesters from class work and all SEE. The continuation of the programme by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him. |
| 4 | Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination. | Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The candidate is also debarred for two consecutive semesters from class work and all SEE. The continuation of the programme by the candidate is subject to the academic regulations in connection with forfeiture of seat. |
| 5 | Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks. | Cancellation of the performance in that course. |
| 6 | Refuses to obey the orders of the Chief Controller of Examinations (CCE) / Controller of Examinations (CE) / Assistant Controller of Examinations (ACE) / any officer on duty or | In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the |

| | | |
|---|---|---|
| | misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination | candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police cases registered against them. |
| 7 | Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall. | Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all SEE. The continuation of the programme by the candidate is subject to the academic regulations in connection with forfeiture of seat. |
| 8 | Possess any lethal weapon or firearm in the examination hall. | Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the |

| | | |
|---|---|---|
| | | courses of that semester. The candidate is also debarred and forfeits the seat. |
| 9 | If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8. | Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them. |
| 10 | Comes in a drunken condition to the examination hall. | Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. |
| 11 | Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny. | Cancellation of the performance in that course and all other courses the candidate has appeared including practical examinations and project work of that SEE. |
| 12 | If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the CCE for further action toward suitable punishment. | |

**Note:*The student(s) found indulging in malpractices during the CIE also will be punished based on the recommendations of the College Academic Committee.***

# MALLAREDDY ENGINEERING COLLEGE (Autonomous)

**Academic Year 2015-16 (Choice Based Credit System)**

**COURSE STRUCTURE – B.Tech. Electrical and Electronics Engineering(EEE)**

**(MR15 Regulations)**

**I SEMESTER**

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | HS | 50H01 | English | 2 | - | - | 2 | 40 | 60 | 100 |
| 2 | BS | 50B01 | Engineering Mathematics | 3 | 2 | - | 4 | 40 | 60 | 100 |
| 3 | BS | 50B02 | Applied Physics - I | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 4 | ES | 50580 | Computer Programming and Numerical Methods | 3 | 1 | - | 3 | 40 | 60 | 100 |
| 5 | ES | 50201 | Electrical Circuits | 3 | 2 | - | 4 | 40 | 60 | 100 |
| 6 | HS | 50H02 | English Language Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 7 | BS | 50B04 | Applied Physics Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 8 | ES | 50581 | Computer Programming and Numerical Methods lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 9 | AC | 50A01 | NSS &Sports | - | - | 2 | - | - | - | - |
| | | | **Total** | 13 | 7 | 14 | 22 | Contact Hours:34 | | |

## II-SEMESTER

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | ES | 50582 | Data Structures through C | 3 | - | - | 3 | 40 | 60 | 100 |
| 2 | BS | 50B07 | Applied Physics - II | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 3 | BS | 50B03 | Applied Chemistry | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 4 | ES | 50203 | Electrical Circuit Analysis and synthesis | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 5 | ES | 50301 | Engineering Graphics | 1 | 1 | 3 | 3 | 40 | 60 | 100 |
| 6 | BS | 50B05 | Applied Chemistry Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 7 | ES | 50204 | Electrical Circuits Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 8 | ES | 50302 | Engineering Workshop | - | - | 4 | 2 | 40 | 60 | 100 |
| 9 | ES | 50583 | Data Structures through C Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| | | | **Total** | 10 | 7 | 19 | 23 | Contact Hours:36 | | |

## III SEMESTER

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | BS | 50B08 | Elementary Calculus and Transforms | 3 | 2 | - | 4 | 40 | 60 | 100 |
| 2 | HS | 50H16 | Environmental Sciences | 2 | - | - | 2 | 40 | 60 | 100 |
| 3 | PC | 50205 | Electro Magnetic Fields | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 4 | ES | 50401 | Electronic Devices and Circuits | 3 | 1 | - | 3 | 40 | 60 | 100 |
| 5 | PC | 50408 | Digital Electronics | 3 | - | - | 3 | 40 | 60 | 100 |
| 6 | ES | 50315 | Fluid Mechanics and Hydraulic Machinery | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 7 | ES | 50402 | Electronic Devices and Circuits Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 8 | ES | 50317 | Fluid Mechanics and Hydraulic Machinery Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 9 | HS | 50H17 | Gender Sensitization | - | - | 4 | 2 | 40 | 60 | 100 |
| 10 | AC | 50A03 | Law for Engineers | - | 2 | - | - | - | - | - |
| Total | | | | 15 | 9 | 12 | 24 | Contact Periods : 36 | | |

## IV SEMESTER

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | BS | 50B10 | Special functions and Complex Analysis | 3 | 2 | - | 4 | 40 | 60 | 100 |
| 2 | PC | 50206 | Power Generation & Distribution | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 3 | PC | 50410 | Pulse and Digital Circuits | 3 | - | - | 3 | 40 | 60 | 100 |
| 4 | PC | 50207 | DC Machines & Transformers | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 5 | PC | 50208 | Control Systems | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 6 | PC | 50209 | Linear System Analysis | 2 | 1 | - | 2 | 40 | 60 | 100 |
| 7 | PC | 50210 | DC Machines Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 8 | PC | 50413 | Pulse and Digital Circuits Lab | | - | 4 | 2 | 40 | 60 | 100 |
| 9 | MC | 50H11 | Human Values and Professional Ethics | - | 2 | - | - | 40 | 60 | 100 |
| Total | | | | 14 | 11 | 8 | 22 | Contact Periods :33 | | |

## V SEMESTER

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | HS | 50H03 | Technical Communication and Presentation Skills | 2 | - | - | 2 | 40 | 60 | 100 |
| 2 | PC | 50211 | Power Transmission Systems | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 3 | PC | 50212 | Power System Analysis | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 4 | PC | 50213 | AC Machines | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 5 | PC | 50214 | Power Electronics | 3 | 1 | - | 3 | 40 | 60 | 100 |
| 6 | PE-I | 50416 | Linear and Digital IC Applications | 3 | 1 | - | 3 | 40 | 60 | 100 |
| | | 50215 | Advanced Control Systems | | | | | | | |
| | | 50216 | PLC and SCADA | | | | | | | |
| 7 | PC | 50217 | Control Systems Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 8 | HS | 50H04 | Technical Communication and Presentation Skills Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 9 | PR | 50218 | Technical Seminar | - | 2 | - | 2 | 100 | -- | 100 |
| Total | | | | 14 | 10 | 8 | 23 | Contact Periods :32 | | |

## VI SEMESTER

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | HS | 50H12 | Engineering Economics & Accountancy | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 2 | PC | 50219 | Electrical Measurements and Instrumentation | 3 | 2 | - | 4 | 40 | 60 | 100 |
| 3 | PC | 50220 | Switch Gear & Protection | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 4 | PE-II | 50422 | Digital Signal Processing | 3 | - | - | 3 | 40 | 60 | 100 |
| | | 50433 | VLSI Design | | | | | | | |
| | | 50221 | Optimal Control Theory | | | | | | | |
| 5 | PE-III | 50584 | Computer Organization and Operating Systems | 2 | 2 | - | 3 | 40 | 60 | 100 |
| | | 50222 | Electrical Distribution Systems & Automation | | | | | | | |
| | | 50223 | Advanced Power Electronics | | | | | | | |
| 6 | PC | 50450 | Microprocessors and Micro controllers | 3 | - | - | 3 | 40 | 60 | 100 |
| 7 | PC | 50224 | AC Machines Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 8 | PC | 50225 | Power Electronics Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 9 | PR | 50H05 | Soft Skills | - | - | 2 | 1 | 40 | 60 | 100 |
| Total | | | | 15 | 8 | 10 | 24 | Contact Periods :33 | | |

## VII SEMESTER

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | HS | 50H13 | Management Science | 2 | - | - | 2 | 40 | 60 | 100 |
| 2 | PC | 50226 | Solid State Drives | 3 | 2 | - | 4 | 40 | 60 | 100 |
| 3 | PE-IV | 50227 | EHV AC Transmission | 2 | 2 | - | 3 | 40 | 60 | 100 |
| | | 50228 | Electric Smart Grid | | | | | | | |
| | | 50229 | Energy Audit & Conservation | | | | | | | |
| 4 | PE-V | 50230 | High Voltage Engineering | 2 | 2 | - | 3 | 40 | 60 | 100 |
| | | 50231 | Electrical Power Quality | | | | | | | |
| | | 50232 | HVDC & FACTS | | | | | | | |
| 5 | PC | 50233 | Power System and Operation Control | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 6 | OE | | Open Elective-1 | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 7 | PC | 50451 | Microprocessors and Microcontrollers Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 8 | PC | 50234 | Electrical Measurements & Simulation Lab | - | - | 4 | 2 | 40 | 60 | 100 |
| 9 | PR | 50235 | Minior Project | - | - | 4 | 2 | 40 | 60 | 100 |
| Total | | | | 13 | 10 | 12 | 24 | Contact Periods :35 | | |

## VIII SEMESTER

| S. No. | Category | Course code | Name of the course | Contact hours/week | | | Credits | Scheme of Valuation | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | |
| 1 | PE-VI | 50236 | Special Machines | 2 | 2 | - | 3 | 40 | 60 | 100 |
| | | 50237 | Neural Networks& Fuzzy Logic | | | | | | | |
| | | 50238 | Utilization of Electrical Energy | | | | | | | |
| 2 | OE | | **Open Elective-2** | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 3 | OE | | **Open Elective-3** | 2 | 2 | - | 3 | 40 | 60 | 100 |
| 4 | PR | 50239 | Major Project | - | - | 20 | 10 | 40 | 160 | 200 |
| 5 | PR | 50240 | Comprehensive Viva Voce | - | - | 4 | 2 | 100 | -- | 100 |
| 6 | PR | 50H15 | Entrepreneurship Skills | - | 2 | - | 1 | 40 | 60 | 100 |
| 7 | AC | 50A04 | Foreign Languages / Fine Arts | - | 2 | - | - | | | |
| Total | | | | 06 | 10 | 24 | 22 | Contact Periods : 40 | | |

# List of Open Electives

| S. No. | Branch | Course Code | Name of the course |
|---|---|---|---|
| 1 | CIVIL | 50102 | Surveying |
| 2 | | 50123 | Air pollution and control |
| 3 | | 50124 | Disaster Management |
| 4 | | 50150 | Green Buildings |
| 5 | MECHANICAL | 50303 | Engineering Mechanics |
| 6 | | 50305 | Mechanics of Solids |
| 7 | | 50307 | Metallurgy and Materials Science |
| 8 | | 50342 | Renewable Energy Sources |
| 9 | | 50344 | Robotics |
| 10 | ECE | 50418 | Digital Design Using Verilog HDL |
| 11 | | 50448 | Principles of Communication Engineering |
| 12 | | 50449 | Embedded System Design |
| 13 | CSE | 50511 | Database Management Systems |
| 14 | | 50518 | Software Engineering |
| 15 | | 50571 | Computer Graphics |
| 16 | | 50553 | Big Data |
| 17 | | 50578 | Cloud and Distributed Computing |
| 18 | | 50579 | Internet of Things |
| 19 | | 50564 | Artificial Intelligence |
| 20 | MINING | 52501 | Fundamentals of Geology |
| 21 | | 52511 | Mine Construction Engineering |
| 22 | | 52528 | Introduction to Mineral Processing |
| 23 | ENGLISH | 50H08 | Interpretation of Literature and Analytical Writing |
| 24 | | 50H09 | Business Communication |
| 25 | | 50H10 | World Literatures |
| 26 | MATHEMATICS | 50B23 | Advanced Optimization Techniques |
| 27 | | 50B24 | Mathematical Modeling |
| 28 | | 50B25 | Differential Equations and Dynamical Systems |
| 29 | PHYSICS | 50B20 | Advanced Physics for Engineers |
| 30 | | 50B21 | Nano Materials: Synthesis and Characterization |
| 31 | | 50B22 | NDT and Vacuum Technology |
| 32 | CHEMISTRY | 50B17 | Chemistry of Engineering Materials |
| 33 | | 50B18 | Nano Chemistry |
| 34 | | 50B19 | Photochemistry and Spectroscopy |

**2015-16**

# Malla Reddy Engineering College (Autonomous)

**LTP**
**2 - -**

**Course Code: 50H01** **Credits:2**

**B.Tech. – I Semester**
**ENGLISH**
**(Common for EEE, ECE and CSE)**

**Objectives:**

To facilitate for the improvement of the English language competency of the students in English with emphasis on all language components namely grammar, vocabulary, listening skills, speaking skills, reading skills and writing skills.

To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.

**Module I:** **[6 Periods]**

Chapter entitled '**Going Places: Travel'** from *Resonance: English for Engineers and Technologists* published by Foundation Books

**Speech** **:** Grammar of Anarchy by Dr. B. R. Ambedkar
**Vocabulary** **:** Formation of words, prefixes, suffixes and root words
**Grammar** **:** Tense, aspect and concord
**Reading** **:**Skimming and Scanning
**Writing** **:**Introduction to writing skills, characteristics of effective writing

**Module II:** **[6 Periods]**

Chapter entitled **'Reaching Out: Mass Media**' from *Resonance: English for Engineers and Technologists* published by Foundation Books

**Speech** **:** Need of Discipline and Visionary Young India by Dr.APJ Abdul Kalam
**Vocabulary** **:** Homonyms, homophones, homographs
**Grammar** **:** Direct and Indirect Speech
**Reading** **:** Intensive Reading and Extensive Reading
**Writing** **:** Paragraph writing- use of cohesive devices; arranging jumbled sentences into paragraph

**Module III :** **[6 Periods]**

Chapter entitled **'Ushering in a New Era: Networking'** from *Resonance: English for Engineers and Technologists* published by Foundation Books

**Short Story** **:** Death of a Hero by Jai Nimbkar
**Grammar** **:** Question Tags; Degrees of Comparison
**Vocabulary** **:** Idiomatic Expressions; Phrasal Verbs
**Reading** **:** Reading for theme and gist.
**Writing** **:** Essay Writing

**Module IV:** **[6 Periods]**

Chapters entitled '**Morphed Universe: Technology as a Double- edged Sword'** from *Resonance: English for Engineers and Technologists* published by Foundation Books

**Short Story** **:** The Doctor's Word by R.K. Narayan
**Grammar** **:** Voice – exercises

**Vocabulary :** One word substitutions; synonyms and antonyms
**Reading :** Reading for interpretation
**Writing :** Letter writing- both formal and informal

**Module V: [6 Periods]**

Chapter entitled **' The Indomitable Human Spirit: Facing Disasters'** from *Resonance: English for Engineers and Technologists* published by Foundation Books

**Short story :** Once There was a King by Rabindranath Tagore
**Grammar :** Types of Sentences, Conditionals
**Vocabulary :** Gender sensitive language, integrated exercises in vocabulary
**Reading :** Reading for specific purposes
**Writing :** Summarizing

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

**Textbooks:**

**In order to improve the proficiency of the student in the acquisition of grammar, error free language, the following text and course content, divided into Five Units, is prescribed.**

1. Elango, et all **,** ***Resonance:"English for Engineers and Technologists",*** published by Foundation Books, 2nd Edition, 2012.
2. Sudha Rani, et all,***"The Enriched Reading",*** published by Pearson Publications, New Delhi, 1st edition, 2015.

**For Grammar practice:**

1. Sudha Rani Et all, ***"A Work Book on English Grammar and Composition",*** published by Tata Mac Graw –Hill, New Delhi, 2nd Edition, 2012.

**Reference Books:**


1. Azar, Betty and Stacy A. Hagen***: "Understanding and Using English Grammar***", Foundation Books, 4th Edition, 2009.
2. Chaudhuri , Santanu Sinha: ***"Learn English: A Fun Book of Functional Language, Grammar, and Vocabulary",***Tata McGraw Hill Education,New Delhi, Paper Back Edition. 2013.
3. Eastwod, John: "***Oxford Guide to English Grammar",***Oxford University Press, 4th Edition, 1994.
4. Field, Marion**: "*Improve Your Written English"***, Kindle books, 5th Edition, 2009.
5. G. Leech and J. Svartvik (1975), "***A Communicative Grammar of English"***, London: Longman, 3rd Edition, 2002.
6. Murphy, Raymond**: "*Intermediate English Grammar"***,Foundation Books Pvt Limited, 2nd Edition, 2013.
7. Murphy, Raymond: "***Essential English Grammar: A Self-Study Reference and Practice Bookfor Intermediate Students of English with Answer*s", Cambridge University Press, 2nd Edition, 2007.
8. Swan, Michael: "***Basic English Usage",*** Oxford University Press, 1st Edition, 1984.

**Related Websites:**

1. http://www.slideshare.net/aszardini/word-formationroot-words-prefixes-and-suffixes
2. http://www.scribd.com/doc/37085980/Circulars-Circular-Letters-Notices-Memo#scribd
3. http://www.zsme.tarnow.pl/jezykiobce/wp-content/uploads/2013/11/writing-letters1.pdf.

**Outcomes:**

1. Use of English Language, written and spoken.
2. Enrichment of language accuracy and fluency.
3. Gaining confidence in using English language and skills for writing in real life situations.
4. Ready to employ extensive and intensive reading skills

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50B01** **Credits: 4**

**B.Tech. – I Semester**

**ENGINEERING MATHEMATICS**

**(Common for CE, ME, EEE, ECE, CSE and Min.Engineering)**

**Prerequisites:** Pre calculus, concepts of Trignomentry etc.,

**Objectives:** This course provides knowledge of Matrices, Eigen values and Eigen Vectors, which are useful in signal processing and stability theory. The concept of Differential equation is essential to the learner to write the associated mathematical model and solving real time engineering problems using Laplace Transforms.

**Syllabus:**

**MODULE – I: Matrices and Linear systems of equations: [12 Periods]**

**MODULE – I**A: Rank of the matrix - Elementary transformations –Echelon form – Normal form – PAQ Form - Inverse of a Matrix by applying Elementary transformations.

**MODULE – IB**: Solution of Linear Systems – Consistency of linear system of equations – Gauss elimination method – Gauss-Jacobi method - Gauss-seidal method- LU-Decomposition method –Solution of Tri-diagonal Systems (Thomas Algorithm).

**MODULE – II: Eigen Values& Eigen Vectors [12 Periods]**

**MODULE – II A:**Linear transformation - Eigen values - Eigen vectors – properties – Linearly independent and dependent vectors - Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem, Orthogonal Matrix.

**MODULE – II B:**Diagonolization of matrix-Calculation of powers of matrix, Quadratic forms – Modal and spectral matrices. Real matrices – Symmetric - skew – symmetric, Similarity Transformation, Orthogonal Transformation, Principle axis.

**MODULE – III: Differential Equations of first order and first degree [12 Periods]**

**MODULE – III A:**Formation of Differential Equations - Solutions of First order Differential Equations: Homogeneous - Non-homogeneous – Exact - Non-exact.

**MODULE – III B:** Leibnitz's Linear Equation - Bernoulli's Differential Equation
Applications of First Order Differential Equations: Orthogonal trajectories - Newton's Law of cooling - Law of natural growth and decay.

**MODULE – IV: Differential Equations of Second & Higher Order[12 Periods]**

**MODULE – IVA:** Rules for finding Complementary function-Particular integral (Non-homogeneousterm of the type $e^{ax}$ , $Sin\,bx\ /\ Cos\,bx, x^n, e^{ax}V(x), x^nV(x) only$)
Method of variation of parameters.

**MODULE – IV B:** Equations reducible to constant coefficients - Cauchy - Euler and Legendre's differential equations. Applications to simple harmonic motion and LCR Circuits.

**MODULE-V: Laplace Transforms [12 Periods]**

**MODULE – V A:**Definition of Laplace transform - Condition for existence –Laplace transform of standard functions –Properties of Laplace transform – Laplace transform of function when they are multiplied or divided by 't' -Evalution of Integrals by using Laplace transforms.

**MODULE – V B:** Inverse transforms: Finding inverse using partial fractions – first shifting theorem – Inverse Laplace transforms of derivatives - Convolution theorem, Dirac's delta function – Unit step function. Application of Laplace transforms to ordinary differential equations

**TEXT BOOKS:**


1) Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers, 10th Edition, Reprint 2010.
2) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 43rd Edition, Reprint 2011.
3) Introduction to Matrix Analysis by Richard Bellman, Dover Publications, 2nd Edition, 1970.


**REFERENCES:**


1) Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Pub. House, Delhi.
2) Mathematical Methods of Science and Engineering by Kanti B.Datta ,Cengage Learning
3) Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
4) Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
5) Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.


**Outcomes:**

After completion of this course, students will be able to:

1. Do operations on Matrices like Row, Column operations, Rank of the Matrix etc.,
2. Able to check the Consistency and Inconsistency of the system of equations.
3. Find out Eigen values and Eigen vectors of the given Matrix.
4. Solve the first order first degree and higher order differential equations and apply them in real time environments.
5. Understand Laplace Transforms and perform various transformations and apply for linear differential equations and real-time signals.

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# Malla Reddy Engineering College (Autonomous)

**LTP22**
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**Course Code: 50B02** **Credits: 3**

**B.Tech. - I Semester**

**APPLIED PHYSICS - I**

**(Common for CE, ME, EEE, ECE, CSE and Min.Engineering)**

**Prerequisites:** NIL

**Objectives:** The objective is to provide clear understanding of LASER, Optical Fiber, Ultrasonic and basic concepts of Statistical Mechanics to apply for Engineering and Technology problems.

**Module- I: Optics** **[9 Periods]**

Principle of superposition, Coherence - Spatial and Temporal; Introduction to Interference, Young's double slit experiment - Optical path difference and Fringe width - Interference in thin films (Reflected light) Cosine law – Newton's rings experiment - Determination of wavelength of light. Concept of diffraction, Diffraction grating as monochromator.

**Module II: Laserand Optical Fibers**

**A: Laser**: **[8 Periods]**

Characteristics of LASER; Absorption, Spontaneous and Stimulated transitions; Einstein's Coefficients and Relations between them; Population Inversion; Pumping - Optical and Electrical; Meta-stable State; Three and Four level pumping schemes; Ruby LASER; Helium-Neon LASER; Semiconductor Diode LASER; Applications of LASER - drilling, welding, data storage, optical signal processing and nuclear fusion.

**B: Optical Fibers** **[4 Periods]**

Principle of Optical Fiber; Acceptance angle and Acceptance cone, Numerical Aperture; Step and Graded index Optical Fibers and their Refractive Index profiles; Attenuation in Optical Fibers, Application of Optical Fibers - Medical, Level sensor and Communication system.

**Module III: Acoustics & Ultrasonics**

**A: Acoustics** **[4 Periods]**

Reverberation & Reverberation time, basic requirements of acoustically good hall; absorption Coefficient, Determination of absorption coefficient based on the standard times of reverberation, Sabine's formula (Qualitative treatment); Factors affecting the architectural acoustics and their remedies.

**B: Ultrasonics** **[8 Periods]**

Introduction, Concept of Magnetostriciton, Piezo and inverse Piezo electric effects; Production of Ultrasonic waves - Magnetostriction method; Piezo electric crystal method; Properties of Ultrasonic waves; Detection of Ultrasonics - Piezo electric detector, Kundt's tube, Sensitive flame method, Thermal detector; Applications - Communication, Industrial, Biological and Medical;

**Module - IV: Waves and Vibrations** **[9 Periods]**

Introduction, Differential equation for SHM and its solution; expression for energy of the oscillator; superposition of two linear SHMs (with same frequencies) - Lissajous figures; Damped vibrations - differential equation and its solution; Critical damping, under damping and over damping, logarithmic decrement; Qualitative treatment of Forced vibrations, sharpness of resonance, analogy between mechanical and electrical oscillator.

**Module -V: Elements of Statistical Mechanics [8 Periods]**

Introduction, Qualitative discussion on Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics, Properties of the Fermi-Dirac statistics, Photon Gas, Wien's displacement law, Rayleigh-Jeans Law, Planck's Law of black body radiation, Concept of Electron gas.

**Text Books:**


1. K Vijay Kumar, S Chandralingam, "**Modern Engineering Physics**'', S. Chand and Company, 1st Edition, 2010.
2. D K Bhattacharya, Poonam Tandon, "**Engineering Physics**", Oxford University Press, 1st Edition, 2015.


**Reference Books:**


1) Eugene Hecht and A R Ganeshan, "**Optics**", Pearson Education, 4th Edition, 2015.
2) P K Palanisamy, **"Engineering Physics"**, SciTech Publication, 4th Edition, 2014.
3) B K Pandey and S. Chaturvedi, "**Engineering Physics**" Cengage Learning India Revised Edition, 2014.
4) R K Gaur and SL Gupta, "**Engineering Physics**" Dhanpat Rai Publications, Eighth Revised Edition, 2006.


**Outcomes:**

After completion of the course, student will be able to:

1. Understand the concepts of Interference, diffraction, applications of LASER and Optical fibers.
2. Analyze the basic requirements of acoustically good hall, various production and Detection methods of ultrasonic besides the applications of ultrasonics.
3. Distinguish free, damped and forced vibrations.
4. Develop basic knowledge on the distribution functions and simple applications

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50580** **Credits: 3**

**B.Tech. - I Semester**

## COMPUTER PROGRAMMING AND NUMERICAL METHODS
## ( Common for ECE AND EEE)

**Prerequisites:** Nil.

**Objective:** To develop programming concepts using C language to solve engineering and technology related problems using numerical methods.

**Module I : Fundamentals & Introduction to C Language**

**A: Fundamentals:** **[4 Periods]**

Hardware, Software, Programming languages, Translators, Introduction to Operating System, Program Development steps-Algorithm, Flow chart, Number Systems.

**B: Introduction to C Language** **[8 Periods]**

History, Simple C Program, Identifiers, Basic data types, User-defined data types, Variables, Constants, Type qualifiers, Managing Input / Output, Operators, Precedence and Associativity, Expression Evaluation, Type conversions, Simple C Programming examples.

**Module II: Control Statements & Arrays**

**A: Control Statements:** **[6 Periods]**

Conditional statements- if and switch statements, ? operator; Loop Control Statements - while, for, do-while statements, C Programming examples, Other statements related to control statements - break, continue, goto, C Programming examples.

**B: Arrays** **[4 Periods]**

Basic concepts, One-dimensional arrays, Two-dimensional arrays, Multi-dimensional arrays, C programming examples.

**Module III: Strings & Functions**

**A: Strings:** **[5 Periods]**

Basic concepts, String Input / Output functions, Arrays of strings, String handling functions, C programming examples.

**B: Functions** **[6 Periods]**

Basics, User defined functions, Inter function communication, Standard functions, Storage Classes-auto, register, static, extern, Scope rules, Array and string manipulations using functions, Recursive functions, C programming examples.

**Module IV: Derived types & Pointers**

**A: Derived types:** **[3 Periods]**

Structures - Basic concepts, Nested structures, Arrays of structures, Structure manipulations using functions, Unions, bit fields, C programming examples.

**B: Pointers:** **[6 Periods]**

Basic concepts, Pointer arithmetic, Pointers and functions, Pointers and strings, Pointers and arrays, Pointers and structures, Self-referential structures, Dynamic Memory Allocation, C programming examples.

**Module V: Numerical Methods**

**A:Algebraic Equations:** The Bisection Method, The Method of False Position (Regular-Falsi Method), Newton-Raphson Method.

**B: Numerical Integration:** Trapezoidal Rule, Simpson's 1/3 Rule and Simpson's 3/8 Rule.

**C:Numerical solution of Ordinary Differential Equations:**Runge-Kutta Methods - Predictor-Corrector Methods: Milne‟s method - Adams- Bashforth Method.

**Text Books:**


1. Pradip Dey, Manas Ghosh, **"Programming in C**", Oxford University Press, 2nd Edition, 2011.
2. E Balagurusamy, "**Computer Programming"**, Tata McGraw Hill,. 1st Edition, 2013.
3. B.S. Grewal, "**Numerical Methods in Engineerithng & Science (with Programs in C, C++ &MATLAB)"**, Khanna Publisher, 10th Edition, 2014.


**References:**


1. Brian W. Kernighan, Dennis M. Ritchie, "**The C Programming Language"**, PHI, 2nd Edition, 1990.
2. Greg Perry and Dean Miller, "**C Programming Absolute beginner's guide**", QUE Publishers, 3rd Edition, 2013.
3. Paul Deitel and Harvey Deitel, "**C How to Program"**, PHI, 7th Edition, 2012.
4. S.S. Sastry, "**Introductory Methods of Numerical Analysis"**, Prentice-Hall of India Private Limited, 5th Edition, 2003.


**Outcomes:**

After completion of this course, student will be able to:

1. Write, compile and debug programs in C language.
2. Design programs involving decision structures, loops, arrays and functions.
3. Explain the difference between call-by-value and call-by-reference
4. Solve the technological problems using numerical methods

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**Course Code: 50201** **Credits: 4**

**B.Tech. – I Semester**

**ELECTRICAL CIRCUITS**

**(Common for EEE and ECE)**

**Prerequisites:** Basic concepts of physics

**Objectives:**This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes magnetic circuits, single phase circuits.

**Module I: Introduction To Electrical Circuits [12 periods]**

Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources-Source transformation – Voltage – Current relationship for passive elements – Kirchhoff's laws-KCL-KVL – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

**Module II:Network Topology [10 Periods]**

Definitions – Graph – Tree, Basic cut-set and Basic Tie-set matrices for planar networks – Loop and Nodal analysis of Networks with independent voltage and current sources - Duality & Dual networks

**Module III:Magnetic Circuits [12 Periods]**

Magnetic Circuits – Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits. Hysteresis and eddy currents.

**Module IV:Single Phase A.C Circuits [13 Periods]**

R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – concept of power factor, Real and Reactive powers – J-notation, Complex and Polar forms of representation, Complex power

**Module V: Resonance& Locus Diagrams [12 periods]**

Resonance – series, parallel circuits, concept of band width and Q factor

Locus diagrams- Series R-L, R-C, R-L-C and parallel combination with variation of various parameters

**Text Books:**

1. William Hayt and Jack E. Kimmerly, "**Engineering Circuit Analysis**", McGrawHill Company, 6th Edition, 2005.
2. Joseph Edminister & Mahmood Nahvi, "**Electric Circuits**", Schaum Soutline Series – Tata McGraw Hill, 3rd Edition, 1999..

**References:**

1. Vanvalken burg, "**Network Analysis**", Prentice Hall of India, 3rd Edition, 1994.
2. A. Chakrabarthy, "**Circuit Theory**", Dhanipat Rai & Co.,6th Edition, 2010.
3. N. N. Parker Smith, "**Problems in Electrical Engineering**", Prentice Hall of India, 9th Edition, 1981.

**Outcomes:**

After completion of the course, students will be able to:

1. Learn how to develop and employ circuit models for elementary electrical components
2. Apply various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, and the node method to solve electrical circuit problems.
3. Analyze the sinusoidal-steady-state response of first and second-order systems.
4. Calculate resonance frequency, bandwidth and Q factor for the given electrical circuit.

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**Course Code: 50H02** **Credits: 2**

**B.Tech. – I Semester**

## ENGLISH LANGUAGE LAB
## (Common for EEE, ECE and CSE)

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

**Objectives:**

To sensitize the students to the intelligibility in their pronunciation of English, speech sounds, word accent, intonation and rhythm

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

To facilitate honing of listening and speaking skills of students

To train students to understand nuances of both verbal and non verbal communication during all activities

To develop confidence to face the audience and participate in activities

To help the students shed inhibitions and communicate with clarity

**Listening Skills:**

**Objectives:**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language to be able to recognise them, awareness regarding stress and recognise and use the right intonation in sentences.*

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

**Speaking Skills:**

**Objectives:**

1. To make students aware of the role of speaking in English and its contribution to their success.

2. To enable students to express themselves fluently and appropriately in social and professional contexts.

• Oral practice
• Describing objects/situations/people
• Just A Minute(JAM) Sessions.

**Syllabus: English Language Communication Skills Lab shall have two parts:**

**a. Computer Assisted Language Learning (CALL) Lab**

**b. Interactive Communication Skills (ICS) Lab**

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

**Module I:**

**CALL Lab:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants

**ICS Lab:** Ice-Breaking activity and JAM session

Listening: listening for sounds in context, for ideas.

Speaking: ideation and translation of ideas into sentences.

**Module II:**

**CALL Lab:** Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms -Consonant Clusters.

**ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Listening: listening for specific purposes, for details.

Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

**Module III:**

**CALL Lab:** Word accent and Listening Comprehension-reading(aloud) meaningfully.

**ICS Lab:** Descriptions- Narrations- Giving Directions and guidelines.

Listening: listening for intelligible English

Speaking: formal and informal conversations, register.

**Module IV:**

**CALL Lab:** Intonation and Common errors in Pronunciation- reading aloud(evaluating through recording).

**ICS Lab:** Extempore- Public Speaking, Oral Presentation Skills

Listening: note taking and listening for speaker's tone/attitude

Speaking: organizing, connecting ideas and sentences, short forms in spoken English, errors in spoken English

**Module V:**

**CALL Lab:** Neutralization of Mother Tongue Influence and Conversation Practice

**ICS Lab:** Information Transfer, Debate

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

**System Requirement (Hardware component):**
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
a) P – IV Processor b) Speed – 2.8 GHZ, c) RAM – 512 MB Minimum
d) Hard Disk – 80 GB, e) Headphones of High quality
**2. Interactive Communication Skills (ICS) Lab :** The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

**Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**
Prescribed Lab Manual: Rani Sudha, "***English Language Communication Skills laboratory"*** *Manual* Published by **Pearson Publication**, 5 edition, New Delhi 2014

**Reference Books:**


1. Gairns ,Ruth and Redman , Stuart: "***Oxford Word Skills"***, *Learn and Practice English Vocabulary*, 2nd Edition, 2008.
2. Hughes , John and Mallett , Andrew: "***Successful Presentations"***: DVD and Student's Book Pack: "**A Video Series Teaching Business Communication Skills"** for Adult Professionals
3. Karia , Akash: "***Public Speaking Mastery, Speak Like a Winner***", Kindle Edition, 2013.
4. Lucas, Stephen: "***The Art of Public Speaking"*** : Tata McGraw Hill, 11th Edition, 2011.


**Websites:**

1. http://www.mindtools.com/CommSkll/ActiveListening.htm
2. http://www.slideshare.net/alisonkis/dialogue-and-roleplay-activity
3. http://www.hse.ru/pubs/lib/data/access/ram/ticket/2/14309868938d576a532b71360b7354268380727a22/An%20article%20for%20Monika%20(2010).pdf

**Outcomes:**

1. Better Understanding of nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students
4. Good understanding of listening skills and speaking skills and their application in real life situations.
5. Good understanding of non-verbal communication and developing confidence to face audience, shed inhibitions.

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**Course Code: 50B04** **Credits: 2**

**B.Tech. – I Semester**
**APPLIED PHYSICS LAB**
**(Common for EEE, ECE and CSE)**

**List of Experiments:**

1. Dispersion of Light –Dispersive power of material of a given glass and calcite prism.
2. Diffraction grating – Determination of the wavelength of a Sodium vapour lamp.
3. Melde's Experiment – Longitudinal and Transverse modes.
4. The RLC series circuit – Determination of resonant frequency, bandwidth and quality factor.
5. Magnetic field along the axis of current carrying circular coil- Stewart and Gee's experiment.
6. LASER- Diffraction due to single slit.
7. Evaluation of Numerical aperture of the given fiber.
8. Energy band –gap of a material of a P-N junction diode.
9. Torsional Pendulum- Determination of Rigidity modulus of two different wires.
10. Sonometer- Frequency of A.C supply.
11. Newton's Rings (Demonstration only).
12. Michelson interferometer (Demonstration only).

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**Course Code: 50581** **Credits: 2**

**B.Tech. - I Semester**

## COMPUTER PROGRAMMING AND NUMERICAL METHODS LAB
## (Common for ECE AND EEE)

1.
a) Practice various Menu items and debugging techniques in IDE.
b) Practicing sample C programs using Conversion specification.
c) Implement various programs logics using algorithms and flowcharts.

2.
a) Write a C program to find smallest and largest of given three numbers.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program to implement basic arithmetic operations.

3
a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
d) Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.

4. Write C programs that use both recursive and non-recursive functions
a) To find the factorial of a given integer.
b) To find the GCD (greatest common divisor) of two given integers.

5.
a) Write a C program to find both the largest and smallest number in a list of integers.
b)Write a C program that uses functions to perform the following:
i) Addition of Two Matrices
ii)Multiplication of Two Matrices

6
a)Write a C program that uses functions to perform the following operations:
i) To insert a sub-string into given main string from a given position.
ii)To delete n characters from a given position in a given string.
b)Write a C program to determine if the given string is a palindrome or not c) Write a C program to find substring in a given string.

d) Write a C program to count the lines, words and characters in a given text.

7.
a) Write a C program to construct a pyramid of numbers.
b)Write a C program to generate Pascal,,s triangle.

8.
Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x2+x3+... + xn
For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents - if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

9.
a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b)Write a C program to convert a Roman numeral to its decimal equivalent.

10.
a) Write a C program that uses functions to perform the following operations:
i) Reading a complex number
ii) Writing a complex number
iii)Addition of two complex numbers
iv)Multiplication of two complex numbers
(Note: represent complex number using a structure.)
b) Write a C program to find grades of a student"s using structures and unions.

11. Write a C program to find out the roots of non-linear equation using:
a) Bisection method
b) Regular-Falsi method
c) Newton-Raphson method

12 Write a C program to find numerical integration using:
a) Trapezoidal rule.
b) Simpson's 1/3rd Rule
c) Simpson's 3/8th Rule

13. Numerical solution of first order ordinary differential equation using 4th order Runge-Kutta method.

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**Course Code: 50A01** **Audit Course**

**B.Tech. – I Semester**
**NSS&SPORTS**

**(Common for CE, ME, EEE, ECE, CSE and Min.Engineering)**

**Course objectives:**

- To develop physical skills and fitness specific to a particular sport.
- It also is intended to help them appreciate the sport while being able to execute the strategies while playing the game/sport.
- Provide them the training and coaching towards achieving their group goals.
- To give the students health and physical fitness to ensure mental and emotional balance.
- NSS (**National Service Scheme)** provides ample opportunities for the students to participate in the community service programs
- To encourage them to become socially and environmentally sensitive, empathetic and responsible individuals of the nation.

**Module I: [ 2 Periods]**

**Introduction of physical education:** Importance of physical education, Athletics (Track events and combined events), Basket ball, Throw ball, Foot ball.

**Module II: [2 Periods]**

**Youth and yoga**- yoga as a tool for healthy lifestyle, Yoga as a preventive, promotive & curative method. Pranayam and Different Yoga traditions and their impacts.

**Various competitions at different levels-** Athletics (field events), volleyball, handball, cricket. Indoor games: Table Tennis, Caroms, chess

**Module III : [4 Periods]**

**Introduction and Basic concepts of NSS:** History, Philosophy, aims & Objectives of NSS, Emblem, Motto, Song and Other Components of NSS, **NSS Programmes and Activities-Concept of regular activities,** Special camping, Day camps. Basis of adoption of villages/ slums & methodology of survey.

**Module IV: [6 Periods]**

**Volunteerism and Shramdan-** needs &Importance of Volunteerism, Motivation and Constraints of Volunteerism, Shramdan as a part of Volunteerism. **Environmental Issues-** Natural Resource Management (Rain water Harvesting, energy conservation etc.). Waste Management, Disaster Management- Role of youth in Disaster Management.

**Civil / Self Defense-** Aims and objectives of Civil defense and need for self defense training.

**Outcomes:** On completion of this course students will be able to:

1. Develop physical fitness and will know the rules and regulations of various games.
2. emerge victorious in Inter College and inter University competitions.
3. Will build a sense of social and civic responsibility in the students.
4. Participate with confidence and leadership qualities.

**Reference books:**


1. Pamela Grundy & Susan Shackleford, "**Shattering the Glass: The Remarkable History of Women in Basketball**" Published 15th May, 2007.
2. Roger Kahn, " **The Boys of Summer**" , 1st Edition, May 9th 1973.
3. Jaci Burton, "**Perfect Play"**, 1st Edition, Feb 1st 2011, series 1.
4. Silva Mehta, Mira Mehta and Shyam Mehta, **"Yoga: The Iyengar Way",** Published by Knopp, 7th April, 1990.
5. Vishnu-Devananda, **"The Complete Illustrated Book of Yoga",** 18th April, 1995.
6. Timothy McCall, **"Yoga as Medicine: The Yogic Prescription for Health and Healing",** published by Harmony, 31st July 2007.
7. Christopher G. Petre, **"Social Work with Children and Their Families: Pragmatic Foundations "**, Journal Vol:24, No.3, September 18th, 2003, 2nd Edition.
8. Rashmi Bansal, "**Stay Hungry Stay Foolish",** 1st December 2008.
9. Beverly Schwartz, "**Rippling: How Social Entrepreneurs Spread Innovation Throughout the World"**, Published by Jossey – Bass, May 27th 2012.

**2015-16**

# Malla Reddy Engineering College (Autonomous)

**L T P**
**3 - -**

**Course Code: 50582** **Credits: 3**

**B.Tech. - II Semester**

**DATA STRUCTURES THROUGH C**

**(Commonfor ECE AND EEE)**

**Prerequisites:**

Programming knowledge in C language.

**Course Objectives:**

The main objective of this course is to deliver the knowledge in various data structures such as linked lists, stacks, queues, trees and graphs along with the applications. It also provides an overview of the fundamentals in performance analysis of algorithms.

**Module - I : Introduction to data structures and Performance Analysis**

**A : Introduction to data structures**, **[4 Periods]**

Types of data structures: Primitive and Non-primitive data structures, Linear and Non-liner data structures. Definition of Algorithm.

**B : Performance Analysis**: **[6 Periods]**

Time and Space complexities. Asymptotic Notations - BigO, Omega and Theta notations, Recursion definition, Design methodology and implementation of recursive algorithms, Linear and Binary recursion, Recursive algorithms for Factorial of a given number, GCD Computation, Fibonacci sequence, Towers of Hanoi.

**Module – II : Preprocessor Directives , File I/O & Searching and Sorting:**

**A:Preprocessor Directives** **[2 Periods]**

#include, define.

**B: File I/O:** **[5 Periods]**

Basic concepts, Text files and Binary files, File input / output operations, File status functions (error handling), Command-Line Arguments, C programming examples

**C: Searching and Sorting:** **[5 Periods]**

Sorting- selection sort, bubble sort, insertion sort, Searching-linear and binary search methods.

**Module - III Linked lists** **[12 Periods]**

Single Linked Lists, Operations-Insertion, Deletion, Concatenating single linked lists, Circular linked lists, Operations- Insertion, Deletion. Double Linked Lists, Operations-Insertion, Deletion. Sparse matrices - Array and linked representations.

**Module - IV Stacks and Queues**

**A: Stacks:** **[6 Periods]**

Basic stack operations, Representation of a stack using arrays and linked lists, Stack Applications - Reversing list, factorial calculation, postfix expression evaluation, infix-to-postfix conversion.

**B: Queues:** **[6 Periods]**

Basic queue operations, Representation of a queue using array and Linked list, Classification and implementation - Circular, Enqueue and Dequeues, Applications of Queues - Round Robin Algorithm, Priority queues.

**Module - V Trees and Graphs**

**A: Trees:** **[8 Periods]**

Basic concepts, Binary Trees: Properties, Representation of binary trees using arrays and linked lists, operations on a binary tree, binary tree traversals, creation of binary tree from in, pre and post -order traversals, Tree travels using stack, Threaded binary trees.

**B: Graphs:** **[6 Periods]**

Basic concepts, Representations of Graphs using Linked list and Adjacency matrix, Graph algorithms, Graph traversals (BFS & DFS)

**Text Books:**

1. Jean Paul Tremblay, Paul G Sorenson, "**An Introduction to Data Structures with Applications**", Tata Mc Graw Hills, 2nd Edition, 1984.
2. Richard F. Gilberg, Behrouz A. Forouzan - "**Data Structures: A Pseudo code approach with C**", Thomson (India), 2nd Edition, 2004.

**Reference Books:**


1. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan - "**Fundamentals of Data Structure in C"**, University Press (India), 2nd Edition, 2008..
2. A.K.Sharma, **"Data structures using C"**, Pearson, 2nd Edition, June, 2013.
3. R.Thareja, **"Data Structures using C"**, Oxford University Press, 2nd Edition, 2014.


**Outcomes:**

At the end of the course the students will be able to:

1. Be capable to identity and apply the appropriate data structures for real world problems.
2. Understand and implement single, double, and circular linked-lists.
3. Implement the Stacks and Queues using both array based and linked-list based representations.
4. Understand tree data structures, including binary tree, and implements both array based and reference based representations.
5. Implement various algorithms on graph data structures, including finding the minimum spanning tree and shortest path.

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# Malla Reddy Engineering College (Autonomous)

**LTP 22 -**

**Course Code: 50B07** **Credits: 3**

**B.Tech. - II Semester**

**APPLIED PHYSICS - II**

**(Common for CE, ME, EEE, ECE, CSE and Min.Engineering)**

**Prerequisites:** NIL

**Objective:**

The objective to provide clear understanding of magnetism and super conductivity, quantum Mechanics and nanomaterial to apply for Engineering and Technical problems

**Module I: Magnetism & Superconductivity** **[9 Periods]**

Magnetic field and Magnetization, magnetic susceptibility, paramagnetism in transition, rare earth elements; magnetization and total angular momentum (definition and relationship); Ferromagnetism, Anti ferromagnetism and Ferrimagnetism; Curie temperature, Hysteresis; Concept of Perfect Diamagnetism; Meissner effect ; Type I and II Superconductors; BCS theory (qualitative); Applications of Superconductors - Smart magnets, SQUIDs, transmission lines, Mag-Lev Train.

**Module II: Quantum Mechanics** **[8 Periods]**

Louis De-Broglie's concept of Matter Waves; Davisson and Germer's experiment; Heisenberg's Uncertainty Principle, Illustration - Why an electron cannot exist in the nucleus?; Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function; Energy of a particle in a one dimensional infinite potential well; Concept of Potential barrier (Tunneling effect)

**Module III: Band Theory of Solids & Semiconductor Physics**

**A: Band Theory of Solids:** **[8 Periods]**

Qualitative discussion of Classical free electron theory, Fermi - Dirac distribution, Qualitative discussion of Quantum free electron theory; Electron in a periodic Potential (Bloch Theorem), Kronig-Penny Model (Qualitative Treatment), Origin of energy Band formation in solids, Classification of materials into Conductors, Semi-Conductors &Insulators, Concept of effective mass of an electron.

**B: Semiconductor Physics** **[9 Periods]**

Direct and Indirect band gap semiconductors, Expression for Charge carrier concentration in Intrinsic semiconductors; Fermi Level in Intrinsic Semiconductors (Derivation) and Extrinsic semiconductor (dependence on temperature and doping concentration); concept of drift and diffusion currents, Continuity equation, Hall Effect; Photo conductivity, optical response, LED materials, Construction of LED; LCD- characteristics of Liquid crystal materials; actionof LCD display device; numeric displays;

**Module IV: Physics of Nanomaterials [9 Periods]**

Introduction - Nano scale, Surface to volume ratio and Quantum confinement; Optical Properties, Electrical properties; brief description of different methods of synthesis of nano materials - physical (LASER ablation, Ball milling), chemical (Vapor deposition, Sol - gel); Carbon nanotubes - properties and applications**,** Applications of nano materials - automobiles, electronics, medical, cosmetics, textile.

**Module V: Electromagnetic Theory [7 Periods]**

Gradient of Scalar field and its Physical Significance; Divergence and Curl of Vector field; Qualitative treatment of Gauss's Law of electrostatics and Gauss law of magnetostatics, Ampere's law, Faraday's law of electromagnetic induction, Induced E.M.F in a conductor, Lenz's Law , Displacement current, Maxwell equations in differential form, wave equation for free space.

**Text Books:**


1. K Vijay Kumar, S Chandralingam, "**Modern Engineering Physics**'', S. Chand and Company, 1st Edition 2010.
2. D K Bhattacharya, Poonam Tandon, "**Engineering Physics**", Oxford University Press, 1st Edition, 2015.
3. David J Griffiths "**Introduction to Electrodynamics**" Prentice Hall, 4th Edition, 2012.


**Reference Books:**


1. Callister W D Jr, "**Material Science and Engineering: An introduction**", John Wiley & Sons Publications, 8th Edition, 2010.
2. P K Palanisamy, "**Engineering Physics"**, 4th Edition, SciTech Publications, 2014.
3. Ghatak Ajay and Lokanatham, "**Quantum Mechanics"**, Springer Publications, 1st Edition, 2014.
4. G Prasad and Bhimashankaram, "**Engineering Physics"**, B S Publications, 3rd Edition, 2008.
5. Sulabha K. Kulkarni, "**Nano technology - Principles and practices"**, Springer Publications. 3rd Edition, 2014.
6. A K Sawhney, "**Electrical and Electronic Measurements and Instrumentation"**, Dhanpatrai and Sons publications, 19th revised Edition, 2014.


**Outcomes:**

After completion of the course, student will be able to:

1. Distinguish ferro, ferri and anti-ferro magnetic materials and understands different types of superconductors.
2. Understand the Kronig penny model after having learnt one dimensional infinite Potential well problem. This knowledge will further help them to understand the concepts related to semi conductors.
3. The various synthesis methods of nano materials and different applications.
4. Students able to get basic knowledge on electromagnetic theory.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B03** **Credits: 3**

## I-B.Tech.
## Applied Chemistry

**(Common for CE, ME, EEE, ECE, CSE and Min.Engineering)**

**Objective:**

The objective to make the learners aware of the standards and cleaning processes to maintain quality of water and to provide basic knowledge on electrochemistry, corrosion, polymers and energy science to apply for real-life situations.

**Module I: Water** **[10 Periods]**

Hardness of Water: causes of hardness, expression of hardness – units – types of hardness, Alkalinity of water specifications for drinking water (BIS and WHO standards); Estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale &sludge, Priming and foaming, caustic embrittlement; Treatment of boiler feed water – Internal treatment (Phosphate, carbonate and calgon conditioning).External treatment – Lime Soda process and ion exchange process, Numerical Problems. Disinfection of water by chlorination and ozonisation. Desalination by Reverse osmosis.

**Module II: Electrochemistry and Corrosion**

**A: Electrochemistry** **[6 Periods]**

Introduction-Conductance-Specific and Equivalent conductance. Electrochemical cells-EMF, Galvanic Cells, calomel Electrode; Nernst equation and its applications- Batteries: Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell). Applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cell; Applications.

**B: Corrosion:** **[6 Periods]**

Causes and effects of corrosion: Theories of corrosion – Chemical & Electrochemical corrosion; Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (Sacrificial anodic). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (Galvanization), Cementation, Electroplating (Copper plating).

**Module III: Polymers** **[12Periods]**

Types of Polymerization-Chain (Free radical Mechanism)&Step growth. Plastics: Thermoplastic & Thermo setting plastics, Compounding& fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon of Nylon – 6,6 and Bakelite. Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers.Bio degradable polymers: poly lactic acid and poly vinyl acetate. Elastomers: Rubber-vulcanization.
Synthetic Rubber-preparatrion,properties and applications of BUNA-S,SBR.
Fibre-rerinforced polymers-properties and applications.

**Module IV: Energy sciences &Combustion**

**A: Fuels** **[6 Periods]**

Classification – solid fuels: coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining. cracking- fixed bed catalytic cracking. Knocking – octane and cetane rating. Bio-diesels-advantages. Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG.

**B: Combustion** **[6 Periods]**

Definition, Calorific value of fuel – HCV, LCV; Determination of calorific value by Junkers gas calorimeter – Numerical problems on combustion. Renewable energy sources-solar, wind, hydro power and biomass energy advantages, disadvantages and Applications

**Module V:Composites, Nano Chemistry and Green Chemistry**

**A: Composites:** **[3 Periods]**

Basics of composites, composition and characteristics-types of composites –particle and fiber reinforced composites and their applications..Concept of Bio-fuels,Bio sensors,BiSurfactants.

**B: Nano Chemistry:** **[3 Periods]**

Introduction and classification of Nanomaterials (Fullerence, Carbon nano tubes and nanowires only) - Application of nanomaterials.Brief introduction to nanocomposites

**C: Green Chemistry:** **[4 Periods]**

Introduction, principles of green chemistry, introduction to ultrasonic and microwave assisted reactions. Concept of R4M4 (Reduce, Reuse, Recycle, Redesign; Multipurpose, Multidimensional, Multitasking and Multi-tracking).

**Text Books:**


1. P.C.Jain and Monica Jain, "**A text Book of Engineering Chemistry"**, DhanpatRai Publications, New Delhi, 12th Edition 2006.
2. Engineering chemistry by M.Thirumala Chary and E.Laxminarayana,Sci-Tech publications.
3. Engineering chemistry by R.P. Mani and B.Rama Devi by Cengage Learning India Pvt.Ltd.


**Reference Books:**


1. F.W. Billmeyer, "**Text Book of Polymer Science"**, John Wiley & Sons, 4th Edition, 1996.
2. M.G. Fontana, N. D. Greene, "**Corrosion Engineering"**, McGraw Hill Publications, New York, 3rd Edition, 1996.
3. B.R.Puri,L.R.Sharma&M.S.Pathania,"**Principles of Physical Chemistry",** S.Nagin Chand &Co., New Delhi, 23rd Edition, 1993.
4. P.W. Atkins and de Paula Julio, "**Physical Chemistry**", Oxford University Press, 8th Edition, (Indian Student Edition), 2009.
5. G.A.Ozin and A.C. Arsenault,"**Nanochemistry: A Chemical Approach toNanomaterials**", RSC Publishing, 3rdEdition, 2005.


**Outcomes:**

After completion of the course, students will be able to:

1. Understand Water treatment, specifically hardness of water.
2. Acquire knowledge on Electrochemical cell, fuel cells, batteries and its applications.
3. Understand the properties and uses of polymeric materials.

4. Analyze the combustion mechanism of various types of fuels(solid,liquid,gas)
5. Acquire basic knowledge on the concepts of Composites,Nano and Green Chemistry

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50203** **Credits: 3**

**B.Tech. – IISemester**

**ELECTRICAL CIRCUIT ANALYSIS AND SYNTHESIS**

**Prerequisites:**Basic knowledge on Electrical circuits

**Objective:**This course introduces the concepts of circuit analysis which is the foundation for all courses of the Electrical and Electronics Engineering discipline.

**Module I: Network Theorems ( Both AC& DC Networks) [12 periods]**

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation and Tellegen's theorems- Statement of theorems and numerical problems.

**Module II:Three Phase Circuits [10 periods]**

Introduction to three phase circuits – types of connection - Star and delta– Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits –Measurement of active and reactive power of balanced and Unbalanced 3 phase circuits .

**Module III: Two Port Network Parameters [12 periods]**

Open circuit impedance(Z) network parameters, Short circuit admittance(Y) network parameters –Transmission(ABCD), Inverse transmission($A^1B^1C^1D^1$) and hybrid parameters – Relationship between two port network parameters – Reciprocity and Symmetry concepts of two port network parameters.

**Module IV:Transient Analysis ( Both ac & dc networks) [13 periods]**

Introduction - Initial conditions of all elements-Transient response of Series R-L, R-C and R-L-C circuits – Solution using differential equation approach and Laplace transform approach.

**Module V:Network Synthesis [12 periods]**

Hurwitz Polynomials, Positive Real Functions, Frequency Response of Reactive One-Port network, Synthesis of Reactive One Port by Foster's Method, Synthesis of Reactive One Port By Cauer Method, Synthesis of RL, RC and LC One Port Networks by Foster and Cauer Methods.

**Text Books :**

1. William Hayt and Jack E. Kimmerly, "**Engineering circuit analysis**", McGrawHill Company, 6th Edition, 2005.
2. Joseph Edminister&mahmoodNahvi, "**Electric circuits**",Schaum outline Series – Tata McGraw Hill, 3rdEdition, 1999.

**References:**

1. Vanvalkenburg, "**Network Analysis"**, Prentice Hall of India, 3rd Edition, 1974.
2. A. Chakrabarthy, "**Circuit Theory"** by DhanipatRai & Co., 6th Edition, 2010.
3. N. N. Parker smith, "**Problems in Electrical Engineering"**, 9thEdition, 1981.

**Outcomes:**

After completion of the course, students will be able to:

1. Analyze electrical circuits using network theorems.
2. Apply the concepts of three phase electrical circuits to electrical machines and power systems.
3. Calculate the different parameters of a given two port electrical network.
4. Draw the transient response of a network for the given input.
5. Build the electrical circuit for the given impedance, admittance functions.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50301** **Credits: 3**

**B.Tech. – II Semester**

**ENGINEERING GRAPHICS**

**(Common for EEE, ECE and CSE)**

**Prerequisites:** Mathematical Geometry.

**Objectives:** Ability to transform data into drawing to communicate with engineers manually and with the help of AutoCAD software.

**Module I: Introduction to Engineering Drawing[Periods: 6T+12P]**

Principles of Engineering Drawing – Drawing instruments – BIS Conventions - Lettering and Dimensioning practices.

**Curves:** Constructions of Curves used in Engineering Practice:

a) Conic Sections- General method only

b) Cycloid, Epicycloid and Hypocycloid

c) Involutes

**Scales:** Construction of different types of Scales- Plain, Diagonal and Vernier scale.

**Module II: Orthographic Projections:[Periods: 5T+10P]**

**Projection:** Principles of Orthographic Projections – Conventions – First Angle projections.

**Projection of Points**- Including Points in all four quadrants.

**Projection of Lines** - Parallel, perpendicular, inclined to one reference plane and inclined to both reference planes. True length and true angle of a line.

**Module III : Projection of Planes&Projection of Solids**

**A: Projection of Planes : [Periods: 3T+6P]**

Plane parallel, perpendicular, inclined to one reference plane and Plane inclined to both the reference planes.

**B: Projection of Solids: [Periods: 3T+6P]**

Projections of regular solids, cube, prism, pyramid,tetrahedron, cylinder and cone.Axis inclined to both the reference planes.

**Module IV: Development of Surfaces&Isometric Projections**

**A: Development of Surfaces** :**[Periods: 3T+6P]**

Development of Surfaces of Right Regular Solids – Prism, Pyramid,Cylinder, and Cone. Frustum and Truncated solids.

**B:Isometric Projections:[Periods: 3T+6P]**

Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids

**Module V: Transformation of Projections&Introduction to Auto CAD:**

**A:Transformation of Projections : [Periods: 4T+8P]**

Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

**B:Introduction to AutoCAD: [Periods: 1T+2P]**

Basic Display, Construction, Editing and dimensioning Commands.

**Text Books:**

1. N.D. Bhat,"**Engineering Drawing"**, Charotar Publishing House, 53rd Edition, 2014.
2. BasantAgrawal**, "Engineering Drawing"**– Tata McGraw Hill, 2nd Edition, 2013.

**Reference Books:**

1. K.L.Narayana, P. Kannaiah, "**Engineering Drawing"**, SciTech Publishers. 2nd Edition, 2013
2. K. Venugopal, "**Engineering Drawing"**, New Age International Publishers, 3rd Edition, 2014.
3. Trymbaka Murthy, "**Computer Aided Engineering Drawing"**, I.K. international Publishing House, 3rd Edition, 2011.

**Outcomes:**

After completion of the course, students will be able to

1. Understand the importance of curves, Projection of lines, planes and solids in Engineering applications
2. Convert orthographic views to isometric views and vice-versa.
3. Familiarize with AutoCAD two dimensional Commands.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50B05** **Credits: 2**

## B.Tech. – II Semester
## Applied Chemistry LAB
### (Common for CE, ME, EEE, ECE, CSE and Min.Engineering)

**List of Experiments:**

1. Calibration of Volumetric apparatus.
2. Estimation of Hardness of water by EDTA Method.
3. Estimation of acid by pH metry.
4. Estimation of alkalinity of water.
5. Estimation of strong acid by Conductometry.
6. Estimation of strong acid by Potentiometry.
7. Determination of ferrous iron in cement by colorimetry.
8. Determination viscosity of given liquids.
9. Preparation of Bakelite.
10. Preparation of Thiokol Rubber.
11. Determination of surface tension of given sample using stalagnometer.
12. To Study the inversion of cane sugar by polarimeter.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50204** **Credits: 2**

**B.Tech. – II Semester**

**ELECTRICAL CIRCUITS LAB**

1) Verification of The venin's& Norton's Theorems for the given circuit.
2) Verification of maximum Power Transfer Theorem for DC Excitation for the Given 'T' Network
3) Verification of Super Position Theorem for given electrical Network
4) Verification of Compensation Theorem for DC Excitation for the given 'T' Network
5) Verification of Reciprocity Theorem for DC Excitation for the given electrical Network
6) Experimental determination of Quality Factor, Bandwidth and resonant frequency for the given Series & Parallel RLC Circuit.
7) Experimental Determination of Z&Y Parameters for the given 'T' network
8) Experimental determination of Transmission & Hybrid Parameters for the given two port network

**PSPICE Simulation**

9) Determination of branch Currents in a given electrical circuit
10) Determination of node Voltages of a given electrical network
11) Determination of Transient response of a given RL & RC Circuit
12) Determination of Load current and voltage for a given electrical Network.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50302** **Credits: 2**

**B.Tech. – II Semester**

**ENGINEERING WORKSHOP**

**(Common for EEE, ECE and CSE)**

**I. 1. Trades for Exercises:**

**At least two exercises from each trade:**

a) Carpentry
b) Fitting
c) Tin-Smithy
d) House-wiring
e) Foundry
f) IT workshop – Hardware identification and connectivity, assembling, disassembling and OS Installation.

**II. Trades for Demonstration**

a) Machine shop
b) Plumbing
c) Identification of Electronic Components.

**Text Books:**

1**.** P. Kanniah, K. L. Narayana, "**Work Shop Manual"**, SciTech Publishers, 2nd Edition, 2009.

2. K.Venkat Reddy, "**Work Shop Practice Manual"** by, B.S. Publications, 6th Edition, 2015.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**– - 4**

**Course Code: 50583** **Credits: 2**

**B.Tech. - II Semester**

**DATA STRUCTURES THROUGH C LAB**

**(Common for ECE AND EEE)**

**Prerequisites:**

Programming knowledge in C language and data structures

1. Write a recursive program to:
a) Compute the nth Fibonacci number and also display the series.
b) Compute Factorial of a positive integer.
c) Find the GCD (n, m).
d) Solve Towers of Hanoi problem - N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

2.
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line)

3.
a) Write a C program that uses non-recursive function to search for a Key value in a given listof integers using Linear search.
b) Write a C program that uses non-recursive function to search for a Key value in a given sorted list of integers using Binary search.

4.
a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.
b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

5. Write a program that uses functions to perform the following:
a) Create a single linked list of integers.
b) Insert an element in all locations of the single linked list.
c) Implement all delete operations on single linked list.
d) Display the contents of the single linked list after insertion/deletion.

6. Write a program that uses functions to perform the following:
a) Create a circular linked list of integers.
b) Insert an element in all locations of the circular linked list.
c) Implement all delete operations on circular linked list.
d) Display the contents of the circular link list after insertion/deletion.

7.Write a program that uses functions to perform the following:
a)Create a double linked list of integers.
b)Insert an element in all locations of the double linked list.
c)Implement all delete operations on double linked list.
d)display the contents of the double linked list after insertion/deletion.

8. Write a program to implement the sparse matrices using:
a) Arrays
b) Linked list

9. Write a program that implements stack operations using:
a) Arrays
b) Linked lists

10. Write a program that uses Stack operations to:
a) Evaluate Postfix expression.
b) Convert infix expression into postfix expression

11. Write a program that implements Linear Queue operations using:
a) Arrays
b) Linked lists

12. Write a program that implements Circular Queue operations using Arrays

13. Write a program that implements Double-ended Queue operations using Arrays

14.
a) Write a recursive program to create a Binary Tree of integers, traverse the tree in preorder, in order and post order and also print the number of leaf nodes and height of the tree.
b) Write a non-recursive program to create a Binary Tree of integers, traverse the tree in pre-order, in order, post order and also print the number of leaf nodes and height

15. Write a program for implementing the following graph traversal algorithms:
a) Depth First Traversal (DFT)
b) Breadth First Traversal (BFT)

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**3 2 -**

**Course Code: 50B08** **Credits: 4**

**B.Tech. – III Semester**

**ELEMENTARY CALCULUS AND TRANSFORMS**

**PREREQUISITES:** Basics of Mathematics.

**OBJECTIVE:** The main objective of the course is to teach transforms based calculus like Laplace transforms and its applications to real life problems. Particularly while solving the differential equations transforms are the powerful aid to simplify the labor involved in calculation part. For time –invariant systems z-Transforms are useful. Fourier Transforms plays important role to solve some partial differential equations. Curve tracing is a draftsman art to identify the curve nature and by using it one can evaluate multiple integrals in the specified domain.

**MODULE – I: Fourier series and transforms [12 Periods]**

**Fourier series:** Determination of Fourier coefficients – Fourier series – even and odd functions – Half-range Fourier sine and cosine expansions.

Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

**Fourier Transforms:** Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms - Finite Fourier transforms – Parsvel's Identity

**MODULE –II: Z-Transforms &Partial Differential Equations [12 Periods]**

Introduction: Definition, Region of convergence, Linearity property, Damping rule, shifting theorems multiplication theorem, initial value theorem, final value theorem.

Inverse z-transforms: power series method, partial fraction method, convolution theorem, Introduction to Partial differential equations, Formation, Linear partial differential equation (Lagrangian Equation) , Non-Linear Partial Differential equation of first order (standard forms).

**MODULE – III: Curve Tracing and Multiple Integrals [12 Periods]**

Tracing of curves in Cartesian and Polar forms.

Multiple integrals, double and triple integrals, Change of order of integration, change of variables, polar , spherical, cylindrical coordinates.

**MODULE –IV: Differential Calculus [12 Periods]**

Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's mean value Theorem, Generalized Mean Value theorem. (Only statements with geometrical interpretation)

Differentiability of multivariable functions: Jacobian, Functional dependence, Maxima and Minima of functions of two variables with constraints and without constraints (Lagrange's method of multipliers).

**MODULE – V: Vector Calculus: [12 Periods]**

Point function, Gradient, Divergence, Curl, Directional derivative, angle between two surfaces. Line integral – Application to work done by a force, Circulation, Potential function. Surface integrals, volume integrals.Vector integral theorems: Green's theorem-Stoke's and Gauss's Divergence Theorem (without proof). verification.

**TEXT BOOKS:**

1. Kreyszig, **"Advanced engineering Mathematics"**, John Wiley & Sons, 10th Edition, 2010. (ModulesI, II,III,IV&V)
2. B.S. Grewal, **"HigherEngineering Mathematics"**, Khanna Publishers, 43rd Edition, 2014.(ModulesI, II,III,IV&V)
3. Ian Sneddon, **"Elements of Partial Differential equations"**, Dover Publishers, 4th Edition, 2006. (Module II)

**REFERENCES:**

1. R.K. Jain & S.R.K. Iyengar, **"Advanced Engineering Mathematics"**, Narosa Publications, 4th Edition, 2014.
2. Kanti B.Datta, **"Mathematical Methods of Science and Engineering"**, Cengage Learning, 1st Edition, 2011.
3. T.K. V. Iyengar, **"Engineering Mathematics – I"**,S Chand, 13th Edition, 2014.
4. D. S. Chandrasekhar, **"Engineering Mathematics – I"**, Prism Books pvt. LTD, 5th Edition, 1999.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Learn the basic rules in Laplace transformations and able to find associated transformations of the defined function.
2. Solve ordinary differential equations by using Laplace Transformations.
3. Learn the concept of region of convergence for the time-invariant systems and associated transformations.
4. Learn the basic rules to form the partial differential equation and solution techniques.
5. Learn the concept of slope of a curve which can be mapped to functions to evaluate mean values.
6. Learn the concept of curve tracing which can use in evaluating the multiple integrals
7. Find the Gradient, Divergence and Curl of a vector valued function in order to evaluate work done by a force, Angular velocity.
8. Know the concept of Line integral, surface integral and volume integral which are used in verifying the Green's and Gauss and Stokes theorems.

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# Malla Reddy Engineering College (Autonomous)

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**2 - -**

**Course Code: 50H16** **Credits: 2**

**B.Tech. – III Semester**

**ENVIRONMENTAL SCIENCES**

**PREREQUISITES:** Environment

**OBJECTIVE:** An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences including geo systems, biology, chemistry, economics, political science and international processes. The ability to work effectively as a member of an interdisciplinary team on complex problems of environment.

**MODULE - I: Ecosystems [07 Periods]**
Definition, Scope and Importance of ecosystem, Concept ofecosystem, Classification of ecosystems, Structural Components of anecosystem, Functions ofecosystem,Foodchains,foodwebsandecological pyramids.Flowofenergy.

**MODULE - II: Natural resources, Biodiversity and biotic resources[09 Periods] Natural resources:** Classification ofResources:LivingandNon-Livingresources,Renewableandnon-renewableresources.
Waterresources:useandoverutilizationofsurfaceandgroundwater, floodsanddroughts, Dams: benefits andproblems. Mineralresources: use andexploitation,environmentaleffectsofextractingandusingmineralresources– casestudies.Growingenergyneeds-Energyresources:renewableandnonrenewableenergysources.
**Biodiversity and biotic resources:**Introduction, Definition, genetic,species and ecosystemdiversity.Valueofbiodiversity:consumptiveuse,productiveuse,social,ethical,aesthetic and intrinsicvalues.

**MODULE - III: Environmentalpollutionandcontrol [09 Periods]**
Classificationofpollution andpollutants, causes,effectsandcontroltechnologies.AirPollution:Primaryandsecondarypollutants,Automobileand Industrialpollution,Ambientairqualitystandards.Waterpollution:Pointandnon-pointsourcesofpollution, Major pollutantsofwaterandtheirsources,drinkingwaterquality standards,SoilPollution:Soilassinkforpollutants,Impactofmodernagricultureonsoil,degradation ofsoil.MarinePollution:
MisuseofInternationalwaterfordumpingofhazardouswaste,coastalpollutiondue tosewage and marine disposal of industrial effluents.

**MODULE - IV: Globalenvironmentalproblemsand globalefforts [06 Periods]**
Greenhouseeffect,GreenHouse Gases (GHG), Global Warming, Sea level rise, climate change andtheir impacts on humanenvironment.OzonedepletionandOzonedepletingsubstances(ODS).Deforestation anddesertification.Internationalconventions/Protocols:Earthsummit,Kyotoprotocol andMontréalProtocol.

**MODULE - V:TowardsSustainableFuture[08 Periods]** Concept ofSustainable Development,Threatsto Sustainability, Populationanditsexplosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainabledevelopment, EnvironmentalEducation,Conservation ofResources,UrbanSprawl,Sustainable CitiesandSustainable

Communities,Humanhealth,RoleofITinEnvironment,EnvironmentalEthics,EnvironmentalEconomics,ConceptofGreenBuilding,CleanDevelopmentMechanism(CDM).

**TEXT BOOKS:**

1. R.Rajagopalan, **"Environmental studiesFromcrisistocure"**, Oxford University Press,2nd Edition, 2005. (Modules I, II, III, IV)
2. Anubha Kaushik, C.P.Kaushik, **"Environmental studies"** New age International Publishers,4th Edition,2012. (Modules I, II, III, IV & V)
3. Erach Bharucha, **"Environmental studies"**UniversityGrants Commission,and UniversityPress, 1stEdition, 2005. (Modules I, II, III, IV & V)

**REFERENCE BOOKS:**

1. M.AnjiReddy "**TextbookofEnvironmental ScienceandTechnology"**3rd Edition, 2007.
2. RichardT.Wright, **"EnvironmentalScience:towardsasustainablefuture"**PHLLearning, PrivateLtd.NewDelhi, 2nd Edition, 2008.
3. Gilbert McMastersandWendell P.Ela, **"Environmental Engineeringandscience"**,3rd Edition,PHI Learning Pvt.Ltd., 2008.

**OUTCOMES:**

At the end of the course students are able to:

1. Enable the students to realize the importance of the sustainable use of natural resources.
2. Make the students aware of the impacts of human actions on environment and measures to minimize and mitigate them.
3. Enable the students to become aware of the current issues and problems pertaining to the environment.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50205** **Credits: 3**

**B.Tech. – III Semester**

## ELECTROMAGNETIC FIELDS

**Prerequisites: Basic concepts of electric and magnetic field**

**Objective:**To expose the students to a variety of basic laws which drive all the electrical and electronics devices. The two categories of fields are studied in this subject i.e. electro static and dynamic, magneto static, and dynamic or time varying with their mathematical formulations.

**Module I: Introduction To Electrostatics [14periods]**

Sources and effects of electromagnetic fields – Vector fields – Different co-ordinate systems – Divergence theorem –Stroke's theorem. Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge –Electric Potential– Properties of potential function – Potential gradient – Gauss's law – Application of Gauss's Law – Maxwell's first law. Laplace's and Poison's equations – Solution of Laplace's equation in one variable.

**Module II: Conductors, Dielectric & Capacitance :[13periods]**

Electric dipole – Dipole moment – potential and EFI due to an electric dipole. Conductors and Insulators. Introduction to permanent magnets, their characteristics and applications.

Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics – Energy stored and energy density in a static electric field – Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity.

**Module III: Magneto Statics, Ampere's circuital law:[12periods]**

Static magnetic fields – Biot Savart's law – Oesterd's experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation. Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Maxwell's third equation.

**Module IV: Force in Magnetic fields, Magnetic Potential:[13periods]**

Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field.

Scalar Magnetic potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson's equations.

**Module V: Inductance, Time Varying Fields:[12periods]**

Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid, toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field. Time varying fields – Faraday's laws of electromagnetic induction – Maxwell's fourth equation – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

**Text Books:**


1) William H. Hayt & John. A. Buck"**Engineering Electromagnetics**"- Mc. Graw-Hill Companies, 7th Editon, 2012.
2) Sadiku,"**Electromagnetic Fields**"-Oxford Publications, 7th edition, 2006.


**Reference Books:**


1. D J Griffiths, "**Introduction to Electro Dynamics**" - Prentice-Hall of India Pvt. Ltd, 2nd editon, 1989.
1. J P Tewari, "**Electromagnetic**s" - Khanna Publishers, 2nd edition, 2005.
2. J. D Kraus,"**Electromagnetics**" -Mc Graw-Hill Inc, 4thedition 1992.
3. S. Kamakshaiah, "Electromagnetic fields" - Right Publishers, 2007.


**Outcome**:

After reading this subject students are able to understand the properties of electric fields and its divergence principles, and properties of magnetic field and its curl principles. Students are also aware of Maxwell's equations and its importance.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50401** **Credits: 3**

**B.Tech. – II Semester**

## ELECTRONIC DEVICES AND CIRCUITS

**Prerequisites:** Fundamental concepts of Physics

**Objective:** This course introduces the construction, principle of operation and characteristics of electronic devices like diodes, transistors, FET's etc.. This course also provides the knowledge on biasing of BJT's & FET's, transistor as an amplifier and applications of diodes.

**Module I: Semiconductor Diode Characteristics [15 periods]**

Review of Semiconductor Physics, Qualitative theory of the p-n Junction, the p-n junction as a diode, band structure ofan open circuited p-n junction, the current components in a p-n diode, quantitative theory of the p-n diode currents, the volt ampere characteristics, the temperature dependence of V-I characteristics, diode resistance, ideal versus practical diodes, diode equivalent circuits, space charge or transition capacitance $C_T$, diffusion capacitance, breakdown mechanism in diode.

**Module II : Rectifiers, Filters &Special Semiconductor Devices**

**A: Rectifiers, Filters: [7 periods]**

Introduction, load line analysis, half-wave rectification, full-wave rectification, general filter considerations, Inductive, Capacitive, LC and CLC filters.

**B: Special Semiconductor Devices:[8 periods]**

Zener diode**,** V-I characteristics of Zener diode, Zener diode as voltage regulator ,Principle of operation, Characteristics and applications of Tunnel diode, Varactor diode, UJT,Photo Diode, LED, LCD, SCR.

**Module III: Bipolar Junction Transistors [7 periods]**

Introduction, transistor construction, transistor operation, transistor current components,transistor as an amplifier, common base configuration, common emitter configuration, common collector configuration, limits of operation, transistor specifications.

**Module IV: Field Effect Transistors [8 periods]**

Junction Field Effect Transistor (JFET) - Principle of operation, volt ampere characteristics, advantagesof JFET over BJT. Introduction to MOSFETs - depletion and enhancement type MOSFETs, operation and volt-ampere characteristics.

**Module V A: BJT Biasing&FET Biasing**

**A: BJT Biasing: [8 periods]**

Need for biasing, Operating point, load line analysis, bias stabilization techniques: fixed bias, collector to base bias,self-bias, Stabilization against variations in $I_{co}$, $V_{BE}$ and $\beta$ for the self bias circuit, bias compensation techniques, thermal runaway and thermal stability.

**B: FET Biasing [7 periods]**

Biasing techniques: Fixed bias, Source self-bias, Voltage divider bias.

**Text Books:**

1. Jacob Milliman, Christos C .Halkias, Satyabrata Jit, "**Electronic Devices and Circuits"**, McGraw Hill (India) ,3rd edition, 2013.
2. S. Shalivahanan, N. Suresh Kumar, A. Vallavaraj**, "Electronic Devices and Circuits"**, Tata McGraw Hill( India), 3rd edition, 2007.
3. Robert Boylestad, Lowis Nashelsky, "**Electronic Devices and Circuit Theory"**, Prentice Hall of India, 5th edition, 1993.

**References:**

1. David. A. Bell, "**Electronic Devices and Circuits"**, Prentice Hall of India, 4th Edition, 1986.
2. G. K. Mittal, "**Electronic Devices and Circuits"**, Khanna Publications, 22nd Edition, 1999.
3. Theodore. F. Bogart Jr. Jeffrey S. Beasley, Guillermo Rico, "**Electronic Devices and Circuits",** Pearson Education( India), 6th edition , 2004.

**Outcomes:**

After completion of the course, students will be able to:

1. Analyze operating principles of major electronic devices, its characteristics and applications
2. Know applications of diodes and transistors in rectifiers and amplifiers circuits.
3. Design and analyze the DC bias circuitry of BJT & FET.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50408** **Credits: 3**

**B.Tech. – IV Semester**

**DIGITAL ELECTRONICS**

**PREREQUISITES:**BasicMathematics.

**OBJECTIVE:**This course is to introduce the basics of number systems, radix conversions, representing the numbers using various codes, code properties and studying about logic gates. This course helps the students in building the digital electronic circuits using gates, combinational logic, sequential logic, Flip Flops and the state machine analysis & applications of state machines.

**MODULE – I:Number systems&Binary codes [10 Periods]**

**Number systems:** Number Systems, Radix conversions, complement of numbers.

**Binary codes:** Binary codes, Weighted and non-Weighted codes, BCD code, gray code, excess 3 codes - Error detecting code, Error Correcting code, Hamming Code, Introduction to HDL Programming.

**MODULE – II:Boolean Algebra&Boolean functions[13 Periods]**

**Boolean Algebra:** Postulates and Theorems - Canonical and Standard forms: SOP and POS forms, Minterms and Maxterms –Logic gates: NOT, OR, AND, NOR, NAND, XOR, XNOR - Universal gates, HDL codes for all the gates

**Simplification of Boolean functions:** Simplification of functions: Karnaugh map(2,3,4,5,6 Variables) and Quine McCluskey method (Tabular Method) - Prime implicants, essential prime implicants.

**MODULE - III:Combinational Logic Circuits [13 Periods]**

Arithmetic circuits: Half adder, full adder, half Subtractor, full Subtractor, binary adder, Carry look ahead adder, BCD adder, Code conversion circuits, Comparator, Decoder, Encoder, Priority Encoder, Multiplexers and Design, De – Multiplexers, ROM, PLA, PAL, HDL codes for Half adder, Half Subtractor, Comparator, Decoder, Encoder and Multiplexer.

**MODULE – IV: Sequential Logic Circuits - I [12 Periods]**

Introduction –Latches and Flip flops: Basic Flip flop circuit, RS, D, JK and T Flip-flops – Triggering of Flip flops: Master Slave Flip flop, edge triggered flip flop – Conversion of one type of Flip flop to another,Setup time, hold time.

**Counters:** Registers, shift register, Ripple counter, Synchronous counter, binary up/down counter, Johnson counter, HDL code for RS,D,JK and T Flip-flops, Registers and Counters.

**MODULE – V:Sequential Logic Circuits - II [12 Periods]**

**Analysis of Sequential Logic circuit:** State Diagram, state table, reduction of state table, state Assignment –- Design procedure of sequential circuits using state diagram, state table and Flip flops. Example design Sequence detector.

**Finite State Machine:** Introduction, FSM capabilities and Limitations, Mealy and Moore models – minimization of completely specified and incompletely specified sequential Machines. Partition techniques and Merger charts

**TEXT BOOKS:**

1. Morris Mano,**"Digital Design"**,PHI, 3rd Edition, 2009.(Units V)
2. A.Anand Kumar,**"Switching Theory and Logic Design"**,PHI 2nd Edition, 2014.(UnitI,II,III,IV&V)
3. John F.Wakerly, **"Digital Design Principles & Practices"**, PHI/ Pearson Education Asia, 3rd Ed., 2005.

**REFERENCE BOOKS:**

1. Zvi Kohavi, **"Switching and Finite Automata Theory"**,TMH, 2nd edition, 2006.
2. Stephen Brown and Zvonka Vramesic, **"Fundamentals of Digital Logic with VHDL Design"**,McGraw Hill, 2nd Edition, 2008.
3. William I. Fletcher, **"An Engineering Approach to Digital Design"**, PHI, 1st Edition, 2009.
4. J.Bhasker , **"VHDL Primer"**, Pearson Education / PHI, 3rd Edition, 1999.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Work on various number systems, radix and codes used to represent the numbers.
2. Understand the logic gates, truth tables, Boolean function simplifications.
3. Build the combinational and sequential circuits.
4. Understand the state machine, analyze & develop the applications using state machines.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50315** **Credits: 3**

**B.Tech. – III Semester**

## FLUID MECHANICS AND HYDRAULIC MACHINES

**Pre-requisite:** Nil

**Objective:** The objective of this subject is to provide the basic knowledge of fluids behavior at different conditions, provide knowledge of working principle of different turbines, and also provide knowledge of calculating performance of turbines and pumps.

**MODULE - I**

**Fluid statics:** Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure –measurement of pressure- Piezometer, U-tube and differential manometers.

**MODULE - II**

**Fluid kinematics:** Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform & non uniform, laminar & turbulent, rotational and irrotational flows-equation of continuity for one dimensional flow.

**Fluid dynamics** : Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, Measurement of flow: pilot tube, venturimeter, and orifice meter, Flow nozzle, Turbine flow meter, momentum equation and its application on pipe bend.

**MODULE - III**

**Closed conduit flow:** Reynold'sexperiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line

**Boundary Layer Concepts:** Definition, thickness, characteristics alon thin plate, laminar and turbulent boundary layers (No derivation) boundary layer in transition, separation of boundary layer, submerged objects – drag and lift.

**MODULE - IV**

**Basics of turbo machinery:** Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work don and efficiency, flow over radial vanes.

**Hydraulic Turbines** : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design –draft tube theory- functions and efficiency.

**Performance of hydraulic turbines:** Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

**MODULE – V**

**Centrifugal pumps:** Classification, working, work done – manomertic head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH.

**Reciprocating pumps:** Working, Discharge, slip, indicator diagrams.

**Text Books:**

1. Streeter**"Fluid Mechanics"** / / McGrawhill Publications
2. MODI and SETH **"Hydraulics, fluid mechanics and Hydraulic machinery",** Standard Book House

**References Books:**

1. D.S. Kumar**"Fluid Mechanics and Fluid Power Engineering"**, Kotaria & Sons.
2. D. Rama Durgaiah **"Fluid Mechanics and Machinery"**, New Age International.
3. James W. Dally, William E. Riley**"Instrumentation for Engineering Measurements",** John Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements).
4. Rajput**"Fluid Mechanics and Hydraulic Machines",** S.Chand Publications

**Outcome:**

1. The students shall be able to know thebehavior fluids at different conditions
2. The student shall be able to apply the knowledge to access the performance of hydraulic machines.
3. The students are able to calculate the performance of pumps and turbines.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50402** **Credits: 2**

**B.Tech. – III Semester**

## ELECTRONIC DEVICES AND CIRCUITS LAB

**Part A: (Only for Viva-voce Examination)**

**Electronic Workshop Practice (In 3 Lab Sessions):**

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   i. Multimeters (Analog and Digital)
   ii. Function Generator
   iii. Regulated Power Supplies
   iv. CRO.

**Part B: For Laboratory Examination ( Both Hardware & Software)**

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Input & Output Characteristics of Transistor in CC Configuration.
6. Half Wave Rectifier with & without filters.
7. Full Wave Rectifier with & without filters.
8. FET characteristics.
9. SCR characteristics.
10. UJT Characteristics

**Equipment required for Laboratories:**

| Sl.No. | Equipment Description | Specifications / Range |
|---|---|---|
| 1. | Regulated Power supplies (RPS) | 0-30 V |
| 2. | CRO's | 0-30 MHz |
| 3. | Function Generators | 0-1 MHz |
| 4. | Multimeters | -- |
| 5. | Decade Resistance Boxes/Rheostats | -- |
| 6. | Decade Capacitance Boxes | -- |
| 7. | Decade Inductance Boxes | -- |
| 8. | Digital Ammeters | 0-10μA, 0-200μA, 0-20 mA |
| 9. | Digital Voltmeters | 0-20V,0-100V |
| 10. | Discrete Electronic Components | Resistors, Capacitors, BJTs, UJTs, LEDs, Diodes-Ge or Si, Step down Transformers. |

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# MALLA REDDY ENGINEERING COLLEGE(*Autonomous)*

**Course Code:50317** **L T P**

**- - 4**

**Credits: 2**

## B.Tech. – III Semester
## FLUID MECHANICS AND HYDRAULIC MACHINES LAB

1. Impact of jet on Vanes.

2. Performance Test on Pelton Wheel.

3. Performance Test on Francis Turbine.

4. Performance Test on Kaplan Turbine.

5. Performance Test on Single Stage Centrifugal Pump.

6. Performance Test on Multi Stage Centrifugal Pump.

7. Performance Test on Reciprocating Pump.

8. Calibration of Venturimeter.

9. Calibration of Orifice meter.

10. Determination of friction factor for a given pipe line.

11. Determination of loss of head due to sudden contraction in a pipeline.

12. Verification of Bernoulli's Theorems.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**-2-**

**Course Code: 50A03** **Credits: Audit Course**

## B.Tech. – III Semester
## LAW FOR ENGINEERS

**Objective:**The objective of the course is to familiarize students (Prospective engineers) withelementary knowledge of laws that would be of utility in their profession. The syllabuscovers Constitution of India and new areas of law like Cyber, IPR, Human Rights, Right toInformation, Corporate and Labour.

**Module I** **[6 Periods]**

Constitutional Law covering the Preamble; Fundamental Rights, Fundamental Duties;
Human Rights and Public International Law - Theoretical foundation, human rights and international law; UNMechanism and specialized agencies, (UNICEF, UNESCO, WHO, ILO);International NGOs – Amnesty International, Human Rights Watch, Greenpeace Foundation;Enforcement of Human Rights in India including Supreme Court, High Courts, StatutoryCommissions – NHRC, NCW, NCM, NC-SCST.

**Module II** **[6 Periods]**

Right to Information Act, 2005 - Evolution and concept; Practice andprocedures;
Labour Laws - Industrial Employment ( Standing Orders) Act, 1946; Workmen's Compensation Act, 1923;(3 Lectures)
Corporate Laws - Law relating to public, private and multinationalcompanies, collaboration agreements fortechnology transfer

**Module III** **[6 Periods]**

Introduction to IT laws & Cyber Crimes –Cyber Crime Investigation and Cyber Security.
Intellectual property – meaning, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets;Patentable inventions, Rights and obligations of patentee, Duration of patents – law andpolicy considerations, Infringement and related remedies;

**Books:**


1. H.M. Seervai - Constitutional Law of India - Tripathi Publications – 4th Edition, 1991
2. S.K. Kapur - Human Rights under International Law and Indian Law - Central Law Agency – 2001
3. Cornish W. R. - Intellectual Property Rights, Patents, Trademarks, Copyrights & Allied Rights - Sweet & Maxwell– 2008
4. Avtarsingh - Company Law - Eastern Book Co.–2007
5. James Graham - Cyber Security Essentials - CRC Press - 1st Ed., 2011


**Outcomes:**

After the course, the student will able to:
1. Understand Fundamental rights, duties and different organizations for human rights protection.
2. Know Labour laws, Corporate Law and Right to Information Act.
3. Learn about Intellectual property rights, cyber crimes and laws.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50B10** **Credits: 4**

**B.Tech. – IV Semester**

**SPECIAL FUNCTIONS AND COMPLEX ANALYSIS**

**PREREQUISITES:**Differential Calculus.

**OBJECTIVE:**The main objective of this course is to introduction of the concept of series solution representation for a selected differential equation. Also we are introduced limited special functions in addition with the theory of complex analysis. For every differential equation closed form solution need not exist. In such case one can depend on series solution representation due to Frobenius. Here the idea is to get the solution in the form of infinite convergent series. Special functions are useful to evaluate improper integrals. The concept of Compex theory is introduced to test the Analyticity of a complex valued function in the Argand plane. Singularities and their classification including the notion of Residue are discussed which are useful to evaluate some typical improper integrals. Conformal mapping and its properties are discussed to learn the mapping of points from Z plane to W plane.

**MODULE - I: Series Solution & Beta, Gamma functions [12 Periods]** Motivation for series solution, Ordinary point and Regular singular point of a differential equation, Series solutions to differential equations around zero , Frobenius Method about zero. Beta function, Gamma function, relationship between them, Properties.

**MODULE-II: Legendre's & Bessel's Polynomials [12 Periods]** Legendre's Differential equation, General solution of Legendre's equation, Legendre's Polynomials & Properties.
Bessel's Differential equation, General solution of Bessel's equation, Bessel functions properties.

**MODULE-III: Complex Functions –Differentiation and Integration [12 Periods]**
Complex functions and its representation on Argand plane, Concepts of limit, Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method.
Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

**MODULE-IV: Power series expansions of complex functions and contour Integration**
**[12Periods]** Radius of convergence -Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity.
Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals by indentation
(a) $\int_c^{c+2\pi} f(\cos\theta \quad ,\sin\theta)d\theta$ (b) $\int_{-\infty}^{\infty} f(x)dx$

**MODULE- V: Conformal mapping [12Periods]** Transformation of z-plane to w-plane by a function, conformal mapping. Standard transformations, Translation; Magnification and rotation; inversion and reflection, Transformations like $e^z$, log z, $z^2$, Bilinear transformation ,Properties of Bilinear transformation, determination of bilinear transformation ,when mappings of 3 points are given.

**TEXT BOOKS:**

1) Ruel Churchill, **Complex Variables and Applications by James Brown**, McGraw Hill Education. 8th Edition, 1970.(Modules III,IV&V)
2) E Kreyszig, **Advanced Engineering Mathematics**, John Wiley & Sons, 10th Edition, 2010. (Modules I,II,III,IV&V)
3) B.S. Grewal, **Higher Engineering Mathematics**, Khanna Publishers. 40th Edition, 2014. (Modules I,II,III,IV&V)

**REFERENCES:**

1) A.K.Kapoor, **Complex Variables Principles And Problem Sessions**, World Scientific Publishers, 1st Edition, 2011.
2) K.B.Datta, **Mathematics for Engineers,** Cengage Publications, 1st Edition, 2013.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Apply the special functions in real-life applications such as engineering; it can be used in determining the flow of fluids, such as the flow around the pipe.
2. In Fluid mechanics, the Cauchy-reimann equations are described by two complex variables. One can assess the flow nature.
3. Conformal mapping is a power aid to study the image patterns in w-plane as compared with the z-plane. One can learn the concept of fixed point notion.

# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50206** **Credits: 3**

**B.Tech. – IV – Semester**

**POWER GENERATION & DISTRIBUTION**

**Objective:**

Electrical Power plays significant role in day to day life of entire mankind. This course concerns the generation and distribution of power along with the economic aspects.

**Module I: Power Stations**

**Thermal Power Stations [12 Periods]**

Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses.- Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

**Nuclear Power Stations**

Nuclear Power Stations: Nuclear Fission and Chain reaction.- Nuclear fuels.- Principle of operation of Nuclear reactor.-Reactor Components: Moderators, Control rods, Reflectors and Coolants.- Radiation hazards: Shielding and Safety precautions.- Types of Nuclear reactors and brief description of PWR, BWR and FBR.
**Gas Power Stations**: Principle of Operation and Components ( Block Diagram Approach Only)

**Module II:General Aspects of Distribution Systems and D.C. and A.C Distribution Systems [12 Periods]**

Classification of Distribution Systems - Comparison of DC vs AC and Under-Ground vs Over - Head Distribution Systems- Requirements and Design features of Distribution Systems-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

**Module III: Air insulated & Gas insulated substations (GIS) [10 Periods]**

Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.
– Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

**Module IV: Power factor and Voltage Control [10 Periods]**
Causes of low p.f -Methods of Improving p.f -Phase advancing and generation of reactive KVAR using static Capacitors-Most economical p.f. for constant KW load and constant KVA type loads, Numerical Problems. Dependency of Voltage on Reactive Power flow.- Methods

of Voltage Control: Shunt Capacitors, Series Capacitors, Synchronous Capacitors, Tap changing and Booster Transformers

**Module V: Economic Aspects of Power Generation & Tariff Methods[10 Periods]**

Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems. Costs of Generation and their division into Fixed, Semi-fixed and Running Costs.

Desirable Characteristics of a Tariff Method.-Tariff Methods: Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods and Numerical Problems**.**

**Text Books:**

1. V.K Mehta and Rohit Mehta, **"Principles of Power systems by s.chand Company h/t. Ltd"**, New Dethi2004.
2. PSR. Murty**, " Electrical Power Systems",** BS publications.

**References:**

1. R. K. Rajput, **"A Text book of Power system Engineering"**, Laxmi Publications (P) Limited.
2. S.N.Singh , **"Electrical Power Generation, Transmission and Distribution"**, PHl.
3. C.L.wadhawa, **"Electrical Power systems"**, New Age lntemational (P) Limited, Pubtishers.
4. Dr. B. R. Gupta, **"Generation of Electrical Energy"**, S. Chand.

**Outcomes:**

After going through this course the student will be able to

1. Draw and explain the layouts of Thermal Power station, Nuclear Power Plant and Gas Power plant
2. Derive the equations for voltage drops in DC and AC distribution systems
3. Define Load, diversity, demand and Plant use factors
4. Describe various Tariff methods

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# Malla Reddy Engineering College (Autonomous)

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**3 - -**

**Course Code: 50410** **Credits: 3**

**B.Tech. – IV Semester**

**PULSE AND DIGITAL CIRCUITS**

**PREREQUISITES:** Analog & Digital Devices and Circuits.

**OBJECTIVE:** This course introduces the concepts of complete response of R-C and R-L circuits, clippers, clampers, switching characteristics of transistors and sampling gates. It also contains various multi vibrators using transistors, design of sweep circuits and sampling gates and realizes logic gates using diodes and transistors.

**MODULE – I: Linear Wave Shaping[10 Periods]** High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and exponential inputs, high pass RC circuit as differentiator and low pass RC circuit as integrator, attenuators, High pass and low pass RL circuits, Applications of High pass and low pass RC circuits.

**MODULE –II: Non-Linear Wave Shaping[12 Periods] Non-Linear Wave Shaping:** Diode clippers, transistor clippers, clipping at two independent levels, emitter coupled clipper, comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, clamping circuit theorem, practical clamping circuits, Applications of Clippers and Clampers.

**Steady State Switching Characteristics of Diodes & Transistors:** Diode as a switch, diode switching times, temperature variation of saturation parameters, design of transistor as a switch, transistor-switching times, Applications of transistor as a switch.

**MODULE –III:Multivibrators[16 Periods]**

**BISTABLE Multivibrators:** The stable state of a Bistable multivibrator, design and analysis of fixed bias and self biased Bistable multivibrator, triggering of Bistable multivibrator, emitter coupled Bistable multivibrator, and Design and analysis of Schmitt trigger circuit using transistors.

**MONOSTABLE and ASTABLE Multivibrators:** Monostable multivibrator, design and analysis of collector coupled Monostable multivibrator and Monostable multi as voltage-to-time converter, Astable multivibrator, collector coupled Astable multivibrator and Astable multi as voltage-to-frequency converter, Applications of Monostable and Astable multivibrators.

**MODULE –IV: Sampling Gates and Logic Families [12 Periods]**

**Sampling Gates:** Basic operating principles of sampling gates, Unidirectional diode gate, Bi-directional sampling gates using transistors and diodes, Reduction of pedestal in gate circuit, four diode sampling gate, an alternate form of four diode gate, Applications of sampling gates

**Logic Families:** Realization of Logic Gates (OR, AND, NOT) Using Diodes & Transistors, DCTL, RTL, DTL, TTL, ECL, CMOS logic family and comparison of logic families, Applications of Logic families.

**MODULE –V: Time Base Generators and Synchronizing Circuits [10 Periods]**

General features of a time base signal, methods of generating time base waveform and errors, UJT Relaxation oscillator, miller and bootstrap time base generators – basic principles,

transistor miller time base generator, transistor bootstrap time base generator.

**Synchronization and Frequency Division:** Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, monostable relaxation circuits, synchronization of a sweep circuit with symmetrical signals.

**TEXT BOOKS:**

1. Jacob Millman, Herbert Taub, Mothiki S. Prakash Rao, **"Pulse, Digital and Switching Waveforms"**, Tata McGraw Hill, New Delhi, 3rd edition, 2008. (Modules I,II,III,IV&V)
2. Anand Kumar, **"Pulse and Digital Circuits"**, Prentice Hall of India, India, 2005. (Modules I,II,III,IV&V)

**REFERENCE BOOKS:**

1. David A. Bell **"Solid state pulse circuits"**, Prentice Hall of India, New Delhi, India. 4th edition, 2002.
2. Mothiki S. Prakash Rao, **"Pulse and Digital Circuits"**, Tata McGraw Hill, India, 2006.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Understand the integrator, differentiator, applications of diode as clippers, clamper circuits.
2. Learn various switching devices such as diode, transistor.
3. Design of multivibrators for various applications, synchronization techniques and sweep circuits.
4. Realizing logic gates using diodes and transistors & various logic families.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50207** **Credits: 3**

**B.Tech. – IV Semester**

**DC MACHINES &TRANSFORMERS**

**OBJECTIVE**

This course introduces the concepts of various AC & DC machines in Electrical Engineering discipline. The emphasis of this course is laid on the machines which include D.C. Generators, D.C Motors, Single phase transformers, Auto transformers & Poly phase transformers.

**Module -I**

**ELECTRO MAGNETIC INDUCTION & BASIC CONCEPTS IN ROTATING MACHINES**

Introduction to magnetic circuits – Magnetically induced EMF and force – AC operation of magnetic circuits –. Energy in magnetic systems – Field energy & mechanical force – Single and Multiple excited systems. MMF of distributed windings – Magnetic fields in rotating machines – Generated voltages – Torque.

**Module - II D.C. Generators**

Construction &Principle of Operation of D.C. Generators – E.M.F Equation- Types of D.C Generators –Armature reaction –Methods of decreasing the effects of armature reaction– Compensating winding-Commutation– Methods of improving commutation.– O.C.C-Voltage build up in generators-Critical field resistance and critical speed - Causes for failure to self excite and Remedial measures–Load characteristics of shunt, series and compound generators.

**Module - III D.C Motors**

Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation–Speed control-3 point and 4 point starters–Constant and Variable losses-calculation of efficiency – condition for maximum efficiency – brake test – Swinburne's test –Hopkinson's test.

**Module – IV Single phase transformers**

Types - constructional details-emf equation - operation on no load and on load - phasor diagrams– Equivalent circuit - losses and efficiency-regulation. All day efficiency-effect of frequency & supply voltage on core losses- minimization of hystersis and eddy current losses.

**Testing of Single Phase Transformer**

O.C and S.C tests - Sumner's test - predetermination of efficiency and regulation-separation of losses test-Parallel operation with equal and unequal voltage ratios.

**Module - V Auto transformers & Poly-phase transformers**

Auto transformers- comparison with two winding transformers-Poly-phase transformers – Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ - open Δ-Scott connection -three winding

transformers-tertiary windings-determination of Zp, Zs and Zt transients in switching - off load and on load tap changing.

**TEXT BOOK**

1. Electric Machines –by I.J.Nagrath & D.P.Kothari,Tata Mc Graw Hill, 7th Edition.2005

**REFERENCES**


1. Electric Machinery – A. E. Fitzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies, 5th editon
2. Electrical Machines – P.S. Bimbra. Khanna Publishers
3. Electric Machines –by Ashfaq Husain, Danapati Rai&Co, New Delahi, 2002 edition.

**Course Code: 50208** **Credits: 3**

**B.Tech. – IVSemester**

**CONTROL SYSTEMS**

**PREREQUISITES:**Basic of Mathematics, Laplace Transforms and Matrices.

**OBJECTIVE:**This course introduces the basics of control systems, types of control systems, mathematical modeling, block diagram representation, signal flow graph, Time domain and frequency domain specifications, stability and state space analysis.

**MODULE -I:Introduction[12 Periods]**
Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback, Mathematical models – Differential equations, Impulse Response and transfer functions.
**Transfer Function Representation:** Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

**MODULE -II:Time Response Analysis[12 Periods]** Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

**MODULE-III:Stability Analysis In S-Domain[12 Periods]** The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.
**Root Locus Technique:** The root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

**MODULE-IV:Frequency Response Analysis[12 Periods]**Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots-Nyquist Plots.
**Compensation techniques** – Lag, Lead and Lead -Lag Controllers design in frequency Domain**.**

**MODULE-V:State Space Analysis of Continuous Systems [12 Periods]**
Concepts of state, state variables and state model, derivation of state models from block diagrams, diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and observability.

**TEXT BOOKS:**

1. I. J. Nagrath and M. Gopal, "**Control Systems Engineering"**, New Age International Publishers, 5th edition, 2007. (Modules I, II, III & IV)
2. A.Nagoor kani, "**Control Systems**", RBA Publications, 2nd Edition, 2006. (Modules I, II, III, IV & V)

**REFERENCE BOOKS:**

1. Benjamin.C.Kuo, **"Automatic Control Systems"**, Prentice Hall of India, 7th Edition, 1995.
2. M .Gopal, **"Control System"** – Principles and Design", Tata McGraw Hill, 2nd Edition, 2002.
3. Schaum's Outline Series, **"Feedback and Control Systems"**Tata McGraw-Hill, 2007.
4. John J.D'azzo & Constantine H.Houpis, **"Linear control system analysis and design"**, Tata McGraw-Hill, Inc., 1995.
5. Richard C. Dorf & Robert H. Bishop, **"Modern Control Systems"**, Addidon – Wesley, 1999.
6. **http://nptel.ac.in/courses/108103007/8**

**Outcomes:**

After completion of the course, students will be able to:

1. Grasp the basics of open loop and closed loop control systems, concept of feedback in control systems, mathematical modeling and transfer function derivations of Synchros, AC and DC servo motors.
2. Apply the basics of Transfer function representation through block diagram, signal flow graphs, time response analysis of different order systems through their characteristic equation with time-domain specifications, stability analysis of control systems in S-domain through R-H criteria and root-locus techniques, frequency response analysis through bode diagrams, Nyquist, polar plots.
3. Apply the above conceptual things to real-world electrical and electronics problems and applications with the basics of state space analysis, design of PID controllers, lag, lead, lag-lead compensators.

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**Course Code:50209** **Credits: 2**

**B.Tech. – IV Semester**

**LINEAR SYSTEM ANALYSIS**

**Prerequisites:** Basic concepts of mathematics.

**Objectives:**

To get an in-depth knowledge about signals, systems and analysis of the same using various transforms and also able to generate different types of signals and frequency domain analysis of different signals and the similarities betweentwo signals in frequency domain.

**MODULE - I:Signals& Systems [10 Periods]**

Definitions, Classification of Signals,Impulse signal& Properties, Mathematical operations on continuous-time signals ,Classification of continuous-time Systems,Orthogonality in Complex functions.

**MODULE- II: Fourier Series And Fourier Transform Representsation [12 Periods]**

Introduction, Trigonometric form of Fourier series, Exponential form of Fourier series, Wave symmetry, Fourier integrals and transforms, Fourier transform of a periodic function , Properties of Fourier Transform , Parseval's theorem , Fourier transform of some common signals, Fourier transform relationship with Laplace Transform.

**MODULE –III:Laplace Transform Applications[8 Periods]**

Application of Laplace transform ,Methods of Analysis – Response of RL, RC, RLC Networks to Step, Ramp, and impulse functions, Shifting Theorem – Convolution Integral – Applications.

**MODULE – IV:Sampling [12 Periods]**

Sampling theorem – Graphical and Analytical proof for Band Limited Signal impulse sampling, natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, introduction to Band Pass sampling, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Power density spectrum, Relation between auto correlation function and Energy / Power spectral density function.

**MODULE – V:Z-Transforms [12 Periods]**

Fundamental difference between continuous and discrete time signals, discrete time complex, exponential and sinusoidal signals, periodicity of discrete time complex exponential, concept of Z-Transform of a discrete sequence. Distinction between Laplace, Fourier and Z-Transforms. Region of convergence in Z-Transforms, constraints on ROC for various classes of signals, Inverse Z-Transform properties of Z-Transforms.

TEXT BOOKS:

1. B.P.Lathi, " **LinearSystems&Signals**",Oxford University Press,2nd Revised Edition,2009.

2. Umesh Sinha " **Network Analysis and Synthesis**", Satya Prakashan Publications,2013.

3.Nagoor Kani, " **Signals and Systems**",McGrawHill Education Private Limited,1stEdition, 2010.

REFERENCE BOOKS:

1.A. N. Tripathi, " **Linear System Analysis**", New Age International, 2nd Edition,2005.

2. Dr.S.Sivanagaraju,Prof.S.Satyanarayana&A.Ramadevi, " **Linearand Discrete Systems Analysis"** Right Publications, 1st Edition, 2007

3. D Roy Chowdhary "**Networks and Systems**", New Age International,1st Edition,2005

**Outcomes:**

After completion of the course, students will be able to:

1. Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.

2. Express periodic signals in terms of Fourier series and express the arbitrary signal as Fourier transform to draw the spectrum.

3. Grasp the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum.

# Malla Reddy Engineering College (Autonomous)

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**4**

**Course Code:50210** **Credits: 2**

**B.Tech. – IV Semester**
**DC MACHINES LAB**

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC shunt generator. Determination of characteristics.
3. Load test on DC series generator. Determination of characteristics.
4. Load test on DC compound generator. Determination of characteristics.
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
6. Fields test on DC series machines. Determination of efficiency.
7. Swinburne's test and speed control of DC shunt motor. Predetermination of efficiencies.
8. Brake test on DC compound motor. Determination of performance curves.
9. Brake test on DC shunt motor. Determination of performance curves.
10. Retardation test on DC shunt motor. Determination of losses at rated speed.
11. Separations of losses in DC shunt motor.
12. Brake test on DC series motor. Determination of performance curves.

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# Malla Reddy Engineering College (Autonomous)

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**4**

**Course Code: 50413** **Credits: 2**

**B.Tech. – IV Semester**

**PULSE AND DIGITAL CIRCUITS LAB**

**LIST OF EXPERIMENTS:**

1. Linear wave shaping.
2. Non Linear wave shaping Clippers
3. Non Linear wave shaping Clampers.
4. Transistor as a switch.
5. Study of Logic Gates.
6. Study of Flip-Flops & some applications.
7. Astable Multivibrator.
8. Monostable Multivibrator.
9. Bistable Multivibrator
10. Schmitt Trigger.
11. UJT Relaxation Oscillator.
12. Bootstrap Sweep Circuit.

**Equipment Required for the Laboratory:**

1. Dual Regulated Power Supply - 0-30V
2. CRO's - 0-20MHz
3. Function Generators - 1 MHZ
4. Multimeters
5. Discrete Electronic Components - Resistors, Capacitors, BJTs, UJTs, LEDs,Diodes- Ge & Si.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50H11**

**B.Tech. – IV Semester**

## HUMAN VALUES AND PROFESSIONAL ETHICS

**Introduction:**

The term 'ethics' is derived from the Greek word ***ethos*** which can mean custom, habit, character or disposition. Ethical awareness is an integral part of professional attitude and it is necessary to take time for reflection-on-action. Building professional attitude begins by understanding what it means to be a professional and how a professional should relate and react to her work environment The Course, Professional Ethics and Human Values will be a part of Value Education leading towards sensitizing the students on Values of Life and preparing them for life. The colleges are centers of excellence for the education of students. Many of these students will be the professionals of tomorrow: Engineers, Business administrators, and so forth. Their expertise, knowledge and power will exercise a crucial influence on the quality of life of millions of citizens. The question is whether they will be sufficiently prepared to recognize the ethical aspects of their professional decisions and to understand the social consequences of their work. The institutions prepare them to become experts in a very limited field, to find technical solutions to specific problems. But often they do not learn how to resolve ethical problems or to make themselves into responsible persons.

The term 'ethics' is derived from the Greek word ***ethos*** which can mean custom, habit, character or disposition. Ethical awareness is an integral part of professional attitude and it is necessary to take time for reflection-on-action. Building professional attitude begins by understanding what it means to be a professional and how a professional should relate and react to her work environment

Objectives:

- To create an awareness on Professional Ethics and Human Values.
- To understand social responsibility of any profession
- To appreciate ethical dilemma while discharging duties in professional life.
- To help the students appreciate the essential complementarily between Values and Skills to ensure sustained happiness and prosperity which are the core aspirations of all human beings
- To develop Holistic Perspectives towards life
- To enable students to lead a practical life adding value to human relations
- To generate capacity for making intelligent and independent value judgments in real life situations.

**MODULE –I Human Values:**

Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage –Empathy – Self-Confidence – Character.

**MODULE –IIProfessional Ethics:**

Variety of moral issues - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

**MODULE-III Human values, Ethics, Life Skills:**
Goals in life – Goal setting – Differentiating Right and Wrong – Integrity – Adaptability – Sense of Humor - Valuing Time – Co-operation – Commitment

**MODULE-IV Harmony in Human Beings Vs Harmony in self:**
Understanding self and body – Human Interactions – Human-Human relationships – Respect and Differentiation – Humanistic education, Humanistic Constitution, Humanistic Universal Order

**MODULE-V**
**A: Responsibilities and Rights:**
Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) – discrimination.

**B: Global Issues:**
Multinational corporations - Environmental ethics - computer ethics - moral leadership

**Books for Reference:**

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
4. Naagarazan. R.S "A Textbook on Professional Ethics and Human Values", New Age International Publishers, 2001
5. A N Tripathy, "Human values", New Age International Publishers, 2003
6. George Reynolds, "Ethics in Information Technology", Cengage Learning, 2002

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50H03** **Credits: 2**

**B.Tech. – V Semester**

## TECHNICAL COMMUNICATION AND PRESENTATION SKILLS

**PREREQUISITES:**Basic English.

**Introduction:** Identifying the importance of communication at work and the nuances of technical communication became imperative to technical graduates. This course intends to introduce the importance, characteristics and nuances of technical communication. Technical communication is all about exchange of information that helps people interact with technology and solve complex problems. Since the communication skills cannot be taught but be developed through practice the student will be competent communicator through application and the use of the concepts and activities in different units.

**OBJECTIVE:**The learners need to be aware of the characteristics of technical communication. The learners are exposed different channels of technical communication**.** The learners should be an effective communicator.

**Methodology:**Facilitator's role: Since classroom learning augments thinking process, helping them to develop written, spoken and non verbal communication, the facilitator / Faculty would briefly discuss the topics with the students and later on guide them while the students involve in activities, writing work and while making presentations. The facilitator is required to design a lot of practical/industry oriented project works for the students
*Students are required to participate, perform, write and submit the work in the form of written documents or Power Point Presentations to hone their spoken written and non verbal communication skills. Students are to take up field work and submit the project work.

**MODULE - I: Technical Vocabulary** **[6 Periods]**
Building vocabulary – identify formal and informal vocabulary – identify technical vocabulary – tips to enhance technical vocabulary, Basics of English Pronunciation.

**MODULE - II:Technical writing** **[6 Periods]**
Characteristics of writing – mechanics of writing – methodology of writing – format & style-structures of writing – circular writing – memo writing – instructions writing.

**MODULE - III:Technical Report writing** **[6 Periods]** Types of report, Abstract Writing, Project report writing, importance of pictorial presentation- graphs, diagrams etc
Instruction: The students are required to work on a project. Field work and collection of information, prepare a project report.

**MODULE - IV:Oral Presentations** **[6 Periods]**
Types of Presentations, 4Ps of Effective Presentation, Elements of effective presentations, Planning and preparing a model presentation, organizing, Barriers of making effective presentation.
Present the project in the form of Power Point Presentation and written document. This report will be given weightage during the external examination.
*This particular module is for internal evaluation purpose(s).

**MODULE - V:Strategies of Reading Technical Text [6 Periods]**

Note-making, SQR3, Reading and answering the technical texts, Reading for Specific Purposes.

**REFERENCE BOOKS:**


1. Chrissie,"**Handbook of Practical Communication Skills",** Jaico Publishing house, 1999.
2. Daniels, Aubrey,**"Bringing Out the Best in People"**, Tata McGraw-Hill:New York, 2003.Wright, Goulstone, Mark,**"Just Listen:Discover the Secret to getting through to absolutely anything"**, American Management Association, 2010.
3. Leslie. T. Giblin,**"Skill with people"**, Publication details not known.
4. Lewis, Norman,**"Word Power Made Easy",**Goyal Publications, New Delhi, 2009.
5. Murthy, A.G, Krishna, **"Ten Much",** Tata McGraw-Hill, New Delhi, 2010.
6. Pease , Barbara and Pease, Allan: **"The Definitive Book on Body Language",** Manjul Publishing House Pvt Limited, 2011
7. Rizvi M Ashraf,**"Effective Technical Communication"**, Tata McGraw-Hill, New Delhi, 2010.
8. Whitcomb, Susan Britton,**"Resume Magic: Trade Secrets of a Professional Resume"**, JIST Works, 2010.


**WEBSITES:**

1. http://www.mindtools.com/pages/article/newTMC_05.htm
2. http://www.kent.ac.uk/careers/intervw.htm
3. http://www.wikihow.com/Write-a-Report

**OUTCOMES:**

After completion of the course, students will be able to:

1. The learner is ready to bring into play latest communication devices.
2. The learner is equipped with the nuances of technical communication

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# Malla Reddy Engineering College (Autonomous)

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**Course Code:50211** **Credits: 3**

**B.Tech. – V – Semester**

## POWER TRANSMISSION SYSTEMS

**Objective:**

This course is an extension of Generation of Electric Power course. It deals with basic theory oftransmission lines modeling and their performance analysis. Also this course gives emphasis onmechanical design of transmission lines, cables and insulators.

**Module I: TRANSMISSION LINE PARAMETERS [12 Periods]**

Types of Conductors – ACSR, Bundled and Standard Conductors- Resistance For Solid Conductors –Skin Effect- Calculation of Inductance for Single Phase and Three Phase, Single and Double Circuit Lines, Concept of GMR & GMD, Symmetrical and Asymmetrical Conductor Configuration with and without Transposition, Numerical Problems, Capacitance Calculations for Symmetrical and Asymmetrical Single and Three Phase, Single and Double Circuit Lines, Effect of Ground on Capacitance, Numerical Problems.

**ModuleII: PERFORMANCE OF TRANSMISSION LINES: [12 Periods]**

Classification of Transmission Lines - Short, Medium and Long Line and Their Exact Equivalent Ciruits- Nominal-T, Nominal-Pie. Mathematical Solutions to Estimate Regulation and Efficiency of All Types of Lines. Long Transmission Line-Rigorous Solution, Evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations – Surge Impedance and Surge Impedance Loading - Wavelengths and Velocity of Propagation – Ferranti Effect , Charging Current-Numerical Problems.

**Module III: MECHANICAL DESIGN OF TRANSMISSION LINES [12 Periods]**

**Overhead Line Insulators**: Types of Insulators, String Efficiency and Methods for Improvement, Capacitance Grading and Static Shielding.

**Corona**: Corona Phenomenon, Factors Affecting Corona, Critical Voltages and Power Loss, Radio Interference.

**Sag and Tension Calculations:** Sag and Tension Calculations with Equal and Unequal Heights of Towers, Effect of Wind and Ice on Weight of Conductor, Stringing Chart and Sag Template and Its Applications, Numerical Problems.

**Module IV: POWER SYSTEM TRANSIENTS & TRAVELLING WAVES[10 Periods]**

Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of Lines with Different Types of Conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions (Numerical Problems). Bewley's Lattice Diagrams (for all the cases mentioned with numerical examples).

**ModuleV: CABLES [12 Periods]**

Types of Cables, Construction, Types of Insulating Materials, Calculations of Insulation Resistance and Stress in Insulation, Numerical Problems. Capacitance of Single and 3-Core Belted Cables, Numerical Problems. Grading of Cables - Capacitance Grading, Numerical Problems, Description of Inter-Sheath Grading.

**Text Books:**

1. C.L.Wadhwa, **"Electrical power systems"**, New Age International (P) Limited, Publishers,4th Edition, 2005.
2. John J Grainger, William D Stevenson, **"Power system Analysis"**, TMC Companies, 4th edition, 1994.

**References:**

1. B.R.Gupta**, "Power System Analysis and Design",** S. Chand & Co, 6th Revised Edition, 2010.
2. I.J.Nagrath and D.P.Kothari , **"Modern Power System Analysis",** Tata McGraw Hill, 3rd Edition,2008.
3. Turan Gonen, **"Electric Power Transmission System Engineering: Analysis and Design",** 2nd Edition, CRC Press, 2009.
4. S. A. Nasar, **"Electric Power Systems",** Schaum‟s Outline Series, TMH, 3rd Edition, 2008.
5. M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarti, **"A Text Book on Power System Engineering"**, Dhanpat Rai & Co Pvt. Ltd., 2003.

**Outcomes:**

After going through this course the student will be able to

1. Derive L and C expressions for various configurations and analyze different types of Transmission lines
2. Describe Traveling wave theory and derive expressions for reflection and refraction coefficients with various terminations of the lines
3. Derive expressions for sag with equal and unequal height towers and describe various types of Insulators and also explain various string efficiency methods
4. Illustrate different types of cables and derive capacitance expressions anddescribe grading of cables

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**Course Code: 50212** **Credits: 3**

**B.Tech. – V – Semester**

## POWER SYSTEM ANALYSIS

**Objective:**To expose the students with applications of matrices in power systems which makes the easy computing inpower flow studies, short circuit analysis, power system steady state and transient analysis.

**Module IPower System Network Matrices-1 [12 Periods]**

Graph Theory: Definitions, Bus Incidence Matrix, $Y_{bus}$ formation by Direct and Singular Transformation Methods, Numerical Problems.

Formation of $Z_{Bus}$: Partial network, Algorithm for the Modification of $Z_{Bus}$ Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).- Modification of $Z_{Bus}$ for the changes in network ( Problems )

**Module IIPower flow Studies [12 Periods]**

Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations – Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

**Module III Load Flow Solutions [10 Periods]**

Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution with or without PV Busses-Derivation of Jacobian Elements, Algorithm and Flowchart.

Decoupled and Fast Decoupled Methods.- Comparison of Different Methods – DC load Flow

**Module IVShort Circuit Analysis [12 Periods]**

Per-Module System of Representation. Per-Module equivalent reactance network of a three phase Power System, Numerical Problems.

Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems.

Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances. Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.

Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.

**ModuleVPower System Steady State Stability Analysis [12 Periods]**

Elementary concepts of Steady State, Dynamic and Transient Stabilities. Description of: Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion

**TEXT BOOKS:**

1. Computer Techniques in Power System Analysis by M.A.Pai, TMH Publications.
2. Modern Power system Analysis – by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing company, 2nd edition, 4th edition-reprint 2005.
3. Electrical Power Systems –by C.L. Wadhwa
4. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill-2nd edition, reprint 2004.

**REFERENCE BOOKS:**

1. A.R.Bergen,**"Power System Analysis"**, Prentice Hall, Inc-3rd edition- reprint 2004.
2. Hadi Saadat **,"Power System Analysis"–** TMH Edition-5th edition-reprint 2004.
3. B.R.Gupta **,"Power System Analysis "** Wheeler Publications-reprint 2004.
4. William stagg,**"Computer methods in power systems"**

Outcomes

After going through this course the student will be able to

- Solve Load flow problems
- Apply symmetrical components for symmetrical and unsymmetrical faultanalysis
- Analyze the different load flow methods Analyze the swing equation and stability

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50213** **Credits: 3**

**B.Tech – V Semester**

**AC MACHINES**

**OBJECTIVE**

This subject facilitates to study and the performance of induction motors which is main drive for industrial applications. This subject also introduces the study and performance of synchronous machines.

**Module IPoly-phase induction motors: [10 Periods]**

Poly-phase induction motors-construction details-Production of a rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor reactance, rotor current and power factor- equivalent circuit - phasor diagram - crawling and cogging-power stages

**Module II Performance of Induction Motors: [12Periods]**

Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation-deduction from torque equation - expressions for maximum torque and starting torque –torque slip characteristics - condition for maximum torque– relation between torque and slip – losses and efficiency –no load and blocked rotor test –equivalent circuit – circle diagram – induction generator.

**Module IIISingle phase induction motors: [10 Periods]**

Single phase induction motors – principle of operation - double revolving field theory -split phase induction motor, capacitor start induction run motor, shaded pole induction motor– equivalent circuit.

**Module IVSynchronous Generators: [12 Periods]**

Synchronous generator – construction, working principle- emf equation–armature reaction – regulation methods – EMF, MMF,ZPF methods – synchronizing to infinite bus bars – two reaction theory – parallel operation of synchronous generators.

**Module VSynchronous Motors: [12 Periods]**

Synchronous motor – constructional features, principle of operation of synchronous motor – methods of starting – power developed by a synchronous motor –synchronous motor with different excitations – effect of increased load with constant excitation, effect of changing excitation constant load – torque equation – V curve and inverted V curve – hunting..

**TEXT BOOKS**

1. PS Bhimbra ,**"Electrical machines",** Khanna Publishers.
2. Electric machinery by A.E. Fritzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition

**REFERENCES**

1. Performance and Design of AC Machines by MG.Say, BPB Publishers
2. Theory of Alternating Current Machinery by Langsdorf, Tata McGraw-Hill Companies, 2nd edition.
3. Electric Machines by I.J.Nagrath and D.P.Kothari,Tata Mc Graw Hill, 7th Edition.2005
4. Electromechanics-II (transformers and induction motors) by S. Kamakashaiah, Hitech publishers

**Outcomes :**

Upon the completion of this subject, the student will be able

- To specify the constructional aspects of transformers
- To carry out different testing methods to predetermine the efficiency of transformers
- To draw the circle diagram for an induction motor to assess its performance
- To know about the performance of synchronous machines

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**Course Code: 50214** **Credits: 4**

**B.Tech. – V – Semester**

**POWER ELECTRONICS**

**Objective:** To understand the concepts of power converters, to understand the application of phase controlled rectifiers. To understand the importance of ac voltage controllers, cyclo converters and inverters for various industrial applications

**Module I POWER SEMICONDUCTOR DEVICES [14 Periods]**

Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics Basic theory of operation of SCR – Static and Dynamic characteristics of SCR - Salient points - Two transistor analogy - UJT firing circuit – Series and Parallel connections of SCRs - Snubber circuit details – Specifications and Ratings of SCRs, BJT, MOSFET, IGBT, Numerical problems, natural and forced commutation (Principle only).

**Module II SINGLE PHASE CONTROLLED CONVERTERS [12 Periods]**

Single Phase Half Controlled Converters: Half controlled converters with R, RL and RLE loads – Derivation of average load voltage and current - without and with freewheeling Diode – Numerical problems Single Phase Fully controlled Converters: Mid point and Bridge connections with R, RL and RLE loads- Derivation of average load voltage and current - Performance parameter of single phase full bridge converter, Effect of source inductance – Derivation of load voltage and current- Numerical problems.

**Module III THREE PHASE CONTROLLED CONVERTERS [10 Periods]**

Three Phase Converters – Three pulse and six pulse converters – Mid point and bridge connections, average load voltage with R and RL loads – Effect of Source inductance – Numerical Problems.

**Module IV AC VOLTAGE CONTROLLERS [12 Periods]**

Single phase AC voltage controllers with R and RL loads-wave forms – Modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor – Numerical problems

**CYCLO CONVERTERS**: Cyclo converters – Single phase mid point cyclo converters with Resistive and inductive load (Principle of operation only)-Bridge configuration of single phase cyclo converter (Principle of operation) – Wave forms

**Module V CHOPPERS [12 Periods]**

Time ratio control and Current limit control strategies – Analysis of Buck and Boost converter with continuous mode of operation - Numerical Problems. INVERTERS Single phase inverter –half and full bridge inverter – Wave forms—performance parameters of inverters– Voltage control techniques for inverters, Pulse width modulation techniques-single, multiple and sinusoidal PWM Numerical ProblemsThree Phase Inverters : analysis of 180 degree and 120 degree modes of operation with resistive, inductive loads - Numerical Problems.

**TEXT BOOKS**

1. Power Electronics by Mohammed H. Rashid, Pearson Education, Third Edition, First Indian reprint 2004.
2. Power electronics, by P S Bimbhra, Khanna Publishers.
3. Thyristorised Power Controllers by S R Doradla, A Joshi,R .M K Sinha G K Dubey, New Age Books

**REFERENCE BOOKS**

1. Fundamentals of Power electronics and Drives by A.Chakrabarti, Dhanpat Rai & Co, 2008
2. Power electronics, by P C Sen, Tata McGraw-Hill Education.
3. Power Electronics by Ned Mohan, Tore M. Undeland and William P. Robbins, John Wiley and Sons, Second Edition.
4. Power Electronics by M D SINGH, K B KANCHANDHANI, Tata McGraw-Hill Publishing Company, second edition, 2006
5. Power Electronics by Vedam Subramanyam, New Age International Pvt Ltd Publishers, Revised Second Edition, 2008

**Outcomes:**

After going through this course the student will be able to

- Analyze operating principles of different converters
- Choose the appropriate converter for various applications
- Select the proper controller/converter for variable speed applications

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**Course Code: 50416** **Credits: 3**

**B.Tech. – V Semester**

**LINEAR AND DIGITAL IC APPLICATIONS**

**PREREQUISITES:**Analog, Pulse and Digital Circuits.

**OBJECTIVE:**This course introduces the basic building blocks of linear integrated circuits and teaches the linear and non - linear applications of operational amplifiers. This also introduces the theory and applications of 555 Timers and PLL. This course also introduces the ADC & DAC, concepts of waveform generation & Sine waveOscillators using Operational Amplifiers.

**MODULE – I: Integrated Circuits & Operational Amplifier [12 Periods]**

Introduction, Classification of IC's, IC chip size and circuit complexity, basicinformation of Op-Amp IC741 Op-Amp and its features, the ideal Operational amplifier, Op-Amp internal circuit, Op-Amp characteristics - DC and AC.

**MODULE – II: Applications of OP - AMP [12 Periods]**

**Linear Applications of OP-AMP:** Inverting and non-inverting amplifiers, adder, subtractor, Instrumentation amplifier, ACamplifier, V to I and I to V converters, Integrator and differentiator.

**Non-Linear Applications of OP-AMP:** Sample and Hold circuit, Log and Antilog amplifier, multiplier and divider, Comparators,Schmitt trigger, Multivibrators, Triangular and Square waveform generators, Oscillators.

**MODULE – III: Filters, Timers and PLL [12 Periods]**

**ACTIVE FILTERS:** Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject andallpass filters.

**TIMER AND PHASE LOCKED LOOPS:** Introduction to IC 555 timer, description of functional diagram, monostable and astableoperations and applications, schmitt trigger, PLL - introduction, basic principle, phase detector/comparator, voltage controlled oscillator (IC 566), low pass filter, monolithic PLL and applications of PLL.

**MODULE – IV: Regulators and Converters [12 Periods]**

**Voltage Regulator:** Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, SwitchingRegulator.

**D/A & A/D Converters:** Introduction, basic DAC techniques - weighted resistor DAC, R-2R ladder DAC, inverted R-2RDAC, A to D converters - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

**MODULE – V: CMOS Logic and Digital Circuits [12 Periods]**

**CMOS Logic:** CMOS logic levels, MOS transistors, Basic CMOS Inverter, NAND and NOR gates, CMOS AND-OR-INVERT and OR-AND-INVERT gates, implementation of any function using cmos logic.

**Combinational Circuits Using TTL *74XX* ICS:** Study of logic gates using*74XX*ICs, Four-bit parallel adder(IC 7483),Comparator(IC 7485), Decoder(IC 74138, IC 74154), BCD-to-7-segment decoder(IC 7447), Encoder(IC 74147), Multiplexer(IC 74151), Demultiplexer (IC 74154).

**Sequntial Circuits Using TTL *74XX* ICS:** Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register(IC 74194), 4- bitasynchronous binary counter(IC 7493).

**TEXT BOOKS:**

1. D. Roy Choudhury, Shail B. Jain, **"Linear Integrated Circuit"**, New Age International Pvt. Ltd., New Delhi, India, 4th edition, 2012. (Modules I, II, III, & IV)
2. Ramakant A. Gayakwad, **"OP-AMP and Linear Integrated Circuits"**, Prentice Hall / Pearson Education, New Delhi, 4th edition, 2012. (Modules I, II & III)
3. Floyd, Jain, **"Digital Fundamentals, Pearson Education"**, New Delhi, 8th edition, 2009. (Module V)

**REFERENCE BOOKS:**

1. Sergio Franco, **"Design with operational amplifiers and analog integrated circuits"**, McGraw Hill, New Delhi, 1997.
2. Gray, Meyer, **"Analysis and Design of Analog Integrated Circuits"**, Wiley International, New Delhi, 1995.
3. John F. Wakerly, **"Digital Design Principles and practices"**, Prentice Hall / Pearson Education, New Delhi, 4th Edition, 2007.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Understand the operational amplifiers with linear integrated circuits.
2. Understand the different families of digital integrated circuits and their characteristics.
3. Design circuits using operational amplifiers for various applications.

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**Course Code: 50215** **Credits: 3**

**B.Tech. – V – Semester**

## ADVANCED CONTROL SYSTEMS
## (Professional Elective-1)

**Objective:** To cater the knowledge of basic and modern control system for the real time analysis and design of control systems. To expose the students to the concepts of state variables analysis. To provide adequate knowledge of non linear systems. To provide comprehensive knowledge of optimal control and model control

**Module I STATE SPACE ANALYSIS, CONTROLLABILITY AND OBSERVABILITY [12 Periods]**

State Space Representation, Solution of State Equation, State Transition Matrix, Canonical Forms – Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form. Tests for controllability and observability for continuous time systems – Time varying case, time invariant case, Principle of Duality, Controllability and observability form Jordan canonical form and other canonical forms.

**Module II DESCRIBING FUNCTION ANALYSIS & PHASE-PLANE ANALYSIS [12 Periods]**

Introduction to nonlinear systems, Types of nonlinearities, describing functions, describing function analysis of nonlinear control systems. Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

**Module III STABILITY ANALYSIS [10 Periods]**

Stability in the sense of Lyapunov, Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

**Module IV MODAL CONTROL & CALCULUS OF VARIATIONS [12 Periods]**

Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement. Full order observer and reduced order observer. Minimization of functionals of single function, Constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrange Equation.

**Module V OPTIMAL CONTROL [10 Periods]**

Formulation of optimal control problem. Minimum time, Minimum energy, minimum fuel problems. State regulator problem. Output regulator problem. Tracking problem, Continuous-Time Linear Regulators.

**TEXT BOOKS:**

1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition, 1996

**REFERENCE BOOKS:**

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998
2. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
3. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies, 1997.
4. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003.

**Outcomes:**

Upon completion of this course, students should be able to:

- Apply the knowledge of basic and modern control system for the real timeanalysis and design of control systems.
- Understand the concepts of state variables analysis.
- Analyze the concept of stability of nonlinear systems and optimal control

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**Course Code: 50216** **Credits: 3**

**B.Tech. – V – Semester**

**PLC AND SCADA**
**(Professional Elective-1)**

**Module I** **[12 Periods]**

**SCADA**: Need of SCADA system, Distributed control Systems (DCS), General definition and SCADA components. Hardware Architecture, Software architecture, Protocol detail, Discrete control and Analog control, application & benefits, PLCs Vs RTUs, RTU Block diagram, , MTU communication interface, Future trends, Internet based SCADA display system, Components of control systems in SCADA.

**Module II** **[10 Periods]**

**PLC programming language standards**: ladder logic, functional block, structural text, instruction, ladder diagrams, trouble shooting, features,

**Module III** **[12 periods]**

**SCADA in Power Systems**: Main task in power systems- Planning, operation, accounting, tasks of national control centre, regional control centre, Generating station control room, AGC-SCADA, SCADA in generation, SCADA in Power Distribution, SCADA in Power Grid.

**Module IV** **[12 Periods]**

**Supervisory Power Management**: Energy Management System, power system operation states, security analysis, computer programmes-generating planning, transmission planning, system studies, energy audit, state estimation, load forecasting.

Utility distribution system design, regulation, distribution automation, DMS, design, layout and construction and commissioning of substations, Substation Automation and Equipment condition monitoring.

**Module V** **[12 Periods]**

Automatic mapping and facility management, Distribution system design, Facility mapping, tracking, facility inventory, system and equipment maintenance, trouble call management, Customer level intelligent automation system, computer level monitoring and control of distribution transformers, Substation and feeder level automation

**TEXT BOOKS:**

1. SCADA: by Stuart A. Boyer: IAS 1999
2. Switch Gear & Protection by S.S. Rao: Khanna Publication New Delhi
3. Power system Control Technology by Terson , Prentice Hall New Delhi

**REFERENCE BOOKS:**

1. Planning for demand side management in the electric sector by J. Parikh, B. Reddy & R. Benerjee: TMH
2. Hand book of Telemetry of Remote control by Elliot L. Gruenberg MGH New Delhi
3. Electronics Communication by Roddy & Coolen
4. Optical fiber Communication by Gower: Eastern Publication, New Delhi
5. Optical Fibre Communication System by M K Raina, Satya Parkashan, New Delhi
6. Electric Power system by S.L. Uppal
7. Power System Engineering by S K Gupta, Umesh Publication

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**Course Code: 50217** **Credits: 2**

**B.Tech. – V – Semester**

**CONTROL SYSTEMS LAB**

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Lag and lead compensation – Magnitude and phase plot
8. Temperature controller using PID(open loop & closed loop)
9. Characteristics of magnetic amplifiers(series, parallel & separately-excited)
10. Characteristics of AC servo motor
11. PSPICE simulation of Op-Amp based Integrator and Differentiator circuits & Linear system analysis (Time domain analysis, Error analysis) using MATLAB
12. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system State space model for classical transfer function using MATLAB

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**Course Code: 50H04** **Credits: 2**

**B.Tech. – V Semester**

**TECHNICAL COMMUNICATION AND PRESENTATION SKILLS LAB**

**Introduction:**Effective Communication binds any progressive organization. At the B Tech third year level, the Technical Communication and Presentation skills laboratory is introduced to help students succeed in attaining a challenging and a professional career. Each unit aims to reinforce learning and helps the learners perform well before and after they enter the world of work. The course is designed to be practical, stimulating and challenging providing opportunities to the learners to go beyond the classrooms and get empowered in Technical Communication skills. The course enables the students understand the employers' expectations that are varied from company to company while giving them insight into the acceptable norms of attitude, behavior and etiquette. The course also focuses on the presentation skills of the learners

**OBJECTIVE:**To help the students understand the requisites to successfully deliver as professionals and the challenges they need to encounter. To help them make a smooth transition from the academic world into the professional world. To refine their style of individual communication and develop a personal style. To broaden and raise awareness about the dynamics of technical communication in the work environment. To integrate the learning experience with the functional areas of communication. Helping the students to become industry ready

**Methodology:**Facilitator's role: Since classroom learning augments thinking process, helping them to develop written, spoken and non verbal communication, the facilitator / Faculty would briefly discuss the topics with the students and later on guide them while the students involved in activities, writing work and while making presentations. The facilitator is required to design a lot of practical/industry oriented project works for the students
*Students are required to participate, perform, write and submit the work in the form of written documents or Power Point Presentations to hone their spoken written and non verbal communication skills. Students are to take up field work and submit the project work.

**MODULE – I:Oral Presentation**
Mechanics of Presentations – Methodology of Presentation, Importance of Non-verbal communication during presentations– Nuances of Presentation.
*This particular module is for internal evaluation purpose(s).

**MODULE – II: Job hunt process**
SWOT analysis, correspondence and browsing the internet to search for a suitable job(s), job application-cover letter drafting, drafting a winning resume', types of resume's -electronic, video and printed resume's

- Instruction: Students are required to prepare their video resume which will be assessed by the faculty member.

**MODULE – III: Group Discussion**
Initiators- Contributor-Informer-Team Leader-Motivator-Creative Contributor , Importance of , Non verbal communication -eye contact, voice characters, posture, gestures, do's and

don'ts, Role play and Simulation- Learners assuming the roles of characters and participating in Group discussion, analysis, or prediction with strictly defined goals.

**MODULE – IV: Interview skills & Office etiquette**

Preparing for the interview, types of interviews, interview session, importance of non verbal communication during the interview, do's and don'ts of interview, follow up and thanking letter. FAQ's. Formal Conversation, office attire- do's and don'ts, greetings and meetings, speaking to seniors and handshakes, offering and taking visiting cards.

**MODULE – V: E- Correspondence and Email etiquette**

Common web mail services, yahoo, gmail etc, fields to pay attention- To:, Cc:, Bcc:, Reply All, Subject, Salutation, Body, Signature, Font, Caps Lock , Highlight, The 'KISS' strategy ( Keep It Simple and Short,)Points to remember while signing off, Introduction to Technical Vocabulary

- This unit is purely for internal assessment/evaluation

**REFERENCESBOOKS:**


1. Chrissie: **Handbook of Practical Communication Skills**: Jaico Publishing house, 1999.
2. Daniels, Aubrey: **Bringing Out the Best in People**: Tata McGraw-Hill:New York, 2003.Wright, Goulstone, Mark: **Just Listen:Discover the Secret to getting through to absolutely anything** : American Management Association, 2010.
3. Leslie.T. Giblin: **Skill with people** Publication details not known
4. Lewis, Norman: **Word Power Made Easy**: Goyal Publications: New Delhi, 2009.
5. Murthy, A.G, Krishna,: **Ten Much** : Tata McGraw-Hill :New Delhi, 2010.
6. Pease, Barbara and Pease, Allan: **The Definitive Book on Body Language**: Manjul Publishing House Pvt Limited, 2011
7. Rizvi M Ashraf: **Effective Technical Communication** : Tata McGraw-Hill:New Delhi, 2010.
8. Whitcomb, Susan Britton: **Resume Magic: Trade Secrets of a Professional Resume**: JIST Works, 2010.


**WEBSITES:**

1. http://www.mindtools.com/pages/article/newTMC_05.htm
2. http://www.kent.ac.uk/careers/intervw.htm
3. http://www.wikihow.com/Write-a-Report

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**Course Code: 50218** **Credits: 2**

**B.Tech. – V Semester**

**TECHNICAL SEMINAR**

**2015-16**

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**Course Code: 50H12** **Credits: 3**

**B.Tech. – VI Semester**

**ENGINEERING ECONOMICS AND ACCOUNTANCY**

**PREREQUISITES:**Nil

**OBJECTIVE:**EEAA is a think beyond program which will make the student to examine the application of microeconomics theory as applied to the manager's responsibilities in an organization. To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making. This course should emphasize the quantitative and qualitative applications of economic principle to business analysis

**MODULE – I:Managerial Economics and Demand [12 Periods]Introduction to Managerial Economics:** Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

**Elasticity of Demand:** Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

**MODULE – II: Theory of Production and Cost Analysis [11 Periods]**

**Theory of Production:** Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

**Cost Analysis:** Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

**MODULE – III: Market structures and Pricing Policies [11 Periods]**

**Introduction to Markets & Market structures:** Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

**Pricing Policies & Methods:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

**MODULE – IV:Business Environment and Capital Budgeting [11 Periods]**

**Business & New Economic Environment**: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

**Capital And Capital Budgeting**: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

**MODULE – V:Financial Accounting and Ratios [11 Periods]**

**Introduction to Financial Accounting:** Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

**Financial Analysis Through Ratios:** Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

**TEXT BOOKS:**

1. Aryasri, **"Managerial Economics and Financial Analysis"**, TMH, 2nd Edition, 2005. (Modules I, II, III, IV & V)
2. Varshney & Maheswari, **"Managerial Economics"**, Sultan Chand, 5th Edition, 2003. (Modules I, II & III)

**REFERENCE BOOKS:**

1. H. Craig Peterson & W. Cris Lewis, **"Managerial Economics"**, PHI, 4thEdition.
2. Domnick Salvatore, **"Managerial Economics In a Global Economy"**, Thomson, 4thEdition.
3. Raghunatha Reddy & Narasimhachary,**"Managerial Economics& Financial Analysis"**, Scitech, 4th Edition.
4. S.N.Maheswari & S.K. Maheswari, **"Financial Accounting"**, Vikas, 6th Edition.
5. Dwivedi, **"Managerial Economics"**, Vikas, 6th Edition.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Think in the terms of a managerial economist.
2. Appraise economic articles in newspapers such as Economic Times.
3. Solve quantitative problems in a business environment.
4. Acquire an ability to apply knowledge of economic concepts, accounting concepts.
5. Identify, formulate, and solve financial problems.
6. Gain knowledge of Financial Concepts as applied to Business Management.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50219** **Credits: 4**

**B.Tech. – VI – Semester**

## ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

**Objectives :**

To introduce the basic concepts related to the operation of Electrical and Electronic Measuring Instruments. To measure high voltages & high currents in distribution systems using Instrument transformers, to measure unknown inductance, Resistance, capacitance using D.C Bridges & A.C Bridges

**Module I MEASURING INSTRUMENTS [12 Periods]**

Classification of measuring Instruments-Deflecting, Control and Damping TorquesPMMC, Moving iron type instruments-Expression for the deflecting torque and control torque-Extension of range using shunts and series resistance, dynamometer type instruments, single phase energy meter, errors and calibration, Measurement of Power and Energy, three ammeter and three voltmeter methods-Electrostatic Voltmeters, Power factor meters

**Module II MEASUREMENTOFRESISTANCE, INDUCTANCE AND CAPACITANCE [12 Periods]**

Measurement of low, medium and high resistances, insulation resistance measurement, Megger, AC bridges for inductance and capacitance measurement.

**Module III INSTRUMENT TRANSFORMERS [12 Periods]**

Current and Potential transformers, ratio and phase angle errors, testing, measurement of power using instrument transformers Potentiometers: AC and DC potentiometers, Calibration of Voltmeters and Ammeters using potentiometers.

**Module IV ELECTRONIC MEASUREMENTS [12 Periods]**

Electronic Voltmeter, Multimeter, Wattmeter & energy meter. Time, Frequency and phase angle measurements using CRO; Spectrum & Wave analyzer. Digital counter, frequency meter and storage oscilloscope.

**Module V INSTRUMENTATION [12 Periods]**

Transducers, classification & selection of transducers, strain gauges, inductive & capacitive transducers, piezoelectric and Hall-effect transducers, thermistors, thermocouples, photo-diodes & photo-transistors, encoder type digital transducers, signal conditioning and telemetry, basic concepts of smart sensors and application. Data Acquisition Systems.

**TEXT BOOKS**

1. Electrical and Electronics measurements And Instrumentation by A.K.Sawhney, Dhanpat rai & co publications.
2. Electrical Measurement and Measuring Instruments by Golding, E.W, Sir Issac Pitman and Sons, 1960, 3rd Edition.
3. Modern Electronic Instrumentation and Measurement Techniques by Helfrick Albert D, Cooper William. DPrentice-Hall of India, Reprint 1992.

**REFERENCES**

1. Instrumentation Measurement and Feedback by Jones, B.E, Tata McGrawHill, 1986

**Course Outcomes**

After going through this course the student will be able to

- To apply the knowledge about the instruments to use them more effectively
- Suggest the kind of instrument suitable for typical measurements

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**Course Code: 50220** **Credits: 3**

## B.TECH. – VI – SEMESTER

## SWITCH GEAR & PROTECTION

**Objective :**

This course introduces all varieties of Circuit Breakers and Relays for protection of Generators, Transformers and feeder bus bars from over voltages and other hazards. It emphasis on Neutral grounding for overall protection.

**Module ICircuit Breakers [12 Periods]**

Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications: Types and Numerical Problems. – Auto reclosures.

Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

**Module IIElectromagnetic and Static Relays [12 Periods]**

Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays.Relays Classification: Instantaneous, DMT and IDMT types.

Application of relays: Over current/ under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays.

Universal torque equation, Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison.

Static Relays: Static Relays verses Electromagnetic Relays.

**Module IIISystem Protection [12 Periods]**

Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected.

Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection.

Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay.

Protection of Bus bars – Differential protection.

**Module IV Protection against over voltages [10 Periods]**

Grounded and Ungrounded Neutral Systems- Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance - Arcing Grounds and Grounding Practices.

**Module V Over voltages in Power Systems [12 Periods]**

Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination -BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

**TEXT BOOKS:**

1. Switchgear and Protection – by Sunil S Rao, Khanna Publlishers
2. Power System Protection and Switchgear by Badari Ram , D.N Viswakarma, TMH Publications
3. The Transmission and Distribution of Electricalenergy- H.Cotton and Barber, ELBS

**REFERENCE BOOKS:**

1. Fundamentals of Power System Protection by Paithankar and S.R.Bhide.,PHI, 2003.
2. Art & Science of Protective Relaying – by C R Mason, Wiley Eastern Ltd.
3. Electrical Power Systems – by C.L.Wadhwa, New Age international (P) Limited, Publishers, 3nd editon
4. A Text book on Power System Engineering by B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, Dhanpat Rai & Co

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50422** **Credits: 3**

**B.Tech. – VI Semester**

**DIGITAL SIGNAL PROCESSING**

**(Professional Elective – 2)**

**PREREQUISITES:**Signals and Systems.

**OBJECTIVE:**This course introduces the processing of discrete-time signals using various transform techniques and structures of digital IIR and FIR filters.This course also introduces the effects of finite-word length effects and Multirate digital signal processingand alsothe architecture and features of DSP processors.

**MODULE -I: Discrete Signals and Realizations [12 Periods]**

**Discrete Time Signals and Systems:** Discrete time signals & discrete time systems, Analysis of Discrete time Linear time invariant Systems, Discrete time systems described by difference equations. Frequency domain representation of discrete time signals and systems.

**Structures for Realization of IIR and FIR Systems: S**olution of difference equations of digital filters using Z-Transforms, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel forms.

**MODULE -II: DFS and FFT [12 Periods]**

**Discrete Fourier Series:** DFS Representation of periodic sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of sequences using DFT and Circular Convolution.

**Fast Fourier Transforms:** Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms and Inverse FFT.

**MODULE -III: IIR Digital Filters [12 Periods]**

Analog filter approximations – Butterworth and Chebyshev, IIR Digital filter Techniques-Impulse Invariant and Bilinear Transformation Methods, Design of IIR Digital filters from Analog filters and Spectral Transformations.

**MODULE -IV: FIR Digital Filters [12 Periods]**

Characteristics of FIR Digital Filters, Frequency Response, Design of Linear phase FIR Digital Filters using Fourier Series and Window Techniques, Comparison of IIR & FIR filters.

**MODULE -V: Multirate DSP and DSP Processors [12 Periods]**

**Multirate Digital Signal Processing:** Down-sampling, Decimation, Up-sampling, interpolation and Sampling Rate Conversion.

**Finite Word Length Effects**: Limit Cycles, Overflow Oscillations and Dead Band effects.

**Introduction to DSP Processors:** Architecture and features of TMS320CXX processor.

**TEXT BOOKS:**

1. John G. Proakis, Dimitris G. Manolakis, **"Digital Signal Processing, Principles, Algorithms, and Applications"**, Pearson Education / PHI, 4th Edition, 2007. (Modules I, II, III& IV)
2. A.Nagoorkani, **"Digital signal processing"**, Tata McGraw Hill, 2nd Edition, 2012.(Modules I,II,III,IV&V)
3. Avtar Singh and S. Srinivasan, **Digital Signal Processing Implementations Using DSP Microprocessors – with Examples from TMS320C54xx**, CENGAGE Learning, India, 1st Edition, 2008. (Module V)

**REFERENCE BOOKS:**

1. Shalivahana, Vallava Raju,Gnana Priya, **"Digital Signal Processing"**,TATA McGraw Hill, 2nd Edition, 2010.
2. Alan V. Oppenheim, Ronald W. Schafer, **"Digital Signal Processing"**, PHI Education, 2006.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Understand the fast computation of DFT using FFT algorithms and implement in real-time applications.
2. Design IIR & FIR Digital filters for the given specifications.
3. Analyze the various errors in the implementation of finite word length effects.
4. Design Real time systems using the multirate processing techniques and the DSP processors.

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**Course Code: 50433** **Credits: 3**

**B.Tech. – VI Semester**
**VLSI DESIGN**
**(Professional Elective – 2)**

**PREREQUISITES:**EDC and Digital Electronics.

**OBJECTIVE:**This course introduces the IC Fabrication steps and various IC technologies. This course also introduces the basics of VLSI technology, design concepts, electrical properties and modeling of Very Large Scale Integrated circuits, Gate-Level circuit Design, Data path subsystem design, Architectures of ASIC's, CPLD`s and FPGA`s.

**MODULE-I:IC Fabrication and Technologies [12 Periods]**
**IC Fabrication**: Steps in Fabrication-Oxidation, Lithography, Diffusion, Ion implantation, Encapsulation and Metallization.
**IC Technologies** – Review of Enhancement and Depletion MOS transistors, NMOS, PMOS & CMOS fabrications, Comparison of NMOS, CMOS & BiCMOS technologies.

**MODULE -II:Basic Electrical Parameters[12 Periods]** $I_{ds}$-$V_{ds}$ relationships, MOS transistor threshold Voltage (Vt), transconductance(gm), output conductance(gds) & figure of merit(wo).
Pass transistor, NMOS Inverter, Determination of pull-up to pull-down ratios, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters, Latch-up in CMOS circuits.

**MODULE-III:VLSI Circuit Design Processes[12 Periods]** VLSI Design Flow, MOS Layers, Stick Diagrams, Lambda based Design Rules and Layout, 2 µm CMOS Design rules for wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits- Scaling models, Scaling function for device parameters, Limitations of Scaling.

**MODULE-IV:Basic Circuit Concepts and Gate Level Design [12 Periods]**
**Basic Circuit Concepts**: Sheet Resistance $R_s$ and Gate Capacitance $C_g$, Wiring Capacitances, Fan-in and fan-out, Choice of layers.
**Gate Level Design**: Logic Gates using CMOS and complex gates, Switch logic, Alternate gate circuits – Pseudo NMOS logic, Dynamic CMOS logic, Clocked CMOS logic($C^2$MOS) and Cascaded Voltage Switch logic(CVSL).

**MODULE-V:Data Path Subsystems, ASIC's and PLD's [12 Periods]**
**Data Path Subsystems:** Subsystem Design – Barrel Shifter, Carry Select and Carry look Ahead Adder, Serial-Parallel and Braun Array Multiplier.
**Application Specific Integrated Circuits** – Channel gate array, Channel less gate array and structured gate array.
**Programmable Logic Devices -** Architectures of CPLDs and FPGAs.

**TEXT BOOKS:**

1. Kamran Eshraghian, Douglas A. Pucknell, **"Essentials of VLSI circuits and systems"**, PHI, 1st Edition, 2005.(Modules I, II & III)
2. K. Lal Kishore, VSV. Prabhakar, **"VLSI Design"**, I. K international Publishing House Private Ltd, 2009.(Modules IV & V)

**REFERENCE BOOKS:**

1. Neil H. E Weste, David Harris, Ayan Banerjee, **"CMOS VLSI Design - A circuits and systems perspective"**, Pearson Education, 3rd Edition, 2009.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Understand the steps involved in IC fabrication and various IC technologies.
2. Draw the layout of any logic circuit using the design rules.
3. Design various adders and multipliers.
4. Understand the Architectures of FPGA and CPLD's.

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**Course Code: 50221** **Credits: 3**

**B.TECH. – VI – SEMESTER**

**OPTIMAL CONTROL THEORY**
**(Professional Elective – 2)**

**Module-I: PERFORMANCE MEASURE [10 Periods]**

Problem formulation - state variable representation of systems - performance measures for optimal control problems - selecting a performance measure.

**Module-II: DYNAMIC PROGRAMMING [12 Periods]**

Optimal control law - principle of optimality - Application of Principle of optimality to decision making - Recurrence relation of Dynamic Programming - Imbedding Principle - computational procedure to solve optimal control problems - Discrete Linear regulator Problems - Hamilton - Jacobi Belman Equation - Continous linear regulator problems

**Module-III: CALCULUS OF VARIATIONS [10 Periods]**

Fundamental concepts - Functional of a single function - functionals involving several independent functions - piece wise smooth extremals - constrained extrema.

**Module-IV: VARIATIONAL APPROACH TO OPTIMAL CONTROL PROBLEM**

**[12 Periods]**

Necessary condition for optimal control - Linear regulator problems - Pontryaginís Minimum Principle and state inequality constraints - Minimum time Problems - Minimum Control - Effort problems - Singular intervals in optimal control Problem.

**Module-V: NUMERICAL METHODS OF OPTIMAL CONTROL [10 Periods]**

Simplex Method - golden section Method - Hill climbing - Gradient - Penalty functions methods.

**TEXT BOOKS**


1. Optimal Control Theory, an Introduction, Donald.E.Kirk, Prentice Hall, Inc., Englewood Cliffs, New Jersey, 1962.
2. Optimal control, Brain D. O. Anderson and J. B. Moore, Prentice Hall, 1990.


**REFERENCES BOOKS**


1. Optimum Systems Control, Andrew P. Sage, Prentice Hall N.H. 1968
2. Optimal control, Michael Athans and Peter L Falb, Dover publications, 2006.
3. Optimization Theory and Application, Rao S.S. Wiley Eastern, New Delhi, 1992.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50584** **Credits: 3**

**B.Tech. – IV Semester**

**COMPUTER ORGANIZATION AND OPERATING SYSTEMS**
**(Professional Elective-3)**

**PREREQUISITES: B**asic computers and Digital Electronics.

**OBJECTIVE:**This course introduces the basic structure and operation of digital computer. It will discuss in detail the operation of arithmetic unit for fixed point and floating point and different ways of communicating with I/O devices. This course also discusses the functions of operating systems to implement a significant portion of operating systems.

**MODULE - I:Basic Structure of Computers[12 Periods]** Computer Types, Functional UNIT, Basic OPERATIONAL Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating – Point Representation.
**Register Transfer Language and Micro Operations:** Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers, Computer Instructions– Instruction Cycle.Memory – Reference Instructions, Input – Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

**MODULE - II:Micro Programmed Control and The Memory System [12 Periods]**
**Micro Programmed Control:** Control Memory, Address Sequencing, Microprogram Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control
**The Memory System:** Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories - Performance Considerations, Virtual Memories Secondary Storage, Introduction to RAID.

**MODULE - III:Input-Output Organization[12 Periods]** Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input –Output Processor (IOP), Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

**MODULE - IV:Operating Systems [12 Periods]**
**Operating Systems Overview:** Overview of Computer Operating Systems Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating Systems Structures-Operating System Services and Systems Calls, System Programs, Operating Systems Generation
**Memory Management:** Swapping, Contiguous Memory Allocation, Paging, Structure of The Page Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation of Frames, Thrashing, Case Studies - UNIX, Linux, Windows
**Principles of Deadlock:** System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

**MODULE - V:File System[12 Periods] File System Interface:** The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.
**File System Implementation:** File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

**TEXT BOOKS:**

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, **"Computer Organization"**, McGraw Hill, 5th Edition, 2002. (Modules I, II & III)
2. M.Moris Mano, **"Computer Systems Architecture"**, Pearson, 3rd Edition, 2000. (Units I, II & III)
3. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, **"Operating System Concepts"**, John Wiley, 8th Edition, 2010. (Modules IV & V)

**REFERENCE BOOKS:**

1. William Stallings, **"Computer Organization and Architecture"**, Pearson, 6th Edition.
2. Andrew S. Tanenbaum, **"Structured Computer Organization"**, PHI, 4th Edition.
3. Sivaraama Dandamudi, **"Fundamentals of Computer Organization and Design"**, Springer Int. Edition.
4. Stallings, **"Operating Systems–Internals and Design Principles"**, Pearson Education, 6th Edition, 2009.
5. Andrew S Tanenbaum, **"Modern Operating Systems"**, PHI, 2nd Edition.
6. B.L.Stuart, **"Principles of Operating Systems"**, Cengage Learning, India Edition.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Know the basic structure of a digital computer.
2. Learn Arithmetic operations of binary number system and the organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.
3. Know the Operating system functions, types, system calls, Memory management techniques and dead lock avoidance.
4. Know Operating systems file system implementation and its interface.

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**Course Code: 50222** **Credits: 3**

## B.TECH. – VI – SEMESTER
## ELECTRICAL DISTRIBUTION SYSTEMS AND AUTOMATION
## (Professional Elective – 3)

**Objective:**To get awareness of distribution systems for load modeling.To understand the design & working of substations. To know about system protection and the coordination course outcomes. To know about Distribution Automation

**Module- IGENERAL CONCEPTS [10 Periods]**

Introduction to distribution systems, Load modeling and characteristics. Load factor, Coincidence factor, Contribution factor and Loss factor - Relationship between the Load factor and loss factor. Classification of loads (Residential, Commercial, Agricultural and Industrial) and their characteristics.

**Module- IIDISTRIBUTION FEEDERS AND SUBSTATIONS [12 Periods]**

Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system. Substations, Location of Substations: Rating of distribution substation, service area within primary feeders, benefits derived through optimal location of substations.

**Module – IIIDISTRIBUTION SYSTEM ANALYSIS [10 Periods]**

Voltage drop and Power-loss calculations: Derivation for voltage drop and Power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines.

**Module - IV PROTECTION [12 Periods]**

Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, Line Sectionalizers, and Circuit Breakers, Coordination of Protective Devices: General coordination procedure Concepts of Smart grid and Demand SideManagement.

**Module - V Voltage Control [12 Periods]**

Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation.

**Distribution Automation**

Need for DA, Objectives & Functions of DA, SCADA, Consumer information service, GIS, Automatic meter reading

**TEXT BOOKS**

1. Electric Power Distribution system, Engineering by Turan Gonen, TMH.
2. Electric Power Distribution by A.S. Pabla, Tata Mc Graw-hill Publishing Company, 1997, 6th edition.

**REFERENCES**


1. Electrical Power Distribution and Automation by S.Sivanagaraju,V.Sankar,Dhanpat Rai and Co.
2. Electrical Power Distribution Systems by V.Kamaraju,TMH Publishers, 2nd Edition.


**Outcomes:**

- Analyze the electrical distribution system for voltage drop and power loss calculations in lines.
- Analyze optimal conductor selection for distribution systems.
- Describe Distribution Automation objectives and SCADA

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**Course Code: 50223** **Credits: 3**

**B.TECH. – VI – SEMESTER**
**ADVANCED POWER ELECTRONICS**
**(Professional Elective – 3)**

**Objective:** To understand the operation of various semi conductor devices.To analyze resonant pulse converters.To describe the operation of multi level inverters with switching strategies for high power applications.To appreciate the design of switch mode power supplies.

**Module I MODERN POWER SEMICONDUCTOR DEVICES[12 Periods]**
Modern power semiconductor devices – MOS Turn Off Thyristor (MTO) – Emitter Turn Off Thyristor (ETO) – Intergrated Gate-Commutated Thyristor (IGCTs) – MOS-Controlled Thyristors(MCTs) – Static Induction Thyristors (SITHs) – Power integrated circuits (PICs) – symbol, structure and equivalent circuit – comparison of their features.

**Module II TWO-LEVEL VOLTAGE SOURCE INVERTER [12 Periods]**
Introduction, Sinusoidal PWM, Modulation Scheme, Harmonic Content, Overmodulation, Third Harmonic Injection PWM, Space Vector Modulation, Switching States, Space Vectors, Dwell Time Calculation, Modulation Index, Switching Sequence, Spectrum Analysis, Even-Order Harmonic Elimination, Discontinuous Space Vector Modulation.

**Module III MULTILEVEL INVERTERS [12 Periods]**
Need for Multilevel Inverters, Multilevel Concept, Classification of Multilevel Inverters – Diode Clamped Multilevel Inverter- Principle of Operation – Main Features - Flying Capacitor Multilevel Inverter – Principle of Operation – Main Features, Cascaded Multilevel Inverter, Principle of Operation- Features, Applications of Multilevel Inverters.

**Module IV DC-DC SWITCH-MODE CONVERTERS AND SWITCHING DC POWER SUPPLIES [12 Periods]**

Linear Power Supplies, Overview of Switching Power Supplies, Dc-Dc Converters with Electrical Isolation, Control of Switch Mode Dc Power Supplies, Power Supply Protection, and Electrical Isolation in the Feedback loop, designing to meet the Power Supply Specifications.
Control Of Dc-Dc Converter, Fly Back, Forward, Full-Bridge Dc-Dc Converter.

**Module VRESONANT CONVERTERS [10 Periods]**

Introduction to Resonant Converters, Classification of Resonant Converters, Basic Resonant circuit concepts, Series Resonant Circuit-Parallel Resonance Circuit, Resonant Switch Converters: ZCS Resonant Buck Converter, ZVS Resonant Boost Converter

**TEXT BOOKS**

1. Power electronics circuits, Devices and applications by M.H. Rashid PHI –I edition – 1995.
2. Power Electronics converters, Applications and Design by Ned Mohan, Tore M. Undeland and William P. Robbins, A John Wiley Sons, Inc., Publication 3rd Edition.

**REFERENCES**

1. High-Power Converters and AC Drives by Bin Wu, A John Wiley & Sons, Inc., Publication
2. Switch mode Power Supply Handbook 3/e, Keith Billings, Taylor Morey, Mc GrawHill.
3. Fundamentals of Power Electronics by Robert W. Erickson , Dragan Maksimovic, KLUWER ACADEMIC PUBLISHERS 2nd Edition.
4. Pulse-width Modulated DC–DC Power Converters by Marian K. Kazimierczuk, John Wiley and Sons, Ltd, Publication

**Outcomes:**

Upon completion of this course, students should be able to:

- Comprehend the semiconductor device switch characteristics
- Analyze and assess multilevel inverters and resonant pulse converters
- To design switch mode power supplies

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## Malla Reddy Engineering College (Autonomous)

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**Course Code: 50450** **Credits: 3**

**B.Tech. – VI Semester**

## MICROPROCESSORS AND MICROCONTROLLERS

**Prerequisite:** NIL
**Objective:**To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.

**Module I: Architecture of 8086**
**A: 8086 Architecture: [09 Periods]**
8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086- Common Function Signals, Timing diagrams, Interrupts of 8086.

**Module II: Programming**
**A: Instruction Set and Assembly Language Programming of 8086: [09 Periods]**
Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

**Module III: I/O and Communication Interface**
**A: I/O Interface: [03 Periods]**
8255 PPI, Various Modes of Operation and Interfacing to 8086, Interfacing Keyboard, Display, D/A and A/D Converter.
**B: Communication Interface: [03 Periods]**
Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.
**C: Interfacing with advanced devices: [03 Periods]**
Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine.

**Module IV: Micro Controller**
**A: Introduction to Microcontrollers: [09Periods]**
Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs

**Module V: Real time Controller**
**A: 8051 Real Time Control: [09 Periods]**
Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

**Text Books:**

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller , 3rd Ed., Cengage Learning.

**References:**

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH,2nd Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao,Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2nd Ed.
4. Microcontrollers and Application - Ajay. V. Deshmukh, TMGH, 2005.
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar,B.S.Umashankar, 2008, Pearson

**Outcomes:**

1. The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2. The student will learn hardware and software interaction and integration.
3. The students will learn the design of microprocessors/microcontrollers-based systems.

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**Course Code: 50224** **Credits: 2**

## B.TECH. – VI – SEMESTER
## AC MACHINES LAB

**LIST OF EXPERIMENTS**:

1. O.C. & S.C. Tests on Single phase Transformer
2. Sumpner‘s test on a pair of single phase transformers
3. Scott connection of transformers
4. No-load & Blocked rotor tests on three phase Induction motor
5. Regulation of a three –phase alternator by synchronous impedance & m.m.f. methods
6. V and Inverted V curves of a three-phase synchronous motor.
7. Equivalent Circuit of a single phase induction motor
8. Determination of Xd and Xq of a salient pole synchronous machine
9. Parallel operation of Single phase Transformers
10. Brake test on three phase Induction Motor
11. Regulation of three-phase alternator by Z.P.F. and A.S.A methods
12. Efficiency of a three-phase alternator

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# Malla Reddy Engineering College (Autonomous)

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**Course Code:50225** **Credits: 2**

## B.TECH. – VI – SEMESTER

## POWER ELECTRONICS LAB

**LIST OF EXPERIMENTS:**

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase fully controlled bridge converter with R and RL loads
5. Forced Commutation circuits ( Class A, Class B, Class C, Class D & Class E)
6. DC Jones chopper with R and RL Loads
7. Single Phase Parallel, inverter with R and RL loads
8. Single Phase Cycloconverter with R and RL loads
9. Single Phase Half controlled converter with R load
10. Three Phase half controlled bridge converter with R-load
11. Single Phase dual converter with RL loads
12. PSPICE simulation of single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads and also of resonant pulse commutation circuit and Buck chopper.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code:50H05** **Credits: 1**

**B.Tech. – VI Semester**

**SOFT SKILLS**

## Introduction:

Today's dynamic business world seeks ways to help their work force learn as they progress through applicable information to help drive business. In keeping with the evolving need of firms and the recruiting process, this course aims at catering to the needs of the students fresh from the academic background ready to enter the world of work from the HR perspectives of any company. Perhaps it is noticed that an intelligent individual lacks the ability to work on team assignments, communicate with clients, or maintain professionalism. This course is a comprehensive preparation and a bridge course that would enable the students to be industry ready before they wind up their undergraduate course. The modules that are chosen are the ones that the industry experts from Infosys emphasize upon. Apart from the technical skills, the course intends to enhance the employability skills and make them employment ready.

## Objective:

- To broaden the perspective of job seekers and help them gain awareness on the standards and the expectations of the recruiters in the industry.
- To draw a link between the academics and the industry and emphasize the importance of the right attitude, grooming, etiquette, self motivation, empathy, commitment, responsibility, self awareness and patience while dealing with a variety of people
- Refining the communication skills of the students
- Sharpen the analytical skills for appropriate decision making
- To develop the art of communication; verbal and non verbal for effective inter and intra personal skills

## Syllabus:

1. Spoken aspects of Communication
2. Work/Business etiquette- dressing and grooming, telephone etiquette, meeting etiquette, dining etiquette, small talk, dealing with people
3. Business communication-Fundamentals of effective communication, Barriers and filters
4. Work in teams-Team concept, advantages of working in teams, team players/leaders
5. Intra personal skills- handling negative emotions;attitude,self confidence, self esteem
6. Principles of goal setting
7. Effective Time management skills
8. Reading skills
9. Writing skills
10. Digital language

**Reference books:**


- The Power of Habit: Why We Do What We Do in Life and Business by Charles Duhigg
- The Zen of Steve Jobs (Paperback) by Caleb Melby
- Software Systems Architecture: Working with Stakeholders Using Viewpoints and Perspectives by Nick Rozanski
- The Art of Focused Conversation: 100 Ways to Access Group Wisdom in the Workplace (Paperback) by R. Brian Stanfield
- The Little Book of Talent: 52 Tips for Improving Your Skills by Daniel Coyle
- The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change (Paperback) by Stephen R. Covey
- How to Win Friends and Influence People (Paperback) by Dale Carnegie
- Thinking, Fast and Slow by Daniel Kahneman
- Never Eat Alone: And Other Secrets to Success, One Relationship at a Time by Keith Ferrazzi
- Emotional Intelligence: Why It Can Matter More Than IQ by Daniel Goleman
- The Effective Executive: The Definitive Guide to Getting the Right Things Done (Paperback) by Peter F. Drucker
- How to Recruit and Hire Great Software Engineers: Building a Crack Development Team (Paperback) by Patrick McCuller
- Quiet: The Power of Introverts in a World That Can't Stop Talking by Susan Cain
- The $100 Startup: Reinvent the Way You Make a Living, Do What You Love, and Create a New Future by Chris Guillebeau
- The Presentation Secrets of Steve Jobsby Carmine Gallo Ackoff,Ressel Lincoln.The art of Problem solving.New York:Wiley.
- The Leader's Guide to Influence: How to Use Soft Skills to Get Hard Results (Paperback) by Mike Brent

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**Course Code: 50H13** **Credits: 2**

**B.Tech. – VII Semester**
**MANAGEMENT SCIENCE**

**PREREQUISITES:**Nil

**OBJECTIVE:**Through reading the text, references and discussion of cases students should be able to understand the fundamentals underlying the management of an organization.

**MODULE – I:Management and Principles of Management [12 Periods] Introduction to Management:** Concepts of Management and organization-nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayols.
**Principles of Management**,: Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

**MODULE – II:Organizational Structures and Types of Organizations [11 Periods]**
**Designing Organizational Structures:** Basic concepts related to Organization - Departmentation and Decentralization, Types of mechanistic and organic structures of organization
**Types of Organizations:** Line organization, Line and staff organization, functional organization ,committee organization, matrix organization, Virtual Organization, Cellular Organization, team structure, boundary less organization, inverted pyramid structure, lean and flat Organization structure and their merits, demerits and suitability.

**MODULE – III:Operations Management and Materials, Marketing Management [11 Periods]**
**Operations Management :** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement- Statistical Quality Control: chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.
**a) Materials Management:** Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.
**b) Marketing Management**: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle, Channels of distribution

**MODULE – IV:HRM and SM [11 Periods]**
**Human Resources Management (HRM) :** Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.
**Strategic Management :** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives

**MODULE – V: Management Practices and PERT/CPM [11 Periods]**

**Contemporary Management Practices:** Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels,

**Project Management (PERT/CPM):** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems)

**TEXT BOOKS:**

1. Aryasri, **Management Science**, TMH, 4th Edition, 2004. (Modules I, II, III, IV & V)
2. Stoner, Freeman, Gilbert, **Management,** Pearson Education, New Delhi, 6th Edition, 2004. (Modules I & II)

**REFERENCE BOOKS*:***

1. Kotler Philip & Keller Kevin Lane,**"Marketing Management"**, PHI, 12th edition, 2005.
2. Koontz & Weihrich, **"Essentials of Management"**, TMH, 6th edition, 2005.
3. Thomas N.Duening & John M.Ivancevich **"Management - Principles and Guidelines"**, Biztantra,2003.
4. Memoria & S.V.Gauker, **"Personnel Management"**, Himalaya, 25th edition, 2005
5. Samuel C.Certo, **"Modern Management"**, PHI, 9th edition, 2005.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Learn the history of management and the contributions of important management techniques.
2. Understand the relevance of environmental scanning, planning and how to take decisions.
3. Learn how to delegate authority and use power to influence people to get the work done through proper communication and control.
4. Learn HR strategies of recruitment and selections and Marketing strategies.

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**Course Code: 50226** **Credits: 4**

**B.Tech-VII Semester**

## SOLID STATE DRIVES

**Objective:** To expose the students from the basic idea of electric drives and its characteristics with different loads,control of DC & AC motors with different methods.

**Module I: Electric Drives [14 Periods]**

Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

**Control of DC motors by Single phase Converters**

Introduction to Thyristor controlled Drives, Single Phase Semi and Fully controlled converters connected to D.C separately excited and D.C series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed D.C motors.

**Module II: Control of DC motors by three phase Converters [10 Periods]**

Three phase semi and fully controlled converters connected to D.C separately excited and D.C series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

**Module III: Four Quadrant operations of DC Drives [14 Periods]**

Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters.

**Control of DC motors by Choppers**

Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed D.C Motors

**Module IV: Control of Induction Motor through Stator voltage and Stator Frequency [12 Periods]**

Variable voltage characteristics-Control of Induction Motor by AC Voltage Controllers – Waveforms – speed torque characteristics.

Variable frequency characteristics- control of induction motor by Voltage source inverter and current source inverter - cyclo converters- PWM control – Introduction to CSI and VSI – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives

**Module V: Control of Induction motor of Rotor side [12 Periods]**

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems

**Control of Synchronous Motors**

Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI.

**Text Books:**

1. G K Dubey**,"Fundamentals of Electric Drives"**, Narosa Publications-5th edition-reprint,2005.

2. B.K.Bose, **"Modern Power Electronics and AC Drives"**, PHI-2002.

**Reference Books:**

1. MD Singh and K B Khanchandani ,**"Power Electronics"**, Tata – McGraw-Hill Publishing company,1998-12th

2. Vedam Subramanyam,**"ThyRistor Control of Electric drives"** –Tata McGraw Hill Publilcations-1988,1989, reprint 2001.

3. S K Pillai,**"A First course on Electrical Drives"** –New Age International(P) Ltd. 2nd Editon-9th edition, reprint 2009.

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**Course Code:50227** **Credits: 3**

**B.TECH-VII SEMESTER**

**EHV AC TRANSMISSION**

**(Professional Elective-4)**

**Objective ;**

This subject deals with the necessity of EHV AC transmission and modes of propagation with examples. It also discussed with corona effects, voltage control and travelling wave theory.

**Unit – I: Preliminaries: [12 Periods]**

Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses- mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius- Examples.

**Line and ground reactive parameters: [12 Periods]**

Line inductance and capacitances – sequence inductances and capacitances – modes of propagation – ground return – Examples

**Unit – II: Voltage gradients of conductors: [10 Periods]**

Electrostatics – field of sphere gap – field of line changes and properties – charge – potential relations for multi-conductors – surface voltage gradient on conductors – distribution of voltage gradient on sub-conductors of bundle – Examples.

**Unit – III: Corona effects – I: [12 Periods]**

Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics - limits and measurements of AN – relation between 1-phase and 3-phase AN levels – Examples.

Radio interference (RI) - corona pulses generation, properties, limits – frequency spectrum – modes of propagation – excitation function – measurement of RI, RIV and excitation functions – Examples.

**Unit – IV: Electro static field AND Traveling wave theory [12 Periods]**

Electrostatic field: calculation of electrostatic field of EHV/AC lines – effect on humans, animals and plants – electrostatic induction in unenergised circuit of double-circuit line – electromagnetic interference-Examples.

Traveling wave expression and solution- source of excitation- terminal conditions- open circuited and short-circuited end- reflection and refraction coefficients-Lumped parameters of distributed lines-generalized constants-No load voltage conditions and charging current.

**UNIT –V: VOLTAGE CONTROL: [12 Periods]**

Power circle diagram and its use – voltage control using synchronous condensers – cascade connection of shunt and series compensation – sub synchronous resonance in series capacitor – compensated lines – static VAR compensating system.

**TEXT BOOKS:**

1. R. D. Begamudre ,"EHVAC Transmission Engineering", New Age International (p) Ltd. 3rd Edition.
2. K.R. Padiyar, "HVDC Power Transmission Systems" New Age International (p) Ltd. 2nd revisedEdition, 2012.

**REFERENCES:**


1. S. Rao "EHVAC and HVDC Transmission Engg. Practice" Khanna publishers.
2. Arrillaga.J " High Voltage Direct Current Transmission" 2nd Edition (London) peter Peregrines, IEE, 1998.
3. Padiyar.K.R, " FACTS Controllers in Power Transmission and Distribution" New Age Int. Publishers, 2007.
4. Hingorani H G and Gyugyi. L " Understanding FACTS-Concepts and Technology of Flexible AC Transmission Systems" New York, IEEE Press, 2000.

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**Course Code: 50228** **Credits: 3**

**B.Tech-VII Semester**

## ELECTRIC SMART GRID

**(Professional Elective-4)**

**Prerequisites:** Basic concepts of Power Systems

**Module I:Basics of Power Systems [12 Periods]**

Load and generation, power flow analysis, economic dispatch and unit commitment problems. integration of renewable to smart grid.

**Renewable Generation**

carbon footprint, renewable resources: wind and solar, micro grid architecture, tackling intermittency, stochastic models and forecasting, distributed storage and reserves.

**Module II: introduction to smart grid [14 Periods]**

Definition, applications, government and industry, standardization

**Smart Grid Communications:**Two-way Digital Communications Paradigm, Network Architectures, IP-based Systems, Power Line Communications, Advanced Metering Infrastructure.Measurements: Sensor Networks, Phasor Measurement Units, CommunicationsInfrastructure, Fault Detection and Self-Healing Systems, Applications and Challenges.

**Module III: Distribution system management [12 Periods]**

Data sources and associated external systems, Modeling and analysis tools, applications.

**Demand Response**: Definition, Applications, and State-of-the Art, Pricing and Energy Consumption, Scheduling, Controllable Load Models, Dynamics, and Challenges, Electric Vehicles and Vehicle-to-Grid Systems, Demand Side Ancillary Services.

**Module IV: Economics and Market operations [10 Periods]**

Energy and reserve markets, market power, generation firms, locational marginal prices, financial transmission rights

**Module V**: **Security and Privacy [12 Periods]**

Cyber Security Challenges in Smart Grid, Load Altering Attacks, False Data Injection Attacks, Defense Mechanisms, Privacy Challenges.

**Text Books:**

1. **"Smart Grid Fundamentals of Design and Analysis"**, James Momoh, Wiley IEEE Press, Ed 2012.
2. **"Smart Grid Technology and Applications"**, Janaka Ekanayake, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, Nick Jenkins, Wiley Press, Ed 2012.

**Reference Books:**

1. **"Control and Optimization Methods for Electric Smart Grids"**, Aranya Chakraborthy, Marija D llic Editor, Springer Publications.

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**Course Code: 50229 Credits: 3**

**B.Tech-VII Semester**

**ENERGY AUDITING & CONSERVATION**

**(Professional Elective-4)**

**Objective:**

To have the knowledge about the concept of energy conservation, energy management, different approaches of energy conservation in industries, economic aspects of energy conservation project and energy audit in commercial and industrial sector will be achieved by this course.

**MODULE I : BASIC PRINCIPLES OF ENERGY AUDIT [12 PERIODS]**

Energy audit- definitions, concept , types of audit, energy index, cost index ,pie charts, Sankey diagrams, load profiles, Energy conservation schemes- Energy audit of industries- energy saving potential, energy audit of process industry, thermal power station, building energy audit

**MODULE II: ENERGY MANAGEMENT [12 PERIODS]**

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting, Energy manger, Qualities and functions, language, Questionnaire - check list for top management

**MODULE III: ENERGY EFFICIENT MOTORS [12 PERIODS]**

Energy efficient motors , factors affecting efficiency, loss distribution , constructional details , characteristics - variable speed , variable duty cycle systems, RMS hp- voltage variation- voltage unbalance- over motoring- motor energy audit

**MODULE IV : POWER FACTOR IMPROVEMENT, LIGHTING & ENERGY INSTRUMENTS [14 PERIODS]**

Power factor – methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on p.f. , p.f motor controllers - Good lighting system design and practice, lighting control ,lighting energy audit,

**Energy Instruments**- watt meter, data loggers, thermocouples, pyrometers,lux meters, tongue testers ,application of PLC's

**MODULE V: ECONOMIC ASPECTS AND ANALYSIS & ITS COMPUTATION [12 PERIODS]**

Economics Analysis-Depreciation Methods, time value of money, rate of return, present worth method , replacement analysis, life cycle costing analysis - Energy efficient motors, Calculation of simple payback method, net present worth method- Power factor correction, lighting - Applications of life cycle costing analysis, return on investment.

**Text Books:**

1. **"Energy management"** by W.R. Murphy & G. Mckay Butter worth, Heinemann publications.
2. **"Energy efficient electric motors"** by John .C. Andreas, Marcel Dekker Inc Ltd-2nd edition, 1995-

**References:**

1. **"Energy management"** by Paul o' Callaghan, Mc-graw Hill Book company-1st edition, 1998
2. **"Energy management hand book"** by W.C.Turner, John wiley and sons
3. **"Energy management and good lighting practice"** : fuel efficiency- booklet12-EEO

**Outcome:**After completion of the course student will have the awareness of

- Different types of industries which are consisted of various energy intensive processes.
- Various energy intensive processes in different industries and to find out the energy conservation opportunities.
- Various methods of energy management and energy auditing on the site.
- Energy auditing and managing the energy demand in industry.

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**Course Code: 50230** **Credits: 3**

**B.Tech-VII Semester**

## HIGH VOLTAGE ENGINEERING
## (Professional Elective-5)

**Objective:**This subject deals with the detailed analysis of Breakdown occur in gaseous, liquids and solid dielectrics. Information about generation and measurement of High voltage and current. In addition the High voltage testing methods are also discussed.

**Module I: Introduction to High Voltage Technology and Applications [12 Periods]**

Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

**Module II: Break Down in Gaseous, Liquid and Solid Dielectrics [12 Periods]**

Gases as insulating media, collision process, Ionization process, Townsend‘s criteria of breakdown in gases, Paschen‘s law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids.

Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

**Module III: Generation and Measurement of High Voltages and Currents[12 Periods]**

Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

**Module IV: Over Voltage Phenomenon and Insulation Co-Ordination [12 Periods]**

Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

**Module V:Non-Distructive Testing of Material and Electrical Apparatus& HighVoltage Testing [12 Periods]**

Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

**Text Books:**

1. M.S.Naidu and V. Kamaraju, **"High Voltage Engineering"** – TMH Publications, 3rd Edition
2. E.Kuffel, W.S.Zaengl, J.Kuffel**"High Voltage Engineering: Fundamentals"**,Elsevier, 2nd Edition.

**Reference Books:**

1. C.L.Wadhwa,**"High Voltage Engineering"**, New Age Internationals (P) Limited, 1997.
2. Ravindra Arora, Wolfgang Mosch,**"High Voltage Insulation Engineering"** New Age International (P) Limited, 1995.

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**Course Code: 50231** **Credits: 3**

**B.Tech-VII Semester**

## ELECTRICAL POWER QUALITY
## (Professional Elective-5)

**Prerequisites:** Basic concepts ofPower Systems and Distribution Systems

**Objective:**This subject deals with the definition of power quality and types of power quality and their issues and solutions. It also discussed some of the power quality problems like interruptions, voltage sag and swells with their reliability evaluation.

**Module1: Introduction: [10 periods]**

Introduction of the power quality problem, terms used in PQ: voltage, sag, swell, surges, Harmonics, over voltages, spikes, voltage fluctuations, transients, interruption, overview of power quality phenomenon. Remedies to improve power quality, power quality monitoring.

**Module II: Interruptions [14 periods]**

Interruptions-definition-difference between failure, outage, interruptions-causes of long interruptions origin of interruptions-limits for the interruption frequency-limits for the interruption duration-costs of interruption-overview of reliability evaluation to power quality, comparison of observations and reliability evaluation.

Short interruptions-definitions, origin of short interruptions, basic principle, fuse saving, voltage magnitude events due to re-closing , voltage during the interruption, monitoring of short interruptions , difference between medium and low voltage systems, multiple events, single phase tripping-voltage and current during fault period, voltage and current at post fault period, stochastic prediction of short interruptions.

**Module III: Voltage sag-characterization [12 periods]**

Voltage sag-definition, causes of voltage sag, voltage sag magnitude, monitoring theoretical calculation of voltage sag magnitude, voltage sag calculation in non-radial systems meshed systems. Voltage sag duration.

Three phase faults, phase angle jumps, magnitude and phase angle for three phase unbalanced sags. Load influence onvoltage sags.

**Module IV: PQ Consideration in industrial power systems [10 periods]**

Voltage sag-equipment behavior of power electronic loads, induction motors , synchronous motors, computers, consumerelectronics adjustable speed AC drives and its operation. Mitigation of AC drives, adjustable speed DC drives and itsoperation, mitigation methods of DC drives.

**Module V: Mitigation of interruptions and voltage sags [12 periods]**

Overview of mitigation methods-from fault trip, reducing the number of faults, reducing the fault clearing time changing the power system, installing mitigation equipment, improving equipment immunity, different events and mitigation methods. System equipment interface-voltage source converter, series voltage controller, shunt controller, combined shunt and series controller.

**Power quality and EMC standards:**

Introduction to standardization, IEC electromagnetic compatibility standards, European voltage characteristics standards, PO surveys.

**Text Book:**

1. Math H J Bollen.IEEE press.**"Understanding power quality problems"**

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**Course Code: 50232** **Credits: 3**

**B.Tech. – VII – Semester**

**HVDCand FACTS**
**(Professional Elective-5)**

**Prerequisites:** Conceptof power systems

**Objective:** This subject deals with the basic concepts of FACTS & HVDC and its applications, analysis of HCDC converters with their control circuitry. This subject also includes reactive power control, power flow with compensation devices or controllers including voltage source converter also.

**Module I: Basic Concepts [10 Periods]** Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC &DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.

**Module II:Analysis of HVDC Converters [14 Periods]**Choice of Converter configuration – analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters – Cases of two 3 phase converters in star –star mode – their performance.

**Converter & HVDC System Control**

Principle of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

**Module III: Reactive Power Control in HVDC [14 Periods]**

Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies-sources of reactive power-AC Filters – shunt capacitors-synchronous condensers.

**Power Flow Analysis in AC/DC Systems**

Modeling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC load flow – P.U. System for d.c. quantities-solution of AC-DC Power flow-Simultaneous method-Sequential method.

**Module IV: Power Flow and Dynamic Stability [12 Periods]**

Transmission interconnections, power flow in an AC System, loading capability limits, Power flow and Dynamic stability considerations, importance of controllable parameters. Opportunities for FACTS, basic types of FACTS controllers, benefits from FACTS controllers, Requirements and Characteristics of High Power devices – Voltage and Current rating, losses and speed of switching, parameter trade-off of devices.

**Module V:Voltage Source Converters [12 Periods]**

Basic concept of Voltage source converter, Single phase full wave bridge converter, Single phase-leg (pole) operation, Square-wave voltage harmonics for a single phase Bridge, 3 Phase full wave bridge converter.

**Text Books:**


1.K.R.Padiyar,**"HVDC Power Transmission Systems: Technology and system Interactions"**, New Age International (P) Limited, and Publishers.

2. S.Rao **, "EHVAC and HVDC Transmission Engineering and Practice".**

3. N.G.Hingorani and L.Guygi, **"Understanding FACTS"**, IEEE Press. Indian Edition is available, Standard Publications, 2001.


**References:**


1. J.Arrillaga, **"HVDC Transmission"**
2. E.W.Kimbark, John Wiley & Sons, **"Direct Current Transmission"**
3. E.Uhlmann, **"Power Transmission by Direct Current"**,B.S.Publications

4. YONG HUE SONG and ALLAN T JOHNS, **"Flexible AC Transmission System (FACTS)"**Institution of Electrical Engineers, London.

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**Course Code: 50233** **Credits: 3**

**B.Tech-VII Semester**

## POWER SYSTEM OPERATION AND CONTROL

**Prerequisites:** Basic concepts of Power Systems

**Objectives:**This subject deals with Economic operation of Power Systems, Hydrothermal scheduling and modeling of governors, turbines and generators. It emphasizes on single area and two area load frequency control and reactive power control.

**Module I: EconomicOperation of Power Systems [14 Periods]**

Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected.

Optimum generation allocation including the effect of transmission line losses, – Loss Coefficients, General transmission line loss formula.

**Module II: Hydrothermal Scheduling [10 Periods]**

Optimal scheduling of Hydrothermal System: Hydroelectric power plant models, scheduling problems-Short term hydrothermal scheduling problem.

**Module III: Load Frequency Control – I [14 Periods]**

Modeling of Governor, Turbine and Generators with corresponding block diagram representation and transfer function.

Single Area Load Frequency Control: Necessity of keeping frequency constant. Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case.

**Module IV: Load Frequency Control – II [12 Periods]**

Proportional plus Integral control of single area and its block diagram representation, steady state response – Load Frequency Control and Economic dispatch control.

Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control

**Module V: Reactive Power Control [10 Periods]**

Overview of Reactive Power control – Reactive Power compensation in transmission systems – advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt and Series Compensation (qualitative treatment).

**Text Books:**

1.Abhijit Chakrabarthi, Sunita Halder,**"Power system analysis operation and control"**, PHI Learning Pvt. Ltd., 3rd Edition.

2. I.J.Nagrath & D.P.Kothari, **"Modern Power System Analysis"**, Tata M Graw – Hill Publishing Company Ltd, 2nd Edition.

3. C.L.Wadhwa, **"Electrical Power Systems"**, Newage International, 3rd Edition

**References:**

1. T.J.E. Miller,"**Reactive power control in electric systems"**, John wiley & sons.
2. J.Duncan Glover and M.S.Sarma,"**Power System Analysis and Design"**, THOMPSON, 3rd Edition.
3. O.I.Elgerd, **"Electric Energy systems Theory"**, Tata Mc Graw-hill Publishing Company Ltd., Second edition.
4. Grainger and Stevenson, **"Power System Analysis"**, Tata McGraw Hill.
5. Hadi Saadat, **"Power System Analysis"**, TMH Edition.

**Outcomes:**After completion of the course, students will be able to:

1. Analyze the optimal scheduling of power plants
2. Analyze the steady state behavior of the power system for voltage and
3. AnalyzeFrequency fluctuations on power system operation
4. Describe reactive power control of a power system

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# Malla Reddy Engineering College (Autonomous)

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**Course Code:** **Credits: 3**

**B.Tech-VII Semester**

**Open elective-1**

**2015–16**

# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50451** **Credits: 2**

**B.Tech-VII Semester**

## MICROPROCESSORS AND MICROCONTROLLERS LAB

**The following programs are to be written for assembler and execute the same with 8086 and 8051 kits**

1. Programs for 16 bit arithmetic operations for 8086 ( using various addressing modes)
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Programming using arithmetic, logical and bit manipulation instructions of 8051.
7. Program and verify timer/counter in 8051.
8. Program and verify interrupt handling in 8051.
9. UART operation in 8051.
10. Communication between 8051 kit and PC.
11. Interfacing LCD to 8051.
12. Interfacing Matrix/keyboard to 8051..

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50234** **Credits: 2**

**B.Tech-VII Semester**

## ELECTRICAL MEASUREMENTS AND SIMULATION LAB

1. Calibration and Testing of single phase energy Meter
2. Calibration of dynamometer power factor meter
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter
4. Kelvin‘s double Bridge – Measurement of resistance – Determination of Tolerance.
5. Schering bridge & Anderson bridge.
6. Measurement of 3 phases reactive power with single-phase wattmeter.
7. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
8. Calibration LPF wattmeter – by Phantom testing
9. Measurement of 3 phase power with single watt meter and Two Watt Meter method
10. Resistance strain gauge – strain measurements and Calibration by Simulation

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**Course Code: 50235** **Credits: 3**

**B.Tech-VIII Semester**

## MINOR PROJECT

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50236 Credits: 3**

**B.Tech-VIII Semester**

## SPECIAL MACHINES

**(Professional Elective-6)**

**Prerequisites:** Electro Magnetic Fields &Basic concepts of Machines

**Module I:Induction generators [12 Periods]**

self excitation requirements, steady state analysis, voltage regulation, different methods of voltage control. Doubly fed induction machines: control via static converter, power flow, voltage/frequency control (generation mode), application to grid connected wind and mini/micro hydel systems

**ModuleII: Brushless DC Machines [10 Periods]**

construction operation, performance, control and applications. Micro Machines: principles of operation of various types. Sensors for control, e.g. Position sensor.

**ModuleIII: Linear Machines [12 Periods]**

Linear Induction Machines and Linear Synchronous Machines. Construction, operation, performance, control and applications. PMDC and PM Synchronous Machine, control and applications. Recent developments in electrical machines.

**Module IV: Stepper Motors [12 Periods]**

Various types, principle of operation, operating characteristics, applications. Servo Motors. Servo amplifier and control. Special types of permanent magnet motors for servo application. Switched Reluctance Motor: Construction, operating performance, control and applications

**Module V: Synchronous and Special Machines [14 Periods]**

Construction of synchronous machines-types - Induced emf - Voltage regulation; emf and mmf methods - Brushless alternators - Reluctance motor - Hysteresis motor – Axial flux machine-construction-working principle, Flux Reversal Machine-construction-working principle-Applications.

**Text Books:**

1. P.C Sen, "**Principles of Electrical Machines and Power Electronics"**, Wisley Edition, Second edition, 1997.
2. Gopal K Dubey, **"Fundamentals of Electrical Drives"** Narosa Publications, Second edition, 2008.

**Reference Books:**

1. Bimal K. Bose, **"Modern Power Electronics and AC Drives"**, Low Price Edition, First edition,2002.
2. R.K Rajput, **"Electrical Machines"**, Laxmi Publications Pvt Ltd, Fifth Edition,2005.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50237** **Credits: 3**

**B.Tech-VIII Semester**

**NEURAL NETWORKS AND FUZZY LOGIC**

**(Professional Elective-6)**

**Prerequisites:** Basic concepts of Science

**Objectives:** This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks. Also deals with Associative Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented. This subject is very important and useful for doing Project Work.

**ModuleI: Introduction to Neural Networks [14 periods]**

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate and Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch- Pitts Model, Historical Developments.

**Essentials of Artificial Neural Networks**

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron, Activation Function, ANN Architectures, Classification Taxonomy of ANN, Connectivity, Neural Dynamics(Activation and Synaptic), Learning Strategy(Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application.

**ModuleII: Single Layer Feed Forward Neural Networks [14 periods]**

Introduction, Perceptron Models, Discrete, Continuous and Multi- Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

**Multilayer Feed Forward Neural Networks**

Credit Assignment Problem, Generalized Delta Rule, Backpropagation(BP) Training algorithm.

**Module III: Associative Memories [14 periods]**

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory(Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory).

**Bidirectional Associative Memory (BAM)**

Architecture, BAM Training Algorithms: Storage and Recall Algorithm.

Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network.

**ModuleIV: Classical & Fuzzy Sets [10 periods]**

Introduction to classical sets- properties, Operations and relations; Fuzzy sets, Uncertainty, properties, fuzzy relations, cardinalities, membership functions.

**Module V: Fuzzy Logic System Components and Fuzzy logic applications [10 periods]**

Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

Fuzzy logic applications: Fuzzy logic control, Design and Analysis

**Text Books:**

1. Rajasekharan and Rai, **"Neural Network, Fuzzy Logic, Genetic Algorithms: synthesis and applications"**, PHI, 2010.
2. Satish Kumar, **"Neural networks"**, TMH, 2004.

**References:**

1. James A Freeman and Davis Skapura, **"Neural Networks"**, Pearson Education, 2002.
2. Simon Hakins, **"Neural Networks"**, Pearson Education.
3. C.Eliasmith and CH. Anderson, **"Neural Engineering"**, PHI.
4. Bart Kosko, **"Neural Networks and Fuzzy Logic System"**, PHI.
5.

**Outcomes:** Upon the completion of this course, the student will be able to:

1. Analyze the concepts of feed forward neural networks and learning of feedback neural networks.
2. Analyze Concept of fuzziness involved in various systems and fuzzy set theory.
3. Comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic.
4. Adequate knowledge of application of fuzzy logic control to real time systems.

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**Course Code: 50238** **Credits: 3**

**B.Tech-VIII Semester**

## UTILIZATION OF ELECTRICAL ENERGY
## (Professional Elective-6)

**Objective :**This subject deals with the fundamentals of illumination and its classification and the electric heating and welding. It gives the detailed study of all varieties of Electric drives and Electric Drive vehicles and their application to electrical traction systems.

**Module I: Electric Heating And Welding [12 periods]**
Advantages and methods of electric heating, resistance heating induction heating and dielectric heating. Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

**Module II: Illumination [12 periods]**
Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light. Discharge lamps, MV and SV lamps – comparison between LED lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

**Module III: Electric Traction – I [12 periods]**
System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostatic braking and regenerative braking.

**Module IV: Electric Traction-II [12 periods]**
Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves. Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation, adhesive weight and coefficient of adhesion.

**Module V: Electric Drive Vehicles [12 periods]**
Concept of Electric Drive vehicles and types – Battery Electric vehicles, hybrid vehicles, Plug-in hybrid Electric vehicles and All-Electric vehicles and benefits of Electric drive vehicles.

**Text Book:**


1. Utilisation of Electric Energy – by E. Openshaw Taylor, Orient Longman.
2. Partab, **"Art & Science of Utilization of electrical Energy"**, Dhanpat Rai & Sons.


**Reference Books:**


1. N.V.Suryanarayana , **"Utilization of Electrical Power including Electric drives and Electric traction"**, New Age International (P) Limited, Publishers, 1996.
2. C.L. Wadhwa ,**"Generation, Distribution and Utilization of electrical Energy",** New Age International (P) Limited, Publishers, 1997.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code:** **Credits: 2**

**B.Tech. – VIII Semester**
**Open Elective-2**

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## MALLA REDDY ENGINEERING COLLEGE(*Autonomous)*

**Course Code:**

**B.Tech. – VIII Semester**
**Open Elective-3**

**2015-16**

# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50239** **Credits: 10**

**B.Tech. – VIII Semester**

**MAJOR PROJECT**

**2015-16**

# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50240** **Credits: 2**

**B.Tech. – VIII Semester**

**COMPREHENSIVE VIVA VOCE**

**2015-16**

# Malla Reddy Engineering College (Autonomous)

**L T P**
**- 2-**

**Course Code: 50H15** **Credits: 1**

**B.Tech. – VIII Semester**
**ENTREPRENEURSHIP SKILLS**

**PRE-REQUISITE: Nil**
**Objective:** The aim of this course is to inspire students to become entrepreneurs so that they will emerge as job providers rather than job seekers.

**MODULE-I:** **[5Periods]**
Understanding Entrepreneurial Mindset-characteristics of an entrepreneur -The evolution of entrepreneurship-Approaches to entrepreneurship- The challenges of new venture start-ups-Critical factors for new venture development.-Twenty first centaury trends in entrepreneurship-Difference between entrepreneur and entrepreneurship.

**MODULE-II:** **[5 Periods]**
The individual entrepreneurial mind-set and Personality-The entrepreneurial journey-Women entrepreneurship: growth problems in India-Entrepreneurial motivations. Corporate Entrepreneurial Mindset-the nature of corporate entrepreneur- -sustaining corporate entrepreneurship.

**MODULE-III:** **[5 Periods]**
Launching Entrepreneurial Ventures-opportunities identification-entrepreneurial Imagination and Creativity-the nature of the creativity process-Innovation and entrepreneurship. Methods to initiate Ventures-Creating new ventures-Acquiring an Established entrepreneurial venture - Intellectual property protection-Patents, Copyrights-Trademarks and Trade secrets.

**Text Book:**

1. D F Kuratko and T V Rao “Entrepreneurship-A South-Asian Perspective “Cengage Learning, 2012. (For PPT, Case Solutions Faculty may visit : login.cengage.com)

**References:**

1. Vasant Desai “Small Scale industries and entrepreneurship” Himalaya publishing 2012.
2. Rajeev Roy “Entrepreneurship” 2e, Oxford, 2012.
3. B.Janakiramand M.Rizwana” Entrepreneurship Development :Text & Cases,Excel
4. Books,2011.
5. Stuart Read, Effectual Entrepreneurship, Routledge, 2013.
6. Robert Hisrich et al “Entrepreneurship” 6the, TMH, 2012.
7. Nandan H, Fundamentals of Entrepreneurship, PHI, 2013

**Outcome:** By the end of this course the students should be able to understand the mindset of the entrepreneurs, identify ventures for launching, develop an idea on the legal framework and also understand strategic perspectives in entrepreneurship- Legal challenges of Entrepreneurship.

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# Malla Reddy Engineering College (Autonomous)

**L T P**

**Course Code:50A04- 2-**

**B.Tech. – VIII Semester**

**FOREIGN LANGUAGE**

**Objectives:**

- To introduce a new language to the students.
- To impart basic knowledge of foreign language to the students to be useful for everyday and Professional Purposes

**Module –I:-**

- Basic introduction of the language and its importance.
- Introduction to the script, words and sentences.

**Module –II**

- Construction of simple sentences for everyday needs like,
  - Greeting
  - Apologies
  - Enquiry
  - Bargaining
  - Seeking directions etc.

**Module –III**

- Language for workplace
  - Participating in meetings.
  - Party etiquette
  - Dining etiquette
  - Self-introductions
  - Introducing others etc…

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50102** **Credits: 3**

**B.Tech.**
**SURVEYING**

**Prerequisites:** Nil

**Objectives:** Student will be able to learn and understand the various basic concept and principles used in surveying like Chain Surveying, Compass Surveying, Plane Table Surveying, Leveling and to calculate Horizontal Angle, Vertical Angle, Horizontal distance and Vertical distance to study the area of ground profile

**MODULE-I:**

**A: INTRODUCTION BASIC CONCEPTS [6 Periods]**

Introduction, Objectives, classifications and Principles of surveying, Scales, Shrinkage of maps, conventional symbols and code of signals, Surveying Accessories, phases of surveying.

**B: MEASUREMENT OF DISTANCES AND DIRECTIONS[6 Periods]** Linear distances: Approximate methods, Direct methods-chains – tapes, ranging- tape corrections, Indirect methods- optical methods –E.D.M methods.

Prismatic Compass:Bearings, Included Angles, Local Attraction, Magnetic Declination and Dip.

**MODULE-II:**

**A: LEVELING[6 Periods]** Basic definitions, types of levels and leveling staves,Temporary and permanent adjustments- method of leveling. Booking and determination of levels-HI method – Rise and fall method, effect of curvature if earth and refraction

**B: CONTOURING[6 Periods]** Characteristics and Uses of contours, Direct and indirect methods of contour surveying, interpolation and sketching of Contours.

**MODULE-III:**

**A: COMPUTATION OF AREAS AND VOLUMES [6 Periods]**

Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries, Planimeter. Volumes:Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

**B: THEODOLITE SURVEYING [6 Periods]**

Types of Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling when the base is accessible and in accessible

**MODULE – IV:**

**A: TRAVERSING [6 Periods]**

Methods of traversing traverse computation and adjustments , gale's traverse table, omitted measurements

**B: TACHEOMETRIC SURVEYING [6 Periods]**

Principles of tacheometry,Stadia and tangential methods of Tacheometry.

**MODULE-V**

**A: CURVES** **[6 Periods]**

Types of curves, design and setting out – simple and compound curves.

**B: INTRODUCTION TO MODERN SURVEYING METHODS** **[6 Periods]**

Total Station, Global positioning system and Geographic information system (GIS).

**TEXT BOOKS:**

1. B.C.PunmiaAshok Kumar Jain and Arun Kumar Jain "**Surveying**" (Vol – 1, 2 & 3), Laxmi Publications (P) ltd., 14th Edition, 2014.
2. Duggal S K, "**Surveying**" (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. 4th Edition, 2004.

**REFERENCES:**

1. Arror K R "**Surveying Vol 1, 2 & 3"**, Standard Book House, Delhi, 4th Edition, 2004
2. Chandra A M, "**Plane Surveying**", New age International Pvt. Ltd., Publishers, New Delhi, 4th Edition 2002.
3. Chandra A M, "**Higher Surveying**", New age International Pvt. Ltd., Publishers, New Delhi, 4th Edition2002.

**WEBREFERENCES:**

1. http://v5.books.elsevier.com/bookscat/samples/9780750669498/9780750669498.PDF
2. http://www.whycos.org/fck_editor/upload/File/Pacific
3. HYCOS/Surface_Waters/Levelling_and_surveying.pdf

**Outcomes:**

After completion of the course, students will be able to:

1. Pprepare Map and Plan for required site with suitable scale
2. Prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
3. Prepare LS & CS, contour maps and carryout surveying works related to land and civil engineering projects

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50123** **Credits: 3**

**B.Tech.**
**AIR POLLUTION AND CONTROL**

**Pre-requisites:** Environmental Studies

**Objectives:**This course provides the knowledge and understanding of the problems associated with air pollution indoor and outdoor. It also describes the regulations pertinent to air pollution especially due to industries making the student to design proper air pollution control devices

**MODULE-I: AIR POLLUTION [12 periods]**
Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources. Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc., ambient air quality standards.

**MODULE-II: THERMODYNAMICS AND KINETICS OF AIR-POLLUTION [12 periods]**
Applications in the removal of gases like SOx, NOx, CO, HC etc., air-fuel ratio, Computation and Control of products of combustion.
.

**MODULE-III: METEOROLOGICAL PARAMETERS AND WIND BEHAVIOUR**
**A: METEOROLOGY [6 periods]**
Properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams Lapse Rates, Pressure Systems
**B: PLUME DISPERSION[6 periods]**
Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

**MODULE-IV: CONTROL OF PARTICULATES [12 periods]** Control at Sources, Process Changes, Equipment modifications, Design and operation of control equipments – Settling Chambers, Centrifugal separators, Filters, Dry and Wet scrubbers, Electrostatic precipitators.

**MODULE-V: GENERAL METHODS OF CONTROL OF $NO_X$ AND $SO_X$ EMISSIONS [12 periods]**
In-plant Control Measures, process changes, dry and wet methods of removal and recycling. Air Quality Management – Monitoring of SPM, SO; NO and CO Emission Standards.

**Text Books:**


1. M.N.Rao and H.V.N.Rao, **"Air pollution"**, Tata Mc.Graw Hill Company, 26th reprint 2007.
2. R.K. Trivedy and P.K. Goel, **"An introduction to Air pollution"**, B.S. Publications, 2nd revised edition,2005.

**References:**


1. Wark and Warner, "**Air Pollution**" Harper & Row Publicatons, New York, 2nd edition, 1981.
2. S.C. Bhatia, "**Textbook of Air Pollution and Its Control",** Atlantic Publishers, 1st edition, 2007.
3. Karl B. Schnelle Jr.,Charles A. Brown, **" Air Pollution Control Technology Handbook"**, Published by CRC Press, 1st edition, 2002.


**Webreferences:**


1. http://www3.cec.org/islandora/en/item/2195-best-available-technology-air-pollution-control-en.pdf
2. http://www.eolss.net/sample-chapters/c09/e4-11-05.pdf
3. https://www.env.go.jp/earth/coop/coop/document/01-apctme/contents.html


**Outcomes:**

After completion of the course, students will be able to:

1. Understand in general terms, the major issues and challenges in Air pollution.
2. Design air pollution control equipment keeping in mind the stringent regulations laid by Pollution control board.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50124** **Credits: 3**

**B.Tech.**
**DISASTER MANAGEMENT**

**Prerequisites:** Nil

**Objectives:** This course provides the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences along with International Strategy for Disaster Reduction. It also has the potential to make the student design and implement disaster mitigation measures.

**MODULE I: CONCEPT OF HAZARDS AND DISASTERS**
**A: ENVIRONMENTAL HAZARDS & DISASTERS:[5 periods]**
Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology – Landscape, Ecosystem and Perception approach - Human ecology & its application in geographical researches.
**B: TYPES OF ENVIRONMENTAL HAZARDS & DISASTERS:[5 periods]**
Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards

**MODULE II: CLASSIFICATION OF HAZARDS**
**A: ENDOGENOUS HAZARDS[8 periods]**
Volcanoes- Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions – Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake, Landslides- causes and impacts, Avalanches -causes and impacts.
**B: EXOGENOUS HAZARDS[12 periods]**
Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms [causes , distribution human adjustment, perception & mitigation], Cumulative atmospheric hazards/ disasters : Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures [ Human adjustment, perception & mitigation], Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures, Extra Planetary Hazards/ Disasters-Man induced Hazards /Disasters- Physical hazards/ Disasters-Soil Erosion Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion, Chemical hazards/ disasters:-- Release of toxic chemicals, nuclear explosion- Sedimentation processes, Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters:- Population Explosion.

**MODULE III:APPROACHES AND MEASURESIN DISASTER MANAGEMENT**
**A: EMERGING APPROACHES[4 periods]**
Three Stages:1. Pre- disaster stage [preparedness]2. Emergency Stage3. Post Disaster stage- Rehabilitation

**B: NATURAL DISASTER REDUCTION & MANAGEMENT[4 periods]**

1] Provision of Immediate relief measures to disaster affected people 2] Prediction of Hazards & Disasters 3] Measures of adjustment to natural hazards

**MODULE IV: DISASTER MANAGEMENT[12 periods]**

An integrated approach for disaster preparedness, mitigation & awareness.

Mitigation- Institutions- discuss the work of following Institution.

a. Meteorological observatory
b. Seismological observatory
c. Volcanological institution
d. Hydrology Laboratory
e. Industrial Safety inspectorate
f. Institution of urban & regional planners
g. Chambers of Architects
h. Engineering Council
i. National Standards Committee

Integrated Planning- Contingency management Preparedness –

a] Education on disasters
b] Community involvement
c] The adjustment of Human Population to Natural hazards & disasters Role of Media Monitoring Management- Discuss the programme of disaster research & mitigation of disaster of following organizations.

a] International Council for Scientific Unions [ICSU]- Scientific committee on problems of the Environment [SCOPE], International Geosphere- Biosphere programme [IGBP]
b] World federation of Engineering Organizations [WFED]
c] National Academy of Sciences
d] World Meteorological organizations [WMO]
e] Geographical Information System [GIS]
f] International Association of Seismology & Physics of Earth's Interior [IASPEI]
g] Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNEP.

**MODULE V: DISASTER MANAGEMENT IN INDIA [10 periods]**

a. A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India

b. Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters -Role of Panchayats in Disaster mitigations

c. Environmental policies & programmes in India- Institutions & National Centers for Natural Disaster reduction, Environmental Legislations in India, Awareness, Conservation Movement, Education & training.

**Text Books:**


1. Jagbir singh,**"Disaster management–Future challenges and opportunities"**, I.K. International publishing house, 1st edition, 2005.
2. Coppala P Damon,**"Introduction to International Disaster management",** ABD publishers**,** 2007**.**


**References:**


1. R.B.Singh [Ed],**"Environmental Geography"**, Heritage Publishers, New Delhi, 1st edition, 1990.
2. Kates,B.I & White. G.F, **"The Environment as Hazards"**, oxford publishers, 5th edition, New York, 1978.
3. R.B. Singh [Ed],**"Disaster Management"**,Rawat Publication,New Delhi,1st edition, 2000.

**Weblinks:**

1. http://www.wcpt.org/disaster-management/what-is-disaster-management
2. http://study.com/academy/lesson/what-are-cyclones-types-causes-effects.html

**Outcomes:**

After completion of the course, students will be able to:

- Analyze, evaluate and manage the environmental, social, cultural, economical, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
- Assessthe different public health aspects at local and global levels as a result of disaster, and can well plan to mitigate them.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50150** **Credits: 3**

**B.Tech.**
**GREEN BUILDINGS**

**Prerequisites:** Nil

**Objectives:** The purpose of the course is provide an overview of emerging delivery systems for high performance green buildings and the basis on which their sustainability can be evaluated.

**MODULE – I** **[10 periods]**
Introduction to green buildings, green materials, sources of green materials, high-performance green buildings Impacts of building construction, operation, and disposal Methods and tools for building assessment, Green Globes.

**MODULE – II** **[10 periods]**
The green building process, Design and construction relationships, benefits of green building , quality, healthy and safe environments , Site and landscape strategies.

**MODULE – III**
Building energy system strategies, Water cycle strategies, Materials selection strategies, Indoor Environmental Quality [IEQ].

**MODULE – III**
Analysis and strategies, Construction, team responsibilities and controls, Building commissioning strategies.

**MODULE – IV** **[10 periods]**
Economic issues and analysis, Use of the Green Strategies cost estimating tool, Future directions in green, high performance building technologies.

**MODULE – V** **[10 periods]**
Carbon accounting Green Building Specification

**TEXT BOOKS:**

1. Green Building, Principles and Practices in Residential Construction, In 2012, Abe Kruger and Carl Seville publication.
2. Green Building Materials: A Guide to Product Selection and Specification, 3rd Edition, Ross Spiegel, Dru Meadows.October 2010

**REFERENCE BOOKS:**

1. Sustainable Construction: Green Building Design and Delivery Hardcover – Import, 16 Nov 2012 by Charles J. Kibert [Author].

**WEB REFERENCES:**

- http://www.ncrec.gov/Pdfs/bicar/GreenBuilding.pdf

**Outcomes:**

After completion of the course, students will be able to:

1. The benefits of green building – quality, healthy and safe environments that are cost effective – should be available to all.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50303** **Credits: 3**

**B.Tech.**
**ENGINEERING MECHANICS**

**Prerequisites:** Fundamental concepts of Physics

**Objective**: The objective of this subject is to provide the basic concepts of effect of systemof forces on rigid bodies, Geometrical Properties of Planes and Solids, problem solving in kinematics and kinetics using different methods.

**Module I: Introduction & Systems of Forces**

**A: Introduction:** **[Periods 2]**

Basic Concepts, Laws of Motion, Force-types, characteristics- Principle of transmissibility.

**B: Systems of Forces:** **[Periods 10]**

Classification**,** Coplanar Concurrent Forces – Components of force– Resultant- Triangle law of Forces-Polygon law of Forces- Parallelogram Law of Forces-Resolution and composition of Forces– Coplanar Non-Concurrent System of Forces, Resultant of Parallel system of Forces -Moment of Force and its Application – Varignon‟s theorem, Couples.

**Module II: Equilibrium of Systems of Forces:** **[Periods 10]** Free Body Diagrams, Types of Supports and their reactions, Internal and External Forces - Types of Equilibrium, Equations of Equilibrium, Conditions of Equilibrium, Equilibrium of bodies under Coplanar concurrent system of forces – Lami‟s Theorem, Converse of the Triangle law of forces, converse of the polygon law of forces.

**Module III: Centroid, Centre of Gravity, Area moment of Inertia and Mass Moment of Inertia**

**A.** **Centroid**:**[ Periods 3]**

Centroids of Lines and Areas (from basic principles) –simple figures– Centroid of Composite Figures- Centroid of L, T, I, Z and channel Sections.

**B. Centre of Gravity:** **[Periods 3]**

Centre of gravity of simple solids (from basic principles), centre of gravity of composite solids, Pappu‟s-Guldinus theorems.

**C.Area moment of Inertia:** **[Periods 3]**

Definition –Moment of inertia of plane areas, Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Moment of Inertia of L, T, I, and channel Sections.

**D.Mass Moment of Inertia:** **[Periods 3]**

Moment of Inertia of Simple solids, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

**Module IV:- Kinematics & Kinetics**

**A: Kinematics:** **[Periods 5]**

Rectilinear motion – Motion of Rigid Body under uniform and variable accelerations – motion under gravity-curvilinear motion -Projectiles-rotary motion, kinematics of general

plane motion.

**B: Kinetics:** **[Periods 5]**

Analysis as a Particle and Analysis as a Rigid Body in Translation – D'Alemberts Principle – Connected bodies- Kinetics of rotating bodies- Equations of Plane Motion– Rolling Bodies.

**Module V: Work, Power and Energy & Impulse-Momentum principle**

**A: Work, Power and Energy:** **[Periods 7]**

Work-energy equation for translation-connected bodies on horizontal and inclined planes-pulleys-Work done by a spring-Work-energy equation to rotary motion and general plane motion.

**B: Impulse-Momentum principle:** **[Periods 3]**

Linear impulse and momentum-connected bodies-pile & hammer.

**Text Books:**


1. S.Timoshenko, DH Young, JV Rao, SukumarPati, "**Engineering Mechanics"**, McGraw Hill Education Publisher,5th Edition(Special Indian Edition), 2013.
2. S.S. Bhavikatti, "**A Textbook of Engineering Mechanics"**, New Age International publishers, 1st Edition,2008.
3. D.S.Kumar Patil, "**Engineering Mechanics"**, SK Kataria & Sons Publishers, 2nd Edition, 2009.


**References Books:**


1. Fedinand . L. Singer, **"Engineering Mechanics"**, Harper & Row Publishers, 3rd Edition, 1975.
2. K.Vijaya Kumar Reddy, J. Suresh Kumar**,"Engineering Mechanics"**, B S Publications, 3rd Edition, 2013.
3. R.S. Khurmi, "**A Text Book of Engineering Mechanics"**, S.Chand Publications, 21st Edition, 2007.
4. K L Kumar, "**Engineering Mechanics"**, TataMcGrawHillEducation,4th Edition, 2011.


**Outcomes:**

After completion of this course, students will be able to:

1. Understand the basic concepts and types of forces.
2. Analyze centroid & centre of gravity, moment of inertia of different Planes and solids.
3. Apply D'Alembert"s principle, work-energy method and Impulse Momentum principle to solve dynamics problems.

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# MALLA REDDY ENGINEERING COLLEGE(Autonomous)

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**Course Code: 50305** **Credits: 3**

**B.Tech.**

## MECHANICS OF SOLIDS

**Pre-requisite:** Engineering Mechanics, Material Science

**Objective:** The objective of this subject is to provide the basic concepts of mechanical behavior of the different materials under various loads. To provide knowledge on shear force and bending moment diagrams of different beams.To provide knowledge about stress distribution across various cross sections of beams

**MODULE – I: Simple Stresses & Strains [15 Periods]**

**Simple Stresses & Strains :**Elasticityandplasticity–Typesof stresses&strains–Hooke'slaw – stress–strain diagramfor ductile and brittle material–Workingstress–Factorofsafety– Lateralstrain,Poisson'sratio &volumetricstrain–Elasticmodulii& therelationshipbetweenthem–Barsofvaryingsection–composite bars–Temperaturestresses . Strainenergy–Resilience–Gradual,sudden,impactandshockloadings.

**MODULE – II: Shear Forceand Bending Moment [12 Periods]**

**Shear ForceAnd Bending Moment:**Definitionofbeam–Typesofbeams–Concept ofshear forceandbendingmoment–S.F andB.Mdiagramsforcantilever,simplysupportedandoverhanging beamssubjectedto pointloads, U.D.L.,uniformly varying loadsand combinationofthese loads– Pointof contraflexure–RelationbetweenS.F.,B.Mandrateofloading atasectionofabeam.

**MODULE - III: BendingStresses&Shear Stresses [14 Periods]**

**A: BendingStresses:**Theoryof simplebending–Assumptions–Derivationofbending equation:M/I=f/y=E/R - Neutralaxis–Determinationbendingstresses– sectionmodulusofrectangularandcircular sections(SolidandHollow),I, T, Angle andChannelsections–Designofsimplebeamsections.

**B: Shear Stresses:**Derivation offormula–Shearstressdistributionacrossvariousbeamssections likerectangular,circular,triangular,I,T and angle sections.

**MODULE - IV: Deflection ofBeams&Torsion [17 Periods]**

**A: Deflection ofBeams:**Bendingintoacircular arc–slope, deflectionandradiusofcurvature– Differentialequationfortheelasticlineofabeam– DoubleintegrationandMacaulay'smethods– Determinationofslope and deflectionforcantileverandsimplysupportedbeamssubjectedto pointloads, -U.D.L - uniformly varying load.

**B: Torsion:** Theory of pure torsion - Assumptions – Derivation of torsion equation, polar section modulus – power transmitted by shafts – combined bending and torsion.

**MODULE - V: Analysis ofPin-JointedPlane Frames&Thin Cylinders[12 Periods]**

**A: Analysis ofPin-JointedPlane Frames:**Determination of forces in the members of varioustypesof cantilever&simply–supportedtrusses-by(i) Method ofJoints (ii) Method ofSections.

**B: Thin Cylinders:**Thin seamlesscylindricalshells–Derivationofformulafor longitudinal and circumferentialstresses– hoop, longitudinalandvolumetricstrains– changesindia,andvolume

ofthin cylinders.

**TEXTBOOKS:**

1. S.Timshenko **"StrengthofMaterials",** D. Van Nostrand Company, inc., 3rd edition, 1983.
2. Ramamrutham **"Strengthofmaterials"**Dhanpat Rai Publishing Company, 17th edition, 2013

**REFERENCE BOOKS:**

1. R..K. Rajput, **"StrengthofMaterials"**S. Chand company Pvt, 5th edition, 2014,
2. R K Bansal **"StrengthofMaterials"**Lakshmi – publication, 6th edition, 2015
3. Bhavikatti **"Strengthofmaterials"**Lakshmi publications, 4th edition, 2014.
4. Sadhu Sing, **"StrengthofMaterials"**, khanna bool publication, 1st edition, 2012
5. Popov **"StrengthofMaterials"**PRENTICE Hall Publisher.
6. D S Kumar, **"StrengthofMaterials,** S K Kataria & Sons, Reprint 2013, 2013.

**COURSE OUTCOME:**

After completion of this course, students will be able to:

1. The student shall be able to know various stress and strains.
2. Students shall know how to calculate shear force and bending moment
3. Students can utilize knowledge acquired in this subject in day –to -day life for designing of machine elements.

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# MALLA REDDY ENGINEERING COLLEGE(Autonomous)

**L TP**

**2 2 -**

**Course Code: 50307** **Credits: 3**

**B.Tech.**

## METALLURGY AND MATERIALS SCIENCE

**Pre-requisite:** Applied Chemistry

**Objective:** 1**.** The objective of this subject is to provide the basic concepts of composition of different materials

2. Provides the concepts of mechanical properties and applications.
3. Provides the concepts of Heat treatment and composite materials.

**MODULE – I: Crystallography&ConstitutionofAlloys [15 Periods]**

**A: Crystallography**: Review of crystal structure, space lattice, crystal planes and crystal directions, co-ordination number, number of atoms per unit cell, atomic packing factor, Numerical related to crystallography. Imperfection in metal crystals: Crystal imperfections and their classifications, point defects, line defects, edge & screw dislocations.

**B: ConstitutionofAlloys:**Necessityof alloying,typesofsolidsolutions,HumeRotherysrules, intermediate alloyphases,andelectron compounds.

**MODULE – II: EquilibriumofDiagrams [15 Periods]**

**EquilibriumofDiagrams:**Experimentalmethodsofconstruction ofequilibriumdiagrams,Isomorphous alloysystems,equilibriumcoolingandheatingof alloys,Leverrule,coringmiscibilitygaps,eutectic systems,congruentmeltingintermediatephases,peritecticreaction.Transformationsinthe solidstate– allotropy, eutectoid, peritectoidreactions,phaserule,relationshipbetweenequilibriumdiagramsand propertiesofalloys.Studyofimportantbinaryphase diagramsofCu-Ni-,Al-Cu,Bi-Cd,Cu-An,Cus-Sn andFe-Fe3C.

**MODULE - III: CastIrons&Steels [13 Periods]**

**A: CastIrons:**Structure and propertiesofWhiteCast iron,MalleableCastiron,greycastiron, Spheriodalgraphitecastiron,Alloycastirons.

**B: Steels:**Classificationof steels,structureandpropertiesofplain carbon steels,Lowalloysteels,Hadfieldmanganesesteels,toolanddiesteels.

**MODULE - IV: HeattreatmentofAlloys&Non-ferrousMetals andAlloys[13 Periods]**

**A: HeattreatmentofAlloys:**Effectof alloyingelementsonFe-Fe3C system,Annealing,normalizing, Hardening,TTTdiagrams,tempering,Hardenability, surface-hardeningmethods,Agehardeningtreatment, Cryogenictreatment ofalloys.

**B: Non-ferrousMetals andAlloys:**Structure and propertiesof copperanditsalloys,Aluminumand its alloys,Titaniumanditsalloys.

**MODULE - V: Ceramicmaterials&Compositematerials [12 Periods]**

**A: Ceramicmaterials:**Crystalline ceramics, glasses, cermaets, abrasivematerials,nano materials–definition, propertiesand applications.

**B:**

**Compositematerials:**Classificationofcomposites,variousmethodsofcomponentmanufacture

of composites,particle–reinforcedmaterials,fiberreinforcedmaterials,metalceramicmixtures,metal–matrixcompositesandC –Ccomposites.

**TEXTBOOKS:**

1. SidneyH.Avener **"IntroductiontoPhysicalMetallurgy",** Tata McGraw Hill publications, 2nd edition, 2013
2. DonaldR.Askeland **"Essential ofMaterialsscienceandengineering",**Thomson, 3rd edition, 2013
3. V.Rahghavan**"ElementsofMaterialscience",**PHI Publications, 6th edition, 2015.

**REFERENCE BOOKS:**

1. kodgire "**MaterialScience andMetallurgy"**, Everest Publishing House, 6th editions, 2011.
2. Agarwal "**ScienceofEngineeringMaterials"**, Tata McGrawHill, 8th edition, 2012.
3. Williamandcollister "**MaterialsScienceandEngineering",** 8th edition, 2010.
4. W.g.vinas&HLMancini "**An introductionto Materialscience"**, 4th edition, 2011
5. C.D.Yesudian&harrisSamuel "**Material science& Material"**, 3rd edition, 2014
6. R.A.FlinnandP K Trojan"**EngineeringMaterialsandTheirApplications",**JaicoBooks, 7th edition, 1999
7. R.K.Rajput "**EngineeringMaterialsandMetallurgy**" S.Chand Publisher, 3rd edition, 2012.
8. Pakirappa "**MaterialsScienceandEngineering",** 6th edition, 2013

**Outcomes:**

After completion of this course, students will be able to:

1. This subject provides knowledge of Crystallography.
2. Provides knowledge of composition of various materials
3. Provides knowledge of heat treatment of different alloys

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# MALLA REDDY ENGINEERING COLLEGE(Autonomous)

**L TP**

**2 2 -**

**Course Code: 50342 Credits: 3**

**B.Tech.**

## RENEWABLE ENERGY SOURCES

**Pre-requisite:** Thermal Engineering

**Objective:** The objective of this subject is to provide knowledge about different alternative energy sources.

**MODULE – I: Principles of Solar Radiation [14 Periods]**

**Principles of Solar Radiation** : Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

**MODULE – II: Solar Energy Collection&Solar Energy Storage and Applications [14 Periods]**

**A: Solar Energy Collection:** Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

**B: Solar Energy Storage and Applications:** Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

**MODULE - III: Wind Energy&Bio-Mass [14 Periods]**

**A: Wind Energy:** Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

**B: Bio-Mass:** Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

**MODULE - IV: Geothermal Energy&Ocean Energy [14 Periods]**

**A: Geothermal Energy:** Resources, types of wells, methods of harnessing the energy, potential in India.

**B: Ocean Energy:** OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

**MODULE - V: Direct Energy Conversion [15 Periods]**

**Direct Energy Conversion:** Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joul Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect,

magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

**TEXT BOOKS:**

1. Tiwari and Ghosal "**Renewable Energy Resources"**, Narosa Publishers
2. G.D. Rai "**Non-Conventional Energy Sources",** Khanna Publishers

**REFERENCE BOOKS:**

1. Twidell & Weir "**Renewable Energy Sources",** Taylor and Francis Group Publishers
2. Sukhatme **"Solar Energy",** TMH Publications
3. B.S Magal Frank Kreith & J.F Kreith "**Solar Power Engineering",** McGraw-Hill Publications
4. Frank Krieth & John F Kreider "**Principles of Solar Energy",** CRC Press Publications.
5. Ashok V Desai "**Non-Conventional Energy"**, Wiley Eastern Publishers
6. K Mittal "**Non-Conventional Energy Systems",**Wheeler Publishers
7. Ramesh & Kumar "**Renewable EnergyTechnologies",** Narosa Publications

**OUTCOMES:**

After completion of this course, students will be able to:

1. The students shall be able know different types of energy sources which are available naturally.

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# MALLA REDDY ENGINEERING COLLEGE(Autonomous)

**L TP**

**2 2 -**

**Course Code: 50344** **Credits: 3**

**B.Tech.**

## ROBOTICS

**Pre-requisite:** Kinematics and dynamics of machinery

**Objective:** 1.The objective of this subject is to provide knowledge of automation of Industries

2. To provide knowledge of design of robot arm, kinematics and dynamics, Trajectory planning of robot and its applications.

**MODULE – I: Introduction [15 Periods]**

**Introduction:** Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.

Components of the Industrial Robotics:-Degrees of freedom-End effectors: Mechanical gripper-magnetic-vacuum cup and other types of grippers-General consideration on gripper selection and design.

**MODULE – II: Motion Analysis&Manipulator Kinematics [13 Periods]**

**A: Motion Analysis:** Homogeneous transformations as applicable to rotation and translation – problems.

**B: Manipulator Kinematics:** Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

**MODULE - III: Dynamics [14 Periods]**

Differential transformation and manipulators, Jacobians – problems.

**Dynamics:** Lagrange – Euler and Newton – Euler formations – Problems.

Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

**MODULE - IV: Robot actuators and Feedback components [13 Periods]**

**Robot actuators and Feedback components:** Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors. Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors.

**MODULE - V: [12 Periods]**

**Robot Application in Manufacturing:** Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.

**TEXT BOOKS:**

1. Groover M P "**Industrial Robotics",** Pearson Edu.
2. Mittal R K & Nagrath I J "**Robotics and Control",** TMH.

**REFERENCE BOOKS:**

1. Fu K S "**Robotics",** McGraw Hill.
2. P. Coiffet and M. Chaironze "**An Introduction to Robot Technology"**, Kogam Page Ltd. 1983 London.
3. Richard D. Klafter "**Robotic Engineering",** Prentice Hall Publishers
4. Asada and Slow time "**Robot Analysis and Intelligence",** Wiley Inter-Science.
5. John J Craig "**Introduction to Robotics",** Pearson Edu.
6. Mark W. Spong and M. Vidyasagar "**Robot Dynamics & Control",** John Wiley & Sons (ASIA) Pvt Ltd.

**Outcomes:**

After completion of this course, students will be able to:

1. Understand what is Robot and how it works.
2. Understand kinematics & dynamics and robot applications in manufacturing.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50418** **Credits: 3**

**B.Tech.**

## DIGITAL DESIGN USING VERILOG HDL

**PREREQUISITES:**Digital Electronics.

**OBJECTIVE:**This course provides the knowledge to design Digital Circuits behavioral and RTL modeling using Verilog HDL. And also verifying these models and synthesizing RTL models to standard cell libraries and FPGAs. This course also provides different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided software tools.

**MODULE - I:Introduction to Verilog HDL** **[12 Periods]** Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Function Verification, System Tasks, Programming Language Interface, Module, Simulation and Synthesis Tools.
**Language Constructs and Conventions:** Introduction, Keywords, Identifiers, White space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data types, Scalars and Vectors, Parameters, Operators.

**MODULE - II:Gate Level & Data Flow Modeling[12 Periods] Gate Level Modeling:** Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances of Primitives, Design of Flip –Flops with Gate Primitives, Delays, Strengths and Construction Resolution, Net Types, Design of Basic Circuit.
**Modeling at Dataflow Level:** Introduction, Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vectors, Operators.

**MODULE - III:Behavioral Modeling[12 Periods]** Introduction, Operations and Assignments, Functional Bifurcation, 'Initial' Construct, 'Always' Construct, Assignments with Delays, 'Wait' Construct, Multiple Always Block, Designs at Behavioral Level, Blocking and Non- Blocking Assignments, The 'Case' Statement, Simulation Flow 'If' an 'If-Else' Constructs, 'Assign- De-Assign' Construct, 'Repeat' Construct, for Loop, 'The Disable' Construct, 'While Loop', Forever Loop, Parallel Blocks, 'Force- Release, Construct, Event.

**MODULE - IV:Switch Level Modeling[12 Periods] Switch Level Modeling:** Basic Transistor Switches, CMOS Switches, Bi Directional Gates, Time Delays With Switch Primitives, Instantiation with 'Strengths' and 'Delays', Strength Contention with Trireg Nets.
**System Tasks, Functions and Compiler Directives:** Parameters, Path Delays, Module Parameters, System Tasks and Functions, File Based Tasks and Functions, Computer Directives, Hierarchical Access, User Defined Primitives.

**MODULE - V:Sequential Circuit Description and Testing** **[12 Periods]**
**Sequential Circuit Description:** Sequential Models - Feedback Model, Capacitive Model,

Implicit Model, Basic Memory Components, Functional Register, Static Machine Coding, Sequential Synthesis

**Component Test and Verification:** Test Bench- Combinational Circuit Testing, Sequential Circuit Testing, Test Bench Techniques, Design Verification, Assertion Verification.

**TEXT BOOKS:**

1. T R. Padmanabhan, B Bala Tripura Sundari, **"Design Through Verilog HDL"**, Wiley, 2009. (Modules I, II, III, IV & V)
2. Zainalabdien Navabi, **"Verilog Digital System Design"**, TMH, 2nd Edition, 1999. (Modules I, II, III, IV & V)

**REFERENCE BOOKS:**

1. Stephen Brown, Zvonkoc Vranesic, **"Fundamentls of Digital Logic with Veilog Design"**, TMH, 2nd Edition, 2010.
2. Sunggu Lee, **"Advanced Digital Logic Design using Verilog, State Machine & Synthesis for FPGA"**, Cengage Learning, 2012.
3. Samir Palnitkar, **"Verilog HDL"**, Pearson Education, 2nd Edition, 2009.
4. Michel D. Ciletti, **"Advanced Digital Design with the Verilog HDL"**, PHI, 2009.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Understand Verilog hardware description languages (HDL) to design Digital Circuits in different Models.
2. Write Register Transfer Level (RTL) models of digital circuits.
3. Describe standard cell libraries and FPGAs.
4. Synthesize RTL models to standard cell libraries and FPGAs.
5. Test the Digital Circuits using Test bencehes.

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# Malla Reddy Engineering College (Autonomous)

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**3 - -**

**Course Code: 50448** **Credits: 3**

**B.Tech.**

**PRINCIPLES OF COMMUNICATION ENGINEERING**

**PREREQUISITES:** Basic Electronic Circuits.

**OBJECTIVE:** This course introduces the need for Modulation of various analog and digital modulation and demodulation techniques. And also introduces the concepts of Digital data transmission. It also discusses the basics of satellite and optical communication.

**MODULE - I: Fundamentals of Analog Communication [15 Periods]**Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth,
modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

**MODULE - II: Digital Communication [9 Periods]**Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration ofFSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, QuadratureAmplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costasloop, DPSK.

**MODULE - III: Digital Transmission [12 Periods]**
Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal toquantization noise rate, companding – analog and digital – percentage error, deltamodulation, adaptive delta modulation, differential pulse code modulation, pulsetransmission – Intersymbol interference, eye patterns.

**MODULE - IV:Spread Spectrum and Multiple Access Techniques [16 Periods]**Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK,
processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

**MODULE - V:Satellite and Optical Communication [8 Periods]**
Satellite Communication Systems-Keplers Law,LEO and GEO Orbits, footprint, Link model-Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

**TEXT BOOKS:**


1. Wayne Tomasi, **"Advanced Electronic Communication Systems"**, 6th Edition, PearsonEducation, 2007. (Modules IV & V)
2. Simon Haykin, **"Communication Systems"**, 4thEdition, John Wiley &Sons, 2001.(Modules I, II & III)

**REFERENCE BOOKS:**


1. H.Taub,D L Schilling,G Saha,**"Principles of Communication"**, 3rd Edition,2007.
2. B.P.Lathi,**"Modern Analog And Digital Communication systems"**, OxfordUniversity Press, 3rd Edition,2007.
3. Blake, **"Electronic Communication Systems"**, Thomson Delmar Publications,2002.
4. Martin S.Roden, **"Analog and Digital Communication System"**, PHI,3rd Edition, 2002.
5. B. Sklar, **"Digital Communication Fundamentals and Applications"**, Pearson Education, 2nd Edition, 2007.


**OUTCOMES:**

At the end of the course students are able to:

1. Know the concepts of various analog and digital modulation and demodulation techniques.
2. Know the concepts of Digital data transmission.
3. Understand the spread spectrum and multiple access techniques.
4. Understand Satellite and Optical communication.

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50449** **Credits: 3**

**B.Tech.**
**EMBEDDED SYSTEM DESIGN**

**PREREQUISITES:** Microprocessors and Microcontrollers.

**OBJECTIVE:** This course introduces the difference between Embedded Systems and General purpose systems. This course familiarizes to compare different approaches in optimizing General purpose processors. This course provides the design tradeoffs made by different models of embedded systems.

**Module - I: Introduction to Embedded Systems** **[08 Periods]**
Definition of Embedded System, Embedded Systems Vs General Computing Systems, History ofEmbedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems,Characteristics and Quality Attributes of Embedded Systems.

**Module - II: Typical Embedded System** **[14 Periods]**
Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs,Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

**Module - III: Embedded Firmware** **[12 Periods]**
Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

**Module - IV: RTOS Based Embedded System Design** **[12 Periods]**
Operating System Basics, Types of Operating Systems, Tasks, Process and Threads,Multiprocessing and Multitasking, Task Scheduling.

**Module - V: Task Communication** **[14 Periods]**
Shared Memory, Message Passing, Remote Procedure Call and Sockets,Task Synchronization: Task Communication/Synchronization Issues, Task SynchronizationTechniques, Device Drivers, How to Choose an RTOS.

**TEXT BOOKS:**

1. Shibu K. V, **"Introduction to Embedded Systems"**, McGraw Hill, 2013. (Modules I, II, III, IV & V)

**REFERENCE BOOKS:**

1. Raj Kamal, **"Embedded Systems"**, TMH.
2. Frank Vahid, Tony Givargis, John Wiley,**"Embedded System Design"**.
3. Lyla**, "Embedded Systems"**, Pearson, 2013.
4. David E. Simon, **"An Embedded Software Primer"**, Pearson Education.

**OUTCOMES:**

At the end of the course students are able to:

1. Understand the basics of an embedded system.
2. Design, implement and test an embedded system.
3. Understand the design tradeoffs made by different models of embedded systems.

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**Course Code: 50511 Credits: 3**

**B.Tech.**

## DATABASE MANAGEMENT SYSTEMS

**Prerequisite:** NIL

**Objective:**To understand the data management and its relations, transactions,concurrency control**.**

**Module I:Introduction to Databases and Database Management System**

**A:Basic Operations on Database System [04 Periods]**

Database system Applications - Advantages of DBMS over File System - Data Models – Instances and schema - View of Data - Database Languages -DDL-DML - Database Users and Administrator - Database System Structure.

**B: Database Design and ER diagrams [05 Periods]**

Attributes and Entity Sets – Relationships and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram-Weak Entity Sets - Extended E-R Features-Database Design with ER model - Database Design for Banking Enterprise

**Module II: Relational Model and SQL**

**A: Introduction to the Relational Model [04 Periods]**

Structure of RDBMS - Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data - Relational Algebra and Calculus.

**B: Introduction to SQL [05 Periods]**

Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations - Join operations - Sub queries and correlated queries, SQL functions , views ,Triggers, Embedded SQL.

**Module III: Dependencies**

**A: Functional Dependencies [09 Periods]**

Introduction , Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies- Schema Refinement in Database Design- Problems Caused by Redundancy – Decompositions – Problem Related to Decomposition –- Lossless Join Decomposition – Dependency Preserving Decomposition - FIRST, SECOND, THIRD Normal Forms – BCNF — Multivalued Dependencies – Fourth Normal Form.

**Module IV: Transactions and Recovery**

**A: Transaction concept [06 Periods]**

Transaction state- Implementation of atomicity and Durability-Concurrent executions – Serializability, Recoverability Lock Based Protocols, Timestamp Based Protocols, Validation

Based Protocols, Multiple Granularity, Dead Lock Handling – Failure Classification – Storage Structure

**B: Recovery and Atomicity** **[03 Periods]**

Log Based recovery – Recovery with concurrent transactions– Checkpoints .

**Module V: File Organization**

**A: Storage of files using Various Techniques** **[09 Periods]**

Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices, $B^+$ Tree Index files, B- tree index files– Static Hashing – Dynamic Hashing – Comparison of Indexing with Hashing.

**TextBooks:**

1. Database System Concepts, Silberschatz, Korth , Fifth Edition, McGraw hill ( 1,2,3 & 5 Units)
2. Database Management Systems, Raghuramakrishnan, Johannes Gehrke,TATA Mc
3. Graw Hill(1,2,3 & 5 Units)
4. Introduction to Database Systems, C.J.Date, Pearson Education ($4^{th}$ Unit)

**References:**

1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

**Outcomes:**

After completion of the course, students will be able to:

1. Understand the fundamental concepts of database management system. These concepts include aspects of database design, database languages, and database-system implementation.
2. Design and query databases, as well as understand the internals of databases.
3. Define the basic functions of DBMS & RDBMS.

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**Course Code: 50518** **Credits: 3**

**B.Tech.**

**SOFTWARE ENGINEERING**

**Prerequisite:** NIL

**Objective:**To understand the basic concepts, issues of software and Identify Life cycle phases In the requirements for a software in real time with test cases.

**Module I:Introduction to Software Engineering**

**A: Basics terms of Software Engineering:** **[04 Periods]**

Changing nature of Software, Software Myths. A Generic View of Process:-Software engineering-A layered technology, The Capability Maturity Model Integration (CMMI)

**B: Process Models:** **[05 Periods]**

The water fall model, Incremental process models, evolutionary process models, and the unified process.

**Module II: Requirements of Software Engineering**

**A: Software Requirements:** **[04 Periods]**

Functional and non functional requirements, User requirements, System requirements, Interface specification, The software requirements document.

**B: Requirements Engineering Process:** **[05 Periods]**

Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management

**Module III: Phases of Software Engineering**

**A: System Models:** **[03 Periods]**

Context models, behavior models, data models, object models, structured methods

**B: Design Engineering:** **[03 Periods]**

Design process and design quality, design concepts the design model

**C: Creating an architectural design:** **[03 Periods]**

Software architecture, data design, architectural styles and patterns, architectural design

**Module IV: Test Strategies**

**A: Methods of Testing:** **[09 Periods]**

A strategic approach to software testing, Black box and White box Testing, Validation Testing, System Testing. Product Metrics, Software Quality, Metrics for analysis model, Metrics for design model, Metrics for source code, Metrics for testing, Metrics for maintenance Metrics for process and products. Software measurement, Metrics for software quality

**Module V: Risk Management**

**A: Management of Risk Process: [09 Periods]**

Reactive vs proactive risk strategies, Software risks, Risk identification, Risk projection Risk refinement, RMMM, RMMM plan Quality Management, Quality concepts, Software quality assurance, Software reviews, Formal technical reviews, Statistical Software Quality Assurance, Software reliability, ISO 9000 Quality standards

**Text Book:**

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.

**References:**

1. Ian Summerville, Software engineering, Pearson education Asia, 6th edition, 2000.
2. Pankaj Jalote- An Integrated Approach to Software Engineering,Springer Verlag,
3. 1997.
4. James F Peters and Witold Pedryez, "Software Engineering – An Engineering
5. Approach",John Wiley and Sons, New Delhi, 2000.
6. Ali Behforooz and Frederick J Hudson, "Software Engineering \ Fundamentals", Oxford University Press, New Delhi, 1996.

**Outcomes:**

After completion of the course, students will be able to:

1. Choose the appropriate Process model for the given project
2. Document the Requirements
3. Develop Different system Models
4. Create simple Test cases
5. Develop the skills for Software measurement
6. Prepare RMMI plan

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50571** **Credits: 3**

**B.Tech.**
**COMPUTER GRAPHICS**

**Prerequisites:** NIL

**Objective**: To understand and use the application programming interface for the implementation of the graphics and its pipeline and modeling.

**Module I: Introduction of Graphics**

**A: Basics of Graphics [04 Periods]**

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphicsmonitorsandworkstationsandinputdevices.

**B: Outputprimitives [05 Periods]**

Pointsandlines,linedrawingalgorithms,mid-pointcircle andellipsealgorithms.Filledareaprimitives:Scan linepolygonfillalgorithm, boundary-fillandflood-fillalgorithms.

**Module II: Transforming and Viewing**

**A: 2-Dgeometricaltransforms [03 Periods]**

Translation,scaling,rotation,reflectionandshear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**B: 2-Dviewing [06 Periods]**

Theviewingpipeline,viewingcoordinatereferenceframe,window toview-portcoordinatetransformation,viewingfunctions,Cohen-Sutherlandand Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clippingalgorithm.

**Module III: 3D Objects**

**A: 3-D Object Representation [09 Periods]**

Polygon surfaces, quadric surfaces, spline representation,Hermitecurve,BeziercurveandB-Splinecurves,BezierandB- Splinesurfaces.Basic illuminationmodels,polygonrenderingmethods.

**Module IV:3D Transforming and Viewing**

**A: 3-DGeometrictransformations [04 Periods]**

Translation, rotation,scaling,reflectionand Shear transformations,composite transformations.

**B: 3-Dviewing [05 Periods]**

Viewingpipeline,viewingcoordinates,viewvolumeandgeneralprojectiontransformsandclipping.

**Module V: Surface detection Methods and Animation**

**A: Visiblesurfacedetectionmethods [05 Periods]**

Classification,back-facedetection,depth-buffer,scan-line, depth sorting,BSP-treemethods,areasub-divisionandoctreemethods.

**B: Computer Animation [04 Periods]**

Design of animation sequence, generalcomputer animationfunctions,rasteranimation,computeranimationlanguages,keyframe systems,motionspecifications

**TEXT BOOKS:**

1. 1"ComputerGraphics*Cversion*",DonaldHearnandM.PaulineBaker,PearsonEducatio.
2. "Computer Graphics Principles &practice", second edition in C, Foley,VanDam,FeinerandHughes, PearsonEducation.

**REFERENCES:**

1. "ComputerGraphics",secondEdition,DonaldHearnandM.PaulineBaker,
2. PHI/Pearson Education.
3. "ComputerGraphicsSecondedition",Zhigandxiang,RoyPlastock,Schaum's outlines,TataMc-Grawhilledition.

**Outcomes:**

After completion of the course, students will be able to:

1. Upon successful completion of the course, students will- gain a proficiency with OpenGL, a standard specification defining a cross-language, cross-platform API for writing applications that produce 2D and 3D computer graphics.
2. Learn the principles and commonly used paradigms and techniques of computer graphics.
3. Develop a facility with the relevant mathematics of computer graphics
4. Be able to write basic graphics application programs including animation
5. Understand the basic aspects of 2D image representations and transformation

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 50553** **Credits: 3**

**B.Tech.**
**BIG DATA**

**Prerequisite:** Mathematics and Analytics.

**Objective:** To understand the Big data refers to a collection of large and complex data sets those are difficult to process using traditional data processing applications.

**Module I:Introduction**

**A: Introduction** **[09 Periods]**

Small and big data, statistics and machine learning, statistical data mining; Providing structure to unstructured data – machine translation, auto coding, indexing, term extraction; Identification, de identification and re identification; ontologies and semantics; introspection;

**Module II: Data Integration**

**A: Data Integration** **[09 Periods]** Data integration and software interoperability; immutability and immortality; measurement; big data and healthcare. Big data techniques – data range, denominator, frequency distributions, mean and standard deviation, estimation-only analysis; big data analysis – clustering, classifying, recommending and modeling, data reduction, normalizing and adjusting data; special considerations – theory in search of data, data in search of a theory.

**Module III: Data Analysis**

**A: Data Analysis** **[09 Periods]** Over fitting, bigness bias, too much data, fixing data; stepwise approach to big data analysis – formulate a question, resource evaluation, reformulate a question, query output adequacy, data description and reduction, algorithm selection, results review; failure, legalities and societal issues.

**Module IV: Data Stream**

**A: Data Stream** **[09 Periods]**

Variable assessment - correlation coefficient, scatterplots; paired-variable assessment – CHAID based data mining; symmetrizing ranked data – scales of measurement, steam and leaf display, Box and Whiskers plot; many-variable assessment – principle component analysis; logistic regression; ordinary regression; regression coefficient; predictive contribution coefficient

**Module V: Data Modeling**

**A: Data Modeling** **[09 Periods]** R language – data modeling in R, importing data into R, Hadoop – different Hadoop modes, Hadoop Distributed File System (HDFS) – fundamentals and architecture, MapReduce –

fundamentals and architecture, Hadoop security, Hadoop programming in Java, Integrating R and Hadoop – RHIPE, RHadoop, data analytics with R and Hadoop, importing and exporting data from various databases, Hive, RBase, Apache Pig- large data analysis platform, automating data processing with Oozie.

**Text Books:**


1. Jules J Berman, Principles of Big Data: Preparing, Sharing, and Analyzing Complex Information, Morgan Kaufman-Elsevier, 2013.
2. Bruce Ratner , Statistical and Machine-Learning Data Mining: Techniques for Better Predictive Modeling and Analysis of Big Data, 2nd Edition, CRC Press, 2011.


**References:**


1. Michael Milton, Head First Data Analysis: A learner's guide to big numbers, statistics, and good decisions, O'Reilly Media Inc., 2009.
2. Big Data Now: 2012 Edition, O'reilly Media Inc., 2012.
3. Vignesh Prajapati , Big Data Analytics with R and Hadoop, Packt Publishing, 2013.


**Outcomes:**

After completion of the course, students will be able to:

1. Understand the concepts of big data
2. The student able to know the machine learning techniques
3. The student can formulate the solutions on big data for queries
4. Apply data mining concepts on big data
5. The student to know the concepts like Hadoop security and data modeling on R

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# Malla Reddy Engineering College (Autonomous)

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**Course Code:50578** **Credits: 3**

**B.Tech.**

## Cloud and Distributed Computing

**Prerequisite:** NIL

**Objective:** To understand the Cloud infrastructure and its applications.

**Module I:**

**A:Understanding Cloud Computing: [09 Periods]**

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.

**Module II:**A **Developing cloud services: [09 Periods]** Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing, Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

**Module III:A:Cloud computing for everyone: [10 Periods]**

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists - Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

**Module IV:**A: **Distributed Systems Computer architecture: [09 Periods]**

CICS, RISC, Multi-core Computer Networking: ISO/OSI Model Evolution of operating systems Introduction to distributed computing systems. DCS design goals, Transparencies, Fundamental issues. Distributed Coordination Temporal ordering of events, Lamport's logical clocks, Vector clocks; Ordering of messages, Physical clocks, Global state detection.

**Module V:A: Process synchronization: [09 Periods]**

Distributed mutual exclusion algorithms, Performance matrix. Inter-process communication Message passing communication, Remote procedure call, Transaction communication, Group communication; Broadcast atomic protocols.,Distributed file systems Deadlocks in distributed systems and Load scheduling and balancing techniques

**References:**

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
3. Distributed Systems Concepts and Design, G. Coulouris, J. Dollimore, Addison Wesley
4. Advanced Operating Systems, M. Singhal, N.G. Shivarathri, McGraw Hill

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# Malla Reddy Engineering College (Autonomous)

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**Course Code:50579** **Credits: 3**

**B.Tech.**

**INTERNET OF THINGS**

**Prerequisite:** Internet Basics and its operations.

**Objective:**To learn the basic issues, policy and challenges in the Internet and understand the components and the protocols in Internet with manage the resources in the Internet. Deploy the resources into business and the cloud and internet environment.

**Module I: INTRODUCTION**

**A: Basics of Internet and its terms** **[09 Periods]**

Definition – phases – Foundations – Policy– Challenges and Issues - identification - security – privacy. Components in internet of things**:** Control Units – Sensors – Communication modules – Power Sources – Communication Technologies – RFID – Bluetooth – Zigbee – Wifi – Rflinks – Mobile Internet – Wired Communication

**Module II: PROGRAMMING THE MICROCONTROLLER FOR IOT**

**A: IOT on sensor and cloud** **[06 Periods]** Basics of Sensors and actuators – examples and working principles of sensors and actuators – Cloud computing and IOT – Arduino/Equivalent Microcontroller platform – Setting up the board - Programming for IOT – Reading from Sensors

**B: Communication** **[03 Periods]**Connecting microcontroller with mobile devices – communication through blue tooth and USB – connection with the internet using wifi / Ethernet.

**Module III: RESOURCE MANAGEMENT IN THE INTERNET OF THINGS**

**A: IOT Resources and its objects** **[09 Periods]** Clustering - Software Agents - Data Synchronization - Clustering Principles in an Internet of Things Architecture - The Role of Context - Design Guidelines -Software Agents for Object – Data Synchronization- Types of Network Architectures - Fundamental Concepts of Agility and Autonomy-Enabling Autonomy and Agility by the Internet of Things-Technical Requirements for Satisfying the New Demands in Production - The Evolution from the RFID-based EPC Network to an Agent based Internet of Things- Agents for the Behaviour of Objects.

**Module IV: BUSINESS MODELS FOR THE INTERNET OF THINGS**

**A: IOT with Business models** **[09 Periods]** The Meaning of DiY in the Network Society- Sensor-actuator Technologies and Middleware as a Basis for a DiY Service Creation Framework - Device Integration - Middleware Technologies Needed for a DiY Internet of Things Semantic Interoperability as a Requirement for DiY Creation -

Ontology- Value Creation in the Internet of Things-Application of Ontology Engineering in the Internet of Things-Semantic Web-Ontology - The Internet of Things in Context of EURIDICE - Business Impact.

**Module V: FROM THE INTERNET OF THINGS TO THE WEB OF THINGS**

**A: Transition of IOT to WEB** **[09 Periods]** Resource-oriented Architecture and Best Practices- Designing REST ful Smart Things – Webenabling Constrained Devices - The Future Web of Things - Set up cloud environment – send data from microcontroller to cloud – Case studies – Open Source e-Health sensor platform – Be Close Elderly monitoring – Other recent projects.

**Reference Books:**


1. Charalampos Doukas , Building Internet of Things with the Arduino, Create space, April 2002
2. Dieter Uckelmann et.al, "Architecting the Internet of Things", Springer, 2011
3. Luigi Atzor et.al, "The Internet of Things: A survey, ", Journal on Networks, Elsevier Publications, October, 2010
4. http://postscapes.com/
5. http://www.theinternetofthings.eu/what-is-the-internet-of-things


**Outcomes:**

After completion of the course, students will be able to:

1. Identify the components of IOT.
2. Design a portable IOT using appropriate boards.
3. Program the sensors and controller as part of IOT.
4. Develop schemes for the applications of IOT in real time scenarios.
5. Establish the communication to the cloud through wifi/ Bluetooth.
6. Manage the internet resources.
7. Model the Internet of things to business.

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**Course Code: 50564** **Credits: 3**

**B.Tech.**

**ARTIFICIAL INTELLIGENCE**

**Perquisite:** NIL

**Objective:** This course contributes to the development of the following capabilities Enabling Knowledge, Problem Solving: and Critical Analysis.

**Module I:Introduction [09 Periods]**

AI problems, AI Technique, defining problem as a static space search production systems, problem characteristics, production system characteristics. Heuristic **Search B:Techniques:** Generate –and –test, hill climbing, Best –First Search, problem reduction, constraint satisfaction, means-ends analysis.

**Module II: Knowledge Representation [09 Periods]**Issues, predicate logic, resolution, representing, knowledge using rules, forward versus Backward reasoning, Matching, control knowledge, weak slot –and –filler structures, semantic nets, frames, strong slot –and –filler structures, conceptual dependency, scripts

**Module III: Reasoning Techniques [09 Periods]**

Nonmonotonic reasoning, Augmenting a problem solver, implementation of depth first search and Breadth first search, statistical reasoning, probability and Bayes theorem, certainty factors and rule - based systems, Bayesian Networks.

**Module IV: Game Playing [09 Periods]**Mini max search, alpha – beta cutoffs, planning system, Goal stack planning, hierarchical planning, understanding, understanding as constraint satisfaction, Waltz algorithm, natural language processing, syntactic processing, Augmented transition Networks, semantic analysis, case grammars.

**Module V: Learning [09 Periods]**Role learning, learning by taking advice, learning in problem solving, learning from examples, Winston's learning program, Decision trees, perception, vision, speech recognition, Navigation, manipulation, Robot architectures, Expert systems, shell, explanation, knowledge acquisition.

**Text Books:**


1. "Artificial Intelligence", 2nd Edition., E. Rich and K. Knight (TMH).
2. Neural Computing: Theory and practice – Waserman

**References:**

1. Artificial Intelligence Structures and Strategies complex problem Solving – George F. Lugar Pearson Education

**Outcomes:**

After completion of the course, students will be able to:

1. Describe the key components of the artificial intelligence (AI) field
1. Describe search strategies and solve problems by applying a suitable search method
2. Describe minimax search and alpha-beta pruning in game playing.
3. Describe and apply knowledge representation
4. Describe and list the key aspects of planning
5. Describe and apply probability theorem and Bayesian networks.
6. Describe the key aspects of intelligent agents

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# Malla Reddy Engineering College (Autonomous)

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**Course Code: 52501** **Credits: 3**

**B.Tech.**
**FUNDAMENTALS OF GEOLOGY**

**PRE-REQUISITE:** Under graduate Physics and Chemistry

**OBJECTIVES:** To introduce fundamentals of geology to the student emphasizing the importance of mineralogy,structural geology, stratigraphy of earth, course is also aimed at explanation of seismic zones, geology and mineral resources of India.

**MODULE-I:General Geology [12 Periods]**
Origin, age, internal structure and composition of Earth.
Landforms: Origin or mode of development, characteristic features and engineering considerations of landforms developed by Rivers, Wind, Glaciers, Oceans and Volcanoes.

**MODULE-II: [12 Periods]** **Mineralogy :Minerals:** Physical and chemical properties; Classification of minerals and properties of common silicate minerals (Quartz, Feldspar, Pyroxene, Amphibole, Garnet, Olivine, Mica), sulphides (Pyrite, Chalcopyrite, Galena, Sphalerite) and oxides (Haematite, Magnetite, Chromite, Pyrolusite, Psilomelane).
**Petrology Igneous rocks:** Magma and lava, extrusive and intrusive forms, textures; Classification and description of some common igneous rocks (Granite, Dolerite, gabbro, Basalt, Rhyolite, Pegmatite). Sedimentary rocks: Sedimentation processes; Classification and description of some common sedimentary rocks (Conglomerate, Sandstone, Shale, Limestone).
Metamorphic rocks: Processes of metamorphism, textures and structures of metamorphic rocks; Classification and description of some common metamorphic rocks (Slate, Phyllite, Schist, Gneiss, Quartzite, Marble).

**MODULE-III:**
**A:Structural Geology [6 Periods]**
Strike and Dip, Fundamental types, characteristic features and mechanics of folds.
**B: [6 Periods]**
Faults, joints (fractures) and unconformities. Foliation and Lineation.

**MODULE-IV:Stratigraphy [12 Periods]**
Principles of stratigraphy , geological time scale, stratigraphic succession, description and mineral wealth of archeans, proterozoic basins, Gondwanas, Deccan traps and Himalayas.

**MODULE-V:Groundwater [12 Periods]**
Hydrological cycle, vertical distribution of groundwater. Types of aquifers, geological formations as aquifers, springs, engineering considerations of groundwater and groundwater exploration.
Earthquakes: Mode of propagation of seismic energy, causes, effects and distribution of earthquakes, seismic Zoning Map of India.

**TEXT BOOKS:**

1. A Text Book of Geology by P.K. Mukherjee/ The world press Pvt Ltd.( 2005)
2. Engineering Geology by D.V Reddy,vikas publishing house pvt Ltd.,(2010),

**REFERENCE BOOKS:**

1. Fundamentals of Engineering Geology by F.G. Bell ; Butterworth Heinemann.(1983)
2. Principles of Physical Geology by Arthur Holmes/ Van Nostrand Reinhold (UK). (1978)
3. Engineering and General Geology, Singh, Parbin ; 6th ed.,Katson Publishing House, Ludhiana(1994)
4. Read, H.H. (1984), "Rutley's Elements of Mineralogy", 26th ed.,CBS, New Delhi
5. Text Book of Applied Engineering Geology, Maruthesh Reddy, New Age International Pvt. Ltd. Publishers, New Delhi(2008)
6. Principles of Petrology,-Tyrell GW, Chapman and Hall Publications, New edition
7. Billings, M.P. Structural Geology, Prentice Hall Ino., N. Jersey, USA, 1972.
8. Krishnan M.S. Geology of India and Burma, 3rd Edition, IBH Publishers, N. Delhi, 1984.

**OUTCOMES:**

After completion of the course, students will be able to:

1. Know about the geology of the ground in which miningactivity is proposed or in vogue.
2. Get acquainted with the geological conditions of the ground and helps students to plan better and safer mining activity.

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**Course Code: 52511** **Credits: 3**

**B.Tech.**

**MINE CONSTRUCTION ENGINEERING**

**PRE-REQUISITE:** Nil

**OBJECTIVES :**This course introduces site selection procedure, Shaft sinking methods, Mechanization, Loose groundshaft lining, Design of lining, Surface layouts, Open pit mines opening out trenches, Scheduling for mine constructions PERT/CPM.

**MODULE-I** **[12 Periods]**

Size of mine Environment and ecology, selection criteria for site of the openings geological investigation.

**MODULE-II** **[12 Periods]**

Underground mine shaft sinking methods through alluvium, soft and hard rock, Mechanization, consolidation of loose ground shaft lining , ground pressure, thickness of lining.

**MODULE-III**

**PART-A:** **[6 Periods]**

Design and procedure of laying the lining, construction of shaft collar heap stead.

**PART-B:** **[6 Periods]**

Design and construction of insets, shaft bottom, excavation for mechanized decking of cages, skip loading, pit bottom lay outs, installation of main haulages.

Main sump size, construction under ground substation, first aid room and office.

**MODULE-IV** **[12 Periods]**

Surface inclines, drivage through soft and hard rock, construction and lining of inclines, lateral and vertical and vertical pressures. Underground development, drivage of roads in stone and coal, mechanization support systems opening of faces.

Surface layouts pit top circuits and coal handling and coal preparation plant, railway sifting and weigh bridges, surface and underground coal bunkers winding house substation, lamp room. Pit head bath, crèche dispensary: office, work-shop, material handling stowing installations, bunker, water tanks, mixing chamber.

**MODULE-V** **[12 Periods]**

Open pit mines opening out trenches, haul roads, construction of benches. Assembling and transporting of draglines, shovels etc. Scheduling for mine constructions PERT/CPM.

**TEXT BOOKS:**


1. Design of Underground hard coal mine, J. Pazdziora, Elsevier.
2. Opencast Mining: MODULE Operations, V. V. Rzhevsky- Mir Publications.

**REFERENCE BOOKS:**

1. Working of Mineral Deposits—G. Popov, International Law & Taxation Publishers
2. Bokey ―Mining.

**OUTCOMES:**

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

1. Gain knowledge on selection of suitable site for mines, different sinking methods, procedureof laying lining, Scheduling for mine construction.

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**Course Code: 52528** **Credits: 3**

**B.Tech.**

## INTRODUCTION TO MINERAL PROCESSING

**PRE-REQUISITE:** Development of Mineral Deposits

**OBJECTIVES:** This course introduces Objectives of mineral processing, characteristics of minerals and coal, crushingmethods, separation methods, methods of concentration, fields of application and limitations.

**MODULE-I: Introduction** **[12 Periods]**
Scope, objectives and limitations of mineral processing, liberation and beneficiation characteristics ofminerals and coal.
**Comminution:**
Theory and practies of crushing and grinding; different types of crushing an grinding equipments – their applications and limitations.

**MODULE-II: Size Separation** **[12 Periods]** Laboratory size analysis and interpretation; settling of solids in fluids; industrial screens,
**Gravity Concentration Methods:**
Jigging, Heavy media separation, flowing film concentrators–theory, applicationsand limitations.

**MODULE-III:**
**PART-A:** **[6 Periods]**
Mechanicalclassifiers and hydro cyclones.
**PART-B: Froth Floatation** **[6 Periods]**
Physico-chemical principles, reagents, machines, floatation of sulphides, oxides and coal.

**MODULE-IV: Electrical Methods of Concentration** **[12 Periods]**
Principles, fields of applications and limitations.

**MODULE-V: Flow Sheets** **[12 Periods]** Simplified flow sheets for coal, zinc, iron, and manganese ores.
Magnetic methods of concentration Principles, Fields of Application and Limitation.

**TEXT BOOKS:**

1. Introduction to Mineral Processing – V. Malleswar Rao, Indian Academy of Geoscience
2. Mineral Processing – Barry AWills, Elsevier.

**REFERENCE BOOKS:**

1. Mineral Processing – S.K. Jain, CBS Publishers & Distributors

**OUTCOMES:**
After completion of the course, students will be able to:

1. Understand characteristics and processing of minerals and size separation after crushing,different methods of separation, flow charts for coal, zinc, iron and

manganese.

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**2 2 -**

**Course Code: 50H08** **Credits: 3**

**B.Tech**

## INTERPRETATION OF LITERATURE AND ANALYTICAL WRITING

**Objectives:**

- To determine how well the students can develop a compelling argument in writing for an academic audience.
- To involve them in critical thinking and persuasive writing exercises .
- To develop effective writing skills -to analyze , to evaluate the data and ideas for making sense
- Encourage students to learn strategies for becoming accurate readers and critical analysts.
- To help learners understand their abilities and strengths while laying a road map towards their career goals.

**Introduction** :

Developing Analytical writing skills through interpretation of literature and enabling the students to think critically. It assesses the ability to articulate and support complex ideas , construct and evaluate arguments and sustain a focused and coherent discussion. Interpreting the text triggers the students' analytical and critical thinking skills while expanding their outlook.

**Methodology :**

- Giving them exercises pertaining to translation of their thoughts into words.
- Giving them vocabulary exercises in different contexts.
- Find supporting evidence.
- Make an outline

**MODULE – I:**

**Introduction to interpretation skills**

- Interpretation in different settings
- Interpretation of Literature
- Understanding the main ideas in the text
- Vocabulary by Theme

From the short novel: Animal Farm: George Orwell

**MODULE – II:**

**Critical Reading**

- Introduction
- The Theme
- Figurative language and characterization
- Interpreter's role and ethics

- Interpretation of story.
- Interpretation of characters
- Animal characters
- Human characters
- Key events
- Things
- Places

**MODULE- III:**

**Critical Writing**

- Introduction
- The Theme
- Figurative language and characterization
- Interpreter's role and ethics
- Interpretation of story.
- Interpretation of characters
- Animal characters
- Human characters
- Key events
- Things
- Places

From the short novel : Animal Farm : George Orwell

**MODULE – IV :**

**Analytical writing:**

- Responding to various situations
- Entering into the role and responding
- Analyze an issue
- Analyze an Argument
- Verbal Reasoning
- Interpretive Reports.

From the short novel : Animal Farm : George Orwell

**MODULE –V:**

**Approaches to literary Criticism**

Formalist Criticism
Biographical Criticism
Historical Criticism
Gender Criticism
Psychological Criticism
Sociological Criticism
Reader-Response Criticism
Mythological Criticism
Deconstructionist Criticism

**Reference books**

1. GRE by CliffsTestPrep-7th edition

2. GRE Exam- A Comprehensive Program
3. MacMilan edition- Glossary of English Literary terms by – M H Abraham
4. Interpreting Literature- A Myth and a Reality- GD Barche

**Outcomes:**

After completion of the course, students will be able to:

1. Students are capable of critical thinking and analytical writing.
2. Learners would get real life experiences through interpretation of literature.
3. Students learn strategies for becoming accurate readers and critical analysts
4. Students are capable of logical thinking towards social, political, economical, legal and technological issues.
5. They are capable of drawing their career vision and mission independently.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50H09** **Credits: 3**

**B.Tech**

**BUSINESS COMMUNICATION**

**Objectives**

- To upgrade the learner's communication and presentation skills and to make the student'scompetent in communication at an advanced level.
- To groom the learners' personality
- To make the students self-confident individuals by mastering inter-personal skills, team management skills, and leadership skills

**Introduction**

Effective communication and interpersonal skills are crucial to increase employment opportunities and to compete successfully in the Global market. The real key to the effectiveness of professionals is their ability to put their domain knowledge into effective practice. Every employer today, looks for an extra edge in their employees. The rapid change in the corporate world asks for proper communication skills in almost all kinds of fields. This course is designed to enhance overall communication skills and soft skills amongst the learners including "How to win interviews". The course content for Business Communication and Soft Skills has been developed keeping in mind the standard of Indian students and the industry requirements.

**MODULE – I: Communication skills**

Types of communication-Oral, aural and written, reading-Word Power-Vocabulary-technical vocabulary, Rate of speech- pitch, tone-clarity of voice.

**MODULE – II: Conversation skills**

Informal and Formal conversation, Verbal and Non-verbal communication.Barriers to effective communication- Kinesics

**MODULE – III: Reading skills**

Types of reading–reading for facts, guessing meaning from context, strategies of reading-scanning, skimming, inferring meaning, critical reading,.

**MODULE – IV: Writing and compositionII**

Letter-writing-business letters-pro forma culture-format-style-effectiveness, promptness-Analysis of sample letters collected from industry-email, fax, Essay writing-nuances of essay writing, types of essays.

**MODULE – V: E- Correspondence**

e mail, etiquette, characteristics and types of social correspondence -advantages and disadvantage.

**REFERENCE BOOKS:**


1. Essentials of Business Communication, Rajendra Pal S KorlahaHi: Sultan Chand & Sons, New Delhi.
2. Basic Communication Skills for Technology, Andrew J.Rutherford: Pearson Education Asia, Patparganj, New Delhi-92.
3. Advanced Communication skills, V.Prasad, Atma Ram Publications, and New Delhi.
4. Raymond V.Lesikav; John D.Pettit Jr.; Business Communication: Theory & application, All India Traveler Bookseller, New Delhi-51
5. Business Cimmunication, RK Madhukar, Vikas Publishing House Pvt Ltd
6. K.R. Laxminarayana: English for Technical Communication-Vols.1 and 2.SCITECH Publications (India) Pvt.Ltd. T.Nagar, Chennai-6000 017
7. Edmond H. Weiss: Writing Remedies: Practical Exercises for Technical Writing, Universities Press, and Hyderabad.
8. Cliffs test Prep for GRE and TOFFEL: Computer Based, IDG Books. India (P) Ltd.New Delhi-002.
9. How to build a better vocabulary – Nurnberg Maxwell & Morris Rosenblum: Grand Central Publishing.
10. How to read better and faster: Norman Lewis, W.R. Goyal Publishers, New Delhi.


**Outcomes:**

After completion of the course, students will be able to:

1. Understand the importance of non-verbal signals in communication.
2. The learner will be confident to participate in business meetings
3. The learner will be encouraged in all- round development by focusing on soft skills
4. The learner will be aware of importance of soft skills in the real time situations.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50H10** **Credits: 3**

**B.Tech**

## WORLD LITERATURES

**Objectives:**

- The undergraduates need to know about the societies across the globe to understand their society better, and this course aims at bringing awareness about the societies across the globe.
- The students need to understand the cultures of different nations as they are going to enter into global careers and understanding these cultures of different nations will help them to cope with the culture shock.

**Module I**

**African literature:**

- **Wole Soyinka**
  Dedication (poem)
- **Chinua Achebe**
  A Mother in a Refugee Camp.(poem)
- **OyetSisto Ocean**
  In the Plantation (short story)
- **David Oyuke**
  Of days and nights of old (short story)

**Module-II**

**Australian Literature:**

- **Christopher Kelen**
  Dark between Empires (poem)
- **Henry Lawson**
  Sons of the South (poem)
- **Ryan O'Neill**
  It's a Tuesday Morning(short story)
- **Linda Heuring**
  Roommates (Short Story)

**Module III**

**American Literature:**

- **Robert Frost**
  A Late Walk (poem)
- **Maya Angelou**
  Caged Bird (poem)

- **Stephen Crane**

  A Dark Brown Dog(Short Story)

- **Mark Twain**

  A True Story –word to word as I heard It (Short Story)

**Module IV**

**European Literature:**

- **Herta Muller**

  "Gri" (fragment) (poem)

- **William Wordsworth**

  I Wandered Lonely As A Cloud (Poem)

- **Grazia Deledda**

  The Portrait of a Country woman (Short Story)

- **Guy de Maupassant**

  Miss Harriet(Short Story)

**Module V**

**Asian Literature:**

- **Gieve Patel**
  How Do You Withstand, Body(poem)
- **Amrita Pritam**
  Empty Space(poem)
- **Mahasweta Devi**
  Our Non-veg Cow (short story)
- **Basil Fernando**
  Albert the Murderer (short story)

**References:**


**Africa's Best Stories:** An Anthology of Africa's Best Short Stories :ChimamandaNgoziAdichie, Wole Soyinka, E. C. OsonduStoryAfrica.inc, America, 2010

**Our Non-veg Cow and Other Stories**MahāśvetāDebī, Seagull Books, 1998

**Original Short Stories of Maupassant** by Guy de Maupassant The Floating Press, 2014

**Unspeakable Women: Selected Short Stories Written by Italian Women during Fascism** by Robin Pickering-Iazzi :The Feminist Press, New York, 1993

www.naosite.lb.nagasaki-u.ac.jp/dspace/bitstream/.../keieikeizai70_03_08.pdf

www.poetryfoundation.org

www.bigbridge.org/BB17/**poetry**/indian**poetry**anthology/**Gieve_Patel**.html

www.romanianstudies.org/.../**poetry**-in-translation

www.poemhunter.com

www.americanliterature.com

www.fishpublishing.com/**short-stories**-to-read-online.php

www.theliftedbrow.com/post/.../an-australian-**short-story**-by-**ryan-oneill**

www.universeof**poetry**.org/australia.shtml

www.famouspoetsandpoems.com › Poets › Wole Soyinka

www.goodreads.com

www.africanwriterstrust.org

**Outcomes**:

After completion of the course, students will be able to:

1. Learnt about the literatures of different nations and continents.
2. Aware of the cultures of different societies of the world and are ready to cope with the culture shock they might experience when set to work in global environment.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B23** **Credits: 3**

**B.Tech**

**ADVANCED OPTIMIZATION TECHNIQUES**

**PRE-REQUISITE:** Nil

**Course Objectives:**

- To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems
- To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology
- To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

**MODULE- I: Single Variable Non-Linear Unconstrained Optimition**: **[8Periods]**
One dimensionalOptimization Methods:- Uni-modal function, elimination method, Fibonacci method, golden section method, interpolation methods- quadratic method.

**MODULE – II: Multi Variable Non-Linear Unconstrained Optimization[8 Periods]**
Direct search method –Univariant Method – pattern search methods – Powell's – Hook – Jeeves search

**MODULE – III:**
**Geometric Programming:**
Polynomials – arithmetic – geometric inequality – unconstrainedG.P
**Dynamic Programming: [8 Periods]** Multistage decision process, principles of optimality, examples,conversion of final problem to an initial value problem, application of dynamic programming, production inventory.

**MODULE IV: Linear Programming**: **[8Periods]**
Formulation – Sensivity analysis. Change in the constraints, costcoefficients, coefficients of the constraints, addition and deletion of variable, constraints. Simulation – Introduction

**MODULE V: Stochastic Programming [8 Periods]** Basic concepts of probability theory, random variables –distributions – mean, variance, Correlation, co variance, joint probability distribution – stochastic linear, dynamic programming.

**Text Books:**

1. S.S Rao,**Optimization theory & Applications,** New Age International, 4th Edition, 2009.

2. Kasan & Kumar, **Introductory to operation research**, Springar, 2004.
3. M.C Joshi,**Optimization Techniques theory and practice**, K.M Moudgalya Narosa Publications, 2004.

**Reference Books:**

1. H.A. Taha,**Operation Research**, TMH, 8th Edition, 2011
2. R.L Rardin,**Optimization in operations research**, 3rd Edition, 1998.
3. Benugundu & Chandraputla, **Optimization Techniques** , Person Asia, 2nd Edition, 2014.

**Outcomes:**

After completion of the course, students will be able to:

1. Develop models of optimization
2. Developed the skills to consider real-world problems and determine whether or not linear programming is an appropriate modeling framework.
3. Solve the models for their optimal solutions; interpret the models' solutions and infer solutions to the real-world problems

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B24** **Credits: 3**

**B.Tech**

## MATHEMATICAL MODELLING

**PRE-REQUISITE:** Nil

**Course Objectives:**

- The objective of the course is to introduce mathematical modeling of engineering problems.
- The construction and analysis of mathematical models inspired by real life problems.
- The course will present several modelling techniques and the means to analyze the resulting systems.

**MODULE-I: Mathematical Modeling& Types of models using Ordinary Differential Equations of First Order:**
Mathematical Model, types of Mathematical models, Procedure of modeling, Linear Growth and Decay Models, Non-Linear Growth and Decay Models, Mathematical Modeling in DynamicsThrough Ordinary Differential Equations of First Order,

**MODULE-II: Mathematical Modeling through Systems of Ordinary Differential Equations of the First Order**
Mathematical Modeling in Population Dynamics, Mathematical Modelling in Economics Through Systems of Ordinary Differential Equations of First Order, Mathematical Models in Medicine, Mathematical Modelling in Dynamics Through Systems of OrdinaryDifferential Equations of First Order.

**MODUELE-III: Mathematical Modelling Through Ordinary Differential Equations of Second Order**
Mathematical Modeling of Planetary Motions, Mathematical Modeling of CircularMotion and Motion of Statellites, Mathematical Modeling Through Linear Differential Equations of Second Order, Miscellaneous Mathematical Models Through Ordinary Differential Equations of the Second Order.

**MODULE-IV: Mathematical Modeling Through Difference Equations**
The Need for Mathematical Modelling Through Difference Equations: Some Simple Models, Basic Theory of Linear Difference Equations with Constant Coefficients, Mathematical Modelling Through Difference Equations in Economics and Finance, Mathematical Modelling Through Difference Equations in Population Dynamics and Genetics, Mathematical ModellingThrough Difference Equations in Probability Theory, Related problems.

**MODULE-V: Mathematical Modeling through Partial Differential Equations**
Motivation of Partial Differential Equations Models,: First Method of Getting PDE Models, Momentum Balance Equations: The Second Method of Obtaining Partial Differential Equation Models, Variational Principles: Third Method of Obtaining Partial Differential

Equation Models, Probability Generating Function, Fourth Method of Obtaining Partial Differential Equation Models, Model for Traffic Flow on a Highway, Nature of Partial Differential Equations, Initial and Boundary Conditions.

**TEXT BOOKS:**


1. Edward A. Bender.. An Introduction to Mathematical Modeling.
2. A. C. Fowler.. Mathematical Models in Applied Sciences, Cambridge University Press.
3. J. N. Kapoor. Mathematical Modeling, Wiley eastern limited. S.M. Ross .Simulation, India Elsevier Publication. A.M.Law and W.D.Kelton.. Simulation Modeling and Analysis, T.M.H. Edition.
4. Numerical Solutions of Differential Equations by M.K.Jain, Wiley Eastern Ltd.


**Outcomes:**

After completion of the course, students will be able to:

1. Know different types of models (static, discrete time, continuous time, stochastic) with case studies chosen from population dynamics and other fields can to be determined.
2. Identify the most important processes governing the problem (theoretical assumptions)
3. Identify the state variables (quantities studied)
4. Identify the basic principles that govern the state variables (physical laws, interactions)
5. Express mathematically these principles in terms of state variables (choice of formalism)

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B25** **Credits: 3**

**B.Tech**

**DIFFERENTIAL EQUATIONS AND DYNAMICAL SYSTEMS**

**PRE-REQUISITE:** Nil

**Objectives:**

- **The aim** *is to give a self contained introduction to the field of or- dinary* **differential equations** *with emphasis on the* **dynamical systems** *point.*
- **The objective of this course** *is to provide the student with an understanding of the ... Apply techniques of Nonlinear* **ODE and Dynamical Systems** *to*

**MODULE-I:**Linear Systems, Uncoupled Linear Systems, Diagonalization, Exponentials of Operators, Linear Systems.

**MODULE-II:** Complex Eigen values, Multiple Eigen values, Jordan Forms , Stability Theory Non homogeneous Linear Systems.

**MODULE-III:** The Stable Manifold Stability and Liapunov Functions, Saddles, Nodes, Foci and Centers Global Theory, Dynamical Systems and Global Existence Theorems .

**MODULE-IV:** Limit Sets and Attractors, The Stable Manifold Theorem for Periodic, Global Phase Portraits and Separatrix Configurations Structural Stability, Higher Codimension Bifurcations at Nonhyperbolic Equilibrium Points.

**MODULE-V:** Hopf Bifurcations and Bifurcations of Limit Cycles from a Multiple Focus Bifurcation, Finite Co -dimension Bifurcations in the Class of Bounded Quadratic Systems.

**Text Books:**

1. Lawrence Perko, Springer Publications , Third edition ,Texts in Applied Mathematics.
2. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers, 10th Edition, Reprint 2010.

**Reference Books:**

1. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
2. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

**Outcomes:**

After completion of the course, students will be able to:

1. Develops the theory of dynamical systems systematically.
2. Learn to analyze non-linear systems described for diagonalization.

3. Know the basic concepts and methods from the theory of differential equations and dynamical systems.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B20** **Credits: 3**

**B.Tech**

**ADVANCED PHYSICS FOR ENGINEERS**

**Prerequisites:** Applied Physics – I & II

**Objectives:**Theobjective of this course is to make the students familiar with the recent advanced concepts in physics.

**Module-I: Special Theory of Relativity** **[9 Periods]**

Introduction, Concept of theory of relativity, Frames of reference-Inertial, non-inertial; Galilean transformation equations, Michelson-Morley experiment, Einstein theory of relativity, Lorentz transformation of space and time, Length contraction, Time dilation, Variation of mass with velocity, Relativistic relation between energy and momentum.

**Module-II:Holography** **[9 Periods]**

Introduction, Basic principle, Construction and Reconstruction of Hologram, Properties of Hologram, Types of Holograms, Applications- Holographic Interferometry, Acoustic Holography, Holographic Microscopy.

**Module –III: Thin films Synthesis and Characterization**

**A - Synthesis** **[7 Periods]**

Introduction, Deposition techniques-Pulsed Laser Deposition (PLD), Spray Pyrolysis; Nucleation and growth of the thin films, properties (Mechanical, Electrical, Magnetic and Optical).

**B –Characterization** **[7 Periods]**

X-Ray Photoelectron Spectroscopy (XPS), Energy Dispersive X-Ray Analysis (EDAX), Principles and applications of X-Ray Diffraction, Electron Diffraction, Atomic Force Microscopy.

**Module-IV: Photonic Crystals** **[9 Periods]**

Important features of photonic crystals, Presence of photonic band gap, anomalous group velocity dispersion, Microcavity, effects in Photonic Crystals, fabrication of photonic Crystals, Dielectric mirrors and interference filters, PBC based LEDs, Photonic crystal fibers (PCFs), Photonic crystal sensing.

**Module-V:Solar cell Physics** **[9 Periods]**

Single, poly and amorphous silicon, GaAs, CdS, $Cu_2S$, CdTe; Origin of photovoltaic effect, Homo and hetero junction, working principle of solar cell, Evaluation ofSolar cell parameters, I-V, C-V and C-fcharacteristics.

**Text / Reference Books:**


1. R K Gaur and SL Gupta, "**Engineering Physics**" Dhanpat Rai Publications, 8th revised Edition, 2006.
2. B K Pandey and S Chaturvedi, "**Engineering Physics**" Cengage Learning India, Revised Edition, 2014.
3. R F Bun shah, "**Hand Book of Technologies for Films and coating"**, Noyes publishers, 1st Edition, 1996
4. B E A Saleh and A C Tech, *"***Fundamentals of Photonics***"*, John Wiley and Sons, New York, 1st Edition, 1993.
5. K L Chopra and S R Das, "**Thin film Solar Cells"**, Plenum press, 1st Edition 1983.
6. K Vijaya Kumar, T Sreekanth and S Chandralingam, "**Engineering Physics**" S Chand and Co 1st Edition, 2008.


**Outcomes:**

After completion of the course, student will be able to:

1. Understand the concepts of special theory of relativity.
2. Analyze the basic concepts of Holography and applications.
3. How to synthesize and different methods of characterization of thin films.
4. Develop basic knowledge on the photonic crystals and solar physics and their applications

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B21** **Credits: 3**

**B.Tech**

## NANO MATERIALS: SYNTHESIS AND CHARACTERIZATION

**Prerequisites:** Applied Physics – I & II

**Objectives:** The objective is to provide different methods of synthesis and characterizationof nano material.

**Module-I: Physical Methods [9 periods]**
Bottom-up approachand Top-down approach, Inert gas condensation, Arc Discharge, lasers ablation, laser pyrolysis, ball milling, molecular beam epitaxial, and electro deposition.

**Module-II: Chemical methods [8 periods]**
Nanocrystals by chemical reduction, photochemical synthesis, electrochemical synthesis,Nano crystals of semiconductors.

**Module-III: Thermal Methods**
**A-**Thermal Methods: **[8 periods]**
Thermolysisroute – spray pyrolysis and solved metal atom dispersion, sol-gel method solvothermal and hydrothermal routes, solution combustion synthesis, CVD method.

**B: Surface Characterization [8 periods]**
Scanning electron microscopy (SEM), Transmission electron microscopy (TEM). Photo luminescence Spectroscopy.

**Module-IV: Compositional and structural Characterization techniques [9 periods]**
X-Ray Photoelectron Spectroscopy (XPS), Energy Dispersive X-Ray Analysis(EDAX),Principles and applications of X-Ray Diffraction, Electron Diffraction, and Electron probe microanalysis(EPMA).

**Module – V: Properties and Applications of Nanomaterials[8 periods]** Carbon Nano Tube (CNT) – Single-Wall Carbon Nano Tube (SWCNT), Multi-wall carbon Nano tube (MWCNT), Activated carbon, Fullerene, Graphene, Quantum wire and Quantum dots

**Text Books:**


1. C N R Rao, A Muller and A K Cheetham "**The chemistry of Nanomaterials: Synthesis, Properties and Appliocations**" John Wiley, First Edition, 2004
2. Hari Singh Nalwa, "**Nanostructured Materials and Nanotechnology**", Academic Press, First Edition, 2002.


**Reference Books:**


1. Charles P Poole Jr "**Introduction to Nanotechnology**", John Willey & Sons, 1st Edition, 2003

**2.** C Dupas, P Houdy, M Lahmani, Nanoscience: "**Nanotechnologies andNanophysics**", Springer-Verlag Berlin Heidelberg, 1st Edition, 2007
3. Guozhong Cao, "**Nanostructures and Nanomaterials, synthesis, properties and applications***",* Imperial College Press, 1st Edition, 2004.
4. T Pradeep, "**NANO: The Essentials: Understanding Nanoscience andNanotechnology***".* Tata McGraw-HillPublishing Company Limited, Revised Edition, 2007
5. Z L Wang, "**Characterization of Nanophase Materials***"* Wiley-VCH, 1st Edition, 2000.
6. K Vijaya Kumar, T Sreekanth and S Chandralingam, "**Engineering Physics**" S Chand and Co 1st Edition, 2008.

**Outcomes:**

After completion of the course, student will be able to:

1. Understand different methods of synthesis of nano materials
2. Analyze the differences in the different methods of synthesis
3. Learn different characterization techniques of nano materials.
4. Develop basic knowledge on the properties and the applications few nano materials.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B22** **Credits: 3**

**B.Tech**

## NDT AND VACUUM TECHNOLOGY

**Prerequisites:** Applied Physics – I & II

**Objectives:** The objective is to provide a basic level of understanding on Non destructive testing and Vacuum technology.

**Module – I: Introduction to Non destructive testing [6 periods]**

Introduction, Objectives of Non destructive testing, Types of defects – Cracking, Spalling, Staining, Construction and Design defects, Honey combing, Dusting, Blistering, Rain damage.

**Module – II: Methods of Non destructive Testing [10 Periods]**

Liquid penetration method, Dye penetration method, Radiographic testing, Ultrasonic Inspection method, Pulse Echo method, Magnetic particle testing, Eddy current Testing.

**Module – III: Introduction to Vacuum Technology and Flow meters**

**A: Introduction to Vacuum Technology [9 Periods]**

Definition of vacuum, Degrees of vacuum and their ranges; Review of Kinetic theory of gases; Definitions of particle flux, mono layer formation time, pressure; Elementary gas transport phenomena; Knudsen's and Reynolds' numbers; Throughput, mass flow and conductance;

**B: Flow meters [8 Periods]**

Molar flow, Mass flow and throughput; Rota meters and chokes; differential pressure techniques;

**Module – IV: Pressure gauges [8 Periods]**

Classification, Direct and indirect gauges, Indirect gauges – Pirani gauge, Thermocouple gauge, Ionization gauge, hot cathode gauge, Penning gauge

**Module – V: Vacuum Pumps [9 Periods]**

Introduction, Pumping speed, Rotary vane pump, Turbo molecular pump, Diffusion pumps

**Text Books:**

1. B K Pandey, S Chaturvedi, **"Engineering Physics"**, Cengage learning, 1st Edition, 2014
2. John. F. O'Hanlon, **"A User's guide to Vacuum technology",** Wiley, 3rd Edition, 2003

**Reference Books:**

1. M R Srinivasan, **"Physics for Engineers"**, New Age international, 1st reprint, 2007
2. R K Gaur and S L Gupta, "**Engineering Physics**", Dhanpat rai, Reprint, 2006
3. Krishna Seshan, "**Hand Book of Thin film deposition**", Noyes, 2nd Edition, 2002

**Outcomes:**

After completion of the course, student will be able to:

1. Understand the concepts of NDT and Vacuum technology.
2. Learn different methods of NDT.
3. Develop basic knowledge of flow meters, pressure gauges and vacuum pumps working and their applications.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**22 -**

**Course Code: 50B17** **Credits: 3**

**B.Tech**

## CHEMISTRY OF ENGINEERING MATERIALS

**Objectives:** The objective is to make the students know about the Concept of phase rule and alloys, phase diagrams of different systems. To give knowledge to the students regarding lubricants, abrasives, glass, ceramics, re-fractories and adhesives. To make the students to understand the basic concepts of chemistry to develop futuristic materials for high-tech applications in the area of engineering.

**Module-I:Phase Rule and alloys periods:10**

Phase Rule: Definition of terms : Phase, component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead-Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.
Alloys-fabrication of alloys-Ferrous alloys-Non ferrous alloys-industrial applications.

**Module-II:Lubricants, Abrasives and Adhesives periods:9**

Introduction to Lubricants-Mechanism of Lubrication-classification of Lubricants-properties of lubricants-viscosity, flash and fire points, cloud and pour points,decomposition stability,saponification number. Abrasives-natural and artificial abrasives-grinding wheels-abrasive paper and cloth. Adhesives-classification -action of adhesives- factors influencing adhesive action development of adhesive strength.

**Module-III: Cement and Concrete periods:8**

Introduction-Classification of cement-natural –chemical composition of cement-portland cement-chemical reactions involved in setting and hardening of cement-additives for cement--mortars and concretes-pre stressed concrete-post tensioning-curing-overall scenario of cement industry-Reinforced concrete constructions-testing and decaying of cement-prevention of cement decay

**Module-IV: Glass, Ceramics and Refractories periods:9**

Structure of glass-properties-Manufacturing of glass-Types of glasses-uses Ceramics-clays-methods for fabrication of ceramic ware plasticity of clays. Ceramic products-glazes. Porcelain and vitreous enamels. Requisites of a good refractory-classification, properties and applications of refractories.

**Module-V: Polymers and Composite materials periods:9**

Structure and properties of polymers-rubber –classification-vulcanization of rubber – preparation properties and application of Buna-S and Buna-N and Thiokol rubber. Biogradable polymers- poly vinyl acetate and poly lactic acid. Liquid crystals-Introduction-

structure of liquid crystal forming compounds-classification-chemical properties-importance and applications.

**Reference books:**


1. Engineering Chemistry by R.P. Mani,K.N. Mishra, B. Rama Devi /CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).
3. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006).
4. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
5. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi(2006) Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.


**Outcomes:**

After completion of the course, student will be able to:

1. Practice professional chemical - polymer engineering knowledge for sustainable development.
2. Apply core concepts in Materials Science to solve engineering problems.

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# Malla Reddy Engineering College (Autonomous)

**L T P**
**2 2 -**

**Course Code: 50B18** **Credits: 3**

**B.Tech**

**NANO CHEMISTRY**

**Objectives:**The objective is to make the learners know about the scope of nanoscale materials and their versatile properties. To give knowledge of various instrumental techniques to the analysis the nonmaterials. To make aware of the learners of different applications of nano materials.

**MODULE-I: NANO CHEMISTRY-I** **Periods: 8**

Introduction -synthesis of nanostructure materials, Bottom-up approach and Top-down approach With examples-sol-gel method,-solvothermal and hydrothermal routes, Chemical Vapor Deposition and precipitation methods.

**MODULE-II:NANO CHEMISTRY-II** **Periods: 9**

Properties of nano materials-Electronic properties, Energy bands and gaps in semiconductors, Fermi surfaces-Optical properties- Fluorescence/luminescence, photoluminescence/fluorescence, electroluminescence, quantum dot. Magnetic properties-mechanical properties-thermal properties.

**MODULE-III:INSTRUMENTAL ANALYSIS** **Periods: 9**

Characterization techniques: Principles involved in Scanning Electron Microscopy(SEM),Electron Dispersion Spectroscopy(EDS), Transmission Electron Microscopy (TEM), Dynamic Light Scattering (DLS) and Atomic Force Microscopy(AFM) - Illustrative examples.

**MODULE-IV:CARBON NANO TUBES AND APPLICATIONPeriods: 10**

Carbon Nano structures ,types and preparation of Carbon Nano tubes.Nano structured crystals. Graphene, Carbonnano-fibers- Carbon clusters and Fullerenes- optical and telecommunication applications. Organic Nano Solar cells and its applications.

**MODULE-V:ENVIRONMENTAL NANOTECHNOLOGYPeriods: 9**

Implications of Nanotechnology & Research needs-Nanostructured Catalysts TiO2 Nanoparticles for Water purification- Nanomembranes in Drinking water treatment and desalination, Nanomembranes in Sea desalination-Nanoparticles for treatment of Chlorinated Organic Contaminants.

**Reference Books:**


1. Nano Technology and Nano Electronics – Materials, devices and measurement Techniques by WR Fahrner – Springer
2. Nano Technology – science, innovation and opportunity by Lynn E Foster;Prentice Hall - Pearsoneducation.
3. Hand book of Nano structured materials; Vol I to V Bio Ethics Readings and cases by Branch.
4. Nano: The Essentials – Understanding Nano Scinece and Nanotechnology – by T.Pradeep; Tata Mc.Graw Hill.

5. Nanotechnology: Principles and Practices – Sulabha K. Kulkarni – Capital Publishing Company
6. Specimen preparation for Transmission Electron microscopy by John & Bravmno et al, published by MRS.

**Outcomes:**

After completion of the course, student will be able to:

1. The students become aware about the synthesis of nanostructure materials.
2. The learners get knowledge about the properties of nano materials and instrumental analysis. The students can come to know about the Carbon nano tubes, Carbon nano-fibers, nano structured Catalysts and Organic nano solar cells.

**2015-16**

# Malla Reddy Engineering College (Autonomous)

**L T P**
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**Course Code: 50B19** **Credits: 3**

**B.Tech**

## PHOTOCHEMISTRY AND SPECTROSCOPY

**Objectives:** The objective is to make the students know about the impact of light on matter and the implications of it also to bring awareness to explore the consequences of light matter interaction. To give knowledge to the learners regarding the structural identification /determination utilizing the different regions of electromagnetic spect

**Module -I**: **Photochemistry IPeriods:9**

Introduction to photochemistry, atomic orbitals,molecular orbitals,thermal and photochemical reactions. Fundamental principles of photochemistry-Interaction of light with chemical substances.absortion spectra, electronic transition. spin multiplicity, singlet and triplet of excited state.

**Module –II**: **Photochemistry IIPeriods:8**

Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Quantum efficiency – determination.Jablonski Diagram-Fluorescence and Phosphorescence. Chemiluminescence and Thermoluminescence with examples. Photosensitization.

**Module –III: Absorption Spectroscopy Periods:10**

Introduction and importance; Principles and instrumentation; Interferences - Chemical & Spectral methods; Applications of Atomic Absorption Spectroscopy for qualitative and quantitative analysis. UV-Visible spectroscopy: principles, applications for qualitative and quantitative analysis.

**Module –IV: IR SpectroscopyPeriods:9**

Introduction- basic principles, Instrumentation. Identification of some functional groups applications for qualitative and quantitative analysis.

**Module –V: Nuclear magnetic resonance spectroscopy Periods:9**

Introduction-basic principles, Instrumentation – chemical shift- Spin-Spin splitting- coupling constant, Spin decoupling, shift reagents. Structure determination, applications of proton NMR spectroscopy.

**REFERENCES BOOKS:**


1. **"Vogel's Text Book of Quantitative Chemical Analysis",** by J. Mendham, R.C. Denney, J.D. Barnes and M.J.K. Thomas, Pearson Education Pvt. Ltd., New Delhi, (**6thedition**).
2. **Organic Spectroscopy by R.C.Banwell**
3. **Organic Spectroscopy by William kemp.**
4. **R.O. Kan .Organic Photochemistry.New York :Mc Graw-Hill.**

5. **N.J Turro ,modern molecular photochemistry,**The Benjamin/comings publishing
6. **Applications of Absorption Spectroscopy of Organic Compounds"** by John R.Dyer, Prentice-Hall of India Pvt. Ltd., New Delhi (**1969**).
7. **Instrumental Methods of Analysis by** Hobart H.Willard and D.U.Merritt & J.R.J.A.Dean, C.E.S Pu8blishers and distributors.
8. **Instrumental methods of chemical analysis** – By Scoog and West .

**Outcomes:**

After completion of the course, student will be able to:

1. Aware about the light matter interaction. The learners get knowledge about the usage of UV-Visible, IR & NMR radiations for structural identification of matter.